ENVIRONMENTAL PERCEPTION OF CLIMATE CHANGE PERCEIVED BY UNIVERSITY STUDENTS ON VEGETARIAN BEHAVIORAL INTENTION

Shyang-Chyuan Fang

Abstract. *With the rapid rise of global temperatures and the negative effects of greenhouse gases, the destruction of natural resources and unlimited development is rapidly endangering the earth. The inefficient use of meat-based agriculture has contributed to contemporary concerns about environmental degradation and global food inequality. Therefore, the research attempted to establish a theoretical model to predict and explain the effects of health risks on vegetarian behavioral intention under climate change. The research investigated the vegetarian behavioral intention of university students derived from environmental perception, environmental attitude, and health risk perception. The research involved six universities in Taiwan, with a total of about 25,000 university students. A total of 1050 replies was received from the questionnaires, were carefully revised and all items were confirmed. Structural equation modeling (SEM) and Smart PLS data analysis were used to find the applicability of the survey data and the research model. The results showed that personality traits, health risk perception, and environmental value positively influence vegetarian behavioral intention. The model facilitated the evaluation of the variables related to environmental responsibility and behavior and could serve as a reference for policy decision-makers and teaching staff in terms of sustainable education.*

Keywords: *climate change, environmental attitude, environmental perception, healthy risk perception, vegetarian diet.*

Introduction

The definition of climate change refers to the long-term climate change of a particular place, region, or the entire Earth. The planet has faced significant changes from the past to the present (Rehan & Nehdi, 2005). In recent years, many parts of the world have been confronted with disasters caused by climate anomalies. In July 2018, for example, California's Carr Fire and Athens in Greece faced serious casualties from forest wildfires. The Carr fire was only one event in a devastating wildfire year in the United States, as well as the rest of the world, including a large fire in the Arctic Circle. These fires took place during a global Heatwave with record heat and unexpected droughts. The World Health Organization has warned that humanity is facing the extreme threat of three major problems: climate change, food crises, and global influenza outbreaks. With the rapid rise of global temperatures and the negative effects of greenhouse gases, mankind is being reminded that the destruction of natural resources and unlimited development is rapidly endangering the earth. As a result, human beings need to pay more attention to efforts to mitigate climate change and to change their own habits. Climate change has become a sensitive international and political issue. Since 1988, the United Nations General Assembly has discussed these issues. According to evidence from the Intergovernmental Panel on Climate Change (IPCC), the global climate has changed significantly due to human activity (IPCC, 2008). Without addressing the effects of climate change, the global cost of natural resources and human health will soon be much higher than the cost of prevention (Bazerman, 2006). Scientific evidence suggests that, although the results of climate change are unpredictable, it is true that the occurrence of bad weather, pests, diseases, and wildfires is increasing, while the frequency of rainfall is uneven and the severity of drought is increasing (IPCC, 2001). Therefore, climate change has become an important public risk that represents the dangers of science and technology, while involving psychological and social factors such as personal experience, effects and emotions, intentions, trust, values, and worldviews (Slovic, 2000).

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Perceptions of Climate Change

In 2015, the Fifth Assessment Report of the United Nations Intergovernmental Panel on Climate Change (IPCC) (AR5) was presented. It states that the rate of global sea-level rise since the mid-19th century has been greater than the average speed of the previous two millennia (*high confidence*). Between 1901 and 2010, the global average sea level rose by .19 m (.17 to .21 m) (IPCC AR5 SPM1, 2015). The serious impact of climate change is obvious. For example, Typhoon Morakot caused severe damage to property and personal casualties in southern Taiwan in 2009, with cumulative rainfall reaching 2,854 mm within three days, causing a direct loss estimated at more than 3 billion US dollars (.7% GDP) (Li, et al., 2014). The perceived risk perception of this background provides further insight into sustainable education in Taiwan in the short, medium, and long term, in response to a risk management strategy consistent with the perception of climate change risk. This includes education for energy conservation and carbon reduction, as well as adjustments and modifications to industrial processes (Djordjevic & Cotton, 2011). The research focused on climate change and the selection of appropriate potential variables to construct an environmental behavioral model based on the theory of planned behavior (Ajzen, 1991). To understand the university students' perceptions on climate change risk, it has been explained that the decision makers in sustainable development should develop appropriate strategies and that educators should plan strong courses to raise students' risk perceptions and knowledge of climate change (Cutter, 1993; Kempton, Boster, & Hartley, 1995). Local catastrophic events may affect the perception of individual risk levels. Bord, Fisher, and O'Connor (1998) suggested that before the severe drought of 1988, the majority of Americans had a limited understanding of climate change issues, but that later the level of perception increased markedly (Dunlap, 1998).

