INVESTIGATION OF THE DETERMINANTS OF TRAVELERS' MENTAL KNOWLEDGE OF PUBLIC PARKING FACILITIES

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ABSTRACT

This paper describes a study of car drivers' familiarity with the parking situation in the vicinity of a regional shopping center. The data used for this study are collected in Hasselt, a medium sized city in Belgium. The central shopping area of Hasselt is surrounded by 23 public parking facilities. 1007 residents have been asked to indicate if they are familiar with each parking facility. The concept of familiarity was related to the socio-demographic and cognitive attributes of the respondents, their trips to the city center and the type of parking facility using multinomial logistic regression and bivariate probit regression. The results show that familiarity with parking facilities is especially related to age and education, and to the frequency of car use towards the city centre, and to a lesser extent to place of residence, income and perceived mental knowledge. In addition to these results, this paper demonstrates the value of collecting virtual buffer data by means of an online survey tool. The authors recommend that simulation models that predict parking choice behavior take into account the different levels of familiarity with parking facilities, and the contributing factors. An important avenue for further research is the combination of personal and facility specific information to assess the familiarity with different types of parking facilities.

INTRODUCTION

Increasing congestion and limitation of space availability in central shopping and business areas forces municipalities to (re)develop transportation plans (*1*). The primary aim of these plans is to optimize the use of the urban street network for both motorized and non-motorized traffic. Planners have a variety of policy measures – widely known as travel demand management (TDM) measures – at their disposal to achieve their goals ranging from car related measures (one way traffic) and public transport related measures (priority at traffic lights) to bike related measures (new bike lanes). A specific group of car related measures concerns parking measures. Parking measures can focus on changing the availability, location, type, size and/or price of parking lots (*2*-*4*). Nonetheless, these parking measures are not always perceived as acceptable. Therefore policy makers should embed this parking restricting measures in a broader policy package which could include the supply of free fringe parking, and the provision of parking permits for local residents and disabled people (*5*-*7*). Moreover, the success of planning measures is especially strongly related to the familiarity of the traveler with the characteristics of the elements of the transportation system.

When a traveler wants to travel he or she has to make different travel related choices to accomplish the trip such as choice of departure time, travel mode, route, and parking location. To make a deliberate choice, the traveler has to be familiar with the attributes of the available choice alternatives. In the context of travel decisions there is little known concerning travelers' familiarity with the attributes of choice alternatives. This also holds for car drivers' familiarity with the attributes of parking facilities in CBD (*8*). For example, Van der Waerden & Borgers (*9*) found that car drivers only know a limited number of parking alternatives when visiting a shopping area. It also appears that car drivers are not familiar with existing parking problems in general (*10*-*11*) and with the levels of different parking attributes in particular (*12*). In general, poor familiarity with parking facilities results into unwanted situations such as congested (overloaded) parking facilities and a number of cars searching for a free parking and, in the same time, influencing the urban traffic flows and environmental quality (*13*).

The aim of the study described in this paper is to contribute to insights into car drivers' familiarity with the parking facilities in the context of shopping trips. In this respect, special attention is paid to travelers' personal characteristics. The main merits of this paper are (i) the proposition of new practical GIS approach to assess the mental knowledge of parking facilities and (ii) an attempt to bridge the research gap related to driver's familiarity with parking facilities.

The remainder of the paper is organized as follows. First attention is paid to the issue of familiarity. Next, the adopted research approach is presented. This part is followed by a description of the data collection and the research sample. Next, the analyses are described including an overview of the results. The paper ends with the conclusions.

FAMILIARITY

A special point of interest related to (parking) choice behavior concerns the set of choice alternatives that is included in the choice process. In general, the individual choice set refers to the set of discrete alternatives considered by an individual in the decision process. Mostly, the individual choice set is a subset of the universal choice set that consists of all alternatives available to the decision maker (*14*-*15*). In practice the formation of choice sets is done by using heuristics or deterministic choice set generation rules, using observed choice set information, or using random choice sets (*16*-*17*). Over the years, researchers have developed various so-called deterministic and probabilistic choice set formation rules. Examples of deterministic rules are 'leaving out all illegal alternatives', 'exclude all alternatives outside the 500 meter range', and 'include only observed alternatives'.

