



Article

Understanding Acceptability towards Sustainable Transportation Behavior, A Case Study of China

Muhammad Waqas ^{1,*}, Qian-li Dong ¹, Naveed Ahmad ², Yuming Zhu ² and Muhammad Nadeem ³

¹ School of Economics and Management, Chang'an University, 2nd Ring Road, Beilin District, Xi'an 710072, Shaanxi, China; dongql169@vip.sina.com

² School of Management, Northwestern Polytechnical University, 127 West Youyi Road, Beilin District, Xi'an 710072, Shaanxi, China; naveedahmad@mail.nwpu.edu.cn (N.A.); zym1886@nwpu.edu.cn (Y.Z.)

³ School of Social Sciences, Lanzhou University, No. 222, Tianshui South Road, Lanzhou 730000, Gansu, China; muhammadnadeemkhaan@gmail.com

* Correspondence: waqasalyani23@chd.edu.cn; Tel.: +86-029-82334335

Received: 5 September 2018; Accepted: 8 October 2018; Published: 15 October 2018



Abstract: Nowadays, increased usage of motorized vehicles has become a cause of serious environmental and health problems which results in noise pollution, air pollution and the emission of greenhouse gases. Sustainable transportation options such as green public buses, subways and public cycling have been introduced to improve environmental quality. However, their adoption is still in the initial stage. Therefore, the aim of this study is to explore the consumer attitude towards sustainable transportation, and their willingness to choose different environmentally friendly options like cycling and public green transportation by applying a norm activation model (NAM). More specifically, this study explored the role of different predictors (sustainable transport benefits awareness, traffic problem awareness, government policies and symbolic motives of using a car) affecting citizen's acceptability to sustainable transportation options with mediating role of environmental concern and moderating role of self-transcendence and self-enhancement. A questionnaire-based survey conducted in four major metropolitan cities of China including Beijing, Shanghai, Guangzhou, and Xi'an found that acceptability towards sustainable transportation is derived from sustainable transport benefits awareness and traffic. Symbolic motives of the car have a negative association with acceptability towards sustainable transportation. The mediating effect of environmental concerns was proved, which extends the role of NAM in this study. Self-transcendence and self-enhancement have positive and negative moderating effects consecutively towards the acceptability of sustainable transportation. This study has potential implications for the government of China, transportation, and urban planning departments in order to take necessary measures to promote sustainable transportation behavior in Chinese citizens.

Keywords: acceptability; sustainable transportation; environmental concern; China; norm activation model

1. Introduction

The majority of the population of China consider the car as a convenient and attractive mode of transportation and heavily depend on a motorized vehicle in their daily life [1]. Nowadays, increased usage of the motorized vehicle has become a cause of serious environmental and health problems which are related to noise pollution, air pollution and the emission of greenhouse gas [2]. More dependence on motorized vehicles also disturbs our physical and mental health and can be a risk factor for chronic diseases [3]. The cost of different motorized vehicles is not a big issue and can be

compensated for with better use of technology and renewable resources; however, it needs a huge monetary investment and is also a time-consuming activity. Due to increasing population and demand for motorized vehicles, scholars have recommended developing an integrated framework composed of sustainable transportation and environmental practices improving quality of life [4,5]. Although promotion of sustainable urban transportation is the focus of many governments, convincing citizens to use sustainable transportation is a big issue.

Although this task is challenging nowadays, as different means of transportation are available for different kinds of trips, a study in the UK shows that the choice of transportation depends on time, comfort and flexibility. People choose different means of transportation for different kind of trips depending on their destination and time management [6]. Car usage is more prevalent in the West, especially in the USA, Australia and to a lesser extent in Europe [7]. Motorization is also gaining momentum in Asian countries, the most remarkable is rapid growth in private car ownership [8].

Urban transportation in China is a serious issue, which is the cause of environmental and health problems. The traffic management Bureau issued a report that shows the transformation from bikes and motorcycles to automobiles, consisting of 61% cars as personalized vehicle ownership has reached 279 million [9]. According to Shaohui [10] in 2016, the car ownership rate was 172 million in China, however, due to increased car ownership rate, the most notable problems are traffic congestion and parking issues. Car density in major Chinese cities like Beijing is 3800 vehicles per square kilometer [11]. The government has taken different initiatives to promote sustainable transportation with the help of private sectors, like Public green transport, subsidies to electric cars, Chinese government public bicycle service, and Private sector bicycles OFO, MOBIKE. Moreover, some companies are also offering car-sharing services e.g., GoFun, EvCard. These initiatives are helping to reduce environmental pollution and to promote sustainable transportation among Chinese citizens.

Most of the previous research in sustainable transportation is related to establishing indicators or an index system for evaluating sustainability [12–14]. In recent years, researchers have focused on the relationship between sustainable transportation and consumer quality of life [15], the role of social networks structures [16,17], and challenges related to acceptability of sustainable transportation [18]. However, there is little focus on consumer attitude towards choosing different alternatives for sustainable transportation [19]. Due to increasing urban sustainable transportation concerns and environmental pollution in China, there is a need to explore the consumer attitude towards choosing the different alternative of sustainable transportation like cycling and public green transportation.

Therefore, the aim of this study is to explore the consumer attitude towards sustainable transportation, and their willingness to choose different environmentally friendly options like cycling and public green transportation. More specifically, this study will check the role of different predictors (sustainable transport benefits awareness, traffic problem awareness, Government policies and symbolic motives of using the car) affecting citizen's acceptability to sustainable transportation options with mediating the role of environmental concern and moderating the role of self-transcendence and self-enhancement.

This study contributes from both the theoretical and practical perspectives. Theoretically, this study adds to the literature on acceptability towards sustainable transportation by applying a Norm activation model (NAM) in the Chinese context. Practically, this study will be helpful for relevant authorities to understand and foster sustainable transportation among Chinese citizens. The rest of the paper is presented as follows: A literature review and hypotheses development are presented in Section 2. Research methodology is presented in Section 3. Section 4 shows data analysis and results. The discussion is presented in Sections 5 and 6 shows the practical implications. Finally, the concluding remarks are presented in Section 7.

2. Literature Review

2.1. Theoretical Framework

Schwartz [20] established the Norm activation model (NAM) by investigating the effect of norms on altruism and widely used in different kinds of pro-environment behavior. There are three types of antecedence that lead to pro-environment behavior. It includes awareness of consequences, the realization of responsibility and personal norms and values. The theory of NAM starts with an individual's understanding about the consequences and realization of responsibility for not performing the environmentally friendly behavior. Awareness of environmental issues triggers personal norms to avert harmful effects [21]. In this model, an individual's awareness is concerned with the common understanding of harmful effects for others; realization of responsibility is related to "ascription of responsibility" for adverse outcomes of not performing pro-socially or pro-environmentally; and personal norms and values are related to moral obligations that an individual possesses to perform social and environmentally friendly behavior. Moreover, an individual's understanding of consequences and realization of responsibility activates the personal norm system. It is due to assigning these negative consequences to themselves and take appropriate actions. Vice versa, if the feelings of negative consequences are not ascribed, the likelihood of ascribing responsibility is not developed. There are two schools of thought about using NAM in a model. Some researchers argue that NAM is a mediation-based model which describes that awareness and ascription of responsibility have an indirect effect on environmentally friendly behavior via personal norm [22–25]. Other researchers have assumed NAM to be a moderation-based model, as awareness of environmental issues and realization of responsibility moderates the association between personal norms and environmentally friendly behavior [26]. In this study, NAM is extended towards the adoption of sustainable transportation options by introducing a mediation-based model. With more awareness regarding transportation problems and the benefits of sustainable transportation, consumers will be more concerned about the environment. As environmental concern relates to a positive attitude towards environmental issues [27]; therefore, this study checks the validity of NAM in the current study based on ascribing responsibility to sustainable transportation and environmentally friendly practices.

2.1.1. Predictors of Acceptability to Sustainable Transportation

Since 2002, an adaptation of car usage has rapidly increased among Chinese citizens. China is standing as the number one car user with 24.4 million cars produced in the world [28,29]. In the literature, the alternatives to car-based transportation have gotten recognition as they decrease carbon in the transportation sector and because they provide improved public transport, give importance to those factors which can increase acceptability of alternatives and provisions of subsidies on renewable fuels [30]. The innovative new technologies including hybrids and electric vehicles, fuel cell vehicles (FCV), hydrogen, and electricity- and biofuel-based vehicles have replaced fuel-based personal transportation. Offer et al. [31] explored citizen's acceptability to a sustainable option such as FCV as an alternative to car use.

In early 2000, FCV and hydrogen-based vehicles created technical interest and had the capability to influence the general public acceptability. FCV and hydrogen-based vehicles are a practical change to be seen as the radical technology in future, and thus, the potentially recognized area still requires in depth research on its acceptability. On the other hand, electric vehicles are also playing a significant role and helping in carbon reduction but currently research emphasizing the acceptability of electric vehicles is still inadequate. Morton et al. [32] identified the opportunities and barriers to the acceptability of electric vehicles at the individual level. Different researchers found different predictors of acceptability to sustainable transportation. Steg and Tertoolen [33] described that habit of car usage has a negative effect on acceptability to sustainable transportation. Steg [25] found out that younger citizens have a negative attitude towards acceptability to sustainable transportation and their usage of the car is positively associated with symbolic and affective motives. Dill and Voros [34] explained that heavy

traffic on the road strongly pushes citizens to adopt sustainable transportation options like cycling, especially in European countries. Chatterton et al. [35] identified carbon emission and awareness of climate change as strong predictors of personal transportation choice. Fishman et al. [36] indicated that fear and risk of accident with motorized vehicles is increasing bicycle riding in Australia. Jakovcevic and Steg [37] described that individual norms have a strong influence on the choice of sustainable transportation options. Kim, Schmöcker, Bergstad, Fujii and Gärling [27] pointed out that trust in the government and environmental problem awareness are strongly associated with acceptability to sustainable transportation. Van Acker et al. [38] developed a comprehensive model to show the main predictors of acceptability to sustainable transportation including lifestyle, status, attitude, speed, price, and comfort. Xia et al. [39] found out traffic problem awareness and benefits of sustainable transportation awareness to be strongly associated with acceptability to sustainable transportation. More details about predictors of acceptability to sustainable transportation are given in Table 1.

Table 1. Predictors of Acceptability to sustainable transportation.