Environmental Behavior Models

The mental model can be used to evaluate risk perception behavior and scientific information and knowledge, as well as to influence its relative importance in the formation of environmental protection concepts. Many environmental educators and environmental psychologists have found positive correlations between environmental education and environmental intentions (Ajzen, 1985; Hadjichambis, Paraskeva-Hadjichambi, Ioannou, Georgiou, & Manoli, 2015; Hines, Hungerford & Tomera, 1987). In the study of psychological models, the causal relationship of climate change has cognitive fallacy; climate change has a default psychological model, which may lead to misunderstanding and illogical inferences (Bostrom, Morgan, Fischhoff, & Read, 1994; Read, Bostrom, Morgan, Fischhoff, & Smuts, 1994). Stedman (2004) proposed a linear regression model to study the risk-sensing variables associated with climate change in the climate change policy formulation process in Canada. The results indicated that demographic characteristics have no significant impact on risk perception but could affect the belief in risk perception. Ohe and Ikeda (2005) established a causal model of climate change to explore the differences between attitudes and mitigation strategies. The result indicated that when an individual considers a public role, in turn, when he/she disagrees, a consensus can be reached from the perspective of individual roles. In Europe, the population has shown greater environmental attitudes and perceptions of the importance of environmental protection, however it is difficult to translate attitudes and perceptions into concrete actions and environmentally-friendly behavior (TNS Opinion & Social, 2008). The Gallup Earth Health Project, which used data from 24 countries, provided similar results (Dunlap, George, & Alec, 1993). Gifford (2008) said there are significant differences between perceptions of climate change and support for environmentally-responsible behavior, and that individuals can perceive the existence of climate change and take more aggressive measures to avoid causing significant physical damage (Zaalberg, Midden, Meijnders, & McCalley, 2009). Therefore, the implementation of environmental education for university students could introduce the concept of environmental sustainability to solve current and future environmental problems (Miller, 2016).

The TPB mode (Ajzen & Driver, 1992; Ajzen, 1985), suggests that individual behavior can be affected by the intent of the action, which depends mainly on attitudes and social norms. Tonglet, Phillips, and Read (2004) used TPB theory to discuss tenants' attitudes and opinions on recycling, and the results showed that attitude is an important factor influencing the behavior of recycling. do Valle, Rebelo, Reis, and Menezes (2008) stated that TPB can be used to predict whether individuals will participate in recycling activities. Klöckner and Blöbaum (2010) set up a comprehensive action-determination model that combined the four theories of TPB, NAM, theoretical concepts of habits (Verplanken & Wood, 2006), and Ipsative Behavioral Theory (Frey, 1989) to investigate the norms process, habitual process, intentional process, and the effect of the situation. Adam and Shauki (2014) revised the

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TPB model using ethical standards to express the positive impact of Malaysian investors' attitudes, social norms, and ethics on the intention and behavior of engaging in socially responsible investments. Yazdanpanah and Forouzani (2015) used the TPB model (including ethics and self-identification) to explore the intentions of Iranian students to buy organic food, and explained that ethics and self-identification are important predictors of behavior intention. Chen (2016) expanded the TPB model to interpret the moral obligation of Taiwan's carbon emission intentions, and found that the moral duty to increase the power of interpretation is different from that of the original TPB model. Masud, Al-Amin, Junsheng, Ahmed, Yahaya, Akhtar, and Banna (2016) applied the TPB model to study the causal relationship of climate change adaptation to behavior intention in Malaysia, and pointed out that attitude, social norm, and perceptual behavior control have a positive and significant influence on behavioral intention.