Also in the context of modeling parking choice, the choice set is important. The choice of a parking facility will be influenced by a person's familiarity with the existing parking facilities. Individuals are not necessarily familiar with all parking facilities available in a particular area and a motorist often makes an explicit utility comparison or cost-benefit trade-off before making a choice (*18*). The recent developments regarding the contents and distribution of parking information will also change car drivers' familiarity with parking facilities.

Little attention has been paid to the size and composition of choice sets for parking choice behavior. Most researchers have either assumed that choice sets contain all available parking facilities at a shopping center or only the parking facilities individuals are familiar with (*5, 9, 19-20*). Only a few empirical studies of choice set composition in the context of parking have been published. In a study of car drivers' familiarity with the parking situation in a regional shopping center, Van der Waerden & Borgers (*9*) found that most car drivers are familiar with 2 or 3 parking lots. Rye *et al*. (*5*) investigated respondents' familiarity with the parking situation in the city center of Edinburgh. They found that 33 percent of the respondents did not know any parking facility, 48 percent indicated that they knew 1 to 8 parking facilities, while only 3 percent knew all 19 available parking facilities in the city center. Rye *et al*. (*5*) indicated that this lack of knowledge is likely to put pressure on the well-known parking locations.

RESEARCH DEGIN AND STUDY AREA

Travelers' familiarity with parking facilities can be considered at different levels of detail. One perspective is to study individual attributes such as price level, walking distance, etc. of parking facilities. Another perspective is to evaluate parking facilities as an entity. In the latter case, the required information concerns the location of individual parking facilities. Spatial knowledge about parking facilities can be collected in different ways. In general, the following levels of detail of the geographical location of the facilities can be queried.

1. ***Exact geographical reference data*** *(see Figure 1a)*. The integration of route planners such as Google Maps in an online questionnaire allows the respondents to indicate specific geographical locations on a map. The geo-reference of the exact point location indicated on the map then can be automatically depicted. This certainly facilitates GIS calculations and visualizations. A drawback however is that interaction possibilities with the respondent are (too) limited, especially in the context of providing personal feedback based on the answer (i.e. the indicated location).
2. ***Grid data*** *(see Figure 1b)*. To capture grid data, the study area is subdivided into small grids. The advantage of this approach is that one can adopt different hierarchical grid layers to determine the level of precision of the indicated answer. However, if the correct answer overlaps multiple grids (e.g. a large parking lot), it is difficult to define the optimal grid size. The latter is directly related to the precision of the answer; the smaller the grids (i.e. the larger the number of grids), the higher the precision.
3. ***Choice data*** *(see Figure 1c)***.** By letting the respondents select a location from a predefined list of locations, the correctness of the answer can be easily verified, and binary selection information for the full choice set is readily available. This type of data is especially interesting for querying information about anchor points such as land marks. Nevertheless, a large degree of the precision of the spatial information is lost using this approach.
4. ***Virtual buffer data*** *(see Figure 1d).* Similar to the geo-referenced and the grid data, virtual buffer data is collected by letting the respondents indicate the requested location(s) on the map. Each correct answer is surrounded by a circular buffer which is not visible to the respondent. The size of this buffer can be made proportionate to the size of the location (i.e. parking facility). If the respondent correctly identifies the location, the location will be made visible on the map. A drawback of this approach is that locations, of which only the general neighborhood is known, are often not depicted by the respondent, while the respondent still might be aware of the location.