Authors (Years)	Empirical Study	Backgrounds of Acceptability to Sustainable Transportation
Xia, Zhang, Braunack-Mayer and Crabb [39]	$n = 381$, respondents lived in Adelaide were interviewed by computer-assisted telephone interviewing (CATI)	Traffic problem awareness and benefits of sustainable transportation awareness are strongly associated with acceptability to sustainable transportation.
Kim, Schmöcker, Bergstad, Fujii and Gärling [27]	$n = 640$, post-graduates and under-graduate of Kyoto university were taken as respondents	Trust on government, environmental problem awareness and personality traits are positively correlated with acceptability to sustainable transportation.
Khoo and Ong [40]	$n = 925$, respondents were students holding with a bachelor's degree	Environmental Awareness and service availability are positively correlated with acceptability to sustainable transportation.
Steg and Gifford [41]	$n = 455$, from Dutch respondents	Individual's short-term interest and quality of life have a strong positive effect on acceptability to sustainable transportation.
Gärling and Schuitema [42]	$n = 325$, respondents were randomly selected from Netherland	The attractiveness of car use, costs attached in car reduction goals and uncertainty are negatively correlated with acceptability to sustainable transportation.
Nobis [43]	$n = 1000$, respondents were the German car share firm	Lack of car sharing is positively correlated with acceptability to sustainable transport.
Steg [25]	$n = 185$ possessed license respondents /113 regularly commuters	Car usage acts as a mediator between attitude and symbolic and affective motives in young males.
Xenias and Whitmarsh [18]	$n = 93$, respondents were transport related experts and local citizens of UK	Improvement of cycling facilitates R & D in low emission vehicles and improved legislation are positively correlated with acceptability towards sustainable transportation.
Steg and Tertoolen [33]	$n = 63$, review of studies	The habit of car usage has a negative effect towards acceptability to sustainable transportation.
Van Acker, Goodwin and Witlox [38]	$n = 611$, respondents were car user	Lifestyle, status, speed, price, comfort, and attitude are negatively associated with acceptability towards sustainable transportation.
Albert et al. [44]	laboratory-based experiment	Personality factors have a strong positive effect on choices of route, trip and travel time.
Fujii [45]	$n = 1200$, respondents were car commuters	Car use habit is negatively associated with acceptability towards sustainable transportation. Environmental degradation and air pollution have a positive effect towards acceptability to sustainable transportation.
Jakovcevic and Steg [37]	$n = 160$, respondents from Argentina	Reduction in car usage acts as a mediator between individual's norms and acceptability to sustainable transportation.
Johansson et al. [46]	$n = 1900$, commuters	Travel comfort, time-saving, and personality traits have a positive effect on acceptability to sustainable transportation.
Bamberg and Schmidt [47]	$n = 254$, respondents were university students	Intention and habit of car use have a negative effect on acceptability to sustainable transportation.
Stradling et al. [48]	$n = 791$, respondents were car drivers	Increased car usage has a positive effect on road casualties, pollution, noise, congestion, damage to wildlife and depletion of resources.

Table 1. Cont.

Authors (Years)	Empirical Study	Backgrounds of Acceptability to Sustainable Transportation
Han [49]	$n = 325$, respondents were commuters	Car ownership is negatively correlated with acceptability to sustainable transportation in Singapore.
Chatterton, Coulter, Musselwhite, Lyons and Clegg [35]	$n = 178$, three stages of research with a distinct group of respondents	Personal carbon emission and considerable climate change have positive effects on personal transport choice.
Dill and Voros [34]	$n = 566$, respondents were adult, ages 18 or over	Too much traffic, bike lanes, and trails have positive correlation acceptability to sustainable transportation.
Anable [50]	$n = 666$, respondents were the visitors to national trust property the UK	Personality traits such as need of safety, comfort, convenience and flexibility are positively correlated with the acceptability of sustainable transportation.
Domarchi et al. [51]	$n = 523$, respondents were the staff of the university	Attitude towards cars act as a mediator between the habit of car use and acceptability to sustainable transportation.
Fishman, Washington and Haworth [36]	$n = 24,858$, respondents were Australian citizens	Fear and risk of accident with motorized vehicles are positively correlated with acceptability to sustainable transportation such as bicycle riding in Australia.

Based on the above-mentioned literature and Table 1, this study proposes the following hypotheses:

Hypothesis 1a. *Sustainable transport benefits awareness is positively associated with the acceptability of sustainable transportation.*

Hypothesis 1b. *Traffic problem awareness is positively associated with the acceptability of sustainable transportation.*

Hypothesis 1c. *Government policies are positively associated with the acceptability of sustainable transportation.*

Hypothesis 1d. *Symbolic motives of the car are negatively associated with the acceptability of sustainable transportation.*

Hypothesis 2. *Predictors of acceptability to sustainable transportation (Sustainable transport benefits awareness, traffic problem awareness, government policies and symbolic motives of the car) are significantly associated with environmental concern.*

2.1.2. Environmental Concern and Acceptability to Sustainable Transportation

Transportation scholars have been inclined to focus on personal beneficial results relating to the perceived time of journey, costs, and flexibility [52], but considering environmental protection is also mandatory for transportation users [53]. A number of researchers have found that environmental concern has a significant influence on travel mode decisions [54,55]. Numerous transportation factors influence environmental concern including apparent threats of environmental destruction to the society, individual, or the earth [56–59]; concerned responsibility or emotional state of guiltiness for the environmental problem; willingness in the reduction of car use for decreasing the environmental problem [60]; perceived benefits and barriers to sustainable travel behavior [61]. Therefore, based on the above literature, the proposed hypothesis can be as follows:

Hypothesis 3. *Environmental concern has a positive effect on the acceptability to sustainable transportation.*

2.1.3. Mediating Role of Environmental Concern

Previous research has considered environmental concern as an attitude towards environmental problems. Many researchers investigated the relationship of environmental concern with different antecedence and consequent behavior. Several studies indicated that people having high environmental concern are more motivated towards pro-environment behavior [62–65].

Environmental concern is influenced by different individual, group and institutional factors including demographic variables (gender, age, education, job status), pro-environmental beliefs (e.g., concern for environmental degradation), and institutional (Banks, Federal and local Government, Municipalities) efforts to protect the environment [66]. In this scenario, different pro-environmental beliefs like traffic problem awareness, sustainable transportation benefits awareness, and government policies about environmental protection can trigger environmental concern that ultimately can increase the likelihood of acceptability towards sustainable transportation modes. Therefore, based on the previous literature and this rationale, it can be hypothesized that:

Hypothesis 4a. *Environmental concern mediates the relationship between sustainable transport benefits awareness and acceptability to sustainable transportation.*

Hypothesis 4b. *Environmental concern mediates the relationship between traffic problem awareness and acceptability to sustainable transportation.*

Hypothesis 4c. *Environmental concern mediates the relationship between government policies and acceptability to sustainable transportation.*

Hypothesis 4d. *Environmental concern mediates the relationship between symbolic motives of car and acceptability to sustainable transportation.*

2.1.4. Moderating Role of Self-Transcendence

Self-transcendence integrates two values including universalism and benevolence. People adopting benevolence are kind towards others and try to improve people's interest. Universalism focuses on securing people's interest and nature. People adopting universalism are more inclined towards justice for all and are more impulsive about environmental problems. Therefore, people having high self-transcendence, value society's welfare and focus on collective interest rather than protecting self-interest [67]. Self-transcendence gives a realization about a behavior that is beneficial for the whole of society and makes people more determined to act and follow that behavior. As sustainable transportation promises benefits for both society and nature, it fulfills the self-transcendence consumer's desire to take care of people's interest and nature. Thus, consumers with high self-transcendence are willing to accept sustainable transportation behavior and consumers with low self-transcendence can accept sustainable transportation behavior under external pressure. Hence, it can be hypothesized:

Hypothesis 5a. *Citizens having high sustainable transport benefits awareness and high self-transcendence values are highly associated with acceptability of sustainable transportation.*

Hypothesis 5b. *Citizens having high traffic problem awareness and high self-transcendence values are highly associated with acceptability of sustainable transportation.*

Hypothesis 5c. *Improved Government policies about sustainability and high self-transcendence values are highly associated with acceptability of sustainable transportation.*

Hypothesis 5d. *Citizens having high symbolic motives of the car and high self-transcendence values are negatively associated with acceptability to sustainable transportation.*

2.1.5. Moderating Effect of Self-Enhancement

Schwartz combines two basic values into self-enhancement including power and achievement. Power values focus on the attainment of social status, power and wealth, and enjoying popularity in public. Achievement values emphasize the manifestation of personal achievements in front of others,

having the objective to act aggressively and influence others behavior [20]. Self-enhancement values can be influenced by subjective norms during the consumer decision-making process. Subjective norms indicate the external pressure influencing other people in the decision-making process. Consumers favoring other beliefs are more sensitive to external pressure. Consumers having high self-enhancement values are more concentrated on self-interest and personal achievements while neglecting the collective interest [67]. Therefore, the subjective norm has a little role in self-oriented people’s lives and shaping their behavior. Contrarily, people having high self-enhancement make efforts to prove their competency and aggressively pursue all alternatives to achieve their targets.

In China, people having certain knowledge, wealth, power and time are more interested to own a car. Thus, this behavior is a signal of consumer competence and a sense of self-enhancement and have a negative attitude towards acceptability to sustainable transportation [68]. So, it can be hypothesized:

Hypothesis 6a. *Citizens having high sustainable transport benefits awareness and high self-enhancement values are negatively associated with acceptability to sustainable transportation.*

Hypothesis 6b. *Citizens having high traffic problem awareness and high self-enhancement values are negatively associated with acceptability to sustainable transportation.*

Hypothesis 6c. *Government policies about sustainability and high self-enhancement values are negatively associated with acceptability to sustainable transportation.*

Hypothesis 6d. *Citizens having high symbolic motives of the car and high self-enhancement values are negatively associated with acceptability to sustainable transportation.*

The model for the study is divided into two parts, model 1 (Figure 1a) shows the mediation-based model and model 2 (Figure 1b) shows the moderation-based model.

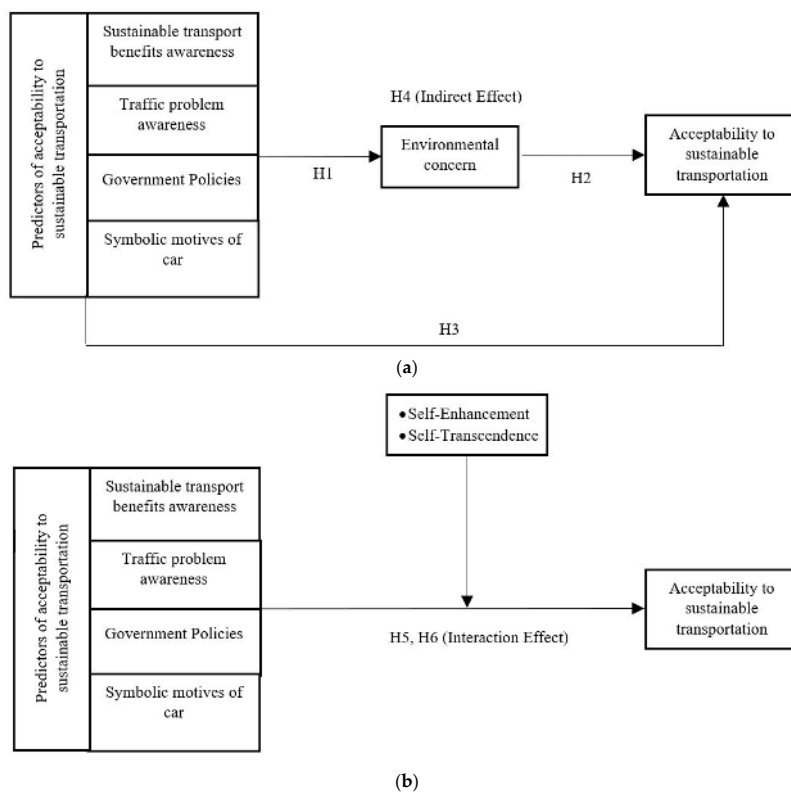


Figure 1. (a) Mediation-based study model. (b) Moderation-based study model.