The VBN (value belief norm) theory (Stern, 2000) presents a complex causal model to support the values, beliefs, and norms of pro-environmental behavior. The model includes Norm–Activation Model revisions (NAM) by Schwartz (1973, 1977) and integrated ecological value theory (Li, Fahima, Beiles, Korol, & Nevo, 1999). Wang, Dou, and Zhou (2008) regarded value as a higher form of attitude (accessible in the form of proximity to behavior), rather than as a form of subjective external perception. Schultz, Gouveia, Cameron, Tankha, Schmuck, and Franĕk (2005) reduced the environmental value of four multi-country studies by leveraging 56 measurable environmental value variables. de Groot and Steg (2008) stated that environmental values can be divided into self-interest and self-centered values, altruism, and the ecological value of the property. Crompton (2008) believed that the value of environmental change can be divided into social and ecological altruism. It mainly refers to sustainable life as strengthening the interests of future generations of ideas, while the latter points out the natural protection of endangered animals living with environmental damage. Milfont (2012) suggested that environmental values enhance individual environmental concerns and reliance on the land, thus creating a code of conduct for the environment. The review of multiple literature also indicated many environmental values and showed that environmental values are multidimensional structures.

Liobikienė and Juknys (2016) combined the VBN theory and the target framework to comprehensively analyze the influence of self-transcendence and self-improvement values on environmental behavior, and concluded that individuals with stronger self-transcendence values will follow the objective norms and the behavior pattern of a more favorable environment.

Research Focus

The research attempted to establish a theoretical model to predict and explain the vegetarian behavior and pro-environmental behavior of undergraduates, including the experience of test models. The empirical research could provide an explanation of the diversity of the methodology for understanding such behavior. The data collected through structured questionnaires can be carefully calculated and tested.

However, individuals' dietary choices often change over time (Beardsworth & Keil, 1991b). The most common reasons why individuals choose vegetarian diets are animal welfare, health, environmental degradation, and global food inequality (Draper, Wheeler, & Lewis, 1990; Neale, Tilston, Gregson, & Stagg, 1993; Richardson, Macfie, & Shepherd, 1994; Richardson, Shepherd, & Elliman, 1993; Silverstone, 1993). The inefficient use of meat-based agriculture has contributed to contemporary concerns about environmental degradation and global food inequality. Therefore, the research attempted to establish a theoretical model to predict and explain the effects of health risks on vegetarian behavioral intention under climate change.

Research Methodology

General Research Background

In June 2012, the Taiwan Ministry of Education, in conjunction with the development of liberal arts (general education), provided subsidies for sustainable development covering eight major areas, including disasters, water resources, infrastructure, energy supply and industrial sectors, coastal areas, agriculture and biodiversity, sanitation, and land use. Liberal Arts (general) education courses are categorized as a discipline that includes science and humanities. Climate change planning is an appropriate course for environmental education and risk perception, through which the students' risk perception is stimulated and the key role of effective learning is raised in response to the changing circumstances of the present environment.

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The research involved six universities in Taiwan, with a total of about 25,000 university students. The survey focused on the environmental perception of university students after receiving environmental education or climate change education. The university students involved in the research were completely voluntary, and after the researchers' judgement and sampling, a questionnaire survey was conducted on the selected participating students under the same criteria.

In order to reduce the possibility of research to separate the measurement of behavioral inclination from the measurement of other constructs, so as to test whether the proposed research model was suitable, a total of 1050 replies was received from February to June 2017. The questionnaire included five reverse questions to ensure that the respondents answered them carefully. If the participant has more than three positive answers to the opposite question, his/her answer would be voided. After removing the responses that had more than 10% incorrect or unanswered questions, the remaining results yielded 983 valid questionnaires. In the research, a self-administered, closed-ended questionnaire with orders choices was used to sample students in Taiwan.