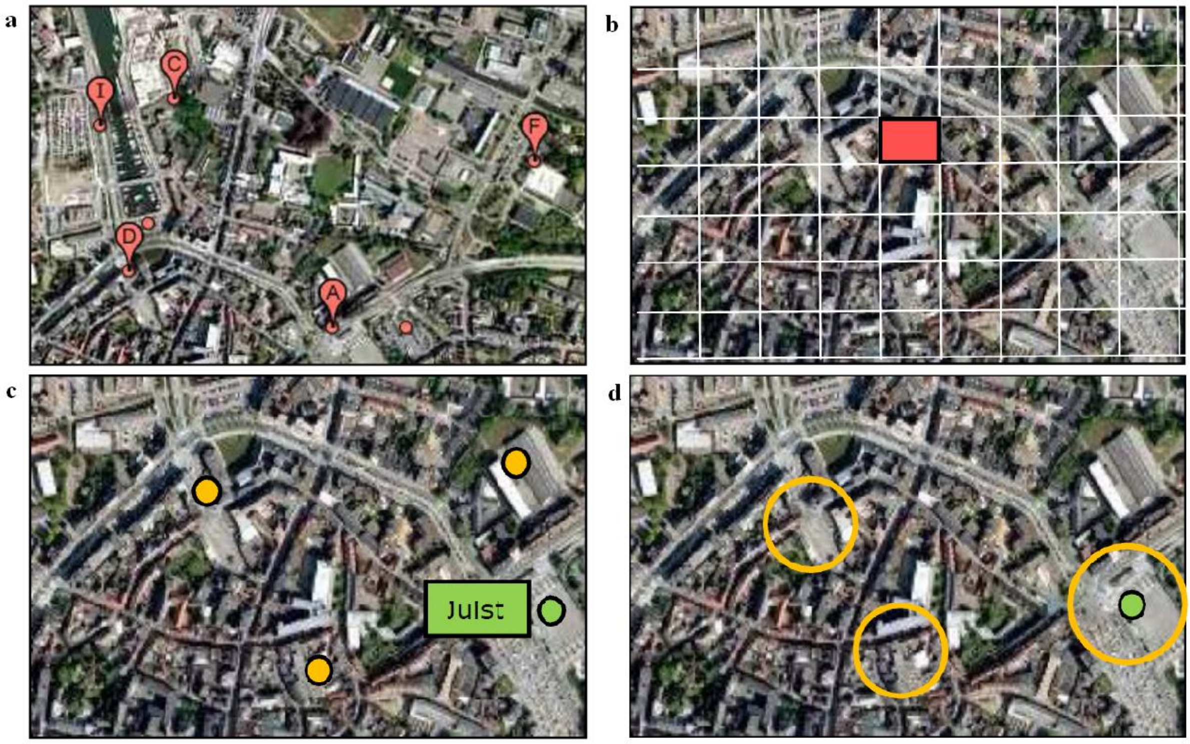

FIGURE 1 Different approaches to collect locations of parking facilities.

In the study reported in this paper, the familiarity to parking facilities was assessed by collecting virtual buffer data about these parking facilities as presented in Figure 1d. The authors highlight the novelty of collecting this type of data. A custom made application was developed integrating different programming languages such as 'Actionscript', 'PHP' and 'MySQL' to collect the data. The application was programmed in Adobe Flash CS4 to enable the development of a vector-based graphical interaction with the end user. Note that the vectors in the program are the actual point or pixels (in this case the virtual buffer data) that are collected. Next to the sequence and number of correctly identified facilities, also the number of wrongfully indicated locations was stored for data cleaning purposes. The study was set up for the city centre of Hasselt. Hasselt is a medium sized Belgian city that has a population of about 74,000 persons and is located in the Meuse-Rhine Euroregion. It has a main central shopping area, which is surrounded by different supporting functions such as public parking facilities.