3. Methodology

The objective of this study is to explore the attitude of Chinese citizens towards sustainable transportation and to find what can be different predictors affecting willingness to adopt different environmentally friendly sources of sustainable transportation like cycling, hybrid car, hydrogen, and FCV. This study was conducted in four major metropolitan cities of China including Beijing, Shanghai, Guangzhou, and Xi'an. Initially, local traffic management authorities of relevant cities were contacted considering the ethical dilemma of the research. The survey was self-administered and online interviewing using the most popular social apps in China, like WeChat, Weibo and QQ. The target population was from four main cities of China above 18 years old. According to the nature of the study, the sample size is unknown. Ref. [69] suggested a formula to calculate the optimal sample size:

$$\text{Required Sample Size} = [(\text{minimum sample size required} \times 100) \div (\text{Average percentage response rate expected})]$$

The minimum sample size for SEM suggested by different researchers [70–72] is 200 and the average percentage of response rate in previous studies related to sustainable transportation is 48% [39,73,74] which is comparatively good. Based on the above suggested values, the sample size of this study can be calculated as: $[(200 \times 100) \div 48] = 417$. The data was collected by using a convenient sampling technique. Finally, a total of 800 questionnaires were successfully distributed among the respondents—486 were sent back due to incomplete response, 461 questionnaires were usable, and the response rate was 58% which was enough good to perform structural equation modeling [75]. Five graduate students were recruited to facilitate the data collection. Data were collected from June 2017 to August 2017. Offline and Online, both modes were used to expedite the data collection process. Before data collection, basic information about sustainable transportation and study objectives was provided to respondents. Considering the different types of respondents, respondents were asked to choose between offline and online modes of data collection. Most of the old age respondents preferred to give responses through offline mode. However, most of the respondents decided to use online mode as 650 million of the total population is using different social networks [76]. For online data collection, initially, a web-link including general and variable questions was generated through a survey facilitation website, and then different respondents were recruited randomly on central locations of the cities by adding their social accounts (WeChat, Weibo and QQ). Chinese multi-purpose messaging and social media app WeChat was used to compensate respondents of study by using one of its famous options of money transfer “Hong Bao” to get maximum response rate. Each respondent was compensated with “Hong Bao” at the time of successful completion of a questionnaire that helped to increase the response rate. Details of the respondents are given in Table 2.

The questionnaire was composed of two parts. The first part includes different demographic questions like gender, age, education, work status and general citizen's transportation practices (car use frequency, other transport use frequency, usage of bicycle). The second part includes the questions related to the main variables in the study. Measures for sustainable transport benefits awareness (6-items), traffic problem awareness (4-items) and acceptability to sustainable behavior (5-items) were adopted from the literature [48,50,77]. Measures for government policy (3-items) were adopted from the study of Khoo and Ong [40]. Environmental concern was measured with four items using the scale of Kim, Schmöcker, Bergstad, Fujii and Gärling [27]. Lastly, the symbolic motives of the car were measured with five items using the scale of Steg [25]. All the measures were assessed by using a five-point Likert scale ranging from 1 = Strongly Disagree, to 5 = Strongly Agree. For measures of self-transcendence and self-enhancement, this study adopted the well-established Schwartz's Portrait Value Questionnaire (PVQ) which has been validated in different cultures and translated into many languages [78,79]. A verbal portrait-based short-version of PVQ comprising of 21 imaginary persons

was used. Each portrait was rated on a five-point scale where 1 = not like me at all, 5 = very much like me.

Table 2. Respondents profiles and general citizen's transportation practices.

Demographics	Count	Percent (%)	Transport Usage	Count	Percent (%)
Gender			Car use frequency		
Male	243	52.71	Never	5	1.08
Female	218	47.29	Occasionally, e.g., 1 to 3 times per month	75	16.27
Age group			1 to 2 times per week		
18–34 years	139	30.15	3 to 4 times per week	56	12.15
35–64 years	196	42.52	5 or more times in week	238	52.63
>65 years	126	27.33	Mode of transportation (daily basis)		
Education			Car (driver/passenger)		
No schooling beyond secondary school level	154	33.41	Public transport (bus/train/tram)	191	41.43
Trade, certificate, diploma	136	29.50	Bicycle	97	21.04
Bachelor's degree or higher	171	37.09	Walk	7	1.52
Work status			Combined, e.g., car first then public transport		
Unemployed	29	6.29	Other	0	0
Employed	432	93.71	Bicycle user		
			No		
			Yes		

All the adopted scales were in the English language that is not the official language in China and there is a low percentage of Chinese citizens who have a good ability to understand English [80]. All the questions were translated into Chinese language and then sent to two language experts of Xi'an international studies university to check its content validity. After performing three repetitions, a structured translated version of the questionnaire was obtained.

4. Analysis

Finally, 486 questionnaires were received, due to incomplete response, 461 questionnaires were usable. Validity and reliability analysis were examined by Exploratory factor analysis (EFA) and Confirmatory Factor Analysis (CFA). Internal consistency was checked by Cronbach's Alpha; Cronbach's Alpha values ranged from 0.78–0.93, which demonstrates internal consistency of all six constructs is greater than the recommended value of 0.70, as recommended by Ref. [81]. Values of Cronbach's Alpha exhibits that the developed scale is reliable.

Exploratory Factor Analysis (EFA) was applied to discover the latent variable on six constructs containing 27 items. The main objective of EFA was to identify the relationship between latent and observed variables if the variables are uncertain and unknown [82]. In this study, principle components analysis with varimax rotation was applied to implement EFA on 27 items. Exploratory Factor Analysis begins with analyzing the suitability of data through sampling adequacy Kaiser-Meyer-Olkin (KMO) and Bartlett test. According to the criteria, the value of KMO should be 0.60 or more to perform factor analysis [83]. The value of KMO was 0.816 which meets the criteria and the outcome of the Bartlett test was $\chi^2 = 3124.567$ and $p > 0.000$ that is representing significant and sufficient inter-correlation. Dabholkar et al. [84] suggested the factor loadings of all items should be more than 0.40. According to Hair et al. [85], the value of commonalities and cross-loadings should be greater than 0.40 to meet the

criteria. According to the findings of EFA eigenvalues, all six constructs should be 1 or more than 1 as suggested by Kaiser [86]. All the factors have an eigenvalue more than 1 with 71.56% total variance. The values of factor loading were ranging between 0.52–0.85 which meets the above-mentioned criteria. Therefore, no item was deleted from the study. The results for EFA are presented in Table 3.

Table 3. Results of Exploratory Factor Analysis.

Variables Name	Items	FL ^a	SMC ^b	
Sustainable transport benefits awareness (STBA) $\alpha = 0.78$	STBA1	From an environmental point of view, it is important we reduce car use.	0.85	0.54
	STBA2	Public transport is a more environmentally friendly option than driving a car.	0.65	0.71
	STBA3	Cycling and walking are more environmentally friendly options than driving a car.	0.63	0.65
	STBA4	Walking and cycling can help me to keep fit and healthy.	0.56	0.50
	STBA5	If more people walked and cycled, this would have a positive effect on our environment.	0.77	0.59
	STBA6	Being environmentally responsible is important to me.	0.52	0.53
Traffic problems awareness (TPA) $\alpha = 0.82$	TPA1	Traffic-related air pollution is dangerous to our health.	0.58	0.61
	TPA2	Traffic can cause noise pollution.	0.83	0.56
	TPA3	Traffic emissions are a threat to the environment.	0.77	0.65
	TPA4	The more cars on the road, the more traffic injuries.	0.54	0.70
Government Policies (GP) $\alpha = 0.80$	GP1	The government policy of reducing car users is attracting me.	0.64	0.89
	GP2	I will use public transportation if the government provides incentives to users.	0.63	0.55
	GP3	I appreciate the government initiative to introduce green public buses.	0.59	0.67
Symbolic Motives of Car (SMC) $\alpha = 0.87$	SMC1	A car provides status and prestige.	0.49	0.92
	SMC2	My car shows who and what I am.	0.53	0.64
	SMC3	I may be jealous of someone with a nice car.	0.59	0.76
	SMC4	You can know a person by looking at his or her car.	0.76	0.51
	SMC5	The brand of a car is more important to me than its functional qualities.	0.53	0.56
Environmental Concern (EC) $\alpha = 0.93$	EC1	I feel a moral obligation to protect the environment.	0.67	0.67
	EC2	I feel that I should protect the environment.	0.60	0.58
	EC3	I feel it is important that people, in general, protect the environment.	0.55	0.54
	EC4	Our environmental problems cannot be ignored.	0.73	0.73
Acceptability to sustainable transportation (AST) $\alpha = 0.79$	AST1	Sourcing and form of funding.	0.65	0.53
	AST2	Cycling is a safe transport option for me.	0.73	0.57
	AST3	I often use public cycling (OFO & MOBIKE)	0.75	0.60
	AST4	I prefer public transport as a commuter.	0.52	0.85
	AST5	Public green transport services are reliable for me.	0.65	0.73

^a FL = Factor Loadings, ^b SMC = Squared Multiple Correlation.

Finally, Confirmatory Factor Analysis (CFA) was applied to 27 items in six categories for the purpose of judging constructs validity. AMOS 21 statistical analysis software was used to perform CFA research technique of Structural Equation Modeling (SEM). CFA is the one of the most important research techniques of SEM, which is widely used in different studies of transportation to find the covariance structure [87] or linear structural relationship models [88]. When a researcher has inadequate information related to latent factors, multivariate regression is used to find the significant relationships between factors. Twenty-seven items under six categories of the confirmatory model were scrutinized, applying different kinds of model fitness indices. The findings of the model displayed that squared multiple correlation (SMC) values ranged between 0.489–0.735, which meets the criteria.

The final results of CFA, model fitness and correlation among different variables of the study are shown in Tables 4 and 5.

Table 4. Model Fitness results.

Variables	Composite Reliability ¹	Average Variance Extracted ²	Fit Indices _{3,4,5}	Statistics	Recommended Criteria
Sustainable transport benefits awareness	0.83	0.672	NFI	0.92	>0.90
Traffic problems awareness	0.81	0.619	NNFI	0.95	>0.90
Government policies	0.85	0.592	CFI	0.91	>0.90
Symbolic motives of car use	0.76	0.634	GFI	0.96	>0.90
Environmental concern	0.88	0.643	AGFI	0.97	>0.80
Acceptability to sustainable transportation	0.80	0.602	RMSEA	0.053	>0.08
Self-transcendence	0.78	0.642	-	-	-
Self-enhancement	0.84	0.598	-	-	-

¹ [89]; ² [90]; ³ [91]; ⁴ [92]; ⁵ [93].

Table 5. Correlation Analysis.

