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The Influence of Environmental, Social, and Personal Factors on the Usage of the App "Environment Info Push"

Yi-Wen Liao [1], Zhi-Yuan Su [2], Chiung-Wei Huang [2,*] and Rustam Shadiev [3]

[1] Department of Information Management, Cheng Shiu University, Kaohsiung 83347, Taiwan; k0632@gcloud.csu.edu.tw
[2] Department of Information Technology, Chia Nan University of Pharmacy and Science, Tainan 71710, Taiwan; box5000@mail.cnu.edu.tw
[3] School of Education Science, Nanjing Normal University, Nanjing 210097, China; 02464@njnu.edu.cn
* Correspondence: cwhuang@mail.cnu.edu.tw

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Abstract: This study analyzed citizens' willingness to use the Environmental Info Push app to participate in air quality control and air pollution prevention. The participants used the app for two weeks and then we investigated the users' opinions about factors relevant to the app, air pollution control, and prevention. Answer sheets to questionnaires were received from 347 participants. All of them were valid and the study conducted research simulation and statistical analysis with SPSS 19 Statistics software and SmartPLS 2.0. The results showed that an individual's willingness to control and prevent air pollution is most influenced by other people. The second most influential factor is the degree of severity of climate change that an individual has recognized. Other influential factors and the order of their effect included: outcome expectation, third; self-efficacy, fourth; self-image, fifth: self-preference, sixth; and self-monitoring, seventh.

Keywords: environmental app; air pollution prevention; personal factors

1. Introduction

Rapid urbanization and the pursuing of a better quality of life in Malaysia have caused the country's environmental degradation, resulting in a series of environmental problems problems [1]. The International Agency for Research on Cancer (IARC), which is a suborganization of the World Health Organization (WHO), categorized "particulate matter," a kind of major component of air pollution, into Group 1A carcinogens in 2013. Among all kinds of particulate matter, PM2.5 causes the most serious damage to humans' health. In recent years, the authorities and concerned citizens have paid much more attention to the issue of air quality due to the serious air pollution, since recent air pollution has often exceeded the standard level. Various sources of air pollution have cast much negative influence upon citizens' health and daily routine. The Environmental Protection Administration (EPA) in Taiwan has mobilized the bureaus and offices concerned with the implementation tasks of air quality improvement including cross-strait agreements on environment protection and the "Internet of Things for Air Quality" that combines micro sensors. In addition, the EPA has also presented an app termed "Environment Info Push." Through the function of "setting alarms," a user can set customized alarms for local air quality and ultraviolet at different alert values. When the hourly monitoring value reaches the threshold value that a user has set, the system will automatically release a message (the period of the message delivery is from 07:00 am to 21:00 pm) to promptly notify the user of the alarming conditions of the local environment. In order to disclose information on factories' exhaust emission and encourage citizens' participation and supervision, the EPA developed a real-time continuous

monitoring and inquiry system on stationary sources of pollutant emission through smokestacks. This system has been integrated into the app of "Environment Info Push." Anywhere and anytime, citizens can search for the latest conditions of exhaust emission of the stationary sources of pollutants surveilled and controlled by the six special municipalities in Taiwan and set alarms to notify themselves.

Air pollution is a serious problem, but citizens' awareness of protecting their own health is quite low, and they tend to be inactive to devote themselves to actions of air pollution prevention. Reducing air pollution produced by economic development and achieving the goal of air quality protection through effective control and measures of assistance are currently the issues of critical importance. In addition, it is necessary to educate our citizens on the recognition of environmental protection beginning in childhood and to improve environmental conditions through environmental actions. Environmental actions have been considered the primary goal of environmental education by most scholars in the field of environmental education. Through environmental actions, current and future environmental problems could be solved.

Academic communities have been advocating that companies should focus on the improvement of their environmental performance. More and more executives of companies are taking actions on the environmental issues, because these environmental actions not only contribute to the sustainability of the natural environment but also satisfy their stakeholders in a way that strengthens the competitiveness of their companies [2]. Until recently, literature concerning conditions of air pollution prevention, monitoring, and measurement, plus conditions of the use of health protection platforms is quite insufficient. The understanding of citizens' cognition of air pollution, their knowledge of air pollution prevention, and their willingness to use an air pollution prevention platform is of critical importance. The results of relevant studies can be used as references for promotion of air pollution prevention and for the making of relevant policies.

A variety of air quality monitoring, measurement, and improvement products are currently available, but the literature regarding the effect of air quality monitoring and measurement and health protection is scarce. Previous scholarships related to this field mainly focused on the introducing of platforms, integrating sensors, and IT techniques in order to understand conditions of air pollution, however, so far, relevant platforms and equipment of air quality improvement have not been applied widely. Furthermore, the relevant studies did not integrate education on air pollution, the use of platforms and equipment related to air pollution, and the concepts of health protection at home. Studies on issues of measuring air quality with IT techniques include research on using a smartphone-based sensing system to monitor and measure local climate and air quality in a location where a smartphone user is located [3], and research on a smart sensing system that could monitor and measure air quality and gather a massive amount of data [4]. From the studies mentioned above we know that air quality casts a significant influence on human health and that there is a rich amount of products that monitor, measure, and improve air quality, however, related studies seldom discussed effects of air quality monitoring and measuring platforms and health protection. This study aims to promote the ideas of air pollution prevention in class and introduce the usage of "Environmental Info Push," a mobile application developed by the Environmental Protection Administration (EPA) in Taiwan. Through educational activities and the application promoting air pollution prevention, this study examines the willingness of the public to use the application.

2. Literature Review

2.1. Air Pollution

Air pollution is the global health threat that should gather most attention in the 21st century. Accompanied with rapid industrialization and urbanization, fine particulate matter emission, which has resulted in haze air pollution, has become one of the most severe environmental problems in China [5]. Fine particulate matter emission has come with rapid industrialization and urbanization causing severe

air pollution, such as smog. Fine particulate matter emission has become one of the most serious environmental problems in China [5].

According to the statistics of the Ministry of Health and Welfare, the concentration of air pollution in nearly all counties and cities in Taiwan exceeded the international standard by two to four times. The EPA's data showed that many epidemiological studies indicated that PM2.5 is the risk factor of lung cancer and cardiovascular diseases. Scholars pointed out that all of the ten leading causes of death related to cancer are related to PM2.5 [6]. The WHO's statistics from 2014 showed that roughly seven million people died from chronic diseases caused by PM2.5 each year, and the death toll keeps climbing [7]. The tolerance of PM2.5 concentration set by the WHO is 10 $\mu g/m^3$. However, the annual average concentration of PM2.5 in Taiwan is 2.5 times higher than the tolerance of PM2.5 set by the WHO. The annual average concentration of PM2.5 in Taiwan exceeds the tolerance by roughly 30 to 40 $\mu g/m^3$. Every increase of 5 $\mu g/m^3$ of PM2.5 concentration raises the risks of cardiovascular diseases by 55%, and every increase of 10 $\mu g/m^3$ of PM2.5 concentration decreases a person's life by 200 days.

The WHO indicated that air pollution has become the top environmental and health problem. According to the EPA's statistics, the primary pollutants in air (PM and O_3) not only increase yearly, but the average concentration of PM2.5 in nearly all counties and cities in Taiwan exceeds the standard of the WHO by multiple times as well. The WHO pointed out that, in 2014, indoor and outdoor air pollution was harmful to the respiratory tract. Respiratory diseases related to air pollution include acute respiratory tract infection and chronic obstructive pulmonary disease. Cardiovascular diseases and cancer are also highly related to air pollution. The whole world is mobilized to fight against air pollution. Many European countries have requested legislation against air pollution, however, the Air Pollution Control Act implemented in Taiwan in 1975 regulates only particulate matter smaller than 10 $\mu g/m^3$ (PM10) but not the deadlier pollutant, PM2.5. The EPA announced the revised air quality standard in May 2012, which included the addition of the air pollution index, "PM2.5", the critical influence cast upon humans' health by PM2.5, how citizens should react to PM2.5, and what preventive measures can be taken to maintain citizens' health. In August 2012, PM2.5 was finally included in the standard regulation of air quality. It has been 37 years late for Taiwan to start dealing with the invisible killer, PM2.5. In additional to Hualien, Taitung, and Hengchun, the yearly average concentration of PM2.5 in nearly all other areas of Taiwan exceeds the standard value [6].