DATA

The information about the mental knowledge of public parking facilities of 1007 respondents was collected by means of an internet-based survey in 2010. The respondents were recruited by means of snowball sampling. No specific requirements for inclusion in the sample were formulated. In total, the exact location of the 23 public parking facilities (13 free car parks (green), 3 free park & ride (P&R) car parks (red), and 7 charged car parks (blue)) could have been indicated (see Figure 2). At the time of the data collection, these public parking facilities were only indicated with 'P'-signs at the location itself. No static or dynamic parking guidance system was available at that time. The majority of the charged car parks are located near the inner ring of the city. This inner ring with a diameter of about 0.8 km and a perimeter of about 2.5 km encloses the historic city centre. The structure of Hasselt with a core that acts as central business district and shopping area, surrounded by supporting functions is typical for many European cities.

FIGURE 2 Public parking facilities in Hasselt.

A basic description of the sample composition is given in Table 1. From this table, it can be seen that the sample is well balanced with regard to socio-demographic variables such as age, gender and income.

TABLE 1 Descriptions and Basic Statistics of the Independent and Dependent Variables

Label	**Description and Frequencies (Nominal) / Mean and Standard Deviation (Continuous)**
Independent Variables	
Gender (F-M)	Gender (Female: 49.95% - Male: 50.05%)
Age	Age (Mean 32.04 - Std 14.78)
Inc (L-MH-U)	Net household income (Low income 15.89% - Medium-high income 59.19% - Undisclosed 24.93%)
Edu (N-UC)	Highest obtained degree (None, primary, high school 44.59% - University, university college 55.41%)
Hasselt (H-E)	Place of residence (Residence in Hasselt 60.68% - Residence elsewhere 39.32%)
Freqvis (W-NW)	Frequency of visiting city centre Hasselt (At least weekly 59.29% - Not weekly 40.71%)
Freqcar (F-O)	Frequency of using the car towards city centre Hasselt (Frequently 47.57% - At most occasionally 52.43%)
Mtm (C-O)	Main transport mode towards city centre Hasselt (Car 49.35% - Other 50.65%)
Pmkn (G-B)	Mental knowledge of city centre Hasselt (Good to excellent 55.81% - Bad to reasonable 44.19%)
Pwf (G-B)	Way-finding capabilities (Good to excellent 81.73% - Bad to reasonable 18.27%)
Cosin (P-NP)	Perceived coziness of city centre Hasselt (Pleasant 83.02% - Not that pleasant 16.98%)
Dependent variables	
Paynr	Number of known charged car parks (Mean 3.11 - Std 1.65)
Prnr	Number of known free park & ride car parks (Mean 0.32 - Std 0.58)
Freenr	Number of known free car parks (Mean 4.95 - Std 2.74)
PCKT	Most known (in %) type of parking facility (None 1.19% - Charged car parks 56.11% - Free park & ride car parks 3.87% - Free car parks 38.83%)
DPAY	At least half of the charged car parks known (Yes 38.73% - No 61.27%)
DFREE	At least half of the free car parks known (Yes 30.49% - No 69.51%)

Besides the different socio-demographic variables, Table 1 also provides a basic insight into the travel behavior of the respondents. The travel behavior towards the city centre of Hasselt in terms of the frequency of visiting the city centre, as well as main transport mode used for these trips, with an additional focus on car use, have been queried. The large share of respondents visiting the city at least weekly is in correspondence with the large number of respondents residing in the city.

A final set of variables which are considered to be potentially influencing the familiarity with the parking facilities, concerns some cognitive attributes such as the self-perceived mental knowledge of and way-finding capabilities in the city centre of Hasselt, as well as the degree of coziness that the respondents award to the city centre. While reported way-finding capabilities and perceived coziness are high for most of the respondents, the self-perceived mental knowledge of the city centre is considerably lower.

When the focus is turned to the knowledge about the parking facilities in Hasselt, one could note from Table 1 and Figure 3 that there is a relative large variability in the number of correctly identified facilities, depending on the type of parking facility. Especially free park & ride car parks are unknown to the respondents, as almost three out of four respondents were unable to indicate at least one such parking facility. In contrast, more than 95% of the respondents pinpointed at least one charged car park, and the same holds true for the free car parks. The statistics also show that mental knowledge of parking facilities is limited: only very few users were able to identify all (or almost all) parking facilities.