Variables	STBA	TPA	GP	SMC	EC	AST	SE	ST
STBA	-	-	-	-	-	-	-	-
TPA	0.17	-	-	-	-	-	-	-
GP	0.24	0.17	-	-	-	-	-	-
SMC	0.41	.037	0.43	-	-	-	-	-
EC	0.563 ***	0.192 **	0.138 *	-0.211	-	-	-	-
AST	0.413 ***	0.554 ***	0.339 ***	-0.130 ***	0.576	-	-	-
SE	-0.754	0.209	-0.235	0.009	-0.009	-0.018	-	-
ST	0.0017	0.248	0.295	0.064	0.021	0.016	0.029	-

STBA = Sustainable transportation benefits awareness, TPA = Traffic Problem awareness, GPS = Government policies for sustainability, SMC = Symbolic motives of car. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Results of Hypothesis

As recommended by Muller et al. [94], this study utilized a hierarchical multiple regression to check the hypothesis, mediation, and moderation. Moreover, following the guidelines of Zhao et al., this study confirmed mediating and moderating effects by running scripts to check the interaction and indirect effects [95–98].

The results of the study were categorized on the base of mediation and moderation results. As Table 6 describes results for the mediation model and Table 7 presents the results for moderation analysis.

Model 1 and Model 3 in Table 6 introduced control variables influencing acceptability to sustainable transportation. Model 2 (Hypothesis 1) proposes a significant association between sustainable transportation benefits awareness, traffic problem awareness, government policies, symbolic motives of car usage and environmental concern. The results show a significant positive association between sustainable transportation benefits awareness and environmental concern ($p = 0.000$); traffic problem awareness and environmental concern ($p = 0.021$); government policies and environmental concern ($p = 0.082$). However, symbolic motives for car usage are not associated with environmental concern ($p = 0.431$).

Model 4 (Hypothesis 3) proposes a significant association among sustainable transportation benefits awareness, traffic problem awareness, government policies, the symbolic motive of car usage and acceptability to sustainable transportation. The results show a significant positive association between sustainable transport benefits awareness and acceptability to sustainable transportation ($p = 0.005$); traffic problem awareness and acceptability to sustainable transportation ($p = 0.0023$); and government policies and acceptability to sustainable transportation ($p = 0.0000$). However, the symbolic motive of car usage is not associated with acceptability to sustainable transportation ($p = 0.753$).

Model 5 (Hypothesis 4) proposes a significant association among sustainable transportation benefits awareness, traffic problem awareness, government policies, the symbolic motive of car usage and acceptability to sustainable transportation via environmental concern.

PROCESS macro with bootstrapped confidence interval [95,96] was used to check the mediation effect due to superiority over other mediation methods like the SOBEL test [95]. Mediation analysis was performed using 10,000 bootstrap samples & 95% confidence interval (CI). If the values of the lower and upper 95% CIs are either both below or both above zero, mediation works. The results show the mediating role of environmental concern in between sustainable transport benefits awareness and acceptability to sustainable transportation ($p = 0.025$); as well as traffic problem awareness and acceptability to sustainable transportation ($p = 0.010$). However, environmental concern is statistically not mediating among government policies and acceptability to sustainable transportation ($p = 0.573$) as well as the symbolic motive of car usage and acceptability to sustainable transportation ($p = 0.743$). The results for mediating the role of environmental concern are described in Table 6.

Table 6. Regression results (Mediation).

Variables	Environmental Concern		Acceptability to Sustainable Transportation		
	Model 1	Model 2	Model 3	Model 4	Model 5
Sustainable transport benefits awareness	-	0.563 *** (0.137)	-	0.413 *** (0.149)	0.271 ** (0.089)
Traffic problems awareness	-	0.192 ** (0.138)	-	0.554 *** (0.126)	0.153 * (0.077)
Government policies	-	0.138 * (0.087)	-	0.339 *** (0.098)	0.137 (0.015)
Symbolic motives of car use	-	-0.211 (0.073)	-	-0.130 (0.048)	0.067 (0.019)
Self-Enhancement	-	-0.009 (0.009)	-	-0.018 (0.006)	-0.008 (0.007)
Self-Transcendence	-	0.021 (0.086)	-	0.005 (0.11)	0.016 (0.070)
Environmental concern	-	-	-	-	0.576 (0.054)
Gender	0.025 (0.076)	0.058 (0.068)	0.024 (0.068)	0.057 (0.070)	0.077 (0.025)
Age	0.038 (0.025)	0.023 (0.022)	0.047 (0.017)	0.068 (0.021)	0.087 (0.034)
Education	0.043 (0.029)	0.037 (0.026)	0.029 (0.087)	0.086 (0.034)	0.036 (0.020)
Work status	0.043 (0.021)	0.029 (0.012)	0.018 (0.013)	0.053 (0.019)	0.056 (0.070)
Car use frequency	0.047 (0.029)	0.043 (0.018)	0.086 (0.024)	0.068 (0.025)	0.056 (0.018)
Bicycle user	0.026 (0.012)	0.031 (0.022)	0.034 (0.020)	0.043 (0.012)	0.023 (0.043)
Constant	2.14 ** (0.338)	4.32 *** (0.452)	3.87 *** (0.378)	2.87 *** (0.332)	1.45 ** (0.532)
R ²	0.014	0.243	0.0231	0.0332	0.0278
ΔR ²	-	0.0282	-	0.265	0.0321
F-value	1.34	9.83 ***	3.57 ***	10.87 ***	25.90 ***
(AIC)	(576)	(543)	(587)	(544)	(398)

Model 1 = Environmental concern control; Model 2 = Environmental concern direct model; Model 3 = Acceptability to sustainable transportation control; Model 4 = Acceptability to sustainable transportation direct model; Model 5 = Acceptability to sustainable transportation mediation model. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$.

Next, we tested H5 and H6 according to the guidelines of Hayes and Matthes [97] for determining the moderating effect in a model. Control variables and direct variables were again introduced in M1* and M2* respectively. While the moderating variable of self-enhancement was introduced in model 3* (Hypothesis 5), according to results, self-enhancement is negatively moderating among sustainable transport benefits awareness and acceptability to sustainable transportation ($p = 0.002$), and government policies and acceptability to sustainable transportation ($p = 0.000$). However, self-enhancement is positively moderating among traffic problems awareness and acceptability to sustainable transportation ($p = 0.956$) and the symbolic motive of car usage and acceptability to sustainable transportation ($p = 0.754$).

Model 4* (Hypothesis 6) proposed self-transcendence is positively moderating among sustainable transport benefits awareness and acceptability to sustainable transportation ($p = 0.005$) as well as to government policies awareness and acceptability to sustainable transportation ($p = 0.0001$). However, self-transcendence is statistically not significantly moderating among traffic problem awareness and acceptability to sustainable transportation ($p = 0.865$) and the symbolic motive of car usage and acceptability to sustainable transportation ($p = 0.902$).

In model 5*, the combined moderating effect of self-enhancement and self-transcendence was evaluated. However, the results remain the same.

To analyze the moderating effect of self-enhancement and self-transcendence, this study utilized the MODPROBE macro in Statistical Package for the Social Sciences (SPSS) as suggested by Hayes and Matthes [97]. MODPROBE is a widely applicable technique to check the moderating effect in a structural model. Taking sustainable transport benefit awareness, traffic problem awareness, government policies related to sustainability, symbolic motives of car usage as independent variables, self-enhancement and self-transcendence as moderating variables, and acceptability to sustainable transportation as the dependent variable, results for moderation were obtained. Five-thousand bootstrap resamples were used to create the statistical output in MODPROBE. The conditional effects of self-enhancement and self-transcendence were determined at values of one standard deviation (SD) below the mean at the mean, and one SD above the mean. The results for moderating effects can be found in Table 7.

Table 7. Regression Results (Moderation).

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
Sustainable transport benefits awareness	-	0.563 *** (0.137)	0.366 (0.131)	0.299 ** (0.027)	0.0374 *** (0.010)
Traffic problems awareness	-	0.192 ** (0.138)	0.052 (0.098)	0.027 ** (0.198)	0.106 ** (0.083)
Government policies	-	0.138 * (0.087)	0.469 (0.128)	0.347 * (0.074)	0.355 (0.109)
Symbolic motives of car use	-	-0.211 (0.073)	0.016 (0.073)	0.018 (0.027)	0.036 (0.075)
Self-Enhancement	-	-0.021 (0.086)	0.004 (0.018)	0.075 (0.017)	0.018 (0.010)
Self-Transcendence	-	0.293 (0.137)	0.05 (0.013)	0.183 (0.009)	0.029 (0.076)
SBTA*SE	-	-	-0.754 ** (0.015)	-	-0.005 ** (0.015)
TPA*SE	-	-	0.209 (0.017)	-	0.009 (0.017)
GP*SE	-	-	-0.235 *** (0.022)	-	-0.036 *** (0.022)
SMC*SE	-	-	0.009 (0.017)	-	0.009 (0.017)

Table 7. Cont.

Variables	Model 1	Model 2	Model 3	Model 4	Model 5
SBTA*ST	-	-	-	0.017 * (0.013)	0.0019 * (0.015)
TPA*ST	-	-	-	0.248 (0.152)	0.249 (0.152)
GP*ST	-	-	-	0.295 ** (0.111)	0.301 *** (0.112)
SMC*ST	-	-	-	0.064 (0.053)	0.069 (0.051)
Gender	0.023 (0.067)	0.046 (0.054)	0.019 (0.051)	0.057 (0.056)	0.023 (0.042)
Age	0.027 (0.018)	0.025 (0.024)	0.038 (0.017)	0.048 (0.021)	0.072 (0.026)
Education	0.034 (0.026)	0.048 (0.032)	0.056 (0.097)	0.075 (0.026)	0.041 (0.056)
Work status	0.023 (0.016)	0.036 (0.022)	0.020 (0.053)	0.067 (0.027)	0.021 (0.083)
Car use frequency	0.042 (0.026)	0.025 (0.013)	0.069 (0.044)	0.051 (0.018)	0.0421 (0.017)
Bicycle user	0.034 (0.019)	0.048 (0.032)	0.043 (0.035)	0.067 (0.042)	0.043 (0.012)
Constant	3.07 ** (0.238)	2.10 *** (0.332)	3.87 *** (0.273)	5.78 *** (0.225)	5.92 ** (0.512)
R ²	0.014	0.243	0.342	0.0332	0.0278
ΔR ²	-	0.028	0.0208 ^c	0.0432 ^c	0.0312 ^c
F-value	1.50	9.67 ***	8.48 ***	8.29 ***	6.21 ***
(AIC)	(576)	(542)	-	(518)	(533)

Model 1 = Self-enhancement & Self-transcendence control model; Model 2 = Self-enhancement & Self-transcendence direct model; Model 3 = Self-Enhancement interaction; Model 4 = Self-transcendence interaction model; Model 5 = Combined interaction model. *** $p < 0.001$, ** $p < 0.01$, * $p < 0.05$. ^c ΔR² for Models 3, Model 4 and Model 5 are in comparison to Model 2.