2.2. Air Quality Index (AQI)

The pollutant concentration and subindex value chart defined by the EPA are displayed in Table A1. The EPA (2008) defines Air Quality Standards as: "the limit value of airborne pollutant concentration in outdoor air". When natural disasters happen, such as volcanic eruptions and forest fires or accidents such as wood or coal fire, there are changes to the composition of clean air and air pollution is generated therefrom. The EPA monitors the daily concentrations of certain gases and particulates (including O_3, PM2.5, PM10, CO, SO_2, NO_2) in air and estimates their degree of impact on the health of humans. From these concentration values and the degree of health impact, different subindices of different pollutants are acquired through calculations. An observation station's air quality index (AQI) of the day is the maximum value of all the subindices of the day.

An index of PM2.5 allows citizens to easily grasp the current air quality conditions. The EPA analyzes the indices of PM2.5 collected from the AQIs from many countries around the world (but mainly from the Daily Air Quality Index in the UK). The Taiwan Air Quality Monitoring Network of the EPA provides an index of PM2.5. Proper air quality, temperature, and humidity are of vital importance to health [8].

The classification system of PM2.5 concentration prediction categorizes PM2.5 concentrations into ten levels, and these levels are given different colors as identification marks according to their impact on humans' health. The corresponding relationships between indices and concentrations shows the quality of outdoor air as a reference for citizens concerning their decisions on outdoor activity.

According to the AQIs and activity suggestions made by the EPA in November 30, 2016, daily activity suggestions corresponding to indices of PM2.5 announced by the EPA are shown in Table A2.

2.3. PM2.5

Common air pollutants include CO, CO_2, O_3, particulate matter (PM), SO_2, and Pb. PM is a kind of particulate pollutant in both solid and liquid forms and floats in the atmosphere. The PM with a diameter of 10 microns (μm) or less is termed inhalable suspended particulate matter (PM10), and PM with a diameter of 2.5 μm or less is termed fine suspended particulate matter (PM2.5). The diameter of PM2.5 is 1/28 of the length of a hair. It is easier for PM2.5 to adsorb toxic substances including heavy metal and poisonous microbes. The size of suspended particles determines the final position of the particles in a respiratory tract. Bigger PM tends to be filtered out by flagella and mucus and cannot go through the nose or throat. PM10 can penetrate these barriers and reach bronchi and pulmonary alveoli. Nevertheless, PM2.5 can arrive at the walls of bronchioles and interrupt the gaseous exchange in lungs. AQIs and their corresponding health impacts presented by the EPA in 2016 are listed in Table A2.

Fine suspended particulate matter, PM2.5, is the biggest environmental health risk in the world. The sources of PM2.5 include exhaust emissions from factories burning fossil fuel, vehicles burning gasoline and diesel fuel, heating through burning coal, cooking, smoking, and construction sites. The definition of particulate matter given in the Handbook of Understanding Fine Particulate Matter is as follows: Particles with a particle size between 10 and 100 μm are termed total suspended particulate (TSP) and are about the size of beach sands and can float in air; Particles with a particle size between 2.5 and 10 μm are termed coarse particles (PM10), with a diameter which is about one-tenth of the diameter of a grain of sand. PM10 can easily pass through nose hair and the curved tract to reach the throat; Particles with a particle size less than 2.5 μm are termed fine particles (PM2.5) and their diameter is about 1/25 of the length of a hair. PM2.5 can penetrate pulmonary alveoli, enter directly into blood vessels, and travel to everywhere in the body through blood circulation.

2.4. The Health Impact of PM2.5

PM2.5 tends to be adsorbed by other carcinogens such as mercury, lead, vitriol, benzene, and dioxin and can travel deep into a trachea, bronchi, and every organ such as the heart, kidneys, the brain, and the liver, causing systemic inflammation. It can also trigger acute and chronic diseases such as respiratory diseases [7]. PM2.5 is the biggest environmental health risk in the world and long-term exposure to PM2.5 will increase the risk of many diseases such as lung cancer, stroke, asthma, etc. It has been estimated that more than three million cases of premature death, in 2010, were caused by PM2.5 [9]. Because the research of household PM2.5-reducing behaviors is within a personal and pro-environmental domain, we aimed to build a model of household PM2.5-reducing behaviors based on relevant theories.

Regarding the relationship between PM2.5 and health impact, according to the 2013 Annual Report of Air Quality Monitoring, the yearly average of PM2.5 concentrations recorded by all air quality monitoring stations in Taiwan was 24 $\mu g/m^3$ (EPA, 2014), which was 2.4 times the standard set by the WHO [10]. Different health impacts on humans' health could be caused by suspended particles according to the particles' different sizes and chemical properties. Many epidemiological studies indicated that PM2.5 can easily adsorb many toxic substances including dioxin, polycyclic aromatic hydrocarbons, and heavy metal. Long-term inhalation of PM2.5 may cause allergy, asthma, pulmonary emphysema, lung cancer, and cardiovascular diseases. Both long-term and short-term exposures to an environment with high concentrations of PM2.5 would increase risks of respiratory diseases and death. The health impacts for people sensitive to air pollution are even more prominent [11].

According to studies done independently, in 2002 and 2009, PM2.5 is significantly correlated with all-cause mortality and the mortality of lung cancer and cardiopulmonary diseases. PM2.5 can cause short-term and long-term health impacts on respiratory tracts, cardiovascular systems, lung functions, and bronchi [12]. Exposures to PM2.5 cast a significant influence on health; with the average of PM2.5

concentrations in Taiwan in 2013 came a 15% increase in risks of lung cancer and pediatric asthma and a 25% increase in risks of stroke, cardiac diseases, and chronic respiratory diseases [13]. Shi, Wang, and Zhao [5] found that the regulation of residents' PM2.5-reducing behaviors concerning the use of vehicles is a key factor in reducing PM2.5 emission in urban areas.

2.5. Social Cognitive Theory (SCT)

After the development of the air pollution prevention platform, we presented a model to evaluate health management behavior. The model is based on social cognitive theory, and we use the model to facilitate the research on how an individual can implement his or her health management behavior. With this model, we are able to find out the factors that influence health management behavior and analyze how these factors interact with each other to cast that influence. We expect to discover the incentive that motivates an individual to put his or her health management behavior into effect and further analyze why some people put the behavior into effect but some other people do not. We consider that some people can regulate themselves to implement health management behavior because of some factors far more important than external ones such as issues of global warming, implement of the country's policy, or influence of mass media.

2.6. Herd Behavior Theory (HBT)

The bandwagon effect means that people are influenced by the thoughts and behavior shared by most people, and therefore they adopt shared thoughts and behavior. This phenomenon is often termed herd behavior. Different fields present similar concepts when interpreting herd behavior, but their emphases are slightly different. The definition of herd behavior in the field of social psychology is as follows: "and individual's conformity is an expression of social influence, and the influence comes from other members in the individual's group" [14]. Herd behavior is the base of the consensus fallacy. Relevant studies about the origin of herd behavior are mostly from the field of social psychology. Asch advanced a noun similar to the meaning of herd behavior, namely, the majority effect, which means when the majority of people in a group approve a certain thing yet their argument is wrong, an individual member of that group may still conform to the opinions of the majority [15–17]. Ash emphasized the importance of an individual's frame of reference in the process of conformity. Thus, social psychology emphasizes that an individual would change his or her thoughts and behavior when he or she is under group pressure, and therefore the individual's thoughts and behavior tend to be consistent with those of the groups to which he or she belongs [18]. That means the individual's original thoughts or behavior are contradicted by the group. Allen [19] divided the form of conformity into two categories, public compliance and private acceptance. Public compliance is the complying behavior an individual would exhibit for winning awards or avoiding punishments in a face-to-face situation. Private acceptance means an individual voluntarily accepts other people's influence of attitudes, spirit, faith, values, and expectations when the individual recognizes certain standards in his or her mind [20,21].

