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The Psychology of Sharing: Multigroup Analysis among Users and Non-Users of Carsharing

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Abstract: The present study investigates the determinants of intention to use carsharing services by an integrated model of psychological predictors of travel behavior. The model proposed is tested by multigroup confirmatory factor analysis (MGCFA) in structural equation modeling (SEM) with further discussion about analysis of invariance and its relevance for comparisons between groups. The sample was classified into four groups: Italian users, Italian non-users, Swedish users, and Swedish non-users of carsharing. The users were respondents who have used or are currently using carsharing, while non-users reported never using the carsharing services. The analysis of data from 6072 respondents revealed that control was the main predictor of intention to use carsharing; driving habits had stronger negative effects for users of carsharing than for non-users; subjective norms positively predicted the intention to use carsharing among all groups; trust was a predictor of intention only for the Italian groups; and climate morality had a small negative effect on the Swedish groups only. The outcomes of this investigation will increase the knowledge about the use of carsharing and help to identify the behavioral and psychological factors that primarily influence people's intention to use it.

Keywords: transport mode choice; theory of planned behavior; technology acceptance model; habits; analysis of invariance

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1. Introduction

How to achieve sustainable transportation for individuals is one of the key problems of future sustainability around the globe. Lately, the concept of sharing has become increasingly popular in the discussion regarding solutions to reduce private car use. This paper investigates the determinants of intention to use carsharing services by using an integrated model of psychological predictors of travel behavior.

Carsharing can be defined as a short-term car rental service that provides to its users access to vehicles for a short-term time interval [1]. Carsharing services are different from car rentals, carpooling, and ride-hailing services, even though they may share some similarities. For car rentals, generally, the customer signs a designated contract with specifications of the service each time he/she rents a car for a certain number of days. In contrast, the members of carsharing services sign a service contract just once, and they may use one of the cars from the fleet whenever they want, given the availability of the fleet.

Carpooling can be defined as an arrangement in which two or more persons share a private vehicle for a trip or part of a journey, and the passengers contribute to the driver's expenses [2]. Some carsharing services allow carpooling among their members, but that is not the rule. The typical carsharing use is that one person uses the car for their trips, and they may be accompanied by a person they know.

Ride-hailing services became extremely popular with Uber, and they are categorized as a taxi-like service. In this case, the service user does not drive the car, and they need to order the service at the moment of the desired trip.

As a relatively new service on the market, different business models of carsharing have been used by different segments of the population, and these services vary in suitability

for different trip purposes [3]. The users and non-users of carsharing have been observed to vary substantially in terms of motivational aspects to use the services, as well as in their psychological attributes and patterns of behavior [4]. Understanding these differences is a key aspect of fostering policies on carsharing and improving the services to benefit most users and those that want to start to use the service.

The most common classification of carsharing is dividing the services into (1) roundtrip (the vehicle is returned to the same station); (2) one-way, station-based (the vehicle is returned to a different designated station); (3) one-way, free-floating (the vehicle can be returned within a geographic area) [5]; and (4) peer-to-peer (P2P) [6]. P2P carsharing is a system that allows car owners to rent out their vehicle when they are not using it. Other drivers can rent the vehicle via an online platform that facilitates the exchange.

The evolving patterns of business models of carsharing also vary across countries, which is the case in Sweden and Italy. These two countries were selected for this investigation, because the users from both nationalities share some common motivational aspects of using carsharing, while the countries have some market particularities worth investigating. Additionally, funding-related considerations partially influenced the choice of countries for investigation.

First, both countries have an increasing market of different carsharing business models. Carsharing in Sweden is still a niche in big cities, with a dominant player owned by an incumbent car manufacturer. The free-floating model has not developed much, while station-based services are prevalent [7]. In Italy, carsharing has consolidated as a recently increasing phenomenon, across 35 cities, with a big fleet and a big market share of free-floating business models [8].

Second, there is some evidence that Swedish users of carsharing are more oriented toward practical and economical motives to use the carsharing services than to social and environmental aspects [9]. Combined with an increased price for public transportation, that negatively affects the use of carsharing, since they are complementary to each other [10]. Similarly, Italian users are also oriented toward convenience and cost savings, compared to the use of public transportation and owning a private car [11].

Given the variations at individual and national levels previously described, the present study compares the determinants of intention to use carsharing among four groups: users and non-users of carsharing services in Italy and Sweden. To compare these groups, multi-group confirmatory factor analysis (MGCFA) in structural equation modeling (SEM) is performed (a detailed description of the analysis of invariance is described in the method section and the importance of assessing measurement invariance when interpreting differences between groups is discussed). The outcomes of this investigation increase the knowledge about the use of carsharing and help to identify the behavioral and psychological factors that mostly influence people's intention to use it.

SEM is widely used in studies on attitudinal issues related to travel behavior and transportation; however, it has been mostly applied to single samples and more traditional modes of transportation, such as the private car, public transportation, and active modes of transport [12–16]. This study adds to the literature an investigation of the psychological and behavioral aspects involved in the use of carsharing services across groups and nationalities.

Carsharing

Carsharing services became a disrupting innovation within the context of the sharing economy [17] and a promise of a more environmentally friendly alternative for transportation. Without taking from its users the benefits typically associated with the instrumental values of cars, such as accessibility and convenience, the carsharing services represent an alternative to private vehicle ownership [18]. Moreover, the carsharing services may have fleets of electric vehicles, promote the use of other modes of transportation such as cycling, walking, and public transport, and reduce the demand for parking areas in city centers [5].

While research has shown evidence of carsharing services as an alternative driving personal travel choice toward a transition to sustainability, there is also evidence that sharing assets, such as cars, is reinforcing the social and economic unsustainable paradigm of overconsumption [19]. The present study has the potential to give one more piece of information to explain this paradoxical puzzle by adding the psychological dimension to the investigation of sharing behavior.

There is strong evidence that psychology can make a difference in the research of climate change [20,21] and be a powerful tool to predict daily mobility behavior [22]. For instance, psychological research has identified that carsharing's benefits of lower prices and reduced environmental impact may be more attractive only for those who have lower psychological ownership profiles [23]. There is also evidence that carsharing users do not necessarily own fewer vehicles than non-users or use the service primarily for environmental reasons [24]. Moreover, it has been estimated that a mode shift to carsharing services may result in an unforeseen reduction of preferences for public transport and bicycle [25].

Since carsharing is relatively new in the market and has not been fully investigated from a behavioral perspective, there is no strong support for one psychological theoretical framework instead of another to investigate the use of this service. Moreover, there is a need to further investigate the behavioral correlates of carsharing use [26]. Therefore, the present research proposes a psychological framework, based on robust theoretical background and ease to communicate among non-academic professionals and the population in general. The main goals of this framework are to provide leads for policies on the topic of carsharing and its outcomes for mobility and to reduce the gap of knowledge of psychological correlates of carsharing use.

2. Theoretical Framework

2.1. The Theory of Planned Behavior (TPB) and the Technology Acceptance Model (TAM)

Carsharing is a service with multiple particularities: it brings the concept of shared mobility-on-demand, it is car-based, it is linked to other modes of transportation, and it is based on e-services, meaning that it also depends on Internet technologies to some extent. Given these multiple particularities, a framework to understand carsharing use should be (a) grounded in robust theory and (b) be parsimonious and inclusive for the specificities of its e-service approach. Therefore, the proposed model was based on the well-established theory of planned behavior (TPB) connected to the technology acceptance model (TAM), to cover technology-related aspects.

Both TPB and TAM have an underlying rationale based on the theory of reasoned action (TRA) and have shown evidence of robust predictiveness of behavior [27,28]. Originally, the TPB was designed to explain behaviors under people's volitional control (an aspect that was lacking in TRA), and the TAM was originally designed for modeling user acceptance of information technology [29].