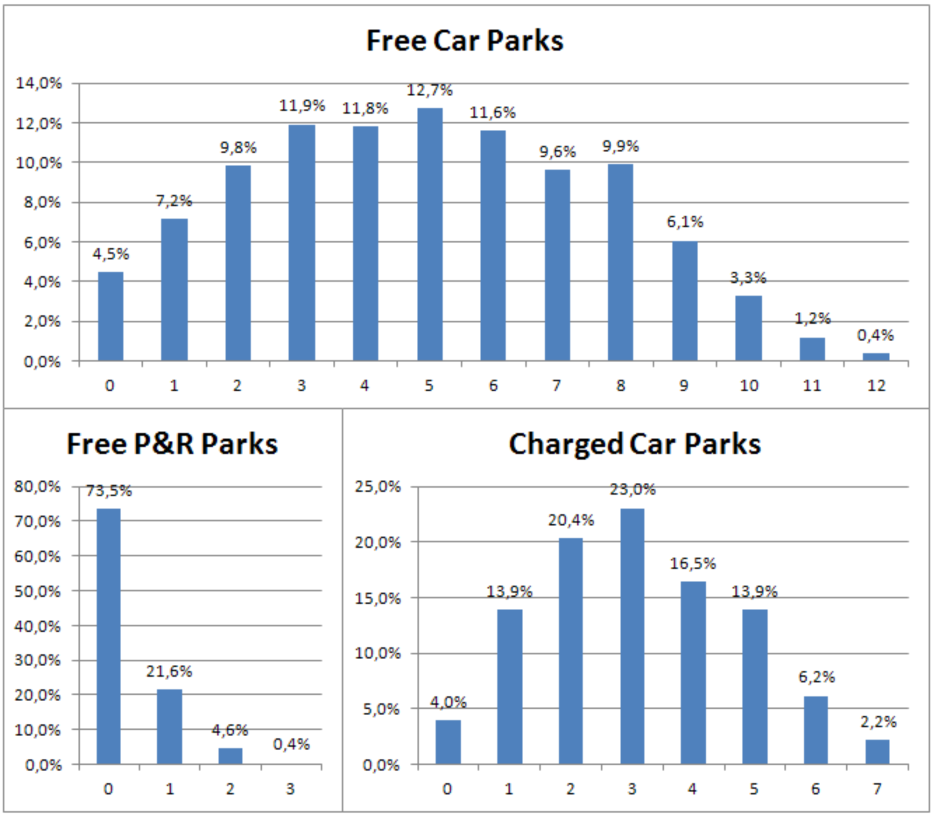

FIGURE 3 Number of identified public parking facilities by facility type.

Therefore, from policy perspective, it is worthwhile to assess which type of parking facility (free, free P&R, charged) is most known (this variable is denoted by PCKT in Table 1) by the car drivers, and to identify the factors that can explain this familiarity. To define this variable, the percentages of known car parks for each facility type where compared and the facility type with the largest percentage was recorded as the answer category for this answer. Suppose that a respondent had indicated that he knew 4 free car parks, 0 free park & ride car parks and 3 charged car parks, then the most known facility type would be charged car parks as 3/7 (charged) > 4/13 (free) > 0/3 (free P&R). From Table 1 it is clear that the familiarity with the charged car parks was the largest, followed by the free car parks. In addition, one could note that only 1.19% knew none of the parking facilities.

Finally, Table 1 provides information about the car drivers that at least know half of the charged car parks and half of the free car parks. This information was not tabulated for the free P&R car parks, as the familiarity with these facilities was considerably lower, as mentioned before.