Instrument and Procedures

Research combined the professional advice of five scholars to discuss the project of the questionnaire. On the basis of the expert opinions, adjustments were made to refine and amend the questionnaire. Through in-depth interviews with professionals, the validity was proved, ensuring that each statement in the formal investigative instrument had the necessary means to discuss the structure.

Research conducted a pilot to verify that the questionnaire was clear and to classify each item as a matrix. All the questionnaires were carefully revised and all items were confirmed. As a result, a pilot study was conducted prior to the formal investigation, during which the meaning of each issue was explained to the participating students to ensure that the questionnaire items were not misunderstood and then fine-tuning the wordings of the survey questions. In the validation, questionnaires were provided to the 50 participating students. After deleting the incomplete questionnaires, there were 45 valid responses. The following points were referenced in the preparation of the test questionnaire. First, after calculating the correlation coefficient matrix for all problems, if there were two problems with similar wordings and a high correlation (correlation coefficients greater than .9), one of the problems would be deleted or the two questions would be merged into one. Second, the total scores of all the samples in the forecast questionnaire were sorted in descending order using the internal consistency indicator. The total score in each of the 25% intervals was selected to form the high and low evaluation groups. The difference between the two groups was identified as a problem, but the discriminant problem was not ruled out. Third, through the recommendations of Hair et al. (2010), the analysis eliminated similar problems with correlation coefficients that were lower than .5.

The above three focuses were used to examine the questionnaires to ensure that they were reliable and effective. At the same time, the determination of the questionnaire was strengthened between the test of the correlation coefficient and the discrimination and similarity of the problem. All the research variables were measured using a 5-point Likert scale (with answers ranging from strongly disagree to strongly agree). The preliminary results suggested that the overall reliability of Cronbach's alphas coefficient was .831, .884, .906, .825, .933, .906, and .776, which indicated the assessment was an appropriate measure to research the structure.

Analysis of the Survey Data

The sample verification rate of the questionnaire was 93.6%. In the preliminary analysis, 35.9% of the students surveyed were male and 64.1% were women. The average age of the sample was 21.15 years (standard deviation 1.35 years). In terms of the curriculum learning performance (environmental education and climate change), 210 students ranked third in the top three, 90 ranked second, and 63 participants declined to answer the question.

When asked whether they were taking or had taken courses related to climate change, 422 students reported they had taken two to three courses, 337 reported one course, 124 reported four to five courses, 39 reported six to seven courses, 26 reported seven courses, and 35 declined to answer.

Table 1 lists the demographic characteristics of the sample. A total of 983 valid questionnaires was distributed and collected in research. Most of those surveyed were 20-22 years old (61.6%) and female (64.1%). Many of the participants were in their second year (44.9%).

Table 1. **Sample profile (*N* =983).**

Variables	Type	Percentage (%)
Age	19 or less	3.1
	20-22	61.6
	23 or older	8.3
Gender	Male	35.9
	Female	64.1
Grade	First-year student	16.4
	Second-year student	44.9
	Third-year student	27.0
	Fourth/final-year student	11.7
How many courses related to climate change	$\leqq 1$	34.3
	2-3	42.9
	4-5	12.6
	6-7	4.0
	>7	2.6

The partial least squares method (PLS) is a statistical method of linear model exploration or tectonic construction. In a general linear model, there are at least two sets of variables, one of which can be considered independent and the other dependent. In general, the regression equation can only handle a set of related variables, while PLS can handle several independent variables and a set of related variables. Based on the SmartPLS 2.0 software developed by Ringle et al. (2005), the research analyzed the measurement and structural model. Petter et al. (2007) thought that the PLS analysis tool is more suitable for component-based models, while LISREL and Amos are better suited to models based on common variables. Component-based models generally recognize the ability to replace a model based on a common variable and can also handle measurements and structural models. Bootstrapping is a resampling technique in which the development focus can be used to calculate the standard error and *t* value of each model parameter.