3. Research Methods

3.1. Definitions of Research Variables and Constructs of Research

The questionnaire was developed in this study and items were adopted from Allen [19], Bandura [22], Brockner [23], Coopersmith [24], Deeter-Schmelz and Ramsey [25], Hegerl et al. [26], Lam and Lee [27], and Wang [14]. The questionnaire employed the Likert scale with a five-point scale from "strongly disagree" (one point) to "strongly agree" (five points). In the research framework, the operational definitions of constructs and evaluations of question items are described as follows: (1) "climate change" is to examine how individuals implement air pollution prevention behavior in the face of extreme climate threats. (2) "Media communication" aims to realize how individuals' air pollution prevention behavior will be influenced by mass media as they receive news reports on severe

damage of the ecological environment of the Earth and the urgent crisis on sustainable development of human survival. (3) The definition of "social norms", in this study, is how individual air pollution prevention behavior will be influenced by climate change information and policy promotion of energy saving and carbon reduction among the public. (4) "Self-monitoring" refers to individuals' keen awareness and observations of the severe condition of air pollution on the Earth and the threat that it poses to human sustainable development. (5) "Self-image" refers to how individuals recognize their personal significance, value, and evaluation of life meaning when they confront the issue of human sustainable development and the air pollution prevention. (6) "Self-preference" relates to an individual's preference for and attitude toward lifestyles, consumption behavior, values, and environmental concerns in the face of the issues of air pollution prevention and sustainable development of human beings. (7) Self-efficacy of air pollution control and prevention represents an individual's degree of confidence in himself or herself to have the faith and ability to take actions to control and prevent air pollution. (8) Conformity is an individual's conforming expression of social influence cast by other members of a group to which the individual belongs; it means an individual has thoughts or adopts behaviors similar to his or her group members in order to gain the group's recognition and fulfill its expectation. (9) Outcome expectation of air pollution control and prevention indicates the degree of an individual's expectation of obtaining the results that could bring the individual benefits and a good reputation. and (10) Willingness to participate in air pollution control and prevention reflects an individual's degree of dedication to controlling and preventing air pollution in order to maintain air quality and protect ecological environments and his or her degree of endeavor to sustain human development.

3.2. Research Framework

This study intended to analyze citizens' willingness to use the "Environmental Info Push" app (Figure 1) to participate in air quality control and air pollution prevention. After we had invited users to try the app out for two weeks, we investigated users' opinions about factors relevant to the app and air pollution control and prevention.

Figure 1. "Environmental Info Push": Screenshots of the app developed by the Environmental Protection Administration (EPA).

Generally speaking, air pollution control and prevention involve the issue of ethical consumerism. Factors, in reality, such as changing individuals' comfortable lifestyles and consuming habits, create an ethical dilemma for people in the aspects of daily life habits and actual consuming behavior, and thus it is difficult for people to take actions to change effectively. Bandura [28] argued that high consumptive lifestyles and excessive population growth are the critical reasons that cause the destruction of ecosystems. Therefore, changing the high consumptive lifestyles is not only an issue of ethics but also an issue of environmental sustainability. Because this issue of ethics involves influencing everyone's lifestyles and global ecological environments interdepending on each other, this kind of ethics is termed

environmental ethics [28]. Many studies have been conducted to measure environmental consciousness, which includes analyzing the relationship between environments, ecology, and the practice of saving energy and reducing carbon emission on the basis of individuals' attention to the environment or the degree of their interest in environmental issues [29–31]. There are also many studies that have researched individuals' past, present, and future promises and willingness to protect the environment in hopes of improving the influence cast upon the natural environment by many negative activities that consume resources [32–34]. Research evidence presented by Fraj and Martinez [35] indicated that an individual's environmental protection activity is positively correlated with the degree to which the person attaches importance to the natural environment. On the basis of social cognitive theory and herd behavior, this study presented a behavioral evaluation model of air pollution control and prevention to explore and analyze the important factors influencing users' willingness to participate in air pollution control and prevention (see Figure 2).

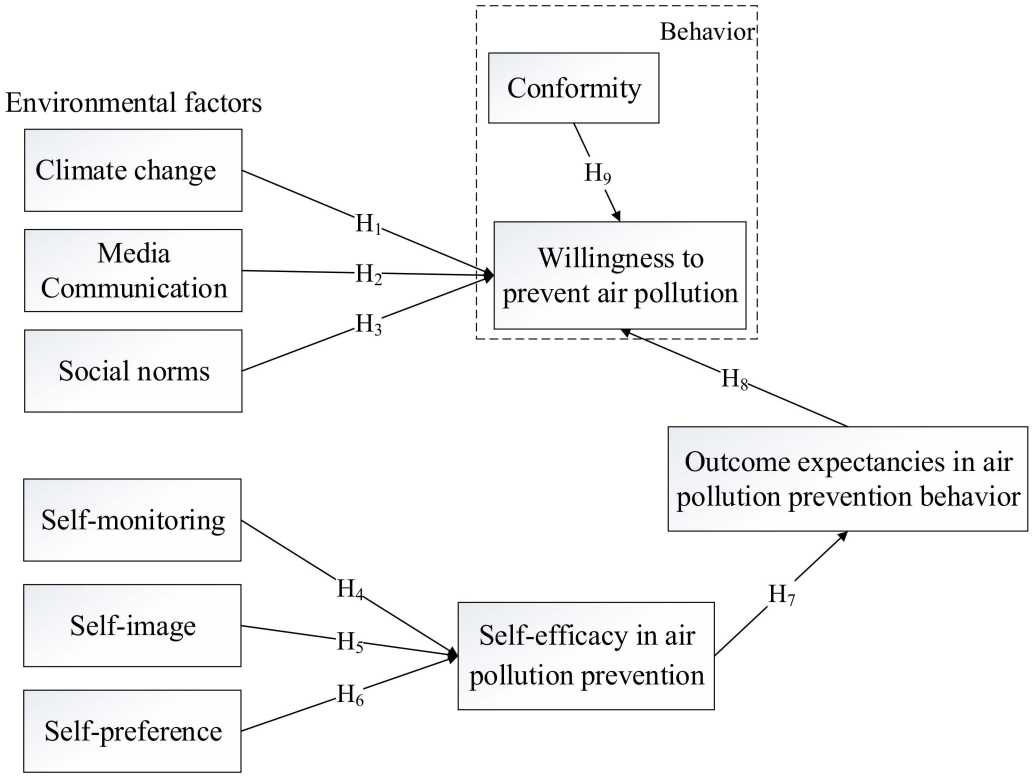


Figure 2. Research framework.

Many studies have discovered that environmental concern is a primary factor in consumers' decision making [35–38]. Only, when consumers are faced with dangers threatening their own life (such as threats of climate change) would they begin to care about their rights, change their perception, thoughts, and attitudes, and further urge themselves to adjust their daily life and consuming habits. Hence, we present the hypothesis as follows:

H1: The more "climate change" influences an individual, the stronger the individual's "willingness to participate in air pollution control and prevention" will be.