According to Cohen et al. [99], the simple slope test provides more details about the interacting role of moderators. This test judges whether the association between independent variables (X) and the dependent variable (Y) is significant at a specific value of moderating variables (Z). Jeremy Dawson developed an excel-based worksheet to conduct the simple slope test. Therefore, according to the recommendation of Dawson [100], this study utilized Jeremy Dawson's Excel worksheet to perform a simple slope test and to show moderating effects at low and high values (STBA*SE, TPA*SE, GPS*SE, SMC*SE, STBA*ST, TPA*ST, GPS*ST, and SMC*ST) on acceptability to sustainable transportation. Slope significance results at high and low values were created by "Two-way interaction effect" excel worksheet [101]. Figures 2–9 present the slope analysis of moderating results of self-enhancement and self-transcendence between predictors and acceptability to sustainable transportation. In Figures 2 and 4, the negative moderating effect of self-enhancement is found between STBA and AST; GPS and AST.

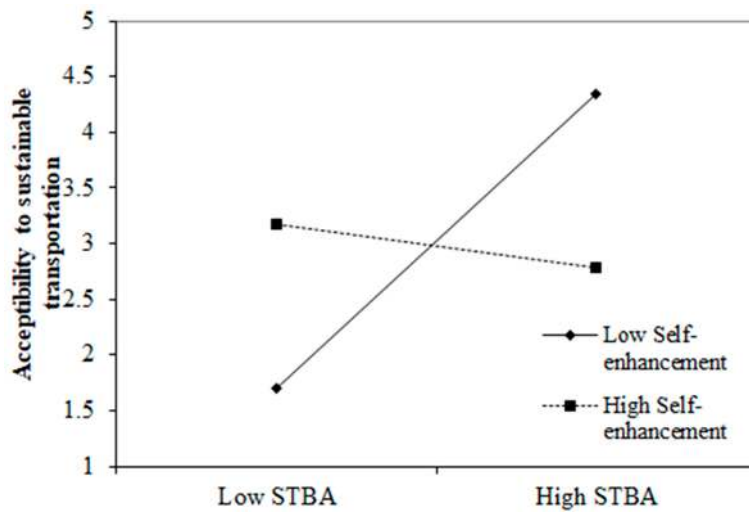


Figure 2. Moderating role of Self-enhancement.

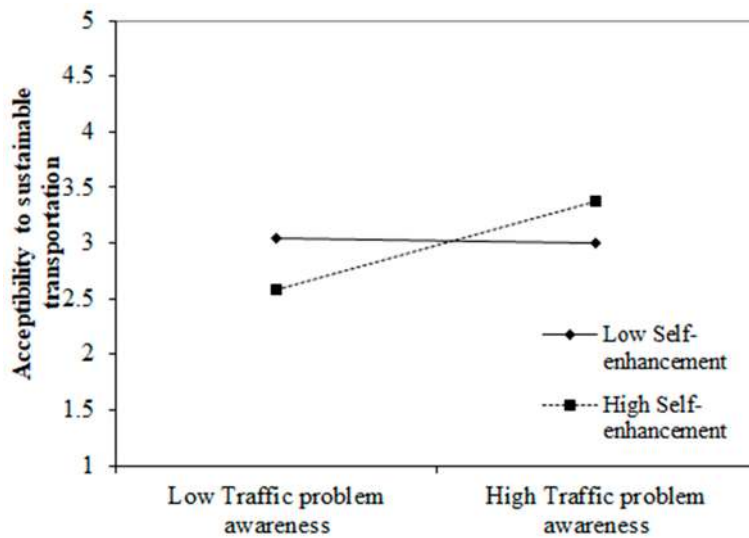


Figure 3. Moderating role of Self-enhancement.

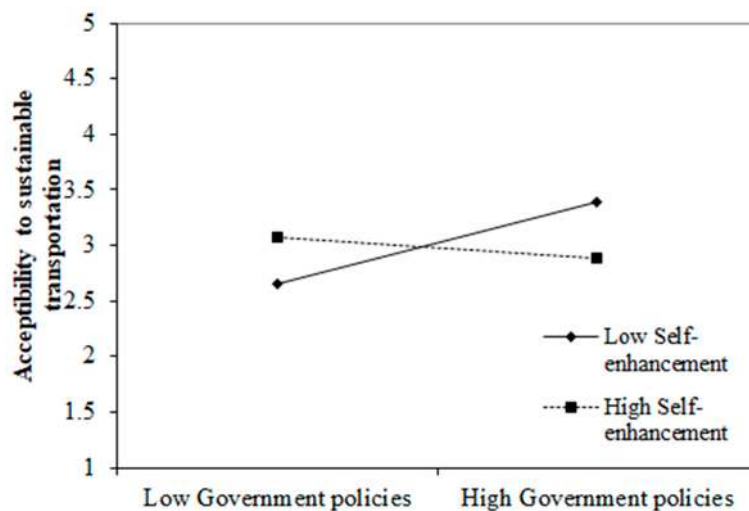


Figure 4. Moderating role of Self-enhancement.

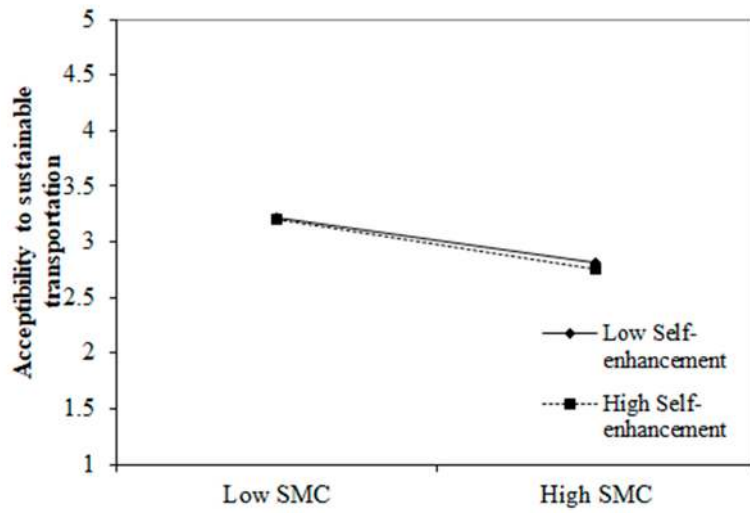


Figure 5. Moderating role of Self-enhancement.

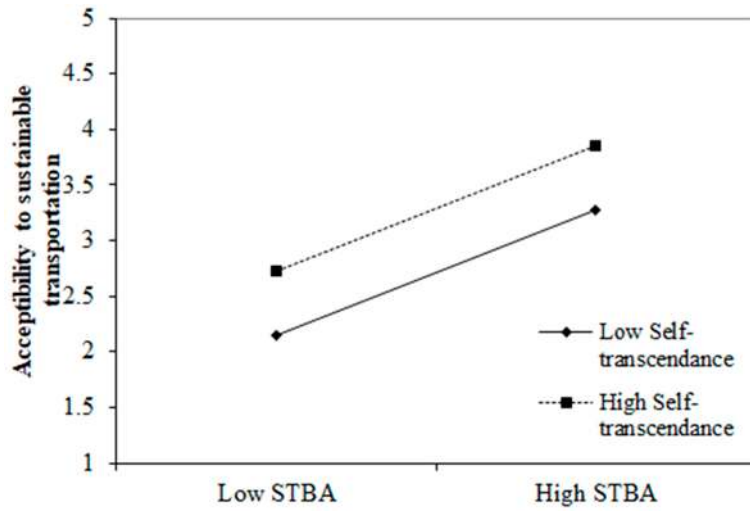


Figure 6. Moderating role of Self-transcendence.

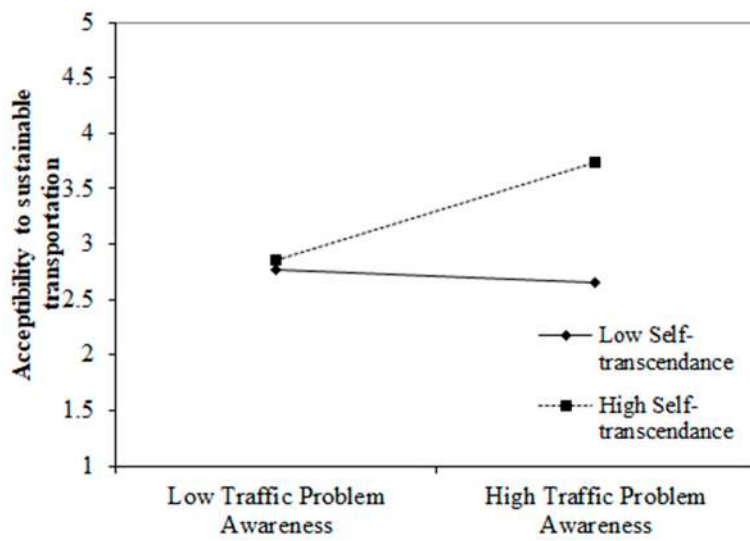


Figure 7. Moderating role of Self-transcendence.

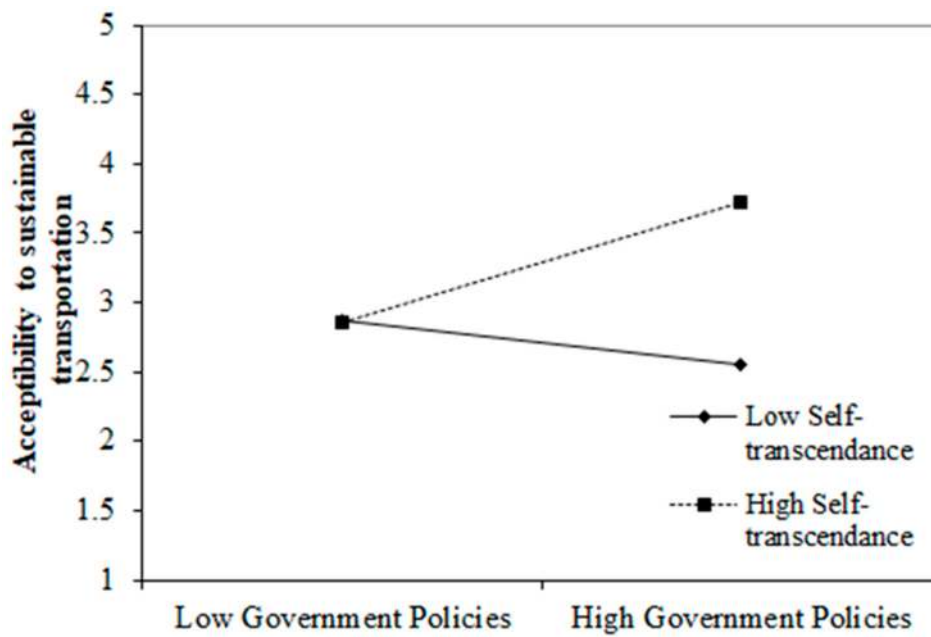


Figure 8. Moderating role of Self-transcendence.