Research Results

Reliability and Validity

Based on the results provided by Bagozzi and Yi (1988), three kinds of commonly used indicators were selected, and the measurement model of the reflection indicator was evaluated and constructed. Two potential variables, environmental perception and personality traits, were the main formative indicators. Important explanations for the various indicators are described below (Table 2).

Table 2. **Reliability and validity indicators of the research model.**

	CR	AVE	R^2
Environmental perception	.831	.712	--
Social identity	.872	.664	--
Environmental Value	.913	.858	.814
Environmental attitude	.812	.605	.465
Vegetarian behavior intention	.946	.815	.772

a) Individual item reliability is an important assessment of the loading of the measured variables on the latent variables, and the statistical significance of each variable loading can be tested. In addition to the formation of indicators, a single measurement variable load greater than .5 indicates significance. The

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loading coefficients of the sample factors ranged from .60 to .93, which conformed to the recommended value of Hair et al. (2010).

b) The composite reliability (CR) of the latent variables is composed of the reliability of all measured variables. The significance of the indicator is similar to Cronbach's alpha, which can be used to represent the internal consistency of the construction indicator. The higher the reliability, the greater the internal consistency of the latent variable. The recommended threshold for Fornell & Larcker (1981) is .6. The CR value of research was between .812 and .946 and the CR value of all variables was greater than .7, indicating good internal consistency.

c) The average variance extracted (AVE) of the latent variables calculates the variance of the explanatory force for each measured variable of a potential variable and evaluates a single measurement variable. The higher the AVE, the better the convergence of the latent variables and the validity of the discriminant. The recommended standard value for Fornell & Larcker (1981) is .5. The AVE value of each latent variable in research was between .605 and .858, and all the variables in the research model were greater than .5.

The coefficient results were distributed within the range of .465 to .814 in the explanatory capacity of the structural model R^2. The standard path factor represents a direct impact that can be realized in all nine-path assumptions. The results showed that the single-factor load of the measurement model was greater than .7, indicating stable and effective measurement results. However, the analysis software did not provide any appropriate and reliable analysis indicators. Therefore, to test the overall fit, the results took advantage of the goodness of fit (GoF) by Tenenhaus, Vinzi, Chatelin, and Lauro (2005). The GoF indicator is the calculated coefficient of the maximum likelihood estimation in the structural model analysis based on the least-biased correlation method.

Marcoulides, Chin, and Saunders (2009) suggested that the standard effect sizes (small: .02; medium: .15; large: .35) suggested by Cohen (1988) lack rigor. Fornell and Larcker (1981) and the GoF indicators were combined with the value of the avenue and new overall coordination indicators (poor: .1; medium: .27; good: .42). The GoF produced by in research was .735, which indicated that the model was acceptable in the overall fit.

Path Analysis of the Research Model

Through analysis (see Figure 1), it was found in research that the hybrid model established by the formation and reflection indicators could be used to test the environmental perception and personality traits to determine the formation of the indicators. Environmental perception was composed of humanistic perception (.321) and ecological perception (.907), which was the main goal of research on the environmental perception of university students. Through the analysis and discussion of personality traits, it was pointed out that the five traits are necessary for individual constitutions. In order to define their potential variables, research defined personality traits as a formative indicator rather than a reflex indicator, although five of the main personality traits are usually classified as reflex indicators. In the five major personality traits, the results of affinity and extraversion were statistically significant, while accountability and emotional stability were not significant.

The results of the PLS evaluation tool were used to identify the path coefficients between the latent and measurable variables and then propose path values. In the validation research model (α= .05), nine of the 10 hypothesized paths were statistically significant. The paths of the individual values for vegetarian behavior were as follows: health risk perception to environmental value (.693); health risk perception to environmental attitude (.124); and health risk perception to vegetarian behavioral intentions (.429). However, the pathways of environmental value, environmental attitude, and environmental perception were as follows: environmental perception to environmental value (.084); and environmental perception to environmental attitude (.316). The path relationship between environment perception and environmental value was not satisfactorily supported.