Roberts [39] argues that consumers' attention to environmental protection would increase if mass media spend more time covering issues concerning environmental protection. Flora et al. [40] discovered that the extent of citizens' awareness could be increased and even their behavior could be changed if well-designed media intervenes a propaganda campaign. Furthermore, Pujari & Wright et al. [41] discovered that although the intervention strategy of media could significantly increase the extent of residents' perception of the concept of recycling and relevant knowledge, it could not significantly

influence residents' behavior of recycling. Bandura [42,43] indicated that mass communication could influence human thoughts, interests, and behavior. He [44] also considered that mass communication could influence how people operate by two means. The first was to urge people to change with information, encouragement, and guidance; the second was to connect people and turn them into social networks and communities by the means of media. Furthermore, natural incentives and continued personalized guidance were given in order to cause the desired change. Among all the environmental factors that influence people, mass communication and communication systems are two powerful tools that could influence or change peoples' lifestyles and behavior [42,43]. Hence, we present the hypothesis as follows:

H2: The more "mass communication" influences an individual, the stronger the individual's "willingness to participate in air pollution control and prevention" will be.

Schwepker and Cornwell [45], Mainieri et al. [46], and Fraij and Martinez [35] discovered that people with a stronger sense of social responsibility would be more willing to participate in green consumer behavior because they tend to think they are morally responsible to do so. In other words, if an individual's approval of social norms is higher, he or she would be more willing to practice green consumer behavior to protect the earth. Hines et al. [47] conducted a comprehensive analysis of the studies focusing on environmental behavior. They obtained that most results indicated that attitudes are positively correlated with responsible environmental behavior and that people with positive attitudes are more likely to exhibit the behavior that is environmentally responsible. In addition, high consumptive lifestyles are a prominent cause of the depredation of ecological environments. Bandura [41] argued that both society and individuals have a moral responsibility and obligation to strive for the protection of ecological environments, and thus the practice of green consumer behavior should be considered a moral issue concerning consumerism. From the perspective of the paradigm of consumers' rationality, Bartiaux [48] conducted an empirical study in Belgium on citizens who did not adopt a green lifestyle. She discovered that the emotions of citizens would be threatened by normalized mechanisms and the valued networks of social normality when they were surrounded by information about climate change and were under the pressure of policy persuasion regarding saving energy and reducing carbon emission. Hence, we present the hypothesis as follows:

H3: The higher the binding power of "social norms" is to an individual, the stronger the individual's "willingness to participate in air pollution control and prevention" will be.

Many researchers have advanced "self-concepts," such as self-efficacy, self-esteem, self-monitoring, and self-preference, in their studies on an individual's self-binding force. Deeter-Schmelz and Ramsey [25] defined self-monitoring as a cognitive ability to adapt or to change one's own behavior when an individual is responding to the behavior of others. Cognitive ability includes an individual's knowledge, skill, and ability, and can be termed as meta-KSA. In terms of a definition, Lennox and Wolfe [49] considered self-monitoring the measurement of the degree of sensitivity to one's own behavior. Cardy et al. [50] considered self-monitoring as the ability to modify one's own behavior after one perceives social cues. In terms of types, self-monitoring belongs to the aspect of cognition rather than feelings, it is more a characteristic rather than a condition; and it is a sort of general self-concept. Laudon and Smither [51] also considered that self-monitoring is an important ability for in individual to effectively dominate the operation of his or her self-regulating mechanism. From Bandura's perspectives, compared with people with a weaker self-monitoring characteristic, people with a stronger self-monitoring characteristic are more likely to observe the evidence in the surrounding environment and evaluate things with the information acquired from their observation. Bandura termed this phenomenon as self-reaction. Hence, we present the hypothesis as follows:

H4: The higher an individual's "self-monitoring" ability is, the higher the "self-efficacy" of the individual's willingness to participate in air pollution control and prevention will be.

Self-esteem is a self-concept often brought up in cognitive psychology. Most scholars' definitions of self-esteem are quite similar to each other. For example, both Coopersmith [24] and Brockner [23] defined self-esteem as the evaluation of a person's own capability, significance, and worth. Many scholars also considered there are many types of self-esteem, such as physical self, and social self [52,53]. The evaluation of these types of self-esteem is termed global self-esteem. In terms of types, self-esteem possesses the aspect of both feelings and cognition and it is more of a characteristic than a condition. Global self-esteem is an individual's self-judgment of their own ability, significance, and worth, and that judgment is obtained from their evaluation of a range of domains (e.g., at school, among friends, and at home) [52]. Lau, Cheung, and Ransdell [54] analyzed global self-concept (or global physical self-concept) and indicated that self-esteem is the personal perceptions of self-presentation and social acceptance, which are the measurement of body weight, appearance, strength, and self-worth. An individual tends to hold a discreet attitude to deal with the issues that everyone pays attention to in order to maintain his or her social image. Hence, we present the next hypothesis as follows:

H5: The higher an individual demands their "self-esteem" to be, the higher the "self-efficacy" of the individual's willingness to participate in air pollution control and prevention will be.

Bauman [55] indicated that it is more suitable to describe an individual's behavior, worldview, and consuming attitude on the basis of an individual's lifestyle rather than class. Jensen [56] suggested that the research of green practices should focus on those daily-life behaviors that tend to be ignored, and these behaviors are the reasons why there would be a huge difference between the results of the research on green attitude (such as green products) and the research on green actions (such as actual consumer behavior). Schwartz [57], Stern et al. [58], and Karp [59] pointed out that environmentalists prefer to be altruistic, prosocial, and open to change. Roberts [39] indicated that ecologically conscious consumers believe in the Earth's limits to growth, biospheric values, and equality with nature. Hence, we present the hypothesis as follows:

H6: The higher an individual's "self-preference" is, the higher the "self-efficacy" of the individual's willingness to participate in air pollution control and prevention will be.

Self-efficacy is a psychological concept from social cognitive theory; it is an individual's belief in their ability to coordinate their motivations, cognitions, and actions to execute a certain mission [22,28,60,61] According to this definition, self-efficacy possesses aspect of cognition but not feelings and it is more of a condition rather than a characteristic. Bandura [28] argued that self-efficacy is not a global disposition but a psychological construct that varies with situations and activities. In addition, the concept of self-efficacy does not stress skills people have, but rather the extent of conviction to which an individual can apply his or her skills to accomplish missions. Therefore, when tasks or situations of decision making vary, an individual's perceived self-efficacy varies. Bandura [60] also argued that beliefs could not be transformed into actions if an individual has doubts and thinks that they might be incompetent (possibly due to similar experience of failures in the past or lack of sufficient resources) despite the fact that the expected result fits the actor's goal.

Tierney and Farmer [62] advanced the idea of creative self-efficacy, which they argued is different from general self-efficacy. With the idea of creative self-efficacy, they analyzed an individual's self-conviction and self-evaluation of their creativity when engaging in a certain task. Furthermore, they analyzed the extent of influence cast upon an individual's creative behavior by the content of tasks (such as the complexity of the task) and the individual's personal characteristics to effectively predict the individual's expression of creativity. In the field of organizational behavior, many studies have proven that there is a direct relationship between self-efficacy and human behavior or performance. With respect to the idea of self-efficacy, Yeonshin and Marina [63] studied the effects of cultural values; perceived consumer effectiveness; and environmental attitudes about four types of pro-environmental behaviors, green-buying, energy-saving, recycling, and political behaviors. Their results showed that cultural values, perceived consumer effectiveness, and environmental attitudes are vital factors that influence environmental protection behavior. Hence, we present the hypothesis as follows:

H7: The higher an individual's "self-efficacy" of green consumer behavior is, the higher the individual's "outcome expectation of air pollution control and prevention" will be.

People take some sort of action because they think the outcome resulting from their action is beneficial. Thus, outcome expectation is an individual's general cognition that a certain result would be caused by a certain action. Outcome expectation is an expectation of the consequences resulting from a behavior; it is also a judgment prior to an action. Bandura [61] indicated that efficacy expectation (also termed self-efficacy) is an individual's conviction that they are able to take actions to attain success. Outcome expectation is the expectation that an individual could acquire outcomes after taking actions. The effective functioning of the willingness to participate in air pollution control and prevention requires not only self-influence, which is self-efficacy in actions against air pollution, but also outcome expectation for the execution of those actions.