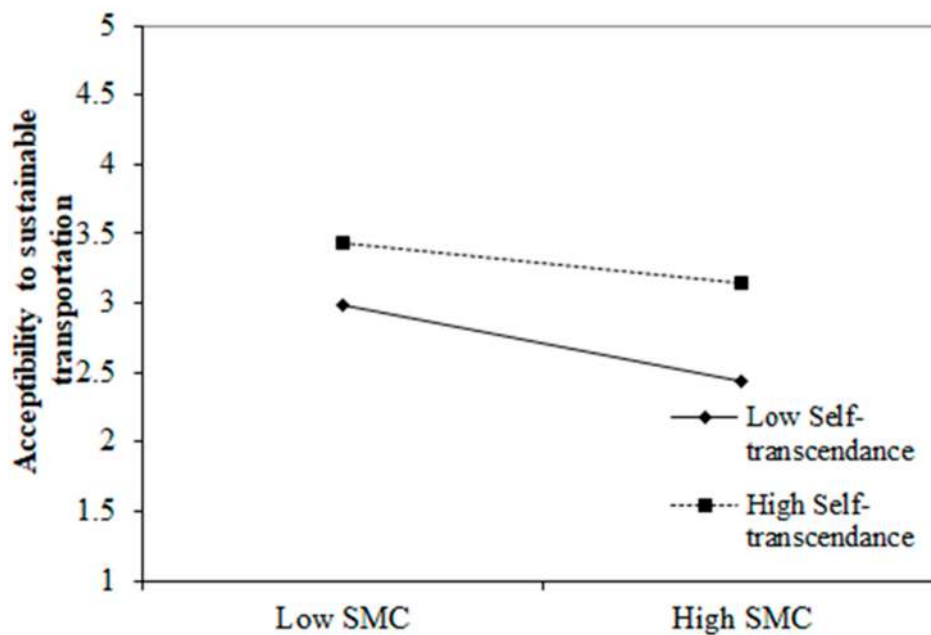


Figure 9. Moderating role of Self-transcendence.

5. Discussion

This study reveals that Chinese citizens are more dependent on personal vehicles due to concerns about safety in public transport. They have a negative perception towards the public transport system. Our findings show that citizens having awareness about traffic problems and sustainable benefits of transport are willing to accept sustainable transport options. These findings are also consistent with the studies of Banister and Button [102] and Franzen [103]. Consumers having more awareness about traffic and sustainability issues nowadays is due to the heavy focus on awareness campaigns in China. China Ministry of Transportation initiated a development plan in 2015, and according to this plan, one out of three citizens must use public transportation rather than using his own car to protect the environment and to get rid of transportation problems. Chinese mayors are also encouraging local citizens to use green buses rather than using own cars.

However, symbolic use of a car is negatively associated with acceptability to sustainable transportation which contradicts with findings of Bergstad et al. [104]. As Chinese citizens are getting wealthier and the automobile has become a lucrative market; therefore, luxury lifestyle and shining cars captured their attention and they are less likely to adopt sustainable transportation. According to Stern [105], awareness of environmental issues and desire to reduce these issues are main predictors of pro-environmental behavior. More awareness about the transport problems makes the citizens more environmentally concerned and it is also consistent with the results of Kim, Schmöcker, Bergstad, Fujii and Gärling [27]. This study revealed that sustainable transport options can be experienced due to environmental consciousness, whereas positive changes in the environment can be seen gradually due to the adaptation of sustainable transport options.

The results show the medium mediating effect of environmental concern in between sustainable transport benefits awareness and acceptability to sustainable transportation, traffic problem awareness and acceptability to sustainable transportation. These results are consistent with the application of NAM as a mediation model, as environmental concern is triggered by sustainable transport benefits awareness and traffic problem awareness [25,106]. It also confirms the rationale of earlier studies that environmental concern has a strong impact when ascription of responsibility related to traffic problems leads to the acceptability of sustainable transportation behavior [107,108]. However, the mediation effect can vary from context to context and depends on earlier knowledge of consumers related to transportation issues.

This study also proved the significance of personal values shaping sustainable transportation behavior as self-enhancement is negatively moderating the acceptability of sustainable transportation which also verifies the results of Schultz and Zelezny [26]. The moderating role of self-transcendence is also proved as consumers are willing to go for green for general society and these results are also consistent with the study of Jakovcevic and Steg [37]. However, still, the adoption of sustainable and green public transportation is at the infancy stage due to multiple barriers.

Making public transport a safe option for Chinese citizens should be the priority policy of the government. An effective marketing program should be developed to create awareness about sustainable transport options. Negative impacts of the car should be communicated to reduce car usage; although this study suggests that citizens having environmental concern are less likely to use the car and adopt sustainable transport options. Moreover, this study authenticated the importance of traditional modes of sustainable transportation such as cycling. Citizens having bicycles are more likely to reduce car usage than non-bicycle ones. Although citizens use car five times in a week for traveling, the bicycle is still considered a good solution for recreation and exercise. Therefore, recreational cycling should be shifted towards commuting cycling.

6. Practical Implications

The results of this paper have a potential implication for the government of China, transportation, and urban planning departments. According to respondents, an adaptation of public transportation and cycling is unsupportive because of risky and time-consuming modes of transportation. Moreover, public transportation is not reliable and is more congested. It could be a significant barrier for adaptation of sustainable modes of transportation and reduction in the usage of cars. Therefore, to increase the acceptability of sustainable transportation, an improved strategy should be developed with the integration of transportation, land and urban planning departments. To achieve more positive results, stakeholders' involvement should be given key priority at the time of strategy formulation and implementation.

Different measures can be taken by the government to reduce the car usage among citizens. Therefore, incentives-based policy should be introduced to increase the acceptability of sustainable transportation among citizens. Discounted fares on green buses and metro trains can be offered to increase their usage. Policy makers and planners should be encouraged to reduce driving cars and motivate the public to adopt sustainable transportation options. A pollution-free environment

through a reduction in car usage is considered as a best practice to create sustainability in the world by focusing on the biosphere, and altruistic and hedonic advantages [109,110]. The relevant authorities should create awareness among citizens about low car usage and highlight its advantages including sustainable biospheres, reduction in the emissions of CO₂, and reduction in noise and smog. Alternative modes of active transportation (sustainable electric vehicles like green buses and Metro trains, FCV, cycling, and walking) should be encouraged by highlighting the benefits of sustainable transportation to enjoy good health and better fitness. Hedonic motives of sustainable transportation can be highlighted to increase affection towards it. The Media has an important role to create awareness, but a strong collaboration between media and traffic control authorities is needed to promote sustainable transportation. OFO and MOBIKE are two leading Chinese bike-sharing companies in China with 2 billion in capital. Their motive is to provide sustainable and pure environmentally friendly mode of transportation. Although, Chinese bike sharing companies are trying to promote environmentally friendly behavior in Chinese citizens, they are also creating difficulty in traffic control. Shortage of parking slots and low awareness about parking bikes at an appropriate place is also increasing problems. Therefore, improvement in regulation should be made for better and effective utilization of sustainable transportation options. According to our findings, it is necessary that personal norms must be strengthened by creating awareness among Chinese citizens about problems associated with usage of cars and to try to increase the sense of responsibility to stimulate their personal norms and values to increase the acceptability level. We believe our study can give new intuitions to increase the personal acceptability and will have a positive effect on the policies of sustainable transportation in major cities of China like Beijing, Shanghai, Guangzhou, and Xi'an.

This study also has the potential to foster sustainable transportation across cultures to strengthen personal norms and values. However, absolute values can be compared to studies on main variables if structural and cultural differences affect them. For example, awareness of the consequences will be greater in that city or country where the usage of cars is affects the environment more, and personal norms will be weaker in that city or country like China where the usage of alternative modes of transportation is not so good, for example: Having no respect for cyclists and trains; subways suffer daily from delays and excessive crowding; and there is no availability of a proper local transportation system. In this case, it will be a difficult task to reduce the car usage.

7. Concluding Remarks

Public transport and other sustainable transport options like cycling are eco-friendly alternatives to car use. This study developed an empirical model of acceptability to sustainable transportation in China. The results of the study highlight the benefits of the sustainable transportation options and have proposed a sustainable solution to transportation problems in China. The government must take initiatives to reduce car use and divert the citizens to choose sustainable modes of transportation. Transport policy measures should be the first priority to reduce environmental problems. However, designing environmentally friendly policy is not sufficient, a variety of educational workshops and seminars should be conducted periodically to reduce car use. Media should play a positive role to create awareness about transportation problems and to provide information on sustainable alternatives of transportation.

This study was based on a cross-sectional survey, however, behavioral changes in respondents are still unknown. Secondly, the study was conducted in four major cities of China and the results were interpreted altogether. This being said, results may differ in between these four cities due to the difference in car ownership rate, public transport infrastructure, urban development, and perception of sustainable transportation. Therefore, comparing the acceptability of sustainable transportation behavior in major cities of China can be a potential focus of future research. Moreover, future research can be conducted to make a comparison of the sustainable behavior of Chinese citizens with other developed nations. Other researchers may be interested in exploring the risks associated with public transportation in China. A comparison of public and personal transportation effectiveness can be a

potential research direction. Although electric or hybrid cars are also an alternative to sustainable transportation, this study did not consider it because of the huge population and extensive traffic problems in China. This study neglected the moderated-mediation results due to complexity. It will be interesting to explore moderated-mediation model in further studies.

Author Contributions: M.W. collected the data, analyzed the data, design and drafting the final manuscript. D.-I.Q. gave some important suggestions for the initial manuscript. N.A. and Y.Z. edited the manuscript. M.N. helps in data collection and removing the mistakes. M.W. confirmed that the manuscript has been read and approved by all authors.

Funding: This research received no external funding.

Conflicts of Interest: The authors declare no conflict of interest.

