

Article

# Views on Public Transport and How Personal Experiences Can Contribute to a More Positive Attitude and Behavioural Change

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**Abstract:** To reduce car usage, several strategies are needed, one of which focuses on social psychological factors. The aim of this study was to predict and explain bus usage using the theory of planned behaviour and the transtheoretical model of change in a sample of 983 residents. The study also evaluated the effect of providing a group of regular car users ( $n = 34$ ) with a free travel pass, to be used on busses and trains in the region. A regression analysis showed that the theory of planned behaviour (TPB) explained 26% of the variance in intention to use the bus, increasing to 59% when past behaviour was added. The use of the free travel pass resulted in a more positive attitude towards bus usage, with a large number having either changed or having started to change their behaviour. When the same people were contacted three months later, 50% still used public transport. The conclusion is that negative attitudes and travel habits can be altered by experience. Although, a reduction of car use can only be achieved if several measures are implemented that make car driving less attractive and sustainable modes of transport more attractive.

**Keywords:** public transport; transport attitudes and norms; theory of planned behaviour; transtheoretical model; transport mode choice

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## 1. Introduction

In the European union, the majority of cars still run on fossil fuels (ACEA 2018). This can have a negative impact on the environment and, according to preliminary data, passenger cars contribute to 44% of the transport sector emissions (European Environment Agency 2016). However, it has been argued that the emission of greenhouse gas might be significantly lower in the future than is generally predicted (Metz 2015). The argument is, at least in western Europe, that car use is reaching saturation point, which is the so called “peak-car” phenomenon (Cohen 2012; Goodwin and Van Dender 2013; Metz 2015; Millard-Ball and Schipper 2011). However, this appears to be a misnomer, as the numbers of new car registrations were up by 3.4% in 2017, this following four consecutive years of increase (car sales statistics 2017).

This is also reflected in how we transport ourselves. During 2015, cars accounted for about 83% of all inland passenger kilometres, whereas public transport (PT) accounted for only 17% in the EU-28 (Eurostat 2018). It has therefore become very clear that actions are needed that will ensure the use of more sustainable modes of transport.

To make people less dependent on their cars, several actions are needed, one of which focuses on the social psychological factors that determine behaviour. The starting point for developing effective measures in persuading people to change is to identify travellers’ needs and interests, but also their barriers to change. It is also worth remembering that the modal choice is not always controlled by so-called “rational” factors, but emotional or “irrational” factors are just as important, if not more so. Willingness to use alternative modes depends not only on whether this is possible, but

also on whether it is perceived as attractive (Eriksson and Forward 2011; Forward 2003). Another important factor is whether a journey by PT can compete with a journey by car. To understand these challenges, we need to look at attitudes towards driving.

### *1.1. Attitudes Towards Driving*

The attitude towards driving is that it is both comfortable and convenient (Anable and Gatersleben 2015; Eriksson and Forward 2009; Forward 1998a; Forward 1998b; Gärling et al. 2002; ), flexible (Anable and Gatersleben 2015; Simsekoglu et al. 2015) and that it saves time (Eriksson and Forward 2009; Murtagh et al. 2012). In addition to this, it also provides the user with a sense freedom (Anable and Gatersleben 2015; Eriksson and Forward 2009) and security (Buys et al. 2012). This in turn can be related to being in control, as they can decide when and where to travel.

The personal disadvantages related to car usage are less well documented than the advantages, but this could include problems with parking and being stressful (Abou-Zeid et al. 2012; Legrain et al. 2015; Rasmussen et al. 2000). However, the negative consequences for everybody is that driving contributes to a poorer environment, although environmental concerns appear to be lower amongst car drivers (Caralampo and Panayotis 2017; Nilsson and Küller 2000; Tertoolen et al. 1998). The study by Tertoolen et al. (1998) showed that a lack of knowledge was not the problem, as information about the environmental impact of car usage did not change their behaviour. The reason for this could be that the positive effects of driving, such as comfort, flexibility and independence, outweigh their negative effects. In that case, self-interest rates higher than public interest.

### *1.2. Attitudes Towards Public Transport*

In contrast to a journey by car, travelling by PT tends to be perceived as less positive (Anable and Gatersleben 2015; De Vos 2018; Gatersleben and Uzzel 2007; Legrain et al. 2015). Many times, it is regarded as being too slow (Eriksson and Forward 2009; Line et al. 2010; Nolan 2010) and inconvenient (Eriksson and Forward 2009). Indeed, when it comes to time, several studies have shown that this is a very important factor for determining modes of transport (Burian et al. 2018; Gardner and Abraham 2007). However, it would appear to be the perception of travel time rather than time itself that is crucial. This means that our experience of time is very much influenced by our own perceived reality and is therefore not always linked to actual time as shown by clocks. When we are immersed in an experience, time may not be an issue if it is also seen as productive rather than wasted (Lyons et al. 2013). For instance, if the time could be used to read, work, or relax, then the time spent is viewed in a more positive light (Jain and Lyons 2008). It could therefore be argued that it is only when the space between departure and destination is left unfilled that we become aware of time (Forward 2003). Thus, a person's attitude to how long it would take to travel by different modes of transport tells us something about how the experience is perceived.

Factors related to safety could also reduce the use of PT, including fear of danger and personal vulnerability (Eriksson and Forward 2009). Fear can be about accidents, being killed or injured by a motor vehicle, or it can be about being attacked by another person. Indeed, studies have presented evidence indicating that fears about personal safety can result in people not using PT, especially after dark.

As previously stated, PT users are the least satisfied with their trip, although it would appear that preferences play an important role (De Vos 2018). If PT was the preferred mode of transport, then they were also more satisfied. Further support for this can be found in the study by Eriksson and Forward (2009), who found that PT users were significantly more positive about using this mode of transport than car users. Compared with car users, they perceived a journey by bus to be more relaxing, quick, pleasant and convenient.

The perception of different modes of transport appears to affect decisions and is not always based on real life experience (Bhattacharya et al. 2014). Instead, non-PT users' negative attitudes towards PT might be based on stereotyped beliefs, that is, prejudice, but also, others' negative experience rather than own experience (Chowdhury et al. 2016; Murray et al. 2010). It has therefore been argued that non-PT users need to overcome these prejudices before they are willing to use the same PT. Some form of real-life exposure that challenge this is therefore needed. Fujii et al. (2001)

found that the negative attitudes about travel time were changed because of an eight-day temporary highway closure. Even one year after the event, the use of PT was still significantly increased. Fujii and Kitamura (2003) then added that other temporary structural changes might also change attitudes and travel habits, such as a one-month free bus ticket. The results from their study showed that after the intervention, PT usage had increased by 20%. Similar results were also presented by Thøgersen (2009), who found that the introduction of a free month travel card increased the use of PT, an effect that remained six months after the trial period. It could therefore be argued that negative attitudes can be overcome by actual experiences.

However, before developing various forms of interventions aimed at reducing the number of car trips, it is important to gather as much information as possible about the target group's perception of PT. In this instance, a theoretical approach is needed, which will help to determine what factors predict their behaviour. This approach has also been substantiated by several meta-analyses, which have shown that interventions grounded in a theory are substantially more effective in reaching their goals when compared to campaigns where no such theoretical background supports the intervention. (e.g., Delhomme et al. 2009). One of the most commonly used theory's is that of the theory of planned behaviour (TPB) (Ajzen 1991).

### 1.3. Theoretical Framework

The theory of planned behaviour (TPB) predicts that a person's behaviour is a function of behavioural intention, which in turn is a function of attitude, subjective norm and perceived behavioural control (Ajzen 1991). Perceived behavioural control can also have a direct effect on behaviour, if the behaviour is not under complete "volitional" control (Madden et al. 1992). These constructs can also be described as "global" or "direct" measures and are determined by three belief-based, or indirect measures, namely: behavioural beliefs, normative beliefs and control beliefs. The differences between global measures and belief-based measures have been described as follows: "the global measure focuses directly on the concept in question, the belief-based measure focus on the presumed determinants from which the concept can be inferred" (Ajzen and Driver 1991, p. 188). In research, belief-based measures are of great interest, as they provide a deeper understanding of what motivates a person to act. However, regarding the indirect measures of perceived behavioural control, many studies only include direct measure (Forward 2008).

In accordance with the expectancy value model (EV), an attitude is the outcome of beliefs regarding the expected value of the attitude object. To form an aggregate measure of attitude, all behavioural beliefs are multiplied by an evaluation of those outcomes and the resulting product is then summed across the number of salient beliefs. According to the EV model, a behaviour is engaged in if the sum of the behavioural beliefs suggest that it will have positive outcomes and that the attitude object possesses the anticipated attributes. The ratings of these scales could be unipolar (1 to 7) or bipolar (−3 to +3). The ones chosen over the years have varied and as Ajzen (1991) puts it, "there is nothing in the theory, however, to inform us whether responses to these scales should be scored in a unipolar fashion // or in a bipolar fashion //" (p. 192).

The criteria used to determine the scales is the one that produces the strongest correlation with the direct measure of attitude (Ajzen 2006). Although, in a later publication, Ajzen and Fishbein (2008) pointed out that most investigators appear to suggest a bipolar rating for the scales measuring outcome evaluation. The results from the studies assessing multiplicative measures of beliefs have received mixed results, which led Hardeman et al. (2013) to make the following recommendation: "// that researchers who use multiplicative composites first establish clear support for a multiplicative model, before they examine a range of meaningful scaling systems on theoretical and empirical grounds" (p. 136).

### The Prediction of Intention

The ability of the TPB to predict intention, including travel behaviour, has been tested in a great number of studies (Bamberg and Schmidt 2003; Donald et al. 2014; Eriksson and Forward 2011; Forward 2004; Fu and Juan 2017; Heath and Gifford 2002).

According to the TPB, the combination of subjective and descriptive norms, also described as normative pressure, can predict intention (Ajzen and Fishbein 2005). However, this has been challenged by a number of studies, which argue that they should be treated as separate constructs (e.g., Cialdini et al. 1990; Conner and McMillan 1999; Forward 2009; Rimal et al. 2002). In relation to the use of PT, Heath and Gifford (2002) found that the descriptive norm significantly predicted the amount of bus use when compared to other travel modes, but not the intention to use the bus. Subjective norm, on the other hand, was a significant predictor of intention, but not behaviour.

Another construct that has been widely discussed is the role of habit. Initially, the formation of new attitudes is a conscious process, but later, when the attitude has become more established, the behaviour is conducted without any deeper reflection (i.e., it becomes a habit). According to the TPB, habit relates to intention, but the effect is indirect and is mediated by the variables, already included in the theory. Although, an increasing number of studies have found that past behaviour has a direct effect on both intention and future behaviour (Bamberg et al. 2003; Forward 2004; Ravis and Sheeran 2003; Thøgersen 2006; Verplanken et al. 1998). This would then indicate that the behaviour will be persistent, until something challenges the motive behind the action.

How long it would take before a new behaviour is conducted is less clear, but according to Lally et al. (2010), it could take up to 66 days. They also found that there was a point when the behaviour could not become more automatic. The conclusion was that if an intervention should succeed, the participants' need to be supported for a fairly long period.

In addition to the TPB, which is a "continuous model", the formation of a new behaviour can be further explained using stage models. These theories are important, as they provide insight as to why, despite successful implementations where a target group has accepted a certain behaviour (e.g., to use PT), the desired behaviour may not emerge. One important theory within this field of research is the transtheoretical model (TTM) (Prochaska and DiClemente 1983). According to the TTM, behaviour change is not the result of a single event, but it is a phenomenon that occurs over time. In the TTM, change is defined as an incremental, gradual, continuous and dynamic process, involving progress through a series of stages (Sutton 2001). The advantage of this approach is being able to match interventions to the different needs of the individual(s). The TTM outlines six stages before a new behaviour is firmly established, including the following: (1) precontemplation—no intention to change their behaviour; (2) contemplation—start to become aware of the problem; (3) preparation—started to prepare themselves for change; (4) action—changed but the risk is still high that they will return to their old behaviour; (5) maintenance—behaviour has started to become a habit; and (6) termination—a new behaviour is established and it is not likely they will return to their old behaviour. The six different stages of change identify the location of people and are central to the model. However, the stages are reversible and it is possible for a person to move both forward and backward (Callaghan et al. 2010; Courneya et al. 2001).

The TTM has received empirical support for explaining health related behaviours (Arden and Armitage, 2008; Haas and Nigg 2009; Lippke and Plotnikoff 2009). In addition to explaining various health related behaviours, the TTM has also been used to understand modal choice (e.g., Bamberg 2007; Forward 2014; Gatersleben and Appleton 2007). Bamberg (2007), for example, used the model to describe car drivers' decision to use PT. The results showed that the perceived consequences became more positive with the advancing stages.

#### 1.4. Aims

This paper describes the results from three different studies. In Study 1, the overall aim was, with the help of TPB and TTM, to identify the important factors that influence and predict PT. The second aim was to provide a deeper understanding of what motivates people to use PT. To achieve this, the beliefs of people who normally only travelled by either bus or car were compared. For car users, the gap between their beliefs about a journey by either bus or car was then assessed and compared with what they considered to be important when travelling. In Study 2, a smaller sample from Study 1, who initially did not travel by PT, received a free travel pass. The intervention was evaluated by means of a before and after study to assess if this would change their perception of PT.

The use of the theory TTM evaluated if the participants had progressed to a higher stage (i.e., being more likely to use PT). In Study 3, the same participants were then followed-up three months later. The aim was to determine how many still travelled by PT. In Studies 2 and 3, information was collected regarding possible barriers to change.

It could therefore be argued that the main contribution of this study is that it uses both the TPB and TTM. TPB helps us to understand what predicts the intention to use PT and by exploring belief-based measures, it also provides us with a deeper understanding of what motivates the use of PT and whether that conflicts with the preferred mode of transport. Although the effect of providing a free travel pass has already been explored, this study takes this a step further. It controls for previous PT uses and only includes those who are regular car users, the group most difficult to change. Through the use of TTM, it is possible to state whether the intervention results in a stage of change. This will give us in-depth information about the effect of the intervention, rather than only assess the behavioural outcomes.

## 2. Method

### 2.1. Procedure

*Study 1:* In cooperation with the Swedish city councils of Motala and Linköping, as well as the operators of PT in the region, a study was conducted on mobility behaviour. Three specific areas were selected and the criteria for being included in the study were based on location, which meant that they had relatively easy access to PT. In Motala, this applied to an area where the residents had a maximum of 3 km to the main train or bus station (mean (M) distance to the nearest bus station was 0.6 km). In Linköping, two areas were selected with the mean distance to the nearest bus station being slightly further (mean: 13 km), but substantially further to the nearest train station (mean: 16 km). In the region, buses are the main mode of PT, as there is only one commuter rail system.

A survey was then delivered by post to 983 people living in Motala. In Linköping, the procedure was slightly different, in so far that a postcard, rather than a survey, was delivered by post to residents, including a link to a web survey. In total, 1275 persons received the postcard. No reminders were delivered.

The first part of the questionnaire included a travel survey, with questions about a regular journey, such as the trip's purpose, distance travelled and the most frequently used mode of transport. The second part included questions based on the TPB measuring their attitudes (behavioural belief, BB and outcome evaluation, OE), social norms (subjective and descriptive), perceived behavioural control and intention. This part also included one question measuring the stage of change (TTM).

The TPB questions referred to a scenario describing a journey by bus, train and the mode of transport they currently used, unless this was by bus or train, with the view to give the respondent a clear understanding of the situation, as follows: "Now we want you to think of a journey you carry out on a regular basis. Imagine that this journey is conducted during this time of year. Try to consider the following statements even if you don't use the mode of transport described".

In this paper, the focus will be on their values regarding journey by bus rather than train. The rationale behind this was based on previous studies, which have found that the attitudes towards the bus and the train differ (Varela et al. 2018) and should be dealt with separately. If we also accept that the inclusion of both bus and train, it would make this paper far too extensive. The percentage of travellers who travelled by train was very low (9%;  $n = 26$ ).

The choice of questions included in the questionnaire was based on previous findings (Eriksson and Forward 2011) and by a panel of experts with extensive knowledge of travel patterns and attitudes towards modal choice within this municipality.

The attitudes toward a journey by bus and the mode of transport they currently used, unless this was bus, were assessed by the following nine items measuring behavioural beliefs: be able to relax, feel free, get to the destination quickly, believe that it is inconvenient, travel in a cheap way, feel unsafe, get a pleasant journey, help to contribute to a better environment and get some time for

myself. All the items were measured on a scale from 1 to 7 (1 = strongly disagree, to 7 = strongly agree). Prior to the data analysis, some of the scores were reversed, so a high value always indicated a more positive belief (Cronbach's  $\alpha$  of 0.87). Outcome evaluations included the same set of beliefs as described above but were judged on how important or serious they were (1 = not very important, to 7 = very important) (Cronbach's  $\alpha$  of 0.75).

In this study, the scaling system that contributed the most to the prediction of the intention to use the bus was going to be used. This meant that various combinations of unipolar (1 to 7) and bipolar scales (+3 to -3) were tested before deciding which one to retain (BBs and OEs unipolar; BBs unipolar and OEs bipolar; BBs and OEs bipolar; BBs bipolar and OEs unipolar). The combination of unipolar and unipolar presented a Cronbach's  $\alpha$  of 0.84 and the other combinations resulted in a value of 0.75.

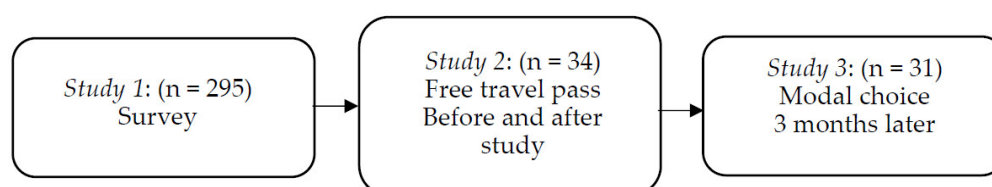
Two types of social norms towards using the bus were assessed, namely: subjective and descriptive norms. The subjective norm was measured by two items referring to partners' and friend's perception of the behaviour (1 = completely unacceptable, to 7 = completely acceptable) (Cronbach's  $\alpha$  of 0.91). The measure of descriptive norms included the same significant others, asking whether they themselves would travel by bus (1 = strongly disagree, to 7 = strongly agree) (Cronbach's  $\alpha$  of 0.65). One direct measure of perceived behavioural control was used, namely: for me to travel by bus would very easy/very difficult. Participants who found it difficult were also asked to indicate why. The intention to travel by bus was assessed by the following item: I intend to (1 = strongly disagree, to 7 = strongly agree). Past behaviour was measured by the following item: in the last two months, how often have you travelled by bus (1 = 3 times or more per week, to 6 = not at all).

The measure of the different stages was adapted from Courneya (1995) and included five questions. The participants who currently drove a car or used PT on their most usual trip were asked to indicate which of the following five statements best described their behaviour: "I currently only use the car and I do not intend to change this" (pre-contemplation); "You are using the car but are planning to use public transport" (contemplation); "The last six months you have sporadically used public transport" (action); and "You are always using public transport for several years and will continue to do so for a long time and intend to go on doing so" (maintenance).

At the end of the questionnaire, background characteristics such as gender, age, education, income, number of people in their household and their age, working hours per week and access to a car were assessed. The final question in the questionnaire was addressed to people who did not currently travel by PT, asking whether they would like to take part in a study using PT free of charge for two weeks. If they answered in the affirmative, they had to indicate their name, postal address and e-mail address.

*Study 2:* Those who responded to the first survey and stated that they would like to take part in the study and according to the results met the requirements (i.e., travelled by car and according to the TTM were at stage 1 or 2;  $n = 41$ ) received a travel pass free of charge, valid for 14 days. Together with the card, a short leaflet describing how to use the card was included. After the trial period, they received a second survey. This survey used the same measures as Study 1, with the only exception being that the TPB questions only referred to a scenario describing a journey by bus or train.

*Study 3:* Three months later, the same respondents received a third survey. This survey was substantially shorter than Surveys 1 and 2 and only asked them which mode of transport they used on a regular basis and how often they had travelled by bus or train during the last two weeks. Figure 1 displays the connections between the different studies.



**Figure 1.** Description of the three different studies.

## 2.2. Participants

*Study 1:* The sample in this study consisted of 295 residents of Motala and Linköping. They were aged between 29 years to 86 years (M 52 years; SD 13.25). All of them travelled independently. With a share of 57%, the proportion of women was slightly larger than of men. The majority used a car on a regular basis (69%) and 7% of those trips were multimodal, with the combination of bike and car being the most common. PT was used by 26% of the participants. Of those who used PT, only 2% of the trips were in combination with other modes of transport. Using a bike was less common, with only 4% using this mode of transport and even fewer (1%) travelled by car as a passenger. Based on the results from the travel surveys carried out in the region, journeys by car were 57% and journeys by PT 14% (Region Östergötland 2016). This would indicate that the participants in this survey were more likely to travel by car and PT.

Furthermore, 74% made a work trip, 2% a trip to study, 14% to service and shopping activities, 8% to leisure activities and 2% had other trip purposes. Table 1 presents the participants' socio-economic and demographic characteristics.

**Table 1.** Socio-economic and demographic background of the participants (n = 295).

	%
<b>Age distribution</b>	
18–30	0.7
31–45	10.9
45–60	23.2
>60	65.2
<b>Gender</b>	
Female	57.0
<b>Household net income per month</b>	
Low (<2400 euro)	42.6
Medium (2401–4800 euro)	33.0
High (>4800 euro)	24.4
<b>Education</b>	
Low (secondary school and/or college)	39.2
High (further education)	59.4
<b>Working hours</b>	
<20	15.5
21–39	18.4
40–50	63.5
>50	2.5
<b>Access to a car</b>	
Always	81.9
Sometimes	11.3
Never	6.8

Data from Region Östergötland (2016) shows that the participants in this study were slightly older (mean: 52 years, as compared with 42 years), although their access to cars was very similar to the participants in this study (Region 85%).

*Study 2:* The second phase of the study included 41 participants who had been selected and who received a free travel pass. After the trial period, they received a second survey. From the responses of this survey, we could see that seven people had not used PT at all during the period and they were therefore not included in the final analysis, this meant that the number of participants in Study 2 was 34.

The socio-economic background of the participants in Study 2 indicated that the majority were women (71%) and the mean age was 46 years old. Nearly all of them always had access to a car (91%) and more than half had access to free parking at their place of work (56%). On average, they worked 36 hours per week and a large proportion had a university or college education (69%). A fairly large proportion had a family income of more than 4900 Euro per month (41%).

*Study 3:* The same participants as in Study 2 participated in Study 3, although three of them failed to respond.

### 3. Results

#### 3.1. Study 1

Table 2 lists the mean and standard deviations (SDs) of the variables and the intercorrelation between items.

**Table 2.** Means, standard deviations (SD) and zero-order Pearson correlations among the various components.

Study Variable	M	SD	1	2	3	4	5
1. Behavioural beliefs ( $\sum b$ )	4.71	(1.28)	-				
2. Outcome evaluation ( $\sum e$ )	5.08	(0.77)	0.17	-			
3. Subjective norm	6.00	(1.65)	0.39	0.11 <sup>n.s.</sup>	-		
4. Descriptive norm	2.88	(1.58)	0.29	0.17	0.30	-	
5. Perceived behavioural control	4.95	(2.09)	0.47	0.11 <sup>n.s.</sup>	0.19	0.13	-
6. Intention to use the bus	2.65	(2.21)	0.49	0.07 <sup>n.s.</sup>	0.25	0.22	0.41

Note:  $r > 0.13$  is significant at  $p < 0.05$ ;  $r > 0.17$  is significant at  $p < 0.01$ .

The items were measured on a scale from 1 to 7 and high values indicated that they and others were in favour of a journey by bus.

The mean values presented in Table 2 indicate that the participants believed that others would accept that they travel by bus, although very few of them would do it themselves. The results also showed that it was relatively easy to do and that their attitudes were fairly positive. However, despite this, the low mean value of intention demonstrates that rather few intend to travel by bus. The items measuring how important the various items were show that the participants regarded them as very important ( $M = 5.08$ ). Upon further analysis assessing the percentage who were positive (i.e., scoring  $> 5$ ), shows that only 17% of the sample intended to travel by bus and when it came to their friends, only 9% would do the same. On the other hand, 51% perceived that such a journey would be easy, 78% that others would accept it and 44% held positive attitudes towards such a journey. Almost all of them (84%) would argue that the items measuring the consequences of a journey (behavioural beliefs) were important. The response from the open question, asking those who found it difficult to use the bus to indicate why, presented fairly varied responses. Some would argue that it was too far to the bus stop, that the bus was not frequent enough; that the bus was sometimes late, which meant that they missed another connection; that they had to stand up during the journey; and that the journey took too long. In the latter case, this was in comparison with the same journey by car.

According to the Pearson's correlation coefficients, all the TPB variables, except for the outcomes evaluation, were significantly associated with intention. Behavioural beliefs and perceived behavioural control were most highly correlated with intentions ( $r = 0.49$  and  $0.41$ , respectively). However, contrary



to the theory, the items were not always more strongly related to intention than to each other. This applied to subjective and descriptive norms, which demonstrated a stronger relationship with each other than with intention. The same also applied to the relationship between descriptive norms and behavioural beliefs.

### 3.1.1. Prediction of the Intention to Travel by Bus

Hierarchical regression analyses were performed to examine the prediction of travelling by bus. To assess which scaling system contributed the most to the prediction of the intention to use the bus, four different multiplicative combinations were tested using a method proposed by several investigators (Ajzen and Fishbein 2008; Hardeman et al. 2013). In all the analyses, BBs (unipolar) were entered into the first step, OEs (unipolar) into the second and BBs x OEs into the last step using various scales.

The results showed that that only the additive combination of behavioural beliefs significantly contributed to the prediction of intention to use the bus ( $\beta = 0.49$ ,  $p < 0.001$ ;  $R^2(\Delta) = 0.24$ ). The results for the outcome evaluation, entered into the second step, were ( $\beta = 0.03$ ,  $p < 0.76$ – $0.84$ ). The various multiplicative combinations, entered into the third and final step, presented similar results to the outcome evaluation ( $\beta = 0.01$ ,  $p < 0.95$ ).

It was therefore decided to only retain the additive measure of behavioural beliefs. The final analyses were made in three steps. First, the original predictors in the TPB were included, namely, behavioural beliefs, subjective norm, descriptive norm and perceived behavioural control. In the second step, gender, age and income were entered. In the third step, past behaviour was examined. The results are displayed in Table 3.

**Table 3.** Prediction of the intention to travel by bus. Hierarchical logistic regression analysis.

Step 1			Step 2			Step 3			
	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$	<i>B</i>	<i>SE B</i>	$\beta$
BB	0.48	0.12	0.29 **	0.48	0.12	0.29 **	0.23	0.09	0.14 *
SN	0.05	0.08	0.04	0.05	0.09	0.04	0.05	0.06	0.04
DN	0.16	0.09	0.11	0.15	0.09	0.11	0.01	0.07	0.01
PBC	0.26	0.06	0.28 **	0.27	0.07	0.28 **	0.10	0.05	0.10 *
Adj R <sup>2</sup>			0.26						
Gender				0.08	0.26	0.02	0.20	0.19	0.05
Age				0.13	0.22	0.04	0.20	0.16	0.06
Income				0.01	0.13	0.01	0.21	0.09	0.11 *
Adj R <sup>2</sup>						0.25			
PB							0.94	0.07	0.67 **
Adj R <sup>2</sup>									0.59

Note: Method = ENTER. *B* = unstandardized coefficient; *SE B* = standard error;  $\beta$  = standardized regression coefficients; Adj R<sup>2</sup> = explained variance in the dependent variable; BB = behavioural belief; SN = subjective norm; DN = descriptive norm; PBC = perceived behavioural control; PB = past behaviour; \*\*  $p < 0.001$ , \*  $p < 0.05$ ;  $F = 38.14$ .

The results from the regression analysis show that the variables within TPB explain 26% of the variance<sup>1</sup>. The most important factors were behavioural beliefs and perceived behavioural control ( $\beta = 0.29$ ,  $p < 0.001$ ;  $\beta = 0.28$ ,  $p < 0.001$ , respectively). In step two, none of the socio-economic factors helped to increase the variance, although in step 3, income became significant ( $\beta = 0.11$ ,  $p < 0.05$ ). This would then indicate that the intention to use the bus was greater amongst people with a low income.

<sup>1</sup> Separate analysis was carried out to test for multicollinearity. The results showed that the level of tolerance was around 0.7 and VIF around 1, indicating that this was not a problem.

When past behaviour was entered into the third step, the variance increased by another 33%, making it the most important factor ( $\beta = 0.67$ ,  $p < 0.001$ ).

### 3.1.2. Assessment of Regular Bus Users and Car Drivers and Indirect Measures

An important aim of this study was to understand why, or why not, people travelled by bus and for that reason individual beliefs were explored in more depth. For this purpose, two distinct groups, those who normally travelled by bus or those who travelled by car, were selected, excluding those who sometimes used one or the other mode of transport. The two groups' socio-economic background and the distance they travel on a regular basis were analysed using the Pearson's Chi-square test (see Table 4).

**Table 4.** Socio demographic factors: bus users and car drivers.

	Bus (n = 58)	Car (n = 193)
<b>Age distribution (%)</b>		
18–30	14.0	3.1
31–45	24.6	40.1
45–60	35.1	37.0
>60	26.3	19.8
<b>Gender ***</b>		
Female	77.2	50.8
Male	22.8	49.2
<b>Children under the age of 10 (% yes)</b>	31.4	37.3
<b>Children between 11 to 15 (% yes) *</b>	15.2	27.7
<b>Household net income per month</b>		
Low (<2400 euro)	48.2	42.0
Medium (2401–4800 euro)	30.4	34.7
High (>4800 euro)	21.4	23.3
<b>Education</b>		
Low (lower than bachelor's degree)	38.6	33.9
High (bachelor's degree or higher)	61.4	59.9
<b>Working hours</b>		
<20	13.7	12.3
21–39	19.6	18.2
40–50	64.7	66.8
>50	2.0	2.7
<b>Access to a car ***</b>		
Always	47.4	97.9
Sometimes	22.8	2.0
Never	29.8	0
<b>Distance travelled most frequently (km)**</b>	32.3	21.1

Note: \*  $p < 0.05$ ; \*\*  $p < 0.01$ ; \*\*\*  $p < 0.001$ .

The results show that their socio-economic backgrounds were rather different. Women and those without access to a car were more likely to travel by bus. People who travelled by bus also travelled a longer distance than those travelling by car and they were less likely to live in a household with children aged 11 to 15. Further analysis demonstrated that two of the items also correlated with the intention to use the bus, namely, access to a car ( $r = -0.49$ ,  $p < 0.01$ ) and distance travelled ( $r = -0.19$ ,  $p < 0.01$ ). The two groups' perception of a journey by bus were then explored using a *t*-test, mean and standard deviation. To determine the size of the observed effect irrespective of the sample size, a test measuring Cohen's *d* was included. The item's relationship with intention to use the bus was also assessed. Although, in this case, the total sample was included.

**Table 5.** Behavioural beliefs for a journey by bus. Mean, SDs, Cohen's *d* for either bus users or car drivers and Pearson's correlation with intention to use the bus.

Behavioural Beliefs	Bus (n = 58) M (SD)	Car (n = 193) M (SD)	<i>p</i>	<i>d</i>	Intention <i>r</i> (n = 295)
Be able to relax	6.56 (.76)	5.07 (1.91)	***	1.02	0.30 **
Feel free	5.55 (1.42)	3.58 (1.99)	***	1.14	0.42 **
Get to the destination quickly	5.25 (1.56)	3.24 (1.92)	***	1.15	0.49 **
Believe that it is inconvenient	2.67 (1.54)	4.42 (1.87)	***	1.02	−0.36 **
Travel in a cheap way	5.41 (1.78)	3.91 (1.78)	***	0.88	0.41 **
Feel unsafe	1.74 (1.22)	2.69 (1.69)	**	0.64	−0.21 **
Get a pleasant journey	5.92 (1.08)	4.34 (1.66)	***	1.12	0.41 **
Contribute to a better environment	6.49 (.92)	5.87 (1.42)	**	0.52	0.15 *
Get some time for myself	5.83 (1.42)	4.30 (2.06)	***	0.86	0.39 **

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ ; scale (1 = strongly disagree, to 7 = strongly agree).

The *t*-test and Cohen's *d* showed that all the nine beliefs differentiated between the two target groups. The greatest difference was regarding how fast the journey was perceived to be and if it made the participants to feel free, both of which generated a large effect size (i.e.,  $p > 1.10$ ). Based on the total sample, the results from the correlation coefficient demonstrated that all of the behavioural beliefs were significantly related to intention. The belief that the bus could reach the destination in a fast way was most closely related to intention ( $r = 0.49$ ,  $p < 0.01$ ). This was then followed by feeling free, travelling in an inexpensive way and getting a pleasant journey ( $r = 0.42$ ,  $p < 0.01$ ). Table 6 presents the significant differences between bus users and car users regarding how important the behavioural beliefs listed above were in connection with a journey (i.e., outcome evaluation).

**Table 6.** Outcome evaluation for a journey in general. Mean, SDs, Cohen's *d* for either bus users or car drivers and Pearson's correlation with intention to use the bus.

Outcome Evaluation	Bus (n = 51) M (SD)	Car (n = 188) M (SD)	<i>p</i>	<i>d</i>	Intention <i>r</i> (n = 295)
Feel free	5.65 (1.59)	6.19 (1.29)	*	0.37	n.s
Get to the destination quickly	5.90 (1.28)	6.45 (0.93)	**	0.49	−0.16 *
That the journey is convenient	5.76 (1.70)	6.52 (0.79)	***	0.57	−0.21 *
Travel in a cheap way	6.32 (0.91)	5.54 (1.57)	***	0.61	0.16 *
Contribute to a better environment	6.26 (1.01)	5.65 (1.49)	***	0.48	0.16 *

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ ; n.s = not significant. Correlations are significant at the level of  $p < 0.01$ , unless something else is indicated. Scale is from 1–7 (1 = not important at all and 7 = very important for me).

Table 6 shows that the bus users and car driver's evaluation of what is important varies significantly regarding five of the nine items. Compared with car drivers, bus users argued that it is less important that they feel free when travelling, that the journey is quick and that it is convenient. What is more important for them is that the journey is as cheap as possible and that they, by travelling in this way, help to contribute to a better environment. The results from the correlation coefficient showed us that four of the five outcome evaluations were significantly related to an intention to use the bus. Participants who would not use the bus valued a fast journey as more important than those who would travel by bus; the same applied to a convenient journey. On the other hand, they did not value the cost of a journey as being more important than other factors and the same applied to their own contribution to a better environment. Further analysis found that the importance of low cost was related to income ( $r = 0.23$ ,  $p < 0.01$ ), but a fast journey was not related to the distance they had to travel on a regular basis. Table 7 presents the significant differences between bus users and car users and whether people close to them would use the bus.

**Table 7.** Descriptive norm for a journey by bus. Mean, SDs, Cohen's *d* for either bus users or car drivers and Pearson's correlation with intention.

Descriptive Norm	Bus (n = 58) M (SD)	Car (n = 193) M (SD)	<i>p</i>	<i>d</i>	Intention <i>r</i> (n = 295)
Friends	3.70 (1.94)	2.73 (1.58)	***	0.55	0.22 **
Family	3.37 (2.25)	2.49 (1.85)	*	0.43	0.22 **

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ . High scores indicate that the person believes that others accept the behaviour and that people close to themselves travel in the same way.

The results showed that only the descriptive norms differed between the two groups. For the subjective norms, both groups would argue that using the bus would be acceptable (bus users' mean is from 6.09 to 6.33; car users' mean is from 6.67 to 6.70). Bus users believed to a greater extent than car drivers that their friends and family would travel by bus ( $p < 0.01$ ), although it appeared to be more common amongst their friends. The results from the correlation coefficient also revealed that the descriptive norm was significantly related to intention to use the bus. Table 8 presents how easy the two groups believed travelling by bus would be.

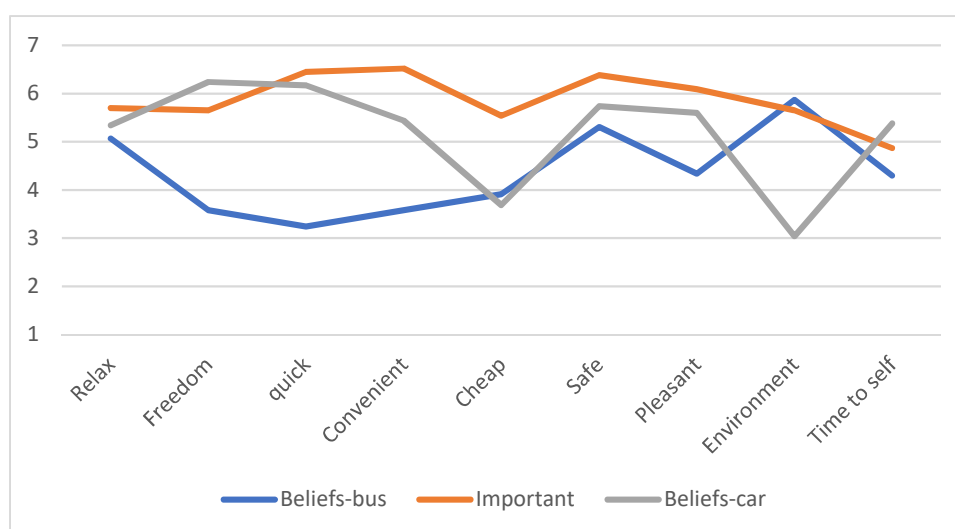
**Table 8.** Perceived behavioural control for a journey by bus. Mean, SDs, Cohen's *d* for either bus users or car drivers and Pearson's correlation with intention.

Perceived Behavioural Control	Bus (n = 58) M (SD)	Car (n = 193) M (SD)	<i>p</i>	<i>d</i>	Intention <i>r</i> (n = 295)
Easy to travel by bus	6.24 (1.11)	4.31 (2.17)	*	1.12	0.41*

Note: \*  $p < 0.001$ ; High scores indicate that the person agrees with the statement that it is easy.

The results showed that the two groups differed in their belief about how easy it is to travel by bus. People who already used the bus found this much easier. The results from the correlation coefficient also showed that this factor was strongly related to their intention to use the bus.

The following figure presents a graphic profile including car users only. It depicts what they regard as important when travelling and illustrates how a journey by either bus or car can fulfil these wishes or requirements.

**Figure 1.** Importance and beliefs about a journey by car or bus (car users only).

The results clearly show that for car users, a journey by car more closely resembles what they consider to be important. On only one aspect does the belief about a journey by car and bus overlap and that is in relation to whether the mode of transport is cheap or not. In this instance, they did not believe that a journey by bus would be cheaper than one by car. For one other factor, namely the

environment, the correspondence between an ideal journey and a journey by bus was better than a journey by car. The figure also shows that the belief about a journey by car exceeded their expectation, which was freedom and time for themselves, which car users believed they could obtain in a car.

### 3.2. Study 2

Study 2 included only the participants who had received a free travel pass. Initially, this group included 41 people, although further analysis showed that seven of them had not used the bus and were therefore excluded from further analysis. The reason they presented for not using the bus was that the service was not frequent enough, that it was inconvenient, as they had to change or take children to nursery, it was not possible to bring the bike and there was no proper bus shelter for protection from the weather. One person would have wanted a printed timetable and not have to rely on the internet. Figure 10 shows the results from the remaining 34 participants and their attitude towards a journey by bus before and after the trial.

A paired sample *t*-test was used to determine if the individuals had changed their attitudes towards a journey by bus after the two-week trial period. In the analysis, all the variables within the TPB were assessed, although Table 9 only presents beliefs that were significant.

**Table 9.** Beliefs before and after. Mean, SDs and Cohen's *d*.

Behavioural Beliefs	Before M (SD)	After M (SD)	<i>p</i>	<i>d</i>
Get to the destination quickly <sup>a</sup>	3.68 (1.70)	4.77 (1.78)	***	0.63
Travel in a cheap way <sup>a</sup>	4.25 (1.91)	5.44 (1.70)	**	0.70
Get a pleasant journey <sup>a</sup>	4.33 (1.48)	5.17 (1.53)	**	0.53
Easy to travel by bus <sup>b</sup>	5.30 (1.86)	5.94 (1.43)	*	0.39

Note: \*\*\*  $p < 0.001$ ; \*\*  $p < 0.01$ ; \*  $p < 0.05$ . Scale (<sup>a</sup> 1 = strongly disagree, to 7 = strongly agree; <sup>b</sup> 1 = very difficult, to 7 = very easy).

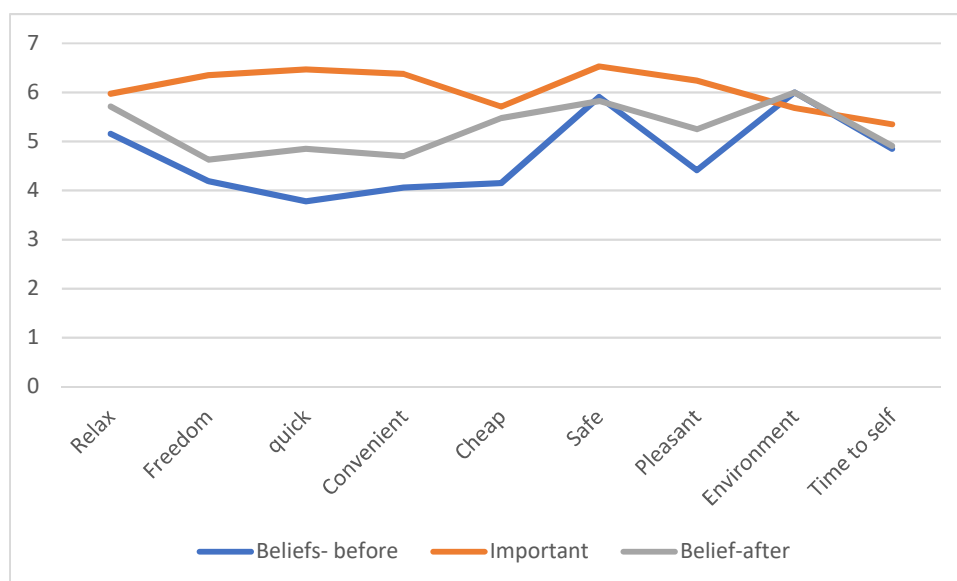
The results show that the experience of using the bus changed their attitudes in so far as they believed that it was quicker, cheaper and more pleasant than what they believed before. They also found it easier to travel by bus. If we compare the percentage of those who agreed strongly with the statements before and after the trial, the results present a rather large increase—getting to the destination quickly (before 16%, after 42%), travel in a cheap way (before 27%, after 61%), get a pleasant journey (before 22%, after 47%) and easy to travel by bus (before 39%, after 74%). Regarding the other variables within the TPB, all of them went in a positive direction, even if the difference was not significant. This also included their intention to travel by bus in the next three weeks. Although this was not significant, 31% of the participants in the before study replied that they intended travel by bus, whereas in the after study, this had increased to 47%. In Figure 2, their belief before and after the trial is presented together with what they found to be important in connection with travel.

The results from the after study showed that a journey by bus more closely resembles what they regard to be important when travelling. Relaxation is very important and this was also something they agreed with more strongly in the after study. The same applied to the cost of a journey. However, it also showed that the bus did not fulfil other aspects, such as giving them a sense of freedom, being quick and being convenient. The results from the questions measuring their stage of change are presented in Table 10.

**Table 10.** Stage of change before and after the trial.

	PC (%)	C (%)	P (%)	A (%)	M (%)
Before	17.6	82.4	-	-	-
After	8.8	17.6	58.8	14.7	-

Note: P = precontemplation; C = contemplation; P = preparation; A = action; M = maintenance.

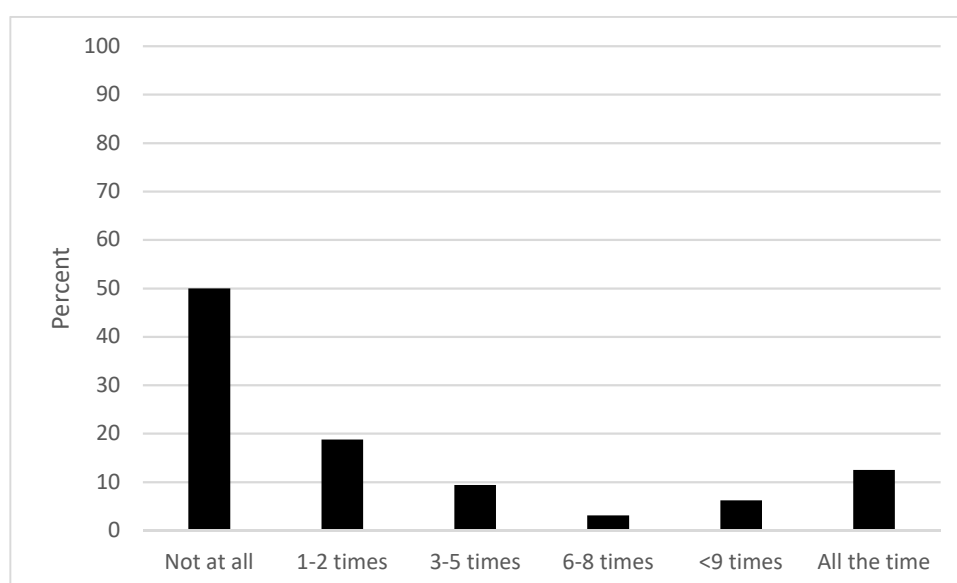


**Figure 2.** Importance and behavioural beliefs before and after the trial.

The results showed that in the before study, all the participants were at stages 1 (pre-contemplation;  $n = 6$ ) or 2 (contemplation;  $n = 28$ ), which was also a prerequisite for being included in the study. In the after study, there had been a shift to another stage, although some were still in stages 1 and 2 ( $n = 6$ ). Further analyses were conducted to see what happened to those previously at stage 1. The results showed that one of them had remained at stage 1 and five of them had moved to stage 2. For stage 2, the results showed that three women had moved back to stage 1. The main reason for this was that the bus was not frequent enough and that it was too far to walk (average distance was 1 km). Five people remained at stage 2, fifteen had progressed to stage 3 and five of them to stage 4. Another reason for not starting to use PT was that they had to wait too long for another bus or train.

### 3.2. Study 3—Questionnaire and the Use of PT Three Months Later

The participants who had taken part in the trial were contacted three months later and asked whether they had travelled by PT in the last two weeks. The results are presented in Figure 3.



**Figure 3.** Participants travel by public transport (PT) in the last two weeks.

The results showed that three months after the trial, 50% still travelled by PT ( $n = 16$ ). Nearly 13% ( $n = 4$ ) had started to do it all the time. Only three of them used only the train, the rest used the

bus ( $n = 10$ ) or bus and train ( $n = 3$ ). The most common reason they did not continue to travel by PT was that it took too long (sometimes twice the time as by car) and that the general standard of the bus was poor. Some felt that it was too expensive, others that it was difficult to relax, mainly because it was too busy. Finally, there was one person who stated that she had started to use an electric bike and another who reported that the bus service had been permanently suspended.

#### 4. Discussion

This paper describes the results from three different studies. In Study 1, the overall aim was, with the help of TPB and TTM, to identify the important factors that influence and predict the PT usage. In Study 2, a smaller sample from Study 1, those who initially did not travel by PT received a free travel pass; an intervention that was evaluated by means of a before and after study. In Study 3, the same participants were then followed-up three months later.

The results from the first study, which included residents from two municipalities in Sweden (Motala and Linköping), showed that 69% used a car on a regular basis. For PT usage, the same applied to 26%.

The results from the descriptive statistics demonstrated that all the variables correlated with the intention to use the bus, except for outcome evaluation. The reason for this could be that those who intended to use the bus have a similar preference to those who did not. This was also confirmed when bus users' and car user's individual beliefs were compared, which we will return to later. The results from the descriptive statistics also showed that contrary to TPB, all the variables within the theory did not correlate more strongly with intention than with each other. Subjective norm presented a stronger relationship with descriptive norm and the same applied to the relationship between descriptive norm and behavioural beliefs.

The next step in Study 1 was to assess the predictive power of TPB. Prior to this, several analyses were carried out to assess which scaling system provided the best result (i.e., unipolar or bi-polar).

The results showed that the multiplicative composites failed to explain any of the variance of intention to use the bus. This could be contrary to the theory itself, even if this study did not assess the correlation between indirect and direct measures. According to Ajzen (2006), the scales used can vary, but the theory strongly suggests that behavioural beliefs should be multiplied by outcome evaluation. However, this has not always been supported since the use of multiplicative composites have presented mixed results (Gagné and Godin 2000; Hardeman et al. 2013; O'Sullivan et al. 2008). In the study by Gagné and Godin (2000), most of the studies reviewed (8 out of 12) showed that an additive measure of behavioural beliefs was often similar or better than the correlation between a direct measure of attitude and the multiplicative composite.

Based on the results from this priority exercise, the final analysis used an additive measure of behavioural beliefs that was entered, together with subjective norm, descriptive norm and perceived behavioural control, into the first step. This was then followed by a second step entering socio-economic factors and a third step entering past behaviour. The results revealed that the original variables in the TPB accounted for 26% of the variance. The most important factors were perceived behavioural control and behavioural beliefs. The results from this analysis would indicate that a positive view about travel by bus, which is also easy to conduct, increased the chances of using the same. The reason a journey by bus could be difficult could be because it was too far to the bus stop; that the bus was not frequent enough; that the bus sometimes was late, which meant that they missed another connection; that they had to stand up during the journey; and that the journey took too long.

The fact that perceived behavioural control and attitudes are important factors is consistent with earlier studies of PT (Donald et al. 2014; Eriksson and Forward 2009). However, in this study, neither subjective nor descriptive norms were significant, which is at variance with other findings (e.g., Donald et al. 2014; Eriksson and Forward 2009; Heath and Gifford 2002). The reason for this could be that the behaviour was habitual, which could have made at least the subjective norm less important (Fredricks and Dossett 1983). Another reason could be that using PT is something most people approve of, even if they do not use it themselves. This was also supported by this study, when car user's individual items measuring subjective norms were analysed. One reason for the descriptive norm being

non-significant could be that using PT is not considered to be risky. Ravis and Sheeran (2003) for instance argued that descriptive norms would be more important when assessing behaviours that carry some form of risk.

In step 2, the socio-economic background was added and the only factor that became significant was income. Therefore, participants with a lower income were more likely to use the bus. In the last step, past behaviour was added, increasing the variance by a substantial amount (33%). This would then be in agreement with other studies of PT (Thøgersen 2006; Fu and Juan 2017). It also confirms that the use of PT is habitual, although it would be wrong to suggest that it is purely automatic, as attitude and perceived behavioural control added to the explanation of the intention.

The aim of this study was not only to assess the predictive power of TPB, but to also provide a deeper understanding of what motivates people to use PT. In this context, the belief-based measures are of great interest.

Analyses were performed on a subset of the sample to determine whether there were any differences between those who normally only travelled by either bus or car. Initially, it was determined that their socio-economic background was different. More women travelled by bus and the same applied to people without access to a car. Bus users also travelled further than those using the car and fewer users had children aged 11 to 15. Further analysis showed that all the factors, except for gender and number of children aged 11 to 15, correlated with the intention to use the bus. That women are more likely to use PT is well documented, although a recent travel survey from the region show that the gap between men and women had become smaller (Linköpings kommun 2015). This means that women have become less likely to use PT than before.

The results analysing individual belief about a journey by bus showed that the two groups differed significantly from each other with respect to all the questions measuring behavioural beliefs. Those who travelled by bus were considerably more positively disposed towards doing so than those who were not. Compared with car users, the largest difference between the two groups related to whether it would be quick, if it made them to feel free and if the journey itself was pleasant. This would also be in agreement with other studies, which have found that PT users are more positive about a journey by bus than car users (Eriksson and Forward 2009). That time is an important factor has also been supported by numerous studies (Burian et al. 2018; Gardner and Abraham 2007). Although both time and freedom tend to be associated with a journey by car rather than PT (Eriksson and Forward 2009; Murtagh et al. 2012).

The survey included questions about how important the listed behavioural beliefs were in connection with a journey (i.e., outcome evaluation). These results clearly showed that many of the individual items did not differ between the two groups. This in turn can explain why the additive measure of outcome evaluation, or indeed the multiplicative composite, failed to predict intention. However, there was some difference between the two groups, as those who travelled by bus considered it to be more important that the mode of transport was inexpensive, that the journey was convenient and that they were able to contribute to a better environment than those who travelled by car. The latter has also been supported by several studies, which found that environmental concerns are lower amongst car drivers (Caralampo and Panayotis 2017; Nilsson and Küller 2000; Tertoolen et al. 1998).

Further analysis looking at the gap between car users' beliefs about a journey by bus or car and importance clearly demonstrated that a journey by car was the preferred mode of transport. Even if car users believed that it was important that a journey helped to contribute to a better environment, other factors such as being quick and convenient were more important. Freedom and time to themselves exceeded their expectations, as they believed that a journey by car gave them more of this. When importance was compared to the belief about a journey by bus, it did not manage to come close to what they would consider to be important when travelling. The only exception was the question about the environment. It was also interesting to note that car users believed that a journey by car would be as cheap as a journey by bus. This in turn probably depends on the fact that car owners only calculate the cost of fuel and not the full cost of running a car when they reflect on the



cost for a journey by car. They certainly do not consider the social cost (i.e., costs of congestion, noise, air pollution and global warming), which are more long term.

The results from the regression analysis, previously presented, showed that perceived behavioural control was the most important factor. This was further supported when the two groups were compared. Bus users considered a journey by bus as very easy, whereas this was not the case amongst the car users. The regression analysis also showed that descriptive norm did not add to the explanation of their intention to travel by bus. The conclusion could then be that this is not important. However, descriptive norm correlated with intention and when car users and bus users were compared, we could see that the perception of others differed between the two groups. Amongst the bus users, it was significantly more of their friends, but also family, who themselves travelled by bus compared with being car users. It could therefore be argued that even if the regression analysis found that their behavioural beliefs about a journey by bus were more important, a descriptive norm should not be ruled out.

In Study 2, the aim was to assess the effect of a free travel pass. The target group in this study included participants who travelled by car on a regular basis and who, according to the TTM, were at Stages 1 or 2 (pre-contemplation or contemplation). The total number who took part in this trial and who used the pass was 34. The main assumption was that if the experience of using a bus had changed their views, then new behaviour could be sustained.

The results were able to demonstrate that this was the case. In general terms, the attitudes toward bus travel became more positive. More specifically, this was linked to a belief that the journey was quicker, cheaper, more pleasant and easier than they had believed before. This would then indicate that at least some of their negative attitudes were based on stereotyped beliefs, which would be in agreement with other studies (Chowdhury et al. 2016; Fujii and Kitamura 2003; Murray et al. 2010). The question was then whether their new experience of a journey by bus more closely resembled what they considered to be important when travelling. The results could somewhat confirm this, especially when it came to relaxation, which they considered to be important and which experience showed them was possible to achieve when travelling by bus. The same applied to cost. However, other equally important aspects were still not close to their own perception of a journey by bus, which were freedom, being quick and being convenient. These are also factors that several studies have found that describe a journey by car (Eriksson and Forward 2009; Forward 1998a; Forward 1998b; Gärling et al. 2002; Murtagh et al. 2012). It could therefore be argued that those who find this very important, might go back to using the car. This was somewhat supported when looking at their stage of change.

As the study also included questions based on the TTM, it was possible to assess where in the process of change the participants found themselves with regard to using PT, before and after the trial. As not previously using PT was one of the prerequisites for taking part in this study, it was therefore interesting to see whether they had moved up or down the scale. The results showed that some of them had remained on stage 2 (i.e., still contemplating), although nearly half had moved to the next stage and had begun using PT occasionally (stage 3) and some had even moved stage 4, using PT all the time. However, a small number stopped contemplating and reverted to stage 1 (pre-contemplation). The question was then why? The reasons specified were that it was too far to the bus stop, there were too few departures and there was too long a wait for transfers.

In Study 3, the participants were contacted roughly three months later to find out how they were travelling. The responses indicated that 50% continued to travel by PT. In this case, it could be bus and/or train. This is a substantially more than 20% increase of PT usage, which the Fujii and Kitamura (2003) study was able to demonstrate.

The reasons for discontinuing the use of PT were that it took too long, there were low standards on the bus and that it was hard to relax during the journey, mainly because of noise from other passengers. The results are consistent with other studies, which have shown that temporary structural changes can change travel habits and attitudes (Fujii and Kitamura 2003; Thøgersen 2009). It also emphasizes how important it is that the new experience is positive. If it is not the case, the risk is very great that the person returns to their old behaviour.

Even though this study presented some interesting results, which adds to previous studies of travel mode choice, there are some limitations worth mentioning. The study did not include both direct and indirect measures of the constructs within the TPB. This prevented us from carrying out a more comprehensive analysis of the most appropriate scale to use. However, it was argued that the indirect measures provided us with a more detailed understanding of the subject matter and that it would be a mistake to limit those in order to introduce direct measures. The reasoning behind this is that a longer survey probably would have resulted in an even lower response rate. Another limitation is that the variables within the TPB only explained a small amount of the variance. It is therefore proposed that further studies should search to identify other factors that could increase our understanding of what predicts bus usage.

This brings us to another limitation, which is the low response rate but also that the age group and their educational background was different from the general population. Another limitation was that the sample consisted of a large proportion of PT users. Although, this enabled us to compare bus users with car users, which otherwise would have required a larger sample. Despite this, we do not claim that our study should be generalized to a much wider population, only further studies can say something about that.

Finally, the number of people who received a free travel pass was rather few and the time period of use was short. Despite this, it did result in an increase in PT usage and one strength of this study was that the group who took part in the trial was carefully selected and followed-up three months later.

## 5. Conclusions

To summarize, this study showed that those who did not travel by bus were negatively disposed toward this mode of transport. For those who only travelled by car, the key factors that led them not to choose the bus were that the trip was not very pleasant, that the journey was too slow and that their sense of freedom was restricted. The importance of attitudes, but also of perceived behavioural control, suggests that the attitude towards PT needs to become more positive and that it should be easy to use. The study found that the introduction of a free travel passes to participants, who were regular cars users, was able to change attitudes and in some cases also their travel habits. This confirms that at least some of the beliefs about PT were based on stereotyped beliefs (i.e., prejudice), as their own experience of using the same PT changed their attitudes.

It would, however, be wrong to suggest that one's own experience is sufficient, as a negative experience might further reinforce their views, which this study also demonstrated. In many respects, a great deal of resources are needed in order to make the experience more satisfying. PT might not always be able to compete with the car, but it can provide the traveller with other positive aspects. For instance, being able to work during the journey and not having to concentrate on driving in a sometimes-stressful environment can be very rewarding. Time is an important factor and by providing separate bus lanes, a journey by bus can be quicker than one by car. The perception of time can also change if the experience provided during the journey is more fulfilling. This emphasizes the need for a better and more integrated transport planning, so that cities can develop physically in a way that supports sustainable mobility (e.g., Banister and Marshall 2008; Cervero 2004).

It could therefore be argued that the reduction of car use can only be achieved if several measures are implemented, which make car driving less attractive and sustainable modes of transport made more attractive.

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