Different people, with different needs in different environments, have different expectation values for the same goal. The expectation value is the judgement of a person as to whether they could attain their goal or not and on the value of the result of attaining the goal. In addition, the targets of outcome expectation may include tangible and intangible benefits. Tangible benefits include economic rewards, power to access information, and job promotion; intangible benefits include reputation and personal satisfaction [64]. Lam and Lee [27] indicated that outcome expectation is a precursor that guides usage behavior. According to social cognitive theory, outcome expectation means an individual's expectation of obtaining rewards or attaining beneficial outcomes resulted from a certain kind of action taken by the individual. Hence, we present the hypothesis as follows:

H8: The higher an individual's "outcome expectation of air pollution control and prevention" is, the higher the extent of the individual's "willingness to participate in air pollution control and prevention" will be.

Social psychologists consider conformity an important part of social influence. The reason why conformity occurs is due to the behavioral change that resulted from other people's actual actions or imaginary behaviors. Therefore, when an individual follows other people's behavioral pattern to act, conformity occurs [65]. Social psychologists induced two reasons for the occurrence of conformity, "informational social influence" and "normative social influence." Informational social influence implies that people tend to observe others' behaviors to obtain important information when they do not know how to act or what to say, and others' behaviors are taken as a guide to the selection of proper actions. Normative social influence implies that an individual wants to be liked and accepted, and therefore the individual conforms their behavior to the group's behavior. The conformity caused by norms occurs not because an individual wants to acquire information from others' behaviors, but because the individual wants to keep staying with the group in order to gain benefits from it [66]. In terms of the willingness to participate in air pollution control and prevention, our willingness to participate in air pollution control and prevention would be influenced by other people. Hence, we present the hypothesis as follows:

H9: The more likely it is for an individual to exhibit "conformity," the higher the extent of the individual's "willingness to participate in air pollution control and prevention" will be.

This present study is based on Bandura's triadic reciprocality [60]. The feasibility of the theory of triadic reciprocality has been verified by Bandura [28,43,60]. Bandura confirmed that this theory could be used to explain the model of the three determining factors that interact with each other, i.e., the force of the environment surrounding humans, individuals' personal factors, and behavioral change. Hence, this study applies social cognition theory and analyzes the following three aspects: first, the influence of environmental and social factors; second, an individual's self-binding force; and third, the power of outcome expectation of green consumer behavior. The interaction of these three aspects will facilitate green consumer behavior.

Hegerl et al. [26] pointed out that we are faced with a high-temperature future. The environment of the Earth will be changing fiercely due to the increase of greenhouse gases. Therefore, the phenomenon of global warming will be more and more obvious due to anthropogenic influence, and its impact will be more and more serious. Many studies were conducted on the measurement of environmental consciousness, including the analysis of the relationship among the environment, ecology, and saving energy, and reducing carbon emissions through the measurement of the extent of individuals' interest in or attention paid to the environment [29,30]. There were also analyses of individuals' past, present, and future promises and willingness concerning their environmental protection behavior for the sake of remedying the negative influence cast upon the natural environment by various resource-consuming activities [32–34,67].

3.3. Data Collection

This study retrieved 412 questionnaires, and 347 of them were effective ones. Among the retrieved effective samples, male respondents occupied 71.5%, and female respondents, 28.5%. Only 9% of the 347 respondents have the experience of using apps related to air pollution control and prevention.

The questionnaire respondents were the undergraduates of a private university of technology in southern Taiwan. They were asked to download Environmental Info Push in class to use the platform to inquire about the daily condition of air quality. After two weeks, we conducted the questionnaire survey with the students on the factors that influence users' willingness to prevent and control air pollution. Because there were more male students than female students in this university, the gender ratio of the respondents also displayed that there were more male respondents than female respondents.

4. Results and Discussion

4.1. Reliability Analysis

This study applied Cronbach's α to examine the reliability of the results. According to the examination, the Cronbach's α value for 12 constructs ranged from 0.6 to 0.92, indicating that the results were higher than the standard value, 0.6 [68].

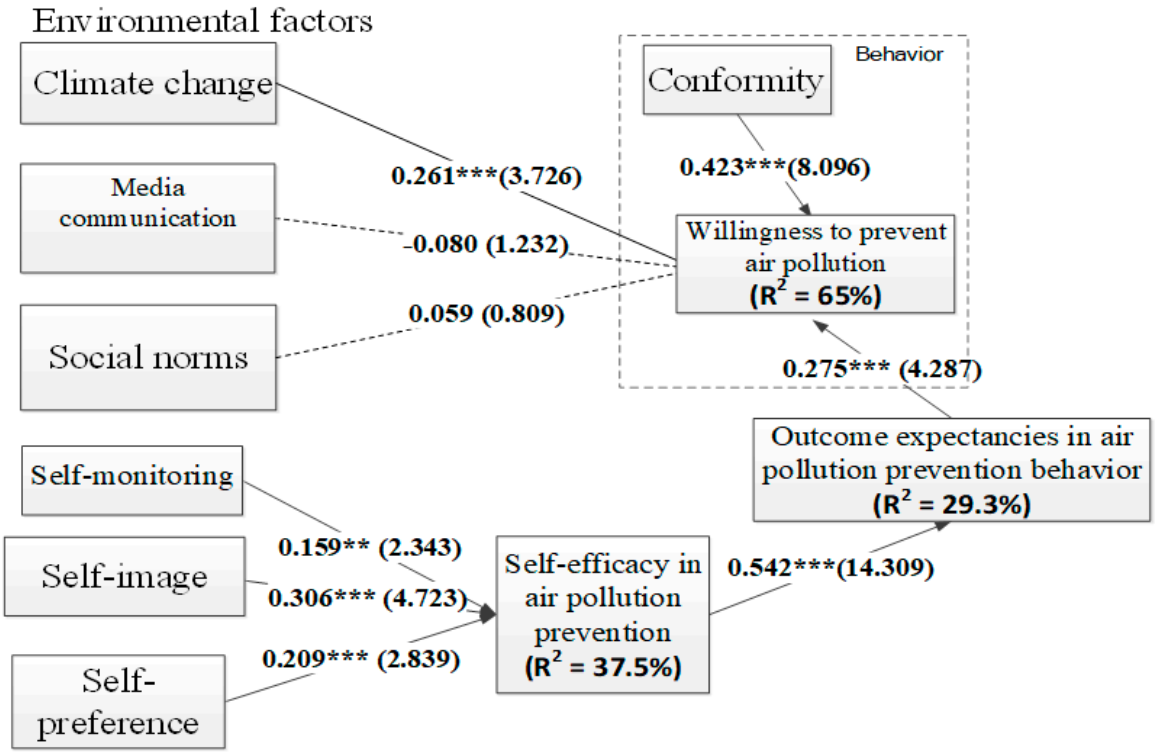
4.2. Measurement Model

The results of reliability, convergent validity, and discriminant validity are shown in Table A3. The composite reliability of each construct was higher than 0.80 and the average variance extracted (AVE) of each construct was higher than 0.5, the recommended value [69]. This means that more than 50% of the items of the hypothesized constructs were valid. This conditional indicator calculates the explanatory power of each construct's measurement items over each construct. The higher the AVE is, the higher the construct's reliability and convergent validity are. In general, the measurement model exhibits proper reliability, convergent validity, and discriminant validity.

4.3. Structural Model

This study applied SPSS Statistics software and SmartPLS to conduct statistical analysis and research simulation. It employed two-phase evaluation models and the bootstrapping approach. The results for the proposed hypotheses are as follows: Concerning the environmental factors, climate change has a significant influence on the willingness to control and prevent air pollution ($\beta = 0.261$). Regarding personal factors, self-monitoring, self-image, and self-preference have significant influence on self-efficacy for air pollution control and prevention ($\beta = 0.150$, $\beta = 0.306$, and $\beta = 0.209$, respectively). Self-efficacy in air pollution control and prevention has a significant influence on outcome expectation of air pollution control and prevention ($\beta = 0.542$). Both outcome expectation of air pollution control and prevention and conformity exhibit a significant influence on the willingness to control and prevent air pollution ($\beta = 0.275$, $\beta = 0.423$). Ullman (2001) indicated that the normed fit index (NFI) could be underestimated when the number of samples is small, and thus the researcher

suggested that the standard of NFI be set to 0.8. The NFI of the model in our study is 0.81, indicating that the model in our study has goodness of fit. The results of the structural model are presented in Figure 3.