References

1. Beirão, G.; Cabral, J.S. Understanding attitudes towards public transport and private car: A qualitative study. *Transp. Policy* **2007**, *14*, 478–489. [CrossRef]
2. Chan, L.; Lau, W.; Zou, S.; Cao, Z.; Lai, S. Exposure level of carbon monoxide and respirable suspended particulate in public transportation modes while commuting in urban area of Guangzhou, China. *Atmos. Environ.* **2002**, *36*, 5831–5840. [CrossRef]
3. Frank, L.D.; Sallis, J.F.; Conway, T.L.; Chapman, J.E.; Saelens, B.E.; Bachman, W. Many pathways from land use to health: Associations between neighborhood walkability and active transportation, body mass index, and air quality. *J. Am. Plan. Assoc.* **2006**, *72*, 75–87. [CrossRef]
4. Ülengin, F.; Kabak, Ö.; Önsel, Ş.; Ülengin, B.; Aktas, E. A problem-structuring model for analyzing transportation–environment relationships. *Eur. J. Oper. Res.* **2010**, *200*, 844–859. [CrossRef]
5. Ma, L.; Dill, J. Associations between the objective and perceived built environment and bicycling for transportation. *J. Transp. Health* **2015**, *2*, 248–255. [CrossRef]
6. Gardner, B.; Abraham, C. What drives car use? A grounded theory analysis of commuters' reasons for driving. *Transp. Res. Part F Traffic Psychol. Behav.* **2007**, *10*, 187–200. [CrossRef]
7. Townsend, C. In Whose Interest?: A Critical Approach to Southeast Asia's Urban Transport Dynamics. Ph.D. Thesis, Murdoch University, Murdoch, Australia, 2003.
8. Li, P.; Zhao, P.; Brand, C. Future energy use and CO₂ emissions of urban passenger transport in China: A travel behavior and urban form based approach. *Appl. Energy* **2018**, *211*, 820–842. [CrossRef]
9. XinhuaNews China Car Ownership Ratio. Available online: http://www.xinhuanet.com/english/2016-01/25/c_135043964.htm (accessed on 23 March 2018).
10. Shaohui, T. China's Car Ownership. *Xinhua*, 25 January 2016.
11. Yue, Y. Xi'an Motor Vehicle Ownership of 215 Million. *Xi'an Evening News*, 28 August 2015.
12. Litman, T. Developing indicators for comprehensive and sustainable transport planning. *Transp. Res. Rec. J. Transp. Res. Board* **2007**, *2017*, 10–15. [CrossRef]
13. Kwok, R.C.; Yeh, A.G. The use of modal accessibility gap as an indicator for sustainable transport development. *Environ. Plan. A* **2004**, *36*, 921–936. [CrossRef]
14. Castillo, H.; Pitfield, D.E. ELASTIC—A methodological framework for identifying and selecting sustainable transport indicators. *Transp. Res. Part D Transp. Environ.* **2010**, *15*, 179–188. [CrossRef]
15. Portney, K.E. *Taking Sustainable Cities Seriously: Economic Development, the Environment, and Quality of Life in American Cities*; MIT Press: Cambridge, MA, USA, 2013.
16. Enoch, M. *Sustainable Transport, Mobility Management and Travel Plans*; Routledge: London, UK, 2016.
17. Lucas, K. Transport and social exclusion: Where are we now? *Transp. Policy* **2012**, *20*, 105–113. [CrossRef]
18. Xenias, D.; Whitmarsh, L. Dimensions and determinants of expert and public attitudes to sustainable transport policies and technologies. *Transp. Res. Part A Policy Pract.* **2013**, *48*, 75–85. [CrossRef]
19. Egbue, O.; Long, S. Barriers to widespread adoption of electric vehicles: An analysis of consumer attitudes and perceptions. *Energy Policy* **2012**, *48*, 717–729. [CrossRef]
20. Schwartz, S.H. Are there universal aspects in the structure and contents of human values? *J. Soc. Issues* **1994**, *50*, 19–45. [CrossRef]

21. Han, H. The norm activation model and theory-broadening: Individuals' decision-making on environmentally-responsible convention attendance. *J. Environ. Psychol.* **2014**, *40*, 462–471. [[CrossRef](#)]
22. Ozaki, R.; Sevastyanova, K. Going hybrid: An analysis of consumer purchase motivations. *Energy Policy* **2011**, *39*, 2217–2227. [[CrossRef](#)]
23. Black, J.S.; Stern, P.C.; Elworth, J.T. Personal and contextual influences on household energy adaptations. *J. Appl. Psychol.* **1985**, *70*, 3. [[CrossRef](#)]
24. Stern, P.C.; Dietz, T. The value basis of environmental concern. *J. Soc. Issues* **1994**, *50*, 65–84. [[CrossRef](#)]
25. Steg, L. Car use: Lust and must. Instrumental, symbolic and affective motives for car use. *Transp. Res. Part A Policy Pract.* **2005**, *39*, 147–162. [[CrossRef](#)]
26. Schultz, P.W.; Zelezny, L.C. Values and proenvironmental behavior: A five-country survey. *J. Cross-Cult. Psychol.* **1998**, *29*, 540–558. [[CrossRef](#)]
27. Kim, J.; Schmöcker, J.-D.; Bergstad, C.J.; Fujii, S.; Gärling, T. The influence of personality on acceptability of sustainable transport policies. *Transportation* **2014**, *41*, 855. [[CrossRef](#)]
28. STATISTA. Automobile Manufacturing Industry in China. Available online: <https://www.statista.com/study/11736/automobile-manufacturing-industry-in-china-statista-dossier/> (accessed on 15 March 2018).
29. Zhao, Q.; Chen, M. A comparison of ELV recycling system in China and Japan and China's strategies. *Resour. Conserv. Recycl.* **2011**, *57*, 15–21. [[CrossRef](#)]
30. Eriksson, L.; Garvill, J.; Nordlund, A.M. Acceptability of single and combined transport policy measures: The importance of environmental and policy specific beliefs. *Transp. Res. Part A Policy Pract.* **2008**, *42*, 1117–1128. [[CrossRef](#)]
31. Offer, G.; Howey, D.; Contestabile, M.; Clague, R.; Brandon, N. Comparative analysis of battery electric, hydrogen fuel cell and hybrid vehicles in a future sustainable road transport system. *Energy Policy* **2010**, *38*, 24–29. [[CrossRef](#)]
32. Morton, C.; Schuitema, G.; Anable, J. Electric vehicles: Will consumers get charged up. In Proceedings of the Universities Transport Study Group 43rd Annual Conference, Milton Keynes, UK, 5–7 January 2011.
33. Steg, L.; Tertoolen, G. Sustainable transport policy: The contribution from behavioural scientists. *Public Money Manag.* **1999**, *19*, 63–69. [[CrossRef](#)]
34. Dill, J.; Voros, K. Factors affecting bicycling demand: Initial survey findings from the Portland, Oregon, region. *Transp. Res. Rec. J. Transp. Res. Board* **2007**, *2031*, 9–17. [[CrossRef](#)]
35. Chatterton, T.; Coulter, A.; Musselwhite, C.; Lyons, G.; Clegg, S. Understanding how transport choices are affected by the environment and health: Views expressed in a study on the use of carbon calculators. *Public Health* **2009**, *123*, e45–e49. [[CrossRef](#)] [[PubMed](#)]
36. Fishman, E.; Washington, S.; Haworth, N. Understanding the fear of bicycle riding in Australia. *J. Australas. Coll. Road Saf.* **2012**, *23*, 19.
37. Jakovcevic, A.; Steg, L. Sustainable transportation in Argentina: Values, beliefs, norms and car use reduction. *Transp. Res. Part F Traffic Psychol. Behav.* **2013**, *20*, 70–79. [[CrossRef](#)]
38. Van Acker, V.; Goodwin, P.; Witlox, F. Key research themes on travel behavior, lifestyle, and sustainable urban mobility. *Int. J. Sustain. Transp.* **2016**, *10*, 25–32. [[CrossRef](#)]
39. Xia, T.; Zhang, Y.; Braunack-Mayer, A.; Crabb, S. Public attitudes toward encouraging sustainable transportation: An Australian case study. *Int. J. Sustain. Transp.* **2017**, *11*, 593–601. [[CrossRef](#)]
40. Khoo, H.L.; Ong, G.P. Understanding sustainable transport acceptance behavior: A case study of Klang valley, Malaysia. *Int. J. Sustain. Transp.* **2015**, *9*, 227–239. [[CrossRef](#)]
41. Steg, L.; Gifford, R. Sustainable transport and quality of life. In *Building Blocks for Sustainable Transport: Obstacles, Trends, Solutions*; Emerald Group Publishing Limited: Bradford, UK, 2007; pp. 183–202.
42. Gärling, T.; Schuitema, G. Travel demand management targeting reduced private car use: Effectiveness, public acceptability and political feasibility. *J. Soc. Issues* **2007**, *63*, 139–153. [[CrossRef](#)]
43. Nobis, C. Carsharing as key contribution to multimodal and sustainable mobility behavior: Carsharing in Germany. *Transp. Res. Rec. J. Transp. Res. Board* **2006**, *1986*, 89–97. [[CrossRef](#)]
44. Albert, G.; Toledo, T.; Ben-Zion, U. The role of personality factors in repeated route choice behavior: Behavioral economics perspective. *Eur. Transp.* **2011**, *48*, 47–59.
45. Fujii, S. Can state regulation of car use activate a moral obligation to use sustainable modes of transport? *Int. J. Sustain. Transp.* **2010**, *4*, 313–320. [[CrossRef](#)]

46. Johansson, M.V.; Heldt, T.; Johansson, P. The effects of attitudes and personality traits on mode choice. *Transp. Res. Part A Policy Pract.* **2006**, *40*, 507–525. [[CrossRef](#)]
47. Bamberg, S.; Schmidt, P. Incentives, morality, or habit? Predicting students' car use for university routes with the models of Ajzen, Schwartz, and Triandis. *Environ. Behav.* **2003**, *35*, 264–285. [[CrossRef](#)]
48. Stradling, S.G.; Meadows, M.; Beatty, S. Helping drivers out of their cars Integrating transport policy and social psychology for sustainable change. *Transp. Policy* **2000**, *7*, 207–215. [[CrossRef](#)]
49. Han, S.S. Managing motorization in sustainable transport planning: The Singapore experience. *J. Transp. Geogr.* **2010**, *18*, 314–321. [[CrossRef](#)]
50. Anable, J. 'Complacent car addicts' or 'aspiring environmentalists'? Identifying travel behaviour segments using attitude theory. *Transp. Policy* **2005**, *12*, 65–78. [[CrossRef](#)]
51. Domarchi, C.; Tudela, A.; González, A. Effect of attitudes, habit and affective appraisal on mode choice: An application to university workers. *Transportation* **2008**, *35*, 585–599. [[CrossRef](#)]
52. Gössling, S. ICT and transport behavior: A conceptual review. *Int. J. Sustain. Transp.* **2018**, *12*, 153–164. [[CrossRef](#)]
53. Joireman, J.A.; Van Lange, P.A.; Van Vugt, M. Who cares about the environmental impact of cars? Those with an eye toward the future. *Environ. Behav.* **2004**, *36*, 187–206. [[CrossRef](#)]
54. Fulton, E.A.; Boschetti, F.; Sporic, M.; Jones, T.; Little, L.R.; Dambacher, J.M.; Gray, R.; Scott, R.; Gorton, R. A multi-model approach to engaging stakeholder and modellers in complex environmental problems. *Environ. Sci. Policy* **2015**, *48*, 44–56. [[CrossRef](#)]
55. Gardner, B.; Abraham, C. Psychological correlates of car use: A meta-analysis. *Transp. Res. Part F Traffic Psychol. Behav.* **2008**, *11*, 300–311. [[CrossRef](#)]
56. Vaske, J.J.; Jacobs, M.H.; Espinosa, T.K. Carbon footprint mitigation on vacation: A norm activation model. *J. Outdoor Recreat. Tour.* **2015**, *11*, 80–86. [[CrossRef](#)]
57. Griffiths, G.; Chambers, L.; Haylock, M.; Manton, M.; Nicholls, N.; Baek, H.J.; Choi, Y.; Della-Marta, P.; Gosai, A.; Iga, N. Change in mean temperature as a predictor of extreme temperature change in the Asia-Pacific region. *Int. J. Climatol.* **2005**, *25*, 1301–1330. [[CrossRef](#)]
58. Tanner, C. Constraints on environmental behaviour. *J. Environ. Psychol.* **1999**, *19*, 145–157. [[CrossRef](#)]
59. Katz-Gerro, T.; Greenspan, I.; Handy, F.; Lee, H.-Y. The Relationship between Value Types and Environmental Behaviour in Four Countries: Universalism, Benevolence, Conformity and Biospheric Values Revisited. *Environ. Values* **2017**, *26*, 223–249. [[CrossRef](#)]
60. Steg, L.; Sievers, I. Cultural theory and individual perceptions of environmental risks. *Environ. Behav.* **2000**, *32*, 250–269. [[CrossRef](#)]
61. Wang, F.; Deng, Z.; Petrick, J.F. Exploring the formation mechanisms of urban residents' travel behaviour in China: Perceptions of travel benefits and travel constraints. *J. Travel Tour. Mark.* **2018**, *35*, 1–13. [[CrossRef](#)]
62. Schlegelmilch, B.B.; Bohlen, G.M.; Diamantopoulos, A. The link between green purchasing decisions and measures of environmental consciousness. *Eur. J. Mark.* **1996**, *30*, 35–55. [[CrossRef](#)]
63. Minton, A.P.; Rose, R.L. The effects of environmental concern on environmentally friendly consumer behavior: An exploratory study. *J. Bus. Res.* **1997**, *40*, 37–48. [[CrossRef](#)]
64. Roberts, J.A.; Bacon, D.R. Exploring the subtle relationships between environmental concern and ecologically conscious consumer behavior. *J. Bus. Res.* **1997**, *40*, 79–89. [[CrossRef](#)]
65. Bamberg, S. How does environmental concern influence specific environmentally related behaviors? A new answer to an old question. *J. Environ. Psychol.* **2003**, *23*, 21–32. [[CrossRef](#)]
66. Wong, T.K.-Y.; Wan, P.-S. Perceptions and determinants of environmental concern: The case of Hong Kong and its implications for sustainable development. *Sustain. Dev.* **2011**, *19*, 235–249. [[CrossRef](#)]
67. Vermeir, I.; Verbeke, W. Sustainable food consumption among young adults in Belgium: Theory of planned behaviour and the role of confidence and values. *Ecol. Econ.* **2008**, *64*, 542–553. [[CrossRef](#)]
68. Belgiawan, P.F.; Schmöcker, J.-D.; Abou-Zeid, M.; Walker, J.; Lee, T.-C.; Ettema, D.F.; Fujii, S. Car ownership motivations among undergraduate students in China, Indonesia, Japan, Lebanon, Netherlands, Taiwan, and USA. *Transportation* **2014**, *41*, 1227–1244. [[CrossRef](#)]
69. Saunders, M.L.; Lewis, P.; Thornhill, A. *Research Methods for Business Students*; Pearson: New York, NY, USA, 2009.
70. Weston, R.; Gore, P.A., Jr. A brief guide to structural equation modeling. *Couns. Psychol.* **2006**, *34*, 719–751. [[CrossRef](#)]