The five main personality traits of environmental attitude and vegetarian behavior intention in these two routes were as follows: personality traits to environmental attitudes (.138); and personality traits to vegetarian behavior intention (.289). These approaches were statistically significant. Individual environmental values and environmental attitudes reflected a positive effect on vegetarian behavior intentions and environmental values to vegetarian behavior intention (.318), as well as environmental attitude to vegetarian behavior intention (.234). The results showed that attitude had a positive effect on the subjects' vegetarian behavior. In addition, environmental perception had a significant impact on environmental value, but the path relationship was not significant. It is difficult to take action on these positive environmental commitments. The issue of climate change is mainly disseminated

through media campaigns featuring emotional images to stimulate the social identity related to climate change, therefore media can play an important role in promoting good environmental attitudes towards climate change. The social identity to environmental attitude (.271) path indicated that social identity and environmental attitudes also had a significant positive correlation.

Health risk perception had a significant positive impact on environmental value but had no significant significance on environmental perception. The variance of environment attitude (R^2) was .465; therefore, environment attitude was affected by environment perception, health risk perception, social identity, and personality traits, which indicated that this conclusion could effectively predict the perception and attitude chain. The vegetarian behavior intention variance (R^2) was .772; therefore, vegetarian behavior intention was affected by factors such as personality traits, health risk perception, and environmental value, which again supported the formation of perception, recognition, and attitude. However, these findings did not show strong support for the environmental attitude towards vegetarian behavior, which differed from previous studies in that there was no significant correlation between environmental attitude and vegetarian behavior intention.
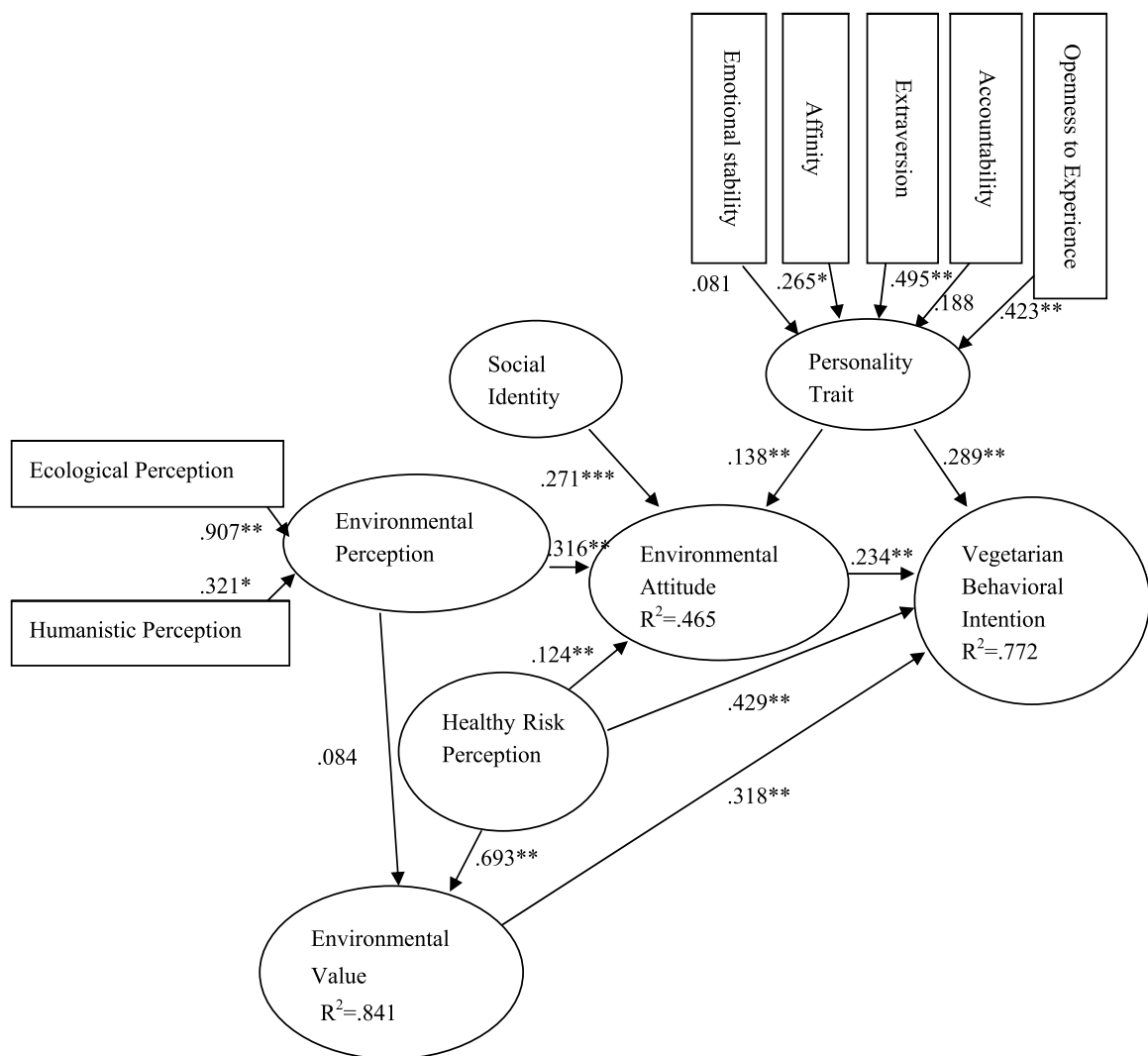