ANALYTICAL METHODOLOGY

To investigate the relationship between the parking facility type car drivers are the most familiar with and the different contribution factors, a multinomial logit model (MNL) has been developed. The MNL focuses on the individual as the unit of analysis and uses the individuals' characteristics (the independent variables which ware described in the previous section) as explanatory variables. Let Y (the most familiarized parking facility type (PCKT)) be the response variable, $y_i = \; y_{i1}, y_{i2}, y_{i3} \;{}^T$, that has a multinomial distribution $\pi_i = \; \pi_{i1}, \pi_{i2}, \pi_{i3} \;{}^T$, and let X be a set of explanatory variables (discrete and/or continuous). Taking *j** as the baseline category (i.e. access roads in this study), the model can be represented by the following equation:

$$\log\left(\frac{\pi_{ij}}{\pi_{ij^*}}\right) = x_i^T \beta_j, \qquad j \neq j^* .$$

Next to the most known parking facility type, a second model will be used to assess the impact of the same set of explanatory variables on the two dummy variables indicating whether at least half of the charged car parks (DPAY) and/or at least half of the free car parks (DFREE) are known. Since the familiarity with charged car parks is most likely significantly correlated to the familiarity with free car parks, the applied statistical method should take into account this correlation. To this end a bivariate probit model is formulated. The bivariate probit model is a natural extension of the 'classical' probit model in which two decisions are made jointly;

$$\begin{array}{l} y_{i1}^* = \beta_1'\mathbf{x}_{i1} + \varepsilon_{i1}, \quad y_{i1} = 1 \text{ if } y_{i1}^* > 0, \quad y_{i1} = 0 \text{ otherwise,} \\ y_{i2}^* = \beta_2'\mathbf{x}_{i2} + \varepsilon_{i2}, \quad y_{i2} = 1 \text{ if } y_{i2}^* > 0, \quad y_{i2} = 0 \text{ otherwise,} \end{array} \begin{pmatrix} \varepsilon_1 \\ \varepsilon_2 \end{pmatrix} \sim N\left(\begin{pmatrix} 0 \\ 0 \end{pmatrix}, \begin{pmatrix} 1 & \rho \\ \rho & 1 \end{pmatrix}\right).$$

To assess the overall significance of the various predictors in the two models, a type III analysis of the effects is made for each of the models. This overall type III analysis indicates which variables significantly explain familiarity to the car parks. Even if the individual parameter estimates are not significant, still the overall variable can explain significantly the relationship with the familiarity. In the final models, only the variables that overall contributed to the model (p-value < 0.10) were kept in the model, with the exception of age and gender which were included as potentially confounding variables.

RESULTS AND DISCUSSION

Before elaborating on the results and their policy implications, it is important to note that multicollinearity among the different explanatory variables was assessed by looking at the variance inflation factors. All variance inflation factors were lower than 1.47 indicating that there was no serious problem of multicollinearity. Moreover, the Rho-squared values of the models (0.39 for the PCKT model and 0.15 for the DPAY-DFREE model) indicated that the models had at least a reasonable fit. This is also confirmed by the lack of fit tests which had a p-value smaller than 0.001.

When the factors, influencing the best known parking facility type, are assessed, one could see from Table 2 that only three factors are significantly influencing this form of familiarity, namely age, education, and the frequency of using the car when making the shopping trips to Hasselt. This means that factors such as income, place of residence (which can be seen as a proxy of distance to the city centre), and the cognitive attributes considered in this study apparently have no direct impact on the type of parking facility that the car drivers are most familiar with.

TABLE 2 Type III Analysis of Effects of MNL Model PCKT*

Effect	Chi²	DF	P-value
Gender	1.191	3	0.755
Age	28.543	3	<0.001
Edu	21.693	3	<0.001
Freqcar	8.794	3	0.032

* Charged Car Parks as Reference Category, *rho-squared*: 0.39

Inspection of the individual parameters of the MNL model (tabulated in Table 3), reveals that especially the parameter estimates comparing the free car parks with respect to the reference category (charged car parks) are significant. The lack of significance for the estimates of the no free P&R parks and no knowledge options (with respect to the charged car parks) is mainly due to the relative low shares of these categories, as reported in Table 1 and Figure 3.