71. Boomsma, A. The robustness of LISREL against small sample sizes in factor analysis models. In *Systems Under Indirect Observation: Causality, Structure, Prediction*; Elsevier: Amsterdam, The Netherlands, 1982; pp. 149–173.
72. Wolf, E.J.; Harrington, K.M.; Clark, S.L.; Miller, M.W. Sample Size Requirements for Structural Equation Models: An Evaluation of Power, Bias, and Solution Propriety. *Educ. Psychol. Meas.* **2013**, *76*, 913–934. [[CrossRef](#)] [[PubMed](#)]
73. Weir, J.P. Quantifying test-retest reliability using the intraclass correlation coefficient and the SEM. *J. Strength Cond. Res.* **2005**, *19*, 231. [[PubMed](#)]
74. Westland, J.C. Lower bounds on sample size in structural equation modeling. *Electron. Commer. Res. Appl.* **2010**, *9*, 476–487. [[CrossRef](#)]
75. Krejcie, R.V.; Morgan, D.W. Determining sample size for research activities. *Educ. Psychol. Meas.* **1970**, *30*, 607–610. [[CrossRef](#)]
76. Chinese Social Media Statistics and Trends Infographic. Available online: <http://socialmediatoday.com/richard-simcott/2213841/social-media-fast-facts-china> (accessed on 20 September 2017).
77. Nilsson, M.; Küller, R. Travel behaviour and environmental concern. *Transp. Res. Part D Transp. Environ.* **2000**, *5*, 211–234. [[CrossRef](#)]
78. Schwartz, S.H.; Melech, G.; Lehmann, A.; Burgess, S.; Harris, M.; Owens, V. Extending the cross-cultural validity of the theory of basic human values with a different method of measurement. *J. Cross-Cult. Psychol.* **2001**, *32*, 519–542. [[CrossRef](#)]
79. Schwartz, S.H. An overview of the Schwartz theory of basic values. *Online Read. Psychol. Cult.* **2012**, *2*, 11. [[CrossRef](#)]
80. Yan, J.; Huizhong, Y. The English proficiency of college and university students in China: As reflected in the CET. *Lang. Cult. Curric.* **2006**, *19*, 21–36. [[CrossRef](#)]
81. Cronbach, L.J. Coefficient alpha and the internal structure of tests. *Psychometrika* **1951**, *16*, 297–334. [[CrossRef](#)]
82. Jolliffe, I.T. Principal Component Analysis and Factor Analysis. In *Principal Component Analysis*; Springer: Berlin, Germany, 1986; pp. 115–128.
83. Tabachnick, B.G.; Fidell, L.S.; Osterlind, S.J. *Using Multivariate Statistics*; Allyn and Bacon: Boston, MA, USA, 2001.
84. Dabholkar, P.A.; Thorpe, D.I.; Rentz, J.O. A measure of service quality for retail stores: Scale development and validation. *J. Acad. Mark. Sci.* **1996**, *24*, 3. [[CrossRef](#)]
85. Hair, J.F.; Black, W.C.; Babin, B.J.; Anderson, R.E.; Tatham, R.L. *Multivariate Data Analysis*; Prentice Hall: Upper Saddle River, NJ, USA, 1998; Volume 5.
86. Kaiser, H.F. The application of electronic computers to factor analysis. *Educ. Psychol. Meas.* **1960**, *20*, 141–151. [[CrossRef](#)]
87. Hu, L.T.; Bentler, P.M. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Struct. Equ. Model. A Multidiscip. J.* **1999**, *6*, 1–55. [[CrossRef](#)]
88. Bentler, P.M.; Weeks, D.G. Linear structural equations with latent variables. *Psychometrika* **1980**, *45*, 289–308. [[CrossRef](#)]
89. Fornell, C.; Larcker, D.F. Evaluating structural equation models with unobservable variables and measurement error. *J. Mark. Res.* **1981**, *18*, 39–50. [[CrossRef](#)]
90. Bagozzi, R.P. *Causal Models in Marketing*; Wiley: Hoboken, NJ, USA, 1980.
91. Mak, B.L.; Sockel, H. A confirmatory factor analysis of IS employee motivation and retention. *Inf. Manag.* **2001**, *38*, 265–276. [[CrossRef](#)]
92. Kim, Y.M. Validation of psychometric research instruments: The case of information science. *J. Assoc. Inf. Sci. Technol.* **2009**, *60*, 1178–1191. [[CrossRef](#)]
93. Hair, J.; Black, W.; Babin, B.; Anderson, R. *Multivariate Data Analysis*; Prentice-Hall: Upper Saddle River, NJ, USA, 2010.
94. Muller, D.; Judd, C.M.; Yzerbyt, V.Y. When moderation is mediated and mediation is moderated. *J. Personal. Soc. Psychol.* **2005**, *89*, 852. [[CrossRef](#)] [[PubMed](#)]
95. Hayes, A.F. *Introduction to Mediation, Moderation, and Conditional Process Analysis: A Regression-Based Approach*; Guilford Press: New York, NY, USA, 2013.
96. Preacher, K.J.; Hayes, A.F. SPSS and SAS procedures for estimating indirect effects in simple mediation models. *Behav. Res. Methods Instrum. Comput.* **2004**, *36*, 717–731. [[CrossRef](#)] [[PubMed](#)]

97. Hayes, A.F.; Matthes, J. Computational procedures for probing interactions in OLS and logistic regression: SPSS and SAS implementations. *Behav. Res. Methods* **2009**, *41*, 924–936. [[CrossRef](#)] [[PubMed](#)]
98. Zhao, X.; Lynch, J.G., Jr.; Chen, Q. Reconsidering Baron and Kenny: Myths and truths about mediation analysis. *J. Consumer Res.* **2010**, *37*, 197–206. [[CrossRef](#)]
99. Cohen, P.; West, S.G.; Aiken, L.S. *Applied Multiple Regression/Correlation Analysis for the Behavioral Sciences*; Psychology Press: Hove, UK, 2014.
100. Dawson, J.F. Moderation in management research: What, why, when, and how. *J. Bus. Psychol.* **2014**, *29*, 1–19. [[CrossRef](#)]
101. Dawson, J.F. Interpreting Interaction Effects. Available online: <http://www.jeremydawson.co.uk/slopes.htm> (accessed on 23 March 2018).
102. Banister, D.; Button, K. *Transport, the Environment and Sustainable Development*; Routledge: London, UK, 2015.
103. Franzen, A. *Environmental Awareness and Traffic Behaviour. Empirical Analyses on the Choice of Means of Transport and the Acceptance of Environment-Policy Measures*; Verlag Ruegger: Zuerich, Switzerland, 1996.
104. Bergstad, C.J.; Gamble, A.; Hagman, O.; Polk, M.; Gärling, T.; Olsson, L.E. Affective–symbolic and instrumental–independence psychological motives mediating effects of socio-demographic variables on daily car use. *J. Transp. Geogr.* **2011**, *19*, 33–38. [[CrossRef](#)]
105. Stern, P.C. New environmental theories: Toward a coherent theory of environmentally significant behavior. *J. Soc. Issues* **2000**, *56*, 407–424. [[CrossRef](#)]
106. Schwartz, S.H. Normative influences on altruism¹. In *Advances in Experimental Social Psychology*; Elsevier: Amsterdam, The Netherlands, 1977; Volume 10, pp. 221–279.
107. Hoogma, R.; Kemp, R.; Schot, J.; Truffer, B. *Experimenting for Sustainable Transport: The Approach of Strategic Niche Management*; Routledge: London, UK, 2005.
108. Aronson, E.; Stern, P.C. *Energy Use: The Human Dimension*; The National Academies Press: Washington, DC, USA, 1984.
109. Lindenberg, S.; Steg, L. Normative, gain and hedonic goal frames guiding environmental behavior. *J. Soc. Issues* **2007**, *63*, 117–137. [[CrossRef](#)]
110. Corral-Verdugo, V.; Mireles-Acosta, J.F.; Tapia-Fonllem, C.; Fraijo-Sing, B. Happiness as correlate of sustainable behavior: A study of pro-ecological, frugal, equitable and altruistic actions that promote subjective wellbeing. *Hum. Ecol. Rev.* **2011**, *18*, 95–104.



© 2018 by the authors. Licensee MDPI, Basel, Switzerland. This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<http://creativecommons.org/licenses/by/4.0/>).