For the TPB, the transport mode choice is a deliberative choice directly predicted by behavioral intention. Given this framework, the intention to choose carsharing as a mode of transportation will be greater if the attitudes towards it are positive, the subjective norms endorse it, and the perceived behavior control to use the carsharing is high (Figure 1).

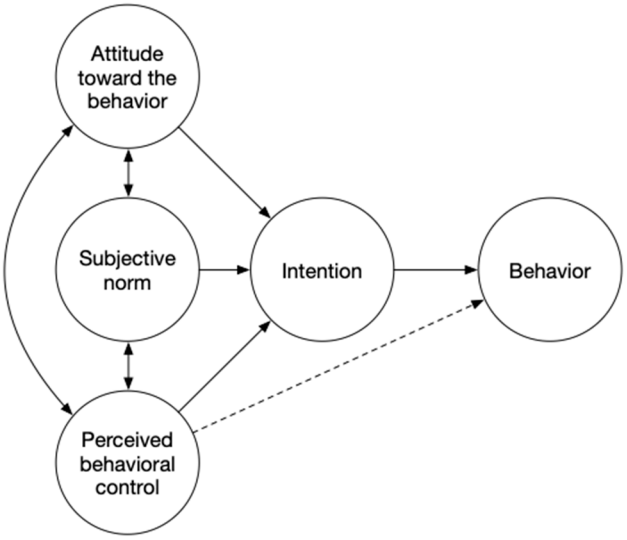


Figure 1. Theory of planned behavior (TPB).

The attitudes towards carsharing represent an overall cognitive evaluation of the carsharing services as positive or negative and to what extent people support its implementation. The subjective norms are expressions of the individual's perceptions of the extent to which they have social approval to use carsharing services from their peers. The perceived behavioral control represents the perception that individuals have to choose carsharing as a mode of transportation for their current needs, given the available constraints.

However, in the context of transitions to new behaviors, such as carsharing, not only the volitional control will affect people's decisions, but the contextual factors as well [30]. To encourage the use of carsharing, the contextual cues should signal to the users that they can easily use the service and that there are no major barriers to their mobility demands.

A similar rationale was applied to the context of bike-sharing, and it successfully explained the relationship of the concepts of perceived behavior control from the TPB with the perception of ease of use and perceived usefulness from TAM [31].

Meta-analyses have shown a set of evidence of applications of these frameworks: TAM has been successfully applied in diverse settings of technology acceptance, such as internet banking and online shopping [32,33]; TPB has satisfactorily been used for contexts other than behaviors under volitional control, such as to predict goal intention and behaviors that involve a certain degree of uncertainty [34].

Specifically for the context of travel behavior, these models have been used to explain the intention to use different modes of transportation [35], the acceptance of automated public transport [36], acceptance of driverless vehicles [37], and online tax adoption [38].

These models have also been explored in extended versions, such as the extension of TPB and TAM with trust to investigate online tax adoption [38] and the extension of TPB (with further inclusion of moral norms, descriptive norms, and environmental concern) to investigate transport mode choice between the private car and public transport [13]. The TPB has been identified as the most influential framework to investigate travel mode choice, and the further inclusion of the concept of habits (along with the concepts from TPB) has greatly contributed to predicting this travel mode choice [39–41].

Given this research background, a model to adequately address the repercussions of the use of carsharing services for individuals is proposed. This model encompasses concepts from TPB (subjective norms and perceived behavior control) and TAM (ease of use and perceived usefulness), as well as the concepts of habits, trust, personal norms, and environmental concern. In the following, it is described how these concepts are related to carsharing use and how they will be modeled.

2.2. Habits, Trust, Norms, and Environmental Concern

Most people have specific habits when traveling during their daily routines due to frequently repeated behavior under similar conditions [42]. Habits are mediated by mental processes and formed to accomplish a certain goal. They are activated by a cognitive structure that is learned, gathered, and recovered from memory given stimulation from the environment [43].

Habit is a challenging barrier to mitigate climate change due to its resistance to change. It is listed as one of the 'dragons of inaction' [44] and, along with measures of past behavior, is shown to be a strong predictor in different transportation contexts [41,45,46].

There is evidence that habit can form attitudes, and in some cases, it may even have a stronger effect on behavior than attitudes [47]. In a context with new demands for use of technology linked to transportation (e.g., applications and the web for buying tickets or booking trips), there will be room for the formation of new trip-planning habits and for choosing modes of transportation. Therefore, it is relevant to include this factor when modeling the use of carsharing services.

Given that people may have a well-established profile of travels based on their previous experiences, the initial trust in a new service is an important factor to be considered. Because people have limited cognitive resources to evaluate a service beforehand, the trust in carsharing services (e.g., that it provides a good and predictable service) may function as a trigger for its use, especially for potential users. The initial trust may have the function to establish a positive link with the perceived usefulness of the service and the subjective norms related to it [38].

Social norms are signals of consequences (positive and/or negative) for a given behavior, and they are differentiated by their motivational content and social context [48]. For instance, people may hold the subjective norm that anticipates negative feedback from their peers when frequently using a private car, depending on their motivation and moral commitments. The moral references on which people rely to make their decisions are, in general, based on expectations or shared expectations learned in a social context [49].

Personal norms are individual perceptions of the moral injunctions for a given behavior connected to one's self-concept and social learning: while the violation of the social norm generates feelings of culpability, the conformity generates feelings of self-satisfaction, enhancing self-esteem [50]. Personal norms are triggered by the perception of consequences and the ascription of responsibility for one's behavior to the other's well-being [51].

In the context of carsharing, as much as one perceives that his/her peers support and/or approve of his/her use of carsharing services, more likely it will be that this person will use the service or become a member. Moreover, if this person perceives that carsharing is a more sustainable way of traveling and if he/she has strong personal norms to reduce his/her impact on the environment due to his/her travels, this person may use the carsharing services as a substitute for a private car. Climate morality was identified as the main factor to change motivation to reduce private car use [52].

With these frameworks and concepts as the foundation of the proposed model, the hypotheses of the present study encompass that behavioral intention to use carsharing is expected to be positively and directly predicted by people's climate morality (environmental concern and personal norms) (H1), subjective norms (H2), control (to what extent they perceive being in control to actively choose to use the service) (H3), and trust (in the availability and to what extent they could rely on the service) (H4). The last hypothesis is that driving habits will negatively predict the intention to use carsharing (H5).

To test these hypotheses, the model illustrated in Figure 2 will be tested. In this model, the latent variable subjective norms is originally from the TPB, and the other latent variables climate morality, trust, and driving habits are essential correlates of travel behavior. The latent variable control is modeled as a combination of concepts from the TPB and TAM, including perceived behavior control (from the TPB), ease of use, and perceived usefulness (from the TAM). The perceived ease of using carsharing, including physical ability and cognitive skills, will influence the extent to which people perceive having control over

their choices. For instance, online booking of a vehicle may be perceived as a barrier or inconvenience to use carsharing if compared to other transport services. The perceived behavior control will also be affected by the perceived usefulness of the service for certain trip purposes. Some carsharing services may be more attractive for shopping trips rather than commuting, for example. Therefore, the concepts of ease of use, perceived usefulness, and perceived behavior control are modeled together in this study.

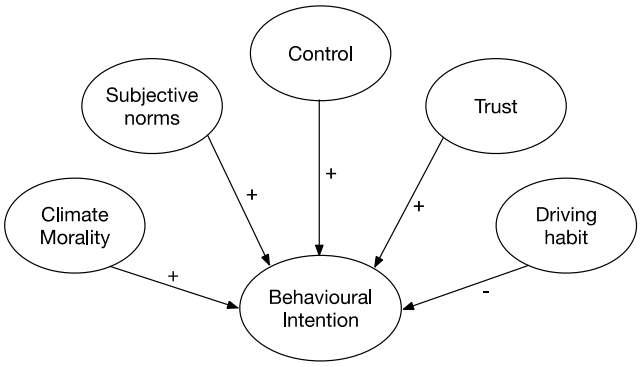


Figure 2. Proposed model to predict intention to use carsharing services.