Note:

1. ** represents $p < 0.01$, and *** represents $p < 0.001$.
2. Numerical values outside the parentheses are path coefficients, and values inside the parentheses are t-values.
3. This suggests reaching the level of significance; ————, not reaching the level of significance. In addition, conformity has the most influence among the factors that influence willingness to prevent air pollution; the second most influential factors are climate change, outcome expectancies in air pollution prevention behavior, and self-efficacy in air pollution prevention, followed by self-image, self-preference, and self-monitoring. The results demonstrate that people's willingness to prevent air pollution is mostly affected by others; the personal awareness of severity of climate change is the secondary factor; and outcome expectancies and self-efficacy are the third, whereas personal factors, including self-image, self-preference, and self-monitoring, show the least influence.

Figure 3. The results of the structural model.

Except hypothesis two and hypothesis three, all the other hypotheses proved to be valid. The results showed three facts as follows: First, among the environmental factors, climate change cast significant influence upon the willingness to control and prevent air pollution, however, media communication and social norms did not have a significant influence over the willingness to control and prevent air pollution. These findings imply that individuals' personal feelings are very influential in their willingness to control and prevent air pollution, whereas the influence of media coverage and social pressure over an individual's willingness to control and prevent air pollution is not significant. Secondly, with respect to personal factors, self-monitoring, self-image, and self-preference cast a significant influence on the willingness to control and prevent air pollution. This implies that an individual perceives air has been severely polluted, and, then, the individual begins to observe the condition of air pollution. The individual's self-perceived importance and value concerning the issues of air pollution control and prevention, as well as his or her life habits, values, environmental

concerns, attitude, and preferences are all influential in their willingness to control and prevent air pollution. Thirdly, if an individual has higher confidence in their own behavior of air pollution control and prevention, they would have a higher expectation for the benefits and the good reputation brought by their behavior of air pollution control and prevention. Fourthly, the higher the outcome expectation an individual holds for their behaviors of air pollution control and prevention, the stronger their willingness to control and prevent air pollution. Lastly, concerning the willingness to control and prevent air pollution, an individual will be influenced by the others; the individual would even adjust his or her willingness to control and prevent air pollution in order to gain the recognition and fulfill the expectation of their social group.

In terms of the explanatory power of each variable, the explanatory power of the influence of climate change, conformity, and outcome expectation over the willingness to control and prevent air pollution was 65%. Self-monitoring, self-image, and self-preference had a significant influence over self-efficacy in air pollution control and prevention, and their explanatory power was 37.5%. Among the factors related to the willingness to control and prevent air pollution, conformity was the most influential factor; climate change was second; outcome expectation was third; and self-efficacy was fourth. The rest of the factors, in descending ranking order, were self-image, self-preference, and self-monitoring. The results showed that an individual's willingness to control and prevent air pollution was most influenced by other people. The second most influential factor was the degree of severity of climate change that an individual has recognized. Outcome expectation came third; self-efficacy, fourth; and self-image, self-preference and self-monitoring came fifth, sixth, and seventh, respectively.

The results showed that the female respondents' scores of self-monitoring and self-efficacy were significantly higher than the male scores, however, there was no gender difference in the constructs of cognition of climate change, cognition of media communication, social norms, self-image, self-preference, conformity, outcome expectancies, and willingness to control and prevent air pollution. The results are presented in Table 1.

Table 1. Male and female students' scores and the T value of the research constructs.

	Cognition of Climate Change	Cognition of Media Communication	Social Norms	Self-Monitoring	Self-Image	Self-Preference	Self-Efficacy	Conformity	Outcome Expectancies	Willingness to Control and Prevent Air Pollution
	CC	CMC	SN	SM	SE	SP	SEF	POE	BHV	WCPP
Male	3.94	3.94	4.13	3.71	3.64	3.65	6.35	4.08	3.52	3.73
Female	4.01	4.06	4.15	3.88	3.77	3.74	6.72	4.13	3.56	3.85
t	−0.96	−1.31	−0.26	−1.82*	−1.29	−0.85	−1.84*	−0.48	−0.47	−1.26

* stands for $t > 1.96$ and $p < 0.05$, indicating significant difference between male and female responders in the construct.

Chin and Newsted [70] indicated that when R^2 is around 0.67, the explanatory power is substantial; around 0.33, moderate; and around 0.19, weak. In addition, Schumacker and Lomax (2010) advanced that the explanatory power is good when R^2 is larger than 0.3. The R^2 of outcome expectancies in behaviors of air pollution prevention and control in the research model is 0.293, which is close to 0.3, meaning the explanatory power is acceptable. The other two explanatory powers are 0.375 and 0.65, respectively, both of which are larger than 0.3, indicating the explanatory power of the model is good. The research model using a sample of males (249 respondents) is displayed below (Figure 4).

The research model using a sample of females (98 respondents) is displayed in Figure 5. We separated the sample of males and the sample of females to independently conduct two analyses of both research models. The explanatory powers of both models are larger than 0.3, meaning both models have good explanatory powers.

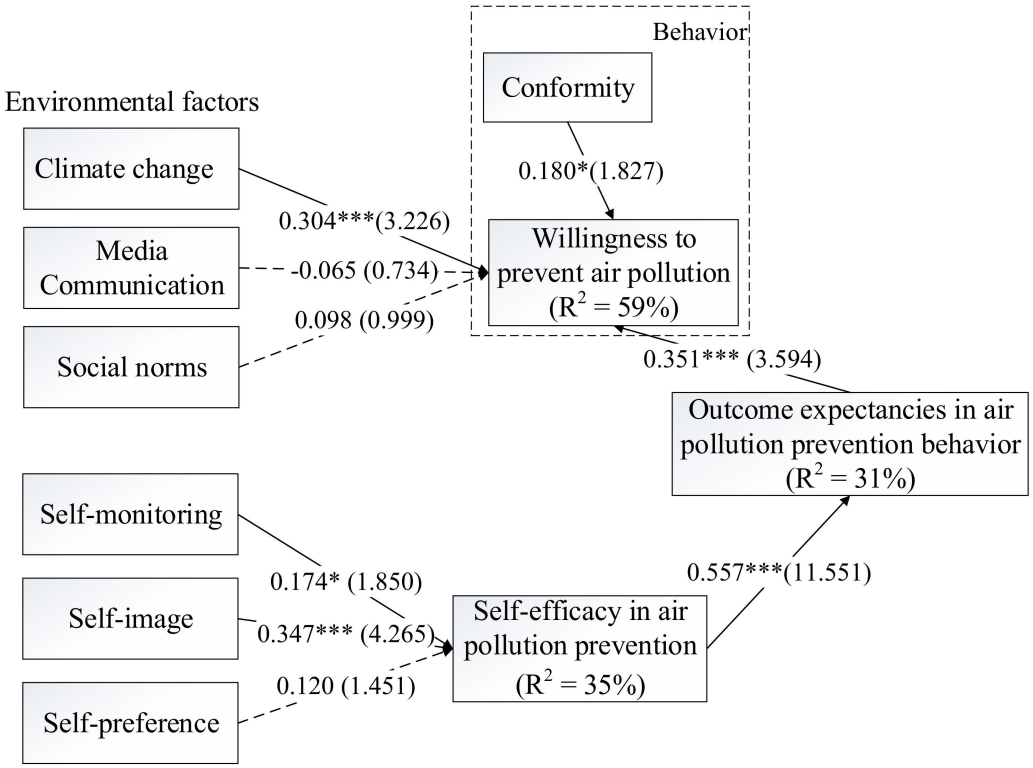


Figure 4. The results of the structural model for males. Notes: * represents $p < 0.05$, and *** represents $p < 0.001$.

