

Cultural Backgrounds Effects on Travel Mode Choice of International Communities in Vienna

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1 ABSTRACT

There are many factors influencing daily travel behaviour. For example, information and communication, living space, policies, and urban planning, are among the parameters that are known to affect travel behaviours. Lifestyle and socioeconomic and demographic structures can also be attributed. Although the cultural background of a person may be a determining factor in all parts of our living space and directing our behaviour, it may not have always been taken into consideration in the context of travel behaviour research. In this study, a multilingual online questionnaire was designed to understand and measure the impact of cultural differences of international communities on transportation mode choices and travel behaviour, and an online survey was carried out in Vienna. 213 participants took part in the questionnaire. After the elimination of invalid ones from the data set, for instance, responses from those living outside of Vienna, 150 responses are used for analysis. The data collected from the participants are split into the ones from international communities with non-Viennese origins, native Viennese people, and a mixed/intermediate group. The transportation mode choices and travel behaviours among these communities are compared by statistical analysis. The preliminary analysis among the international communities. evaluating commuting, grocery shopping, and leisure travel shows signs of cultural influences on using transportation modes, frequency and duration. It also implies that more comprehensive and detailed studies are needed on this subject. The result implies that existing policies should be more dynamic and adaptive, especially taking account of the widespread migration wave nowadays.

Keywords: Travel Behavior, Mode Choice, Cultural Background, Transportation Policy, Vienna

2 INTRODUCTION

Travel behaviour and travel mode choice affect the daily lives of individuals and have an important place in their activities. Many factors determine them: household size, income level, gender, socio-demographic and transportation parameters. as well as social status such as culture, ethnicity, and immigration (Klinger and Lanzendorf, 2016). Due to war, economic crisis, and conflicts experienced throughout the world, immigration has occurred and has been experienced in previous years. It has also manifested itself in Asia, the Middle East, and finally Europe in this last decade. Although integration and adaptation to the conditions of the region emerge in the countries and continents where these communities live, it cannot be ignored that the ethnic origin and culture that they belong to continue to be kept alive.

In this study, a multilingual online questionnaire was designed to understand and measure the impact of cultural differences of international communities on transportation mode choices and travel behaviour, and an online survey was carried out in Vienna. 213 participants took part in the questionnaire. After the elimination of invalid ones from the data set, for instance, responses from those living outside of Vienna, 150 responses are used for analysis. The data collected from the participants are split into the ones from international communities with non-Viennese origins, native Viennese people, and a mixed/intermediate group. The transportation mode choices and travel behaviours among these communities are compared

We undertook an empirical study in Vienna, the state and capital of Austria (Fig. 1), a city with roughly 2.000.000 residents and above in 2021 to collect data on, and contribute to the empirical scholarship on immigrants' everyday travel behaviour. One of Vienna's biggest proportions of citizens who live here are those with foreign citizenship (31.5%), and even more (41.9%) have immigrant heritage. Serbian and Turkish immigrants were the major immigrant groups in Vienna in 2021, accounting for 5.3% and 4% of the city's overall foreign population, respectively. Following these groups were citizens from Germany, Poland, and Romania (Stadt Wien, 2021).