2.3. Research Questions

Given the proposed theoretical model, the following research questions guide this investigation:

RQ1: To what extent does the proposed model, based on TPB and TAM, explain the intention to use carsharing in a near future?
RQ2: What are the main incentives and barriers to the intention to use carsharing?
RQ3: Do habits, climate morality, subjective norms, control, and trust differently affect users and non-users of carsharing regarding their intention to use this service?
RQ3a: If there are substantial differences between users and non-users, to what extent do they differ depending on their cultural backgrounds?

3. Materials and Methods

3.1. Data Collection Procedure

The data was collected by a survey distributed via a link to respondents in Swedish and Italian, with an option to the English version, from April to June 2018. The Swedish survey was distributed by the Laboratory of Opinion Research at the University of Gothenburg (LORE) for users and non-users of carsharing. The administration of the Italian version of the survey was done by a panel company for the sample of non-users and by two carsharing operators for the sample of users. The sample was classified into four groups: Italian users, Italian non-users, Swedish users, and Swedish non-users of carsharing. The users were respondents who have used or are currently using carsharing, while non-users reported never using the carsharing services. The administration of the survey was concentrated in different cities in Italy and Sweden, where at least one carsharing service was active at the time of the survey.

To facilitate reproducibility and data reuse, this paper offers a complete Supplementary Material containing the software environment, the code, the protocols, the methods, and extra descriptive analyses. The link for access to the dataset is available (see Data Availability Statement and Data Availability Statement).

3.2. Survey: Cross-Cultural and Group Differences

To address issues related to the survey's language, in each country, researchers native to the local language translated the survey from English to Swedish and Italian. Cultural issues were taken into consideration, especially related to the concept of carsharing (lin-

guistic aspect) and its use (cultural aspect) across countries. Back translations were also part of the process of survey development [53].

At the beginning of the survey, the participants were asked about their level of familiarity with the concept of carsharing (1 = strongly disagree to 7 = strongly agree), including an option to select "I am not familiar with the concept of carsharing".

The definition of carsharing presented in the survey was "carsharing is a membership service available to all qualified drivers in a community. No separate written agreement is required each time a member reserves and uses a vehicle. The carsharing companies offer their members access to a dispersed network of shared vehicles 24 h, 7 days a week. It should be highlighted that the trips are not shared between drivers, only the vehicles are shared at different times by different drivers". If the respondents reported not being familiar with the concept of carsharing, they were not included in the study. The authors adopted this procedure to guarantee the validity of the responses.

The items of the survey were adapted from previous literature in the area or similar, considering if the respondent was a user or non-user of carsharing. Only the latent variable of habit and climate morality (a proposed combination of the concepts of personal norms and environmental concern) had the same phrasing of the items for both groups. The reason is that those variables were not dependent on the respondents' experience with carsharing services.

The behavioral intention was assessed by one item: "I will continue to use carsharing" (for users) and "I will become a member of a carsharing service" (for non-users) [54,55].

The habit was assessed by eight items that intended to capture the automaticity and the psychological need to use a car on daily basis (e.g., "I use the car without planning") [55].

Climate morality was assessed by five items that involved the individual's perception of the negative effects of their use of the car towards the natural environment (e.g., "I feel morally obliged to reduce the environmental impact due to my travel patterns") [55].

Subjective norms were assessed by three items that involved the individual's perception of their peer's evaluation when it comes to the use of carsharing (e.g., "people who are important to me like that I use carsharing" for users and "people who are important to me would like that I use carsharing" for non-users) [50,54].

Trust was assessed by three items that involved the perception of the quality and trustworthiness of the services (e.g., "based on my previous experience with carsharing, I know . . . it is trustworthy" for users and "based on my knowledge about carsharing, I think . . . it is trustworthy" for non-users) [56].

Control was assessed by six items that involved the individual's perception of control, usefulness, and ability to accomplish their daily travel needs by using carsharing services (e.g., "carsharing helps me to accomplish activities that are important to me" for users and "using carsharing would help me to accomplish activities that are important to me" for non-users.) [38,54].

All items across variables had a 7-point scale, in which 1 corresponded to the lower valence of the measurement and 7 corresponded to the strongest valence of the measurement. The concept of climate morality is treated as a combination of the concepts of personal norms and environmental concern. Similarly, the concept of control is treated as a combination of the concepts of perceived behavior control, ease of use, and perceived usefulness (see the Supplementary Material). By combining these concepts, it was possible to integrate the theory of planned behavior (TPB) and the technology acceptance model (TAM) all together in the same predictive model.

3.3. Sample

The participants were classified into four groups: Italian users (n = 1377), Italian non-users (n = 1874), Swedish users (n = 1068), or Swedish non-users (n = 1753) of any kind of carsharing service. Table 1 summarizes the sociodemographic profiles of all groups.

Table 1. Sociodemographic variables by the groups.

Sociodemographic Variables	Italy		Sweden	
	Users	Non-Users	Users	Non-Users
	(*n* = 1377)	(*n* = 1874)	(*n* = 1068)	(*n* = 1753)
Age (%)				
40–18 years	61.7	29.3	32.9	22.5
60–41 years	29.4	43	47.2	41.7
90–61 years	8.9	27.7	19.9	35.9
Gender (% male)	58.2	50.5	61.1	59.3
Monthly income in Euros (%) [1]				
<849	13.8	13.7	1.3	2.3
850–1499	19.9	20.3	4.8	8.4
1500–2199	17.2	20.5	5	9.6
2200–2849	12.4	10.9	12.3	14.1
2850–4249	10.5	9.7	43.9	35.5
4250<	3.9	4.5	30.8	27
I don't know/				
I don't want to answer/Other	22.3	24.8	1.9	2.9
Missing	18	0.6	3.4	5.6
Highest education (%)				
Upper secondary school	20.5	32.5	5.2	9.7
Post-secondary school	10.2	12.7	5.6	8.7
University or postgraduate studies	68.9	53.8	88.5	80
Other	0.4	1	0.7	1.6
Children in the household (%) [2]				
No children	50.4	50.2	51.5	62.5
One child from 0 to 3 years	12.5	8.8	18.6	8.9
One child from 4 to 6 years	12.1	7.8	14.9	9.5
One child from 7 to 15 years	16.7	16.4	26.2	24.6
One child from 16 or older	13.8	25.5	7.6	8.4
Frequency of Public transport use (%)				
Never	4.2	9.5	4.1	5.6
More seldom	16.1	25.2	11.6	13.4
A few times a week	19	24.2	19.2	21.3
1–3 days a week	21.2	14.9	20.8	20.5
4–6 days a week	26.8	18.1	17.9	16.6
Daily	12.7	8.1	26.4	22.5

[1] Personal monthly income before taxes. [2] Categories are not mutually exclusive: one can have more than one child and have children in different age categories.

3.4. Data Analysis and Analysis of Invariance

Structural equation modeling (SEM) was used to examine the effects of different factors on the intention to use carsharing, and multigroup confirmatory factor analysis (MGCFA), an extension of CFA, was used to identify which paths of the model have the same effect between groups and which paths vary depending on the group. The software used was R (version 4.0.3) and the package was the package lavaan version 0.6.7 [57].

This kind of analysis allows two hypotheses to be tested: Do the indicators of the factors included in the model measure these factors in the same way for users and non-users of carsharing? If so, are the means for users and non-users of carsharing different for the factors?

However, to make group comparisons, one must be sure that configural, metric, and scalar invariances are met [58]. First, the measurement model was tested by using confirmatory factor analysis (CFA), and the configural, metric, and scalar invariances were tested by constraining the parameters step by step and by using Δcomparative fit indexes to evaluate measurement invariance. The ΔGFIs (goodness-of-fit indexes) used are

independent of model complexity and sample size and are not correlated with the overall fit measures. In this procedure, if two nested models show a decrease higher than 0.01 in the value of CFI, the more restrictive model should be rejected [59].