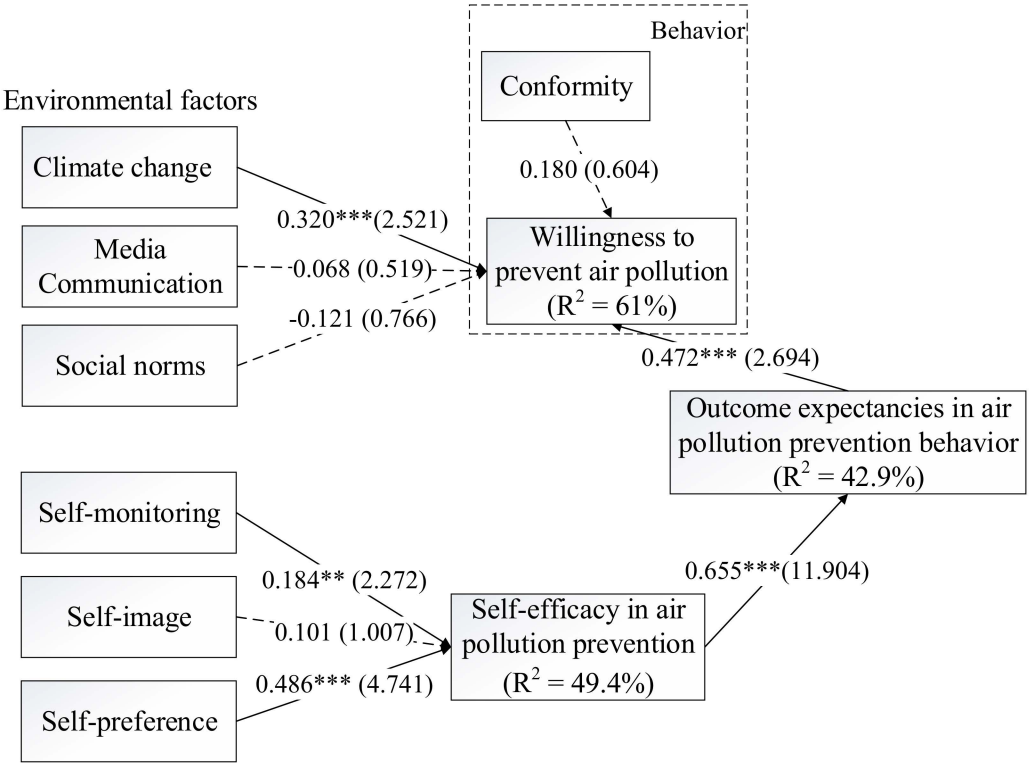


Figure 5. The results of the structural model for females. Notes: ** represents $p < 0.01$, and *** represents $p < 0.001$.

Concerning the gender difference in H9, the influence of conformity over the willingness to prevent and control air pollution, the analytical results showed that males' conforming behaviors would

influence their willingness to prevent and control air pollution, however, females' conforming behaviors would not influence their willingness to prevent and control air pollution. Regarding the gender difference in H5, the influence of self-image over self-efficacy in air pollution prevention and control, the analytical results showed that males' self-image would influence their self-efficacy in air pollution prevention and control, however, females' self-image would not influence their self-efficacy in air pollution prevention and control. With respect to the gender difference in H6, the influence of self-preference over self-efficacy in air pollution prevention and control, the analytical results showed that males' self-preference would not influence their self-efficacy in air pollution prevention and control, however, females' self-preference would influence their self-efficacy in air pollution prevention and control.

Shi et al. [71] integrated the theory of planned behavior and norm activation theory to analyze the significant of influence factors in families' behavior and intention to reduce PM2.5. Their results indicated that perceived behavioral control and descriptive norms were significantly influential in the willingness to reduce PM2.5, however, subjective norms were not. In addition, perceived behavioral control cast an adjusting effect on the control of relationship between family moral norms and on the intention to reduce PM2.5. The results confirmed that the integration of the theory of planned behavior and norm activation theory was suitable for the prediction of families' participation in the behaviors of reducing PM2.5.

Shi et al. [5] discussed the PM2.5-reducing behaviors of citizens using public transportation and citizens who purchased electric cars and analyzed major predictive factors and their influence on the basis of TPB. Their results showed that both subjective norms and moral norms exerted a positive influence on the willingness to reduce each vehicle's exhaust of PM2.5. Self-efficacy and perceived behavioral control produced different effects on the two sorts of behaviors. In the process of using public transportation, self-efficacy positively and significantly influenced the willingness to reduce PM2.5 exhaust, and perceived behavioral control had an adjusting effect on the relationship between subjective norms and the willingness to reduce PM2.5 exhaust, however, when purchasing an electric car, self-efficacy and perceived behavioral control did not influence the willingness to reduce PM2.5 exhaust. Self-efficacy adjusted the relationship between moral norms and the willingness to reduce PM2.5 exhaust, and perceived behavioral control influenced the relationship between subjective norms and the willingness to reduce PM2.5 exhaust. This result would help policymakers take effective measures to reduce PM2.5 exhaust and smog.

Mei et al. [1] evaluated the environmental performance index (EPI) of Malaysia and collected the data of environmental awareness and behaviors from three federal territories and thirteen states to discuss the necessity of social and psychological factors and analyze the factors that influenced Malaysians' evaluation of public environmental awareness and behavioral standards. Their research displayed Malaysians' environmental awareness and behavioral standards concerning the following four categories: water pollution, air pollution, waste management, and climate change. The results showed that Malaysians had a rich understanding of water pollution and they demonstrated the strongest willingness to take conservative actions, however, their scores in waste management and air quality protection were not as high as in environmental awareness. Mei et al. [1] hope their research could initiate the understanding of the importance of environmental awareness and behaviors and benefit the considerations for policymaking by integrating environmental awareness and behaviors.

Among the environmental factors that influenced air pollution prevention and control, personal perceptions of the influence of climate change exerted positive and significant influence on the willingness to control and prevent air pollution. However, the influence of media communication related to the coverage of air pollution and severe environmental destruction and the pressure of policy persuasion did not cast significant influence on an individual's willingness to control and prevent air pollution. In terms of personal factors, self-monitoring, self-image, and self-preference positively and significantly influenced an individual's willingness to control and prevent air pollution. In addition,

self-efficacy and outcome expectancies had positive and significant influences over the willingness to control and prevent air pollution.

The results showed that an individual's recognition of air pollution control and prevention, awareness of the importance of self-recognition, life habits, values, confidence in the ability to control and prevent air pollution, expectation of benefits brought by the control and prevention, and expectation degree all cast significant influence on the willingness to control and prevent air pollution.

5. Conclusions

In addition to temperature and rainfall reports, weather forecasts in Taiwan have also included PM2.5 report. For the general public's reference on daily life activities, the EPA divides the concentrations of PM2.5 into ten levels and marks the levels with different colors. The most dangerous level, level 10, is colored red. The term "purple explosions of air quality" was also derived from weather reports and spread into social and health news. Information concerning PM2.5 has appeared more and more frequently in our life. People with sensitive respiratory tracts know that air is worsening even without the news. The WHO has declared that air pollution is the cause of many diseases and deaths. Human bodies cannot block PM2.5 from entering into respiratory tracts due to its minute size. PM2.5 can cause damage to human organs once it is inhaled. According to the WHO's latest up-to-date report, 92% of the global population are breathing air that has been excessively polluted. Minor syndromes caused by air pollution may include coughs, hyperventilation, and fatigue; severe and acute diseases caused by air pollution many include strokes, heart attacks, pneumonia, chronic and acute respiratory diseases (including asthma). The number of people who died from air pollution every year has exceeded six million. "Breathing" turns out to be one of the main culprits of diseases and deaths and this is not the life we want.