Figure 1.   Path coefficients of the research model.

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Table 3.   **Discriminant validity and correlation coefficient.**

	Environmental attitudes	Environmental perception	Healthy risk perception	Social identity	Environmental Value	Vegetarian behavioral intention	Personality trait
Environmental attitudes	.865						
Environmental perception	.248	1.000					
Healthy risk perception	.218	.222	.952				
Social identity	.319	.033	.115	.711			
Environmental Value	.405	.281	.285	.235	.716		
Vegetarian behavioral intention	.624	.383	.418	.451	.325	.826	
Personality trait	.333	.021	.227	.324	.251	.356	1.000

Note: All correlation coefficients are significant at the. 001 level. The diagonal element is the square root of AVE, which should definitely be greater than the diagonal correlation coefficient.

In the research, structural equation modeling (SEM) and Smart PLS data analysis were used to find the applicability of the survey data and the research model. The most important reason for using PLS instead of covariance structure SEM was to create minimum sample distribution requirements and to not require data to conform to homogeneity or normalities (see Table 3). In addition, according to the key conclusions put forward by Goodhue et al. (2012), environmental perception and personality traits were treated as formative constructs, and composites with optimized weights were adopted.

Discussion

From the perspective of sustainability/green education and Social Theory (VBN + TPB), at the center of personality traits (including perception, emotion, motivation, and behavioral intent), VBN theory interprets the behavioral intention and the TPB theory of individual perception and environmental change to confirm the interaction between motivation, emotion and behavioral intent. Research that combines these two important social theories has been more effective in understanding the promotion of vegetarian behavior under climate change and encouraging individuals to mitigate and adapt to climate change.

Human-owned environmental perception can be an incentive to mitigate climate change. In addition, environmental valuation is an antecedent variable that affects human beings and protects the living space of animals. The environmental beliefs of global climate change are made up of environmental perceptions, environmental attitudes, and behavioral intentions. However, it was noteworthy that there was no significant direct relationship between environmental perception and health value. It is believed that environmental perception has an impact on environmental attitude. Wang et al. (2008) stated that value can be interpreted as a higher level of environmental attitudes. Stern (2011) said that value can lead to behavioral change and has a greater impact on the perception of the environment, therefore, environmental value has a significant impact on an individual's environmental beliefs and relationships. This conclusion is consistent with other behavioral theory models (Jansson et al., 2011; Milfont, 2012; Nigbur et al., 2010; Spence et al., 2012; Zaalberg et al., 2009).

Other studies have also considered the importance of norms. Bamberg and Moser (2007) and Thogersen (2008) analyzed the notion that social norms are a belief in stress. Research used the conceptual form of individual social identity rather than the definition of human self-identity put forth by Mannetti et al. (2004). Therefore, the result confirmed the normative pressure formed by moral obligation and the moral consciousness and collective consciousness of individual value systems. This kind of pressure forms the social characteristics of sustainable

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development. The results were consistent with those of Roeser (2012) and Shackelford (2006) and showed that group norms have a significant effect on behavioral constancy and environmental attitudes.

At the same time, research on personality traits has been fully supported and developed. Costa and McCrea (1992) and Goldberg (1990) used factors such as affinity, extraversion, openness, accountability, and emotional stability. Research used confirmatory factor analysis to test the stability of relative factors, and the developed model was used as a stable predictive variable. In previous studies, Fraj and Martinez (2006) and Moody and Hartel (2007) concluded that individuals tend to consume environmentally-friendly products in a highly responsible manner. In addition, Rhodes et al. (2005) conducted an empirical study of five key personality traits and found that all individual personality traits were stable. Existing research has shown that personality traits belong to a variant form. In addition, there is a significant positive statistical relationship between personality traits and environmental perception and environmental attitudes.

Research Limitations

When a questionnaire is used to measure the behavioral tendencies of an individual's environment, the participants may often deviate from the general approach when answering questions. Research used a variety of methods, such as hiding the details of the respondents or the meaning of the problem, and used reverse problems to design questions and answers. In addition, the results regarding problem behavior were listed last. Then, using the methods proposed by Harman (1976) and Sanchez, Korbin, and Viscarra (1995), principal component factor analysis of the research variables was carried out to see if any single factor could explain most variations. Covariance matrix analysis was also used to validate the post-hoc model. However, the influence of some common variables could not be completely reduced, which was the main limitation of this research.

Conclusions

In the aspect of sustainable development education, it is possible to improve the vegetarian behavior of university students in the context of climate change and the perception of health risks. The results of this research confirmed the path relationship between latent variables and could be used as guidance for decision-makers and educators. Research collected measurable and latent variables related to climate change risk perception and established a PLS environmental perception model that could enable university students to better understand climate change. The model could better assess the causal relationships of various potential variables of environmental responsibility and behavior and could provide a useful reference for decision-makers and educators in sustainable education. The results showed that the model had better stability and better fitting performance.

Using the standard path coefficient, nine of the 10 suggested paths reached statistical significance. In addition, the pathway coefficients of health risk perception in various structures, from environmental values and perspectives to vegetarian behavioral intentions, were .693 for the perceived health risk perception of environmental value and .124 for the perceived health risk perception of environmental attitudes. In addition, .429 of the respondents thought of health risk perception as vegetarian behavioral intent. These results suggested that environmental values and environmental attitudes reflected a positive impact on vegetarian behavior intention. However, although environmental attitude showed a stronger impact on climate change than environmental values, the pathway relationships were not statistically significant. The results suggested that environmental attitude could guide individual vegetarian behavioral intention and that it is difficult to establish attitudes in actual behavioral commitments.

In the research, personality traits, health risk perception, environmental attitudes, and environmental values had a positive and statistically significant effect on the behavioral intention of vegetarians. A vegetarian diet can promote pro-environmental behavior and the design directions of courses available for policy decision-makers and teaching staff. Research collected relevant measurable and potential variables to form a PLS learning and perception model. The model facilitated the evaluation of the casual relationships among potential variables related to environmental responsibility and behavior and could serve as a reference for policy decision-makers and teaching staff in terms of sustainable education.

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