4. Results

4.1. Measurement Model

To investigate the validity of the measurement model, a six-factor model was tested by using CFA. Behavioral intention, habit, climate morality, subjective norms, trust, and control were modeled as interrelated latent variables.

The interrelatedness of the items within each latent variable was measured by Cronbach's alpha [60], and the lower bound to the reliability of the scales was reported by the λ_2 [61]. They were assessed separately by each group.

Even though Cronbach's alpha has been largely reported as a measure of internal consistency of a test [62], other authors strongly advocate that this is a misunderstanding of the seminal work of Cronbach [55] and that better measures of lower bound should be used instead [63–65]. Given the tradition among psychologists to report alpha and the work proposed by [62], this article reports both measures. Moreover, for the specific case of this study, there were no major differences between the Cronbach's alpha and λ_2, and they were all under the acceptable range (see Table 2). This is the case because all latent variables were unidimensional, and in these cases, alpha performs well [63].

Table 2. Cronbach's alpha and Guttman's lambda values.

Variables	Italy		Sweden	
	Users	**Non-Users**	**Users**	**Non-Users**
Habits	Alpha = 0.900 λ_2 = 0.897	Alpha = 0.896 λ_2 = 0.893	Alpha = 0.904 λ_2 = 0.897	Alpha = 0.919 λ_2 = 0.913
CM [1]	Alpha = 0.866 λ_2 = 0.840	Alpha = 0.872 λ_2 = 0.845	Alpha = 0.885 λ_2 = 0.858	Alpha = 0.875 λ_2 = 0.851
SN [2]	Alpha = 0.880 λ_2 = 0.823	Alpha = 0.809 λ_2 = 0.753	Alpha = 0.879 λ_2 = 0.820	Alpha = 0.790 λ_2 = 0.759
Control	Alpha = 0.801 λ_2 = 0.799	Alpha = 0.808 λ_2 = 0.803	Alpha = 0.842 λ_2 = 0.833	Alpha = 0.841 λ_2 = 0.835
Trust	Alpha = 0.824 λ_2 = 0.774	Alpha = 0.880 λ_2 = 0.829	Alpha = 0.896 λ_2 = 0.841	Alpha = 0.909 λ_2 = 0.853

[1] CM = Climate morality. [2] SN = Subjective Norms.

The missing data were treated by case-wise (or 'full information') maximum likelihood (FIML) estimation, and the standard errors were estimated by the robust method, as strongly advised by previous studies [66,67] (the percentage of missing values by each item of the scales are reported in the Supplementary Material).

Four steps of analysis of invariance were performed across groups and nationalities (Italian users, Italian non-users, Swedish users, Swedish non-users). Configural invariance was tested in the first step to examine the goodness of fit of the factor structure across the groups. The factor loadings and item intercepts were unconstrained, and the model was fit onto the groups. The second step tested the metric invariance to examine if the factor loadings were equivalent across the groups. Therefore, each factor loading was constrained equally across groups. The purpose was to inspect if the construct of each latent variable that predicts behavioral intention had the same meaning across groups. Scalar invariance was assessed in the third and fourth steps to examine if the latent means can be compared across groups. The item intercepts of the factors habits and climate morality were constrained as equal across groups in the third and fourth steps, respectively [68].

For each step of the confirmatory factor analysis (CFA), the chi-square statistic test was reported along with other fit indexes (CFI, RMSEA, SRMR) (see Table 3). The ΔCFI

values were all under 0.01, and therefore the most strict model (M4) was kept. The means and standard deviations for all items are reported in the Supplementary Material.

Table 3. Indices of analysis of invariance.

Measurement of Invariance	Indices		
	CFI	**RMSEA**	**SRMR**
M1. Configural invariance	0.948	0.055 [0.054, 0.056]	0.051
M2. Metric invariance	0.946	0.056 [0.054, 0.057]	0.058
M3. Scalar invariance (habits)	0.936	0.060 [0.059, 0.062]	0.075
M4. Scalar invariance (habits and climate morality)	0.937	0.059 [0.058, 0.061]	0.078

Since the items of the factors subjective norms, trust, and control had equivalent intercepts between users and non-users, they were not tested for scalar invariance. The reasons are because these factors are strictly connected with the respondent's previous experiences with carsharing and because the phrasing of the items was adapted for the reality of each group.

The chi-square (χ^2) tests the exact-fit hypothesis that there is no difference between the covariance in the tested model and the population covariance matrix. By rejecting this hypothesis, one may conclude that there is evidence against the given model explanation and that the discrepancies between the given model and the data should be further interpreted. The binary decision of rejecting or not the hypothesis does not imply that the model should be retained or rejected [69]. This argument is based on the fact that the chi-squared test is sensitive to sample size. For instance, the sample size in this study is considered large for this kind of analysis, and small discrepancies between the model and the data may have led to this *p*-value.

The four steps of the confirmatory factor analysis (CFA) indicated a good fit, although the chi-square test had a significant *p*-value on the four steps. The first step presented χ^2 (964) = 5394.60, $p < 0.001$. The second step presented χ^2 (979) = 5611.82, $p < 0.001$. The third step presented χ^2 (1004) = 6520.62, $p < 0.001$. The fourth step presented χ^2 (1012) = 6438.98, $p < 0.001$.

The values of the root mean square error of approximation (RMSEA) were acceptable, and the 90% confidence interval has a good narrow range, giving confidence in a good fit. This index is an indicator of a badness-of-fit statistic in which values closer to zero indicate better results. The fit of the analyzed path model (CFI) was about 94–95% better than that of the independence model (the null model). Moreover, the standardized square root of the average squared covariance residuals (SRMR) indicated a good fit [69] (see Table 3).

Given the results of the values of GIFs, it is possible to address the first research question (RQ1) and assume that the proposed model is a good model to predict carsharing use. Moreover, the results of the analysis of invariance allow group comparisons to answer the research questions RQ3 and RQ3a in the coming section, together with RQ2.

4.2. Structural Model

The results in Tables 4 and 5 show the effect of habit, climate morality, subjective norms, control, and trust on the behavioral intention to use carsharing for users and non-users in Sweden and Italy. These results give support to answer RQ2, RQ3, and RQ3a.

Table 4. Regression paths by groups in Sweden.

Sweden	Users				Non-Users			
	Estimate	**Std.Err.**	**CI**	***p*-Value**	**Estimate**	**Std.Err.**	**CI**	***p*-Value**
BI~								
Habit	**−0.212**	0.048	[−0.306, −0.117]	<0.001	**−0.071**	0.031	[−.131, −0.010]	0.021
Climate morality	**−0.097**	0.044	[−0.183, −0.010]	0.028	**−0.140**	0.036	[−0.211, −0.070]	<0.001
Subjective norm	**0.125**	0.051	[0.026, 0.224]	0.014	**0.156**	0.041	[0.076, 0.236]	<0.001
Control	**0.773**	0.075	[0.627, 0.920]	<0.001	**0.329**	0.040	[0.251, 0.407]	<0.001
Trust	−0.005	0.059	[−0.121, 0.110]	0.926	0.057	0.034	[−.011, 0.124]	0.099

Note: Bold numbers indicate statistical significance at 95% confidence intervals.

Table 5. Regression paths by groups in Italy.

Italy	Users				Non-Users			
	Estimate	**Std.Err.**	**CI**	***p*-Value**	**Estimate**	**Std.Err.**	**CI**	***p*-Value**
BI~								
Habit	**−0.079**	0.039	[−0.155, −0.003]	0.041	−0.009	0.027	[−0.061, 0.044]	0.743
Climate morality	−0.011	0.055	[−0.118, 0.097]	0.844	0.036	0.038	[−0.038, 0.110]	0.342
Subjective norm	**0.374**	0.072	[0.232, 0.515]	<0.001	**0.363**	0.039	[0.287, 0.439]	<0.001
Control	**0.486**	0.094	[0.302, 0.670]	<0.001	**0.436**	0.048	[0.341, 0.531]	<0.001
Trust	**0.254**	0.076	[0.106, 0.402]	0.001	**0.103**	0.034	[0.037, 0.169]	0.002

Note: Bold numbers indicate statistical significance at 95% confidence intervals.

Control was the main predictor of intention to use carsharing among users ($\beta_{Sweden} = 0.77$, $p < 0.001$; $\beta_{Italy} = 0.48$, $p < 0.001$) and non-users ($\beta_{Sweden} = 0.32$, $p < 0.001$; $\beta_{Italy} = 0.43$, $p < 0.001$). Driving habits negatively predicted the intention to use carsharing ($\beta_{Users\ Sweden} = -0.21$, $p < 0.001$; $\beta_{Non\text{-}users\ Sweden} = -0.07$, $p = 0.021$; $\beta_{Users\ Italy} = -0.79$, $p = 0.041$), except for Italian non-users ($\beta = -0.00$, $p = 0.743$). Subjective norms positively predicted the intention to use carsharing among users ($\beta_{Sweden} = 0.12$, $p = 0.014$; $\beta_{Italy} = 0.37$, $p < 0.001$) and non-users ($\beta_{Sweden} = 0.15$, $p < 0.001$; $\beta_{Italy} = 0.36$, $p < 0.001$). Trust was a predictor of intention only for the Italian groups ($\beta_{Users\ Sweden} = -0.00$, $p = 0.926$; $\beta_{Non\text{-}users\ Sweden} = 0.05$, $p = 0.099$; $\beta_{Users\ Italy} = 0.25$, $p < 0.001$; $\beta_{Non\text{-}users\ Italy} = 0.10$, $p = 0.002$). Climate morality had a small negative effect on the Swedish groups only ($\beta_{Users\ Sweden} = -0.09$, $p = 0.028$; $\beta_{Non\text{-}users\ Sweden} = -0.14$, $p < 0.001$; $\beta_{Users\ Italy} = -0.01$, $p = 0.844$; $\beta_{Non\text{-}users\ Italy} = 0.03$, $p = 0.342$).

Five chi-squared tests were performed to test the null hypothesis that the regression coefficients were the same across groups for the five parameters. Each parameter was constrained at each time, and a χ^2 difference test was performed to assess the difference between the model fits, one model unconstrained for the groups and one model constrained.

To compute an χ^2 difference test, the difference of the χ^2 values of the two models in question is taken as well as the difference of the degrees of freedom. If the χ^2 diff-value is significant, the model with more freely estimated parameters fits the data better than the model in which the parameters in question are fixed [70].

The results indicate that there are differences between the unconstrained and constrained models for the parameters habit (χ^2 diff (3) = 17.1, $p < 0.001$), climate morality (χ^2 diff (3) = 9.2, $p < 0.05$), and control (χ^2 diff (3) = 36.1, $p < 0.001$). No differences were identified for the parameters subjective norms (χ^2 diff (3) = 3.3, $p = 0.33$) and trust (χ^2 diff (3) = 7.7, $p = 0.05$). Therefore, comparisons among coefficients are only statistically significant at 95% confidence interval for the coefficients of the variables habit, climate morality, and control.

Table 6 summarizes the hypothesis testing. The results show that H1 was not supported. The effect of climate morality was statistically significant only between the Swedish groups, with a negative effect. H2 and H3 were supported among all groups. H4 was

supported only between the Italian groups, and H5 was supported among all groups except for Italian non-users.

Table 6. Summary of hypotheses and results.

Hypothesis		Result
H1	Behavioral intention to use carsharing will be positively and directly predicted by people's climate morality	Not supported
H2	Behavioral intention to use carsharing will be positively and directly predicted by people's subjective norms	Supported
H3	Behavioral intention to use carsharing will be positively and directly predicted by people's control	Supported
H4	Behavioral intention to use carsharing will be positively and directly predicted by people's trust	Partially supported
H5	Driving habits will negatively predict the intention to use carsharing	Partially supported

5. Discussion

The main purpose of this article was to propose and test an integrative structural model based on the frameworks of the TPB and TAM. This model specifies that intention to use carsharing depends on habits, climate morality (personal norms and environmental concern), subjective norms, control (perceived behavior control, ease of use, and perceived usefulness), and trust.

In this section, the research questions are firstly discussed, followed by a specific discussion of each latent variable modeled in this study and methodological aspects. The section is finalized with limitations and a proposal for future research.

The results of this study provide evidence to support both the TPB and the TAM as important frameworks to investigate and predict transport behavior, answering the RQ1 (to what extent does the proposed model, based on TPB and TAM, explain the intention to use carsharing in a near future?). They also show the importance of looking at behavioral aspects related to the use of new transport services, such as carsharing. Therefore, the results and discussion provided by this study have many implications for the transport research area and environmental psychology.

Control was the main positive factor to predict the intention to use carsharing. Among the factors with negative effects on behavioral intention, driving habits had similar negative effects between the Swedish groups, but did not affect Italian non-users. Climate morality had similar negative effects between the Swedish groups, but no effect between the Italian groups. These results successfully answer the RQ2 (What are the main incentives and barriers to the intention to use carsharing?) by indicating that perception of control was the main incentive to intention to use carsharing, while driving habits were the main barrier.

The estimates and CIs reported in Tables 4 and 5 give support to answer the RQ3 (Do habits, climate morality, subjective norms, control, and trust differently affect users and non-users of carsharing regarding their intention to use this service?) and RQ3a (If there are substantial differences between users and non-users, to what extent do they differ depending on their cultural backgrounds?). Swedish users and non-users do not differ substantially in terms of psychological predictors of the intention to use carsharing. Between the Italian groups, driving habits did not affect the behavioral intention of non-users and had a small effect on users.

These results give evidence that users and non-users of carsharing in Sweden do not differ to great extent regarding the effects of driving habits, climate morality, and control on the intention to use carsharing. The greatest differences come when comparing Swedish and Italian groups. Climate morality was a negative predictor for Swedish groups, but not for Italians.

Driving habits had stronger negative effects for users of carsharing than for non-users. This result indicates that users with a high perception of a need for a car are less willing to use carsharing. Non-users may have a variety of preferences for traveling, and they do not

necessarily have a strong link with a car to reach their destinations. Habitual behaviors are mental schemas linked to a goal to act [71]. If there is no link between traveling to a certain destination and the vehicle "car", it is unlikely that someone would choose a service based on cars to travel.

The concept of climate morality was hypothesized to have a positive relationship with the intention to use carsharing, given the support from the literature that carsharing may be a more sustainable way of traveling compared to private cars. However, climate morality had a small negative effect among the Swedish groups and no effect at all among the Italian groups.

This result could indicate a low perception of carsharing as a way of reducing environmental impact (since it is car-based). Despite the forecasted reduction in CO2 emissions and land use due to the use of carsharing instead of private cars [72], the impact assessment of the carsharing is complex, and it depends on the time framings of methodological designs (if it is cross-sectional, 'before–after' or longitudinal designs) [73]. Additionally, other factors can be more relevant to the decision to use carsharing, and concerns toward the environment are not always aligned with pro-environmental behavior performance [74].

The comparison of the effect of climate morality between nationalities is challenging and interesting. Italy has been reported as a relatively environmentally friendly country in the European Union (EU) [75], and the intention to reduce car use and travel in a more environmentally friendly way has been identified as quite low among Swedish residents [76].

However, this small difference between countries should be carefully considered, both because it is not a large difference and because climate morality has been modeled as a direct predictor in this study and previous research has argued that variables measuring environmental concern perform better as an indirect predictor of a specific behavior [77].

Subjective norms were a positive predictor across groups and nationalities. This result corroborates with previous studies that identified that the perception of approval of peers can be an influence for transport services, such as bike-sharing [31] and public transport use [78,79].

The importance of investigating subjective norms is to highlight the cultural aspects of behaviors and develop strategies to promote the given behavior. Once the effect is estimated, one may advocate for more or less marketing strategies, such as a discount for social peers, club members, and sharing on social media.

The measure of control was assessed by a combination of perceived behavior control, perceived ease of use, and usefulness. This aspect is strictly connected to the services' online platforms, vehicles, and parking schema. In this study, control was the main predictor of intention to use carsharing, corroborating previous studies. PBC has been shown to be among the main predictors of willingness to use shared parking systems [80] and to re-use free-floating carsharing [81].

The factor trust captured the predictability, trustworthiness, and quality of the carsharing service. This factor is strictly associated with people's perception of the availability of vehicles and to what extent they can rely on the service to keep their regular travels without major incidents. Previous research has shown that this is a major component of decision-making and of the probability of enjoying a carsharing service [82].

Interestingly, trust was only a positive predictor of behavior intention among the Italian groups. However, the χ^2 difference test did not indicate statistical differences across the groups. Previous research has identified that increased familiarity with the service platform has a positive impact on consumer's trust in the service [3]. However, the results from this study do not give support for that. Users and non-users of carsharing did not differ in levels of trust in the service.

It should be noted that in many previous studies with similar aims, the modeling of the variables has not always been under scrutiny of measures of invariance, which challenges the validity of the conclusions driven from the comparisons between groups. In this study, this kind of contribution can be done, and the effect of psychological variables in the intention to use carsharing can be compared between users and non-users of carsharing

in Sweden and Italy. However, as with any cross-sectional study, the effects modeled are correlational and therefore should not be interpreted as causal.

In terms of limitations of this study, participants were recruited across European countries; however, it was only in Italy and Sweden that the data collection was successful, limiting the cross-cultural analysis to these two countries. It should be mentioned that there was no control for which kind of carsharing the participants have taken part in (e.g., roundtrip; one-way, station-based; one-way, free-floating; peer-to-peer). These differences in the service could be more or less attractive for different profiles of users and non-users and consequently influence their intention to use carsharing in the near future. Additionally, shifts in modal structure for less carbon-intensive vehicles are usually connected to transport infrastructure, urban planning, and population density [83]. The present model did not control for these aspects; therefore, the conclusion drawn from this study to compare Sweden and Italy should be carefully considered.

6. Conclusions

Overall, the effects of the psychological predictor variables can be used as a source of information to understand the use of carsharing and provide insightful knowledge about the behavior of users of carsharing and the spread of the use of the service among those that have not had any experience with the service before. The results have shown that there are psychological common factors predicting intention to use carsharing between users and non-users, but also that there are some particularities for each group. Control was the main predictor of intention to use carsharing. Driving habits had stronger negative effects for users of carsharing than for non-users. Subjective norms positively predicted the intention to use carsharing among all groups. Trust was a predictor of intention only for the Italian groups. Climate morality had a small negative effect on the Swedish groups only.

Climate morality, that is, the personal norms to reduce the impact on the environment and the concern with it, is not affecting people's intention to use carsharing to a substantial extent. This aspect of the model, the considerations taken based on environmental issues, should be further investigated in future studies. For instance, the connection between carsharing use and the use of public transportation could better explain to what extent the modal choice is oriented to convenience or environmental concerns. To what extent do people perceive carsharing services as an alternative to reduce their environmental impact due to their personal travel behaviors?

Future research could tackle this aspect by investigating the qualities of services that mostly satisfy different profiles of users and potential users and their demands. Moreover, in what circumstances, for instance, the travel purpose, are people more willing to take a carsharing? Previous research has shown that psychological predictors of travel mode choice differ depending on the travel purposes [4,84].

The results of this study indicated that driving habits are negative predictors, but with a relatively small effect. What other factors may be hindering the use of carsharing? Among those that have not had experience with this service, what aspects are impeding them to have the first trial? Therefore, other barriers to use carsharing services could be further investigated in connection with habits.

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/su13126842/s1, to facilitate reproducibility and data reuse, this paper offers a complete Supplementary Materials containing the software environment, the code, the protocols, the methods, and extra descriptive analyses.

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References

1. Wu, C.; Le Vine, S.; Philips, S.; Tang, W.; Polak, J. Free-floating carsharing users' willingness-to-pay/accept for logistics management mechanisms. *Travel Behav. Soc.* **2020**, *21*, 154–166. [CrossRef]
2. Olsson, L.E.; Maier, R.; Friman, M. Why Do They Ride with Others? Meta-Analysis of Factors Influencing Travelers to Carpool. *Sustainability* **2019**, *11*, 2414. [CrossRef]
3. Liao, F.; Molin, E.; Timmermans, H.; van Wee, B. Carsharing: The impact of system characteristics on its potential to replace private car trips and reduce car ownership. *Transportation* **2020**, *47*, 935–970. [CrossRef]
4. Ramos, É.M.S.; Bergstad, C.J.; Nässén, J. Understanding daily car use: Driving habits, motives, attitudes, and norms across trip purposes. *Transp. Res. Part F Traffic Psychol. Behav.* **2020**, *68*, 306–315. [CrossRef]
5. Shaheen, S.; Cohen, A.; Farrar, E. Carsharing's impact and future. *Adv. Transp. Policy Plan.* **2019**, *4*, 87–120. [CrossRef]
6. Wilhelms, M.-P.; Henkel, S.; Falk, T. To earn is not enough: A means-end analysis to uncover peer-providers' participation motives in peer-to-peer carsharing. *Technol. Forecast. Soc. Chang.* **2017**, *125*, 38–47. [CrossRef]
7. Bocken, N.; Jonca, A.; Södergren, K.; Palm, J. Emergence of Carsharing Business Models and Sustainability Impacts in Swedish Cities. *Sustainability* **2020**, *12*, 1594. [CrossRef]
8. Mugion, R.G.; Toni, M.; Di Pietro, L.; Pasca, M.G.; Renzi, M.F. Understanding the antecedents of car sharing usage: An empirical study in Italy. *Int. J. Qual. Serv. Sci.* **2019**, *11*, 523–541. [CrossRef]
9. Dill, J.; McNeil, N.; Howland, S. Effects of peer-to-peer carsharing on vehicle owners' travel behavior. *Transp. Res. Part C Emerg. Technol.* **2019**, *101*, 70–78. [CrossRef]
10. Burkhardt, J.; Millard-Ball, A. Who Is Attracted to Carsharing? *Transp. Res. Rec. J. Transp. Res. Board* **2006**, *1986*, 98–105. [CrossRef]
11. Akyelken, N.; Givoni, M.; Salo, M.; Plepys, A.; Judl, J.; Anderton, K.; Koskela, S. The importance of institutions and policy settings for car sharing—Evidence from the UK, Israel, Sweden and Finland. *Eur. J. Transp. Infrastruct. Res.* **2018**, *18*, 340–359. [CrossRef]
12. Arroyo, R.; Ruiz, T.; Mars, L.; Rasouli, S.; Timmermans, H. Influence of values, attitudes towards transport modes and companions on travel behavior. *Transp. Res. Part F Traffic Psychol. Behav.* **2020**, *71*, 8–22. [CrossRef]
13. Donald, I.J.; Cooper, S.R.; Conchie, S.M. An extended theory of planned behaviour model of the psychological factors affecting commuters' transport mode use. *J. Environ. Psychol.* **2014**, *40*, 39–48. [CrossRef]
14. Lind, H.B.; Nordfjærn, T.; Jørgensen, S.H.; Rundmo, T. The value-belief-norm theory, personal norms and sustainable travel mode choice in urban areas. *J. Environ. Psychol.* **2015**, *44*, 119–125. [CrossRef]
15. Nordfjærn, T.; Zavareh, M.F. Does the value-belief-norm theory predict acceptance of disincentives to driving and active mode choice preferences for children's school travels among Chinese parents? *J. Environ. Psychol.* **2017**, *53*, 31–39. [CrossRef]
16. Sigurdardottir, S.B.; Kaplan, S.; Møller, M.; Teasdale, T.W. Understanding adolescents' intentions to commute by car or bicycle as adults. *Transp. Res. Part D Transp. Environ.* **2013**, *24*, 1–9. [CrossRef]
17. Sprei, F. Disrupting mobility. *Energy Res. Soc. Sci.* **2018**, *37*, 238–242. [CrossRef]
18. Katzev, R. Car Sharing: A New Approach to Urban Transportation Problems. *Anal. Soc. Issues Public Policy* **2003**, *3*, 65–86. [CrossRef]
19. Martin, C.J. The sharing economy: A pathway to sustainability or a nightmarish form of neoliberal capitalism? *Ecol. Econ.* **2016**, *121*, 149–159. [CrossRef]
20. Gifford, R. Environmental Psychology Matters. *Annu. Rev. Psychol.* **2014**, *65*, 541–579. [CrossRef]
21. Stern, P.C. Contributions of Psychology to Limiting Climate Change. *Am. Psychol.* **2011**, *66*, 303–314. [CrossRef]
22. Hunecke, M.; Haustein, S.; Böhler, S.; Grischkat, S. Attitude-based target groups to reduce the ecological impact of daily mobility behavior. *Environ. Behav.* **2010**, *42*, 3–43. [CrossRef]
23. Paundra, J.; Rook, L.; van Dalen, J.; Ketter, W. Preferences for car sharing services: Effects of instrumental attributes and psychological ownership. *J. Environ. Psychol.* **2017**, *53*, 121–130. [CrossRef]
24. Ramos, É.M.S.; Bergstad, C.J.; Chicco, A.; Diana, M. Mobility styles and car sharing use in Europe: Attitudes, behaviours, motives and sustainability. *Eur. Transp. Res. Rev.* **2020**, *12*, 13. [CrossRef]
25. Schröder, T.; Wolf, I. Modeling multi-level mechanisms of environmental attitudes and behaviours: The example of carsharing in Berlin. *J. Environ. Psychol.* **2017**, *52*, 136–148. [CrossRef]
26. Chng, S.; Abraham, C.; White, M.P.; Hoffmann, C.; Skippon, S. Psychological theories of car use: An integrative review and conceptual framework. *J. Environ. Psychol.* **2018**, *55*, 23–33. [CrossRef]
27. Ajzen, I. Martin fishbein's legacy: The reasoned action approach. *Ann. Am. Acad. Political Soc. Sci.* **2012**, *640*, 11–27. [CrossRef]

28. Ajzen, I.; Fishbein, M. Attitude-behavior relations: A theoretical analysis and review of empirical research. *Psychol. Bull.* **1977**, *84*, 888–918. [CrossRef]
29. Davis, F.D.; Bagozzi, R.P.; Warshaw, P.R. User Acceptance of Computer Technology: A Comparison of Two Theoretical ModePublished. *Manag. Sci.* **1989**, *35*, 982–1003. Available online: https://www.jstor.org/stable/2632151?seq=1&cid=pdf-reference#references_tab_contents (accessed on 14 February 2020). [CrossRef]
30. Steg, L.; Perlaviciute, G.; van der Werff, E. Understanding the human dimensions of a sustainable energy transition. *Front. Psychol.* **2015**, *6*, 805. [CrossRef] [PubMed]
31. Kaplan, S.; Manca, F.; Nielsen, T.A.S.; Prato, C.G. Intentions to use bike-sharing for holiday cycling: An application of the Theory of Planned Behavior. *Tour. Manag.* **2015**, *47*, 34–46. [CrossRef]
32. Yousafzai, S.Y.; Foxall, G.R.; Pallister, J.G. Technology acceptance: A meta-analysis of the TAM: Part 1. *J. Model. Manag.* **2007**, *2*, 251–280. [CrossRef]
33. Yousafzai, S.Y.; Foxall, G.R.; Pallister, J.G. Technology acceptance: A meta-analysis of the TAM: Part 2. *J. Model. Manag.* **2007**, *2*, 281–304. [CrossRef]
34. Sheppard, B.H.; Hartwick, J.; Warshaw, P.R. The Theory of Reasoned Action: A Meta-Analysis of Past Research with Recommendations for Modifications and Future Research. *J. Consum. Res.* **1988**, *15*, 325. [CrossRef]
35. Eriksson, L.; Forward, S.E. Is the intention to travel in a pro-environmental manner and the intention to use the car determined by different factors? *Transp. Res. Part D Transp. Environ.* **2011**, *16*, 372–376. [CrossRef]
36. Madigan, R.; Louw, T.; Wilbrink, M.; Schieben, A.; Merat, N. What influences the decision to use automated public transport? Using UTAUT to understand public acceptance of automated road transport systems. *Transp. Res. Part F Traffic Psychol. Behav.* **2017**, *50*, 55–64. [CrossRef]
37. Nordhoff, S.; van Arem, B.; Happee, R. Conceptual Model to Explain, Predict, and Improve User Acceptance of Driverless Podlike Vehicles. *Transp. Res. Rec. J. Transp. Res. Board* **2016**, *2602*, 60–67. [CrossRef]
38. Wu, I.-L.; Chen, J.-L. An extension of Trust and TAM model with TPB in the initial adoption of on-line tax: An empirical study. *Int. J. Hum. Comput. Stud.* **2005**, *62*, 784–808. [CrossRef]
39. Bamberg, S.; Ajzen, I.; Schmidt, P. Choice of Travel Mode in the Theory of Planned Behavior: The Roles of Past Behavior, Habit, and Reasoned Action. *Basic Appl. Soc. Psychol.* **2003**, *25*, 175–187. [CrossRef]
40. Gardner, B.; Abraham, C. Psychological correlates of car use: A meta-analysis. *Transp. Res. Part F Traffic Psychol. Behav.* **2008**, *11*, 300–311. [CrossRef]
41. Lanzini, P.; Khan, S.A. Shedding light on the psychological and behavioral determinants of travel mode choice: A meta-analysis. *Transp. Res. Part F Traffic Psychol. Behav.* **2017**, *48*, 13–27. [CrossRef]
42. Gärling, T.; Axhausen, K.W. Introduction: Habitual travel choice. *Transportation* **2003**, *30*, 1–11. [CrossRef]
43. Aarts, H.; Verplanken, B.; Van Knippenberg, A. Predicting behavior from actions in the past: Repeated decision making or a matter of habit? *J. Appl. Soc. Psychol.* **1998**, *28*, 1355–1374. [CrossRef]
44. Gifford, R. The dragons of inaction: Psychological barriers that limit climate change mitigation and adaptation. *Am. Psychol.* **2011**, *66*, 290–302. [CrossRef] [PubMed]
45. Itzchakov, G.; Uziel, L.; Wood, W. When attitudes and habits don't correspond: Self-control depletion increases persuasion but not behavior. *J. Exp. Soc. Psychol.* **2018**, *75*, 1–10. [CrossRef]
46. Ouellette, J.A.; Wood, W. Habit and Intention in Everyday Life: The Multiple Processes by Which Past Behavior Predicts Future Behavior. *Psychol. Bull.* **1998**, *124*, 54–74. [CrossRef]
47. Kroesen, M.; Handy, S.; Chorus, C. Do attitudes cause behavior or vice versa? An alternative conceptualization of the attitude-behavior relationship in travel behavior modeling. *Transp. Res. Part A Policy Pract.* **2017**, *101*, 190–202. [CrossRef]
48. Schwarts, S.H. Normative explanations of helping behavior: A critique, proposal, and empirical test. *J. Exp. Soc. Psychol.* **1973**, *9*, 349–364. [CrossRef]
49. Steg, L.; Bolderdijk, J.W.; Keizer, K.; Perlaviciute, G. An Integrated Framework for Encouraging Pro-environmental Behaviour: The role of values, situational factors and goals. *J. Environ. Psychol.* **2014**, *38*, 104–115. [CrossRef]
50. Thøgersen, J. Norms for environmentally responsible behaviour: An extended taxonomy. *J. Environ. Psychol.* **2006**, *26*, 247–261. [CrossRef]
51. Schwartz, S.H. Words, deeds and the perception of consequences and responsibility in action situations. *J. Pers. Soc. Psychol.* **1968**, *10*, 232–242. [CrossRef]
52. Andersson, A. Is climate morality the answer? Preconditions affecting the motivation to decrease private car use. *Transp. Res. Part D Transp. Environ.* **2020**, *78*, 102198. [CrossRef]
53. van de Vijver, F.; Tanzer, N.K. Bias and equivalence in cross-cultural assessment: An overview. *Rev. Eur. Psychol. Appl.* **2004**, *54*, 119–135. [CrossRef]
54. Ajzen, I. Constructing a TpB Questionnaire: Conceptual and Methodological Considerations. Working Paper, University of Massachusetts, Amherst, September 2002. Available online: http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.601.956&rep=rep1&type=pdf (accessed on 15 June 2021).
55. Klöckner, C.A.; Friedrichsmeier, T. A multi-level approach to travel mode choice—How person characteristics and situation specific aspects determine car use in a student sample. *Transp. Res. Part F Traffic Psychol. Behav.* **2011**, *14*, 261–277. [CrossRef]

56. Zhang, T.; Tao, D.; Qu, X.; Zhang, X.; Lin, R.; Zhang, W. The roles of initial trust and perceived risk in public's acceptance of automated vehicles. *Transp. Res. Part C Emerg. Technol.* **2019**, *98*, 207–220. [CrossRef]
57. Rosseel, Y. lavaan: An R Package for Structural Equation. *J. Stat. Softw.* **2012**, *48*, 1–36. [CrossRef]
58. Vandenberg, R.J.; Lance, C.E. A Review and Synthesis of the Measurement Invariance Literature: Suggestions, Practices, and Recommendations for Organizational Research. *Organ. Res. Methods* **2000**, *3*, 4–70. [CrossRef]
59. Cheung, G.W.; Rensvold, R.B. Evaluating Goodness-of-Fit Indexes for Testing Measurement Invariance. *Struct. Equ. Model. Multidiscip. J.* **2002**, *9*, 233–255. [CrossRef]
60. Cronbach, L.J. Coefficient alpha and the internal structure of tests. *Psychometrika* **1951**, *16*, 297–334. [CrossRef]
61. Guttman, L. A basis for analyzing test-retest reliability. *Psychometrika* **1945**, *10*, 255–282. [CrossRef]
62. Tavakol, M.; Dennick, R. Making sense of Cronbach's alpha. *Int. J. Med. Educ.* **2011**, *2*, 53–55. [CrossRef]
63. Cortina, J.M. What Is Coefficient Alpha? An Examination of Theory and Applications. *J. Appl. Psychol.* **1993**, *78*, 98–104. [CrossRef]
64. Schmitt, N. Uses and abuses of coefficient alpha. *Psychol. Assess.* **1996**, *8*, 350–353. [CrossRef]
65. Sijtsma, K. On the Use, the Misuse, and the Very Limited Usefulness of Cronbach's Alpha. *Psychometrika* **2009**, *74*, 107–120. [CrossRef]
66. Graham, J.W. Missing data analysis: Making it work in the real world. *Annu. Rev. Psychol.* **2009**, *60*, 549–576. [CrossRef]
67. Schafer, J.L.; Graham, J.W. Missing data: Our view of the state of the art. *Psychol. Methods* **2002**, *7*, 147–177. [CrossRef] [PubMed]
68. L Milfont, T.; Fischer, R. Testing measurement invariance across groups: Applications in cross-cultural research. *Int. J. Psychol. Res.* **2010**, *3*, 111–130. [CrossRef]
69. Kline, R.B. Principles and practices of structural equation modelling. In *Methodology in the Social Sciences*, 4th ed.; Guilford Press: New York, NY, USA, 2016.
70. Schermelleh-Engel, K.; Moosbrugger, H.; Müller, H. Evaluating the fit of structural equation models: Tests of significance and descriptive goodness-of-fit measures. *MPR Online* **2003**, *8*, 23–74. Available online: https://www.researchgate.net/publication/251060246_Evaluating_the_Fit_of_Structural_Equation_Models_Tests_of_Significance_and_Descriptive_Goodness-of-Fit_Measures (accessed on 3 June 2021).
71. Aarts, H.; Dijksterhuis, A. Habits as knowledge structures: Automaticity in goal-directed behavior. *J. Pers. Soc. Psychol.* **2000**, *78*, 53–63. [CrossRef]
72. Firnkorn, J.; Müller, M. What will be the environmental effects of new free-floating car-sharing systems? The case of car2go in Ulm. *Ecol. Econ.* **2011**, *70*, 1519–1528. [CrossRef]
73. Firnkorn, J.; Shaheen, S. Generic time- and method-interdependencies of empirical impact-measurements: A generalizable model of adaptation-processes of carsharing-users' mobility-behavior over time. *J. Clean. Prod.* **2016**, *113*, 897–909. [CrossRef]
74. Tam, K.P.; Chan, H.W. Environmental concern has a weaker association with pro-environmental behavior in some societies than others: A cross-cultural psychology perspective. *J. Environ. Psychol.* **2017**, *53*, 213–223. [CrossRef]
75. Lévy-Leboyer, C.; Bonnes, M.; Chase, J.; Ferreira-Marques, J.; Pawlik, K. Determinants of Pro-Environmental Behaviors. *Eur. Psychol.* **1996**, *1*, 123–129. [CrossRef]
76. de Groot, J.; Steg, L. Impact of transport pricing on quality of life, acceptability, and intentions to reduce car use: An exploratory study in five European countries. *J. Transp. Geogr.* **2006**, *14*, 463–470. [CrossRef]
77. 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]
78. Carrus, G.; Passafaro, P.; Bonnes, M. Emotions, habits and rational choices in ecological behaviours: The case of recycling and use of public transportation. *J. Environ. Psychol.* **2008**, *28*, 51–62. [CrossRef]
79. Thøgersen, J. Promoting public transport as a subscription service: Effects of a free month travel card. *Transp. Policy* **2009**, *16*, 335–343. [CrossRef]
80. Liang, J.; Eccarius, T.; Lu, C. Investigating factors that affect the intention to use shared parking: A case study of Taipei City. *Transp. Res. Part A Policy Pr.* **2019**, *130*, 799–812. [CrossRef]
81. Mattia, G.; Guglielmetti Mugion, R.; Principato, L. Shared mobility as a driver for sustainable consumptions: The intention to re-use free-floating car sharing. *J. Clean. Prod.* **2019**, *237*, 117404. [CrossRef]
82. Kim, J.; Rasouli, S.; Timmermans, H. Satisfaction and uncertainty in car-sharing decisions: An integration of hybrid choice and random regret-based models. *Transp. Res. Part A Policy Pr.* **2017**, *95*, 13–33. [CrossRef]
83. Greening, L.A. Effects of human behavior on aggregate carbon intensity of personal transportation: Comparison of 10 OECD countries for the period 1970–1993. *Energy Econ.* **2004**, *26*, 1–30. [CrossRef]
84. Zailani, S.; Iranmanesh, M.; Ariffin, T.; Chan, T. Is the intention to use public transport for different travel purposes determined by different factors? *Transp. Res. Part D Transp. Environ.* **2016**, *49*, 18–24. [CrossRef]