More and more cities around the world have begun monitoring air quality in recent years. Greenpeace has been assisting many countries with severe air pollution, including India, China, and Indonesia, in conducting air quality survey and pollution data analysis. Greenpeace also advices the governments of these countries for taking countermeasures, however, faced with the severe problem of air pollution, early warning, monitoring, and supervision are not enough. The sources of air pollution have to be eradicated in order to maintain a living environment without life risks.

Cultivating citizens' awareness, cognition, and initiatives of air pollution control and prevention with education, propaganda, and strategies is profoundly important. Through the model of evaluation of the willingness to control and prevent air pollution, we recognized that the strengthening of citizens' willingness to control and prevent air pollution can be done with collective power because conformity can drive citizens to change their life habits in order to maintain air quality and raise their willingness to control and prevent air pollution. In addition, several factors also influence the individual's willingness to control and prevent air pollution, which include individual ability to carry out the actions of air pollution control and prevention, self-perceived importance and values, life habits, consuming habits, environmental concerns and attitude, degree of preference, evaluation of self-efficacy in controlling and preventing air pollution, and outcome expectation. The results showed that strengthening citizens' cognition of air pollution, building their ability to deal with air pollution, and changing their daily life habits and values will be beneficial to the implementation of the tasks of air pollution control and prevention.

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Appendix A

Table A1. The pollutant concentration and subindex value

Air Quality Index (AQI).	8-h Average Value of O_3 (ppm)	One-Hour Average Value of O_3 (ppm)[1]	24-h Average Value of $PM_{2.5}$ ($\mu g/m^3$)	24-h Average Value of PM_{10} ($\mu g/m^3$)	8-h Average Value of CO (ppm)	One-Hour Average Value of SO_2 (ppb)	One-Hour Average Value of NO_2 (ppb)
Good 0~50	0.000–0.054	–	0.0–15.4	0–54	0–4.4	0–35	0–53
Okay 51~100	0.055–0.070	–	15.5–35.4	55–125	4.5–9.4	36–75	54–100
Unhealthy to the sensitive 101~150	0.071–0.085	0.125–0.164	35.5–54.4	126–254	9.5–12.4	76–185	101–360
Unhealthy to everyone 151~200	0.086–0.105	0.165–0.204	54.5–150.4	255–354	12.5–15.4	186–304 (3)	361–649
Very unhealthy 201~300	0.106–0.200	0.205–0.404	150.5–250.4	355–424	15.5–30.4	305–604 (3)	650–1249
Dangerous 301~400	(2)	0.405–0.504	250.5–350.4	425–504	30.5–40.4	605–804 (3)	1250–1649
Dangerous 401~500	(2)	0.505–0.604	350.5–500.4	505–604	40.5–50.4	805–1004 (3)	1650–2049

Notes: (1) An AQI is generally calculated with an eight-hour value of O_3. However, some areas' AQI calculation based on a one-hour value of O_3 has the merit of early warning. In this condition, both the eight-hour and one-hour AQIs were calculated, and the index with higher value was adopted as the AQI. (2) The AQI values higher than 301 were calculated with one-hour values of O_3 but not eight-hour values of O3. (3) The AQI values higher than 200 were calculated with 24-hour values of SO_2 but not one-hour values of SO_2.

Table A2. AQIs and Activity Suggestions.

AQI	0~50	51~100	101~150	151~200	201~300	301~500
Impact on Health	Good	Moderate	Unhealthy for Sensitive Groups	Unhealthy	Very Unhealthy	Hazardous
Status Color	Green	Yellow	Orange	Red	Purple	Dark Red
Activity Suggestions for the General Public	Normal Outdoor Activity	Normal Outdoor Activity	1. If you are coughing, your eyes hurt, or your throat hurts, you **should consider decreasing** outdoor activities. 2. Students still **can** engage in outdoor activities, but we **advise** students to **decrease** long and fierce exercises.	1. If you are coughing, your eyes hurt, or your throat hurts, you **should decrease** the consumption of physical strength, especially outdoor activities. 2. Students **should avoid** taking long and fierce exercises and **should increase** rest periods when engaging in other outdoor activities.	1. The general public **should decrease** outdoor activities. 2. Students **should** immediately **stop outdoor activities** and move the activities to indoor areas.	1. The general public **should avoid** having activities outdoors. 2. Students **should** immediately **stop outdoor activities** and move the activities to indoor areas.
Activity Suggestions for the Sensitive	Normal Outdoor Activity	**Very sensitive people** are advised to pay attention to possible body reactions such as coughs and hyperventilation, but there is no problem with engaging in outdoor activities.	1. Patients, children and senior citizens with heart, respiratory and cardiovascular diseases are advised to **decrease physical-strength -consuming activities** and outdoor activities. Wearing a mask when having to go out is necessary. 2. People with asthma may need to increase the frequency to use inhalations.	1. Patients, children and senior citizens with heart, respiratory and cardiovascular diseases are advised to **stay indoors and decrease physical-strength -consuming activities**. Wearing a mask when having to go out is necessary. 2. People with asthma may need to increase the frequency to use inhalations.	1. Patients, children and senior citizens with heart, respiratory and cardiovascular diseases **should stay indoors and decrease** physical-strength -consuming activities. Wearing a mask when having to go out is necessary. 2. People with asthma should increase the frequency to use inhalations.	1. Patients, children and senior citizens with heart, respiratory and cardiovascular diseases **should stay indoors and avoid** having physical-strength -consuming activities. Wearing a mask when having to go out is necessary. 2. People with asthma should increase the frequency to use inhalations.

Source: Taiwan Air Quality Monitoring Network of the EPA (From: Environmental Protection Administration Executive Yuan, 2019).

Table A3. Result of the Analysis of Reliability, Convergent Validity, and Discriminant Validity.

	M	SD	SE	CR	CA	CC	MC	SN	SM	SI	SP	SEF	OE	CF	WP
CC	3.96	0.69	0.04	0.92	0.89	0.81									
MC	3.97	0.80	0.05	0.95	0.93	0.70	0.90								
SN	4.13	0.75	0.05	0.95	0.93	0.76	0.78	0.87							
SM	3.76	0.85	0.05	0.94	0.92	0.56	0.65	0.68	0.87						
SI	3.68	0.82	0.05	0.95	0.93	0.62	0.61	0.64	0.79	0.88					
SP	3.66	0.84	0.05	0.93	0.90	0.49	0.53	0.54	0.70	0.70	0.88				
SEF	6.57	1.69	0.11	0.95	0.94	0.50	0.44	0.50	0.55	0.58	0.53	0.82			
OE	4.08	0.77	0.05	0.97	0.96	0.61	0.59	0.66	0.54	0.55	0.42	0.55	0.93		
CF	3.53	0.75	0.05	0.95	0.93	0.56	0.58	0.58	0.62	0.68	0.42	0.56	0.58	0.85	
WP	3.75	0.86	0.05	0.96	0.94	0.66	0.55	0.62	0.64	0.68	0.54	0.53	0.67	0.72	0.94

Note: [1]CC stands for the influence of climate change; MC, the influence of media communication; SN, the influence of social norms; SM, the influence of self-monitoring; SI, the influence of self-image; SP, the influence

of self-preference; SEF, the influence of self-efficacy in controlling and preventing air pollution; OE, the influence of outcome expectation of air pollution control and prevention; CF, the influence of conformity; WP, the willingness to control and prevent air pollution. [2]M stands for the average value; SD, standard deviation; SE, standard error; CR, composite reliability; CA, Cronbach's α; AVE, the average variance extracted. [3]The diagonal entries are the square roots of the AVE, the off-diagonal entries are shared variation coefficients, and the numerical values in the diagonal entries are correlation coefficient values between each construct.

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