TABLE 3 Maximum Likelihood Parameter Estimates MNL Model PCKT*

Parameter	Free car parks			No car parks known			Free Park & Ride parks		
	Est.	S. E.	P-value	Est.	S.E.	P-value	Est.	S.E.	P-value
Intercept	0.284	0.186	0.127	-4.561	0.840	<0.001	-2.849	0.480	<0.001
Gender: M	0.024	0.135	0.857	0.661	0.622	0.288	-0.059	0.333	0.859
Age	-0.027	0.005	<0.001	0.011	0.018	0.521	-0.002	0.011	0.857
Edu: UC	0.624	0.144	<0.001	-0.131	0.600	0.828	0.843	0.372	0.023
Freqcar: F	-0.377	0.137	0.006	-0.014	0.590	0.981	-0.511	0.340	0.133

* Charged car parks as reference category

With regard to the gender effect, one could notice that none of the individual parameters was significant. Notwithstanding, gender was kept in the final model, as both age and gender were used as control variables (see supra). Concerning age, one could see that when age increases, the odds of knowing primarily free car parks, in comparison to charged ones, decrease.

With reference to the effect of education, two significant impacts can be highlighted. Having obtained a college degree increases the odds of predominantly being familiar to free car parks, when compared to charged car parks, with 87% (=exp(0.624)-1). In addition, it increases the odds of being mainly familiar to P&R rides with even 132%.

The final parameter that can be interpreted from this model is the effect of car use frequency for trips towards the city centre of Hasselt. Respondents who frequently use their car are less familiar to free car parks, in reference to charged car parks, than non-frequent car users. At first sight, this effect might sound contra-intuitive, but this might be partially accounted for by the fact that most centrally located car parks in the city are the charged car parks.

After having discussed the factors influencing the most known parking facility type, the focus is now turned to the discussion of the impact on the two dummy variables indicating whether at least half of the charged car parks (DPAY) and/or at least half of the free car parks (DFREE) are known. The overall significance tests are tabulated in Table 4. In contradiction to the results of the MNL model, a larger number of factors significantly influence the familiarity with charged and/or free car parks according to the bivariate probit model. Factors such as income, place of residence, and one of the cognitive attributes now do play a significant role, albeit the role of income is still limited (an overall p-value of 0.079). In correspondence to the MNL model, gender although not significant, was kept in the final model as a control variable.

TABLE 4 Type III Analysis of Effects of Bivariate Probit Model DPAY-DFREE

Effect	Chi^2	DF	P-value
Gender	3.317	2	0.190
Age	18.671	2	0.000
Hasselt	10.666	1	0.001
Inc	5.097	2	0.078
Edu	7.336	1	0.007
Freqcar	4.197	1	0.040
Pmkn	30.240	2	0.000

Rho-squared: 0.15

Investigation of the individual parameters of the Bivariate Probit model (displayed in Table 5), shows that age significantly increases the likelihood of knowing at least half of the charged car parks. This in line with the MNL model where the odds of knowing primarily free car parks, in comparison to charged ones, decreased with age, or formulated differently, the odds of knowing primarily charged car parks, in reference to the free ones, increased.

TABLE 5 Maximum Likelihood Parameter Estimates MNL Model DPAY-DFREE

Parameter	DPAY			DFREE		
	Est.	S.E.	P-value	Est.	S.E.	P-value
Intercept	-0.571	0.137	<0.001	-0.351	0.141	0.013
Gender: M	-0.091	0.083	0.270	0.085	0.084	0.311
Age	0.012	0.003	<0.001	0.000	0.003	0.963
Inc: L	0.096	0.128	0.452			
Inc: M	0.211	0.097	0.029			
Edu: N				-0.226	0.083	0.007
Hasselt: E	-0.289	0.089	0.001			
Freqcar: O				0.165	0.080	0.041
Pmkn:B	-0.233	0.090	0.009	-0.480	0.089	<0.001
Rho	0.520	0.044	<0.001			

Regarding the effect of income, one could depict a significant increase in the odds of knowing at least half of the charged car parks for respondents with a medium or high income, when compared to respondents with a low income or the ones that did not want to disclose their income.

With respect to the effect of education, one could observe a decrease in the odds of knowing at least half of the free car parks for respondents that did not obtain a college degree. This confirms the finding of the MNL model that a college degree increases the odds of predominantly being familiar to free car parks, when compared to charged car parks.

Concerning the effect of the place of residence, one could notice that the respondents that are not residing in Hasselt have a lower chance of knowing at least half of the charged car parks when compared to respondents residing in Hasselt. This can be accounted for by the fact that the overall familiarity with all car parks (the total number of car parks known) is higher for people residing in the study area.

With reference to the effect of car use frequency, one could notice that respondents who only occasionally use their car when visiting the city centre are more familiar to free car parks, are more likely familiar with at least half of the free car parks, then frequent car users. This supports the MNL finding that frequent car-visitors are less familiar to free car parks then non-frequent car users in comparison to charged car parks.

With regard to the only significant cognitive attribute in the model, one could observe that the self-perceived mental knowledge of the city centre matches the familiarity with both type of parking facilities: a lower self-perceived mental knowledge corresponds to a lower probability of knowing at least half of the charged car parks, and to a lower chance of having correctly identified at least half of the free car parks.

A final estimate that can be interpreted from the model is the correlation between the familiarity with charged car parks and the familiarity with free car parks. Recall, that the bivariate probit model was explicitly adopted to be able to take into account these correlations. The high value for rho and the corresponding large significance support the hypothesis that the familiarities of these two types of parking facilities are indeed correlated.

CONCLUSIONS

In this paper, it is shown that familiarity with parking facilities is heterogeneous among travelers. Familiarity is especially related to age and education, and to the frequency of car use towards the study area. After all, these factors were identified as significant by both models that were analyzed. Rising ages increase the familiarity with charged car parks, whereas higher education and higher car use frequency increases the familiarity with free car parks. Besides, place of residence, income and perceived mental knowledge were highlighted as being significant by the second model.

The availability of this type of information concerning travelers' familiarity with parking facilities is important for planners. For example, Bonsall & Palmer (*21*) concluded that the choice process of car drivers who are familiar with the local circumstances is more structured (and in addition better to predict) than the choice process of unfamiliar drivers. A structured process offers planner better handles to influence travelers' decision making process covering decisions of destination, travel mode, route, and parking. If travelers' familiarity with the parking situation in the vicinity of shopping areas is known, this information can be used when looking to the utilities of different destinations, travel modes, and route alternatives. Furthermore, it is recommended that simulation models that predict parking choice behavior (see e.g. *13*, *22*-*23*), take into account the different levels of familiarity with parking facilities, and the contributing factors. This offers better insights into the parking demand at different (known) parking locations including the distinction between parking facilities based on for example payment regime (paid versus unpaid parking).

Next to the contributing factors to the familiarity to parking facilities, this paper demonstrated the value of collecting virtual buffer data by means of an online survey tool. Note that this does not exclude other approaches for capturing geographical location information. With regard to the value of the survey tool, it is worthwhile to mention that after this study, the local public administration has implemented a parking guidance system. Thus, from policy point of view, it would be worthwhile to reuse the online tool to compare the familiarity in the current situation, with the one reported in this paper. After all, the explicit naming of the parking facilities might have increased the familiarity with certain type of facilities (*24*-*25*).

Finally, it is recommended to further investigate the familiarity by combining different layers of information: next to personal information, facility specific information, such as prices and the number of parking lots, and the actual parking choices made by the travelers can be collected to detail and further refine the current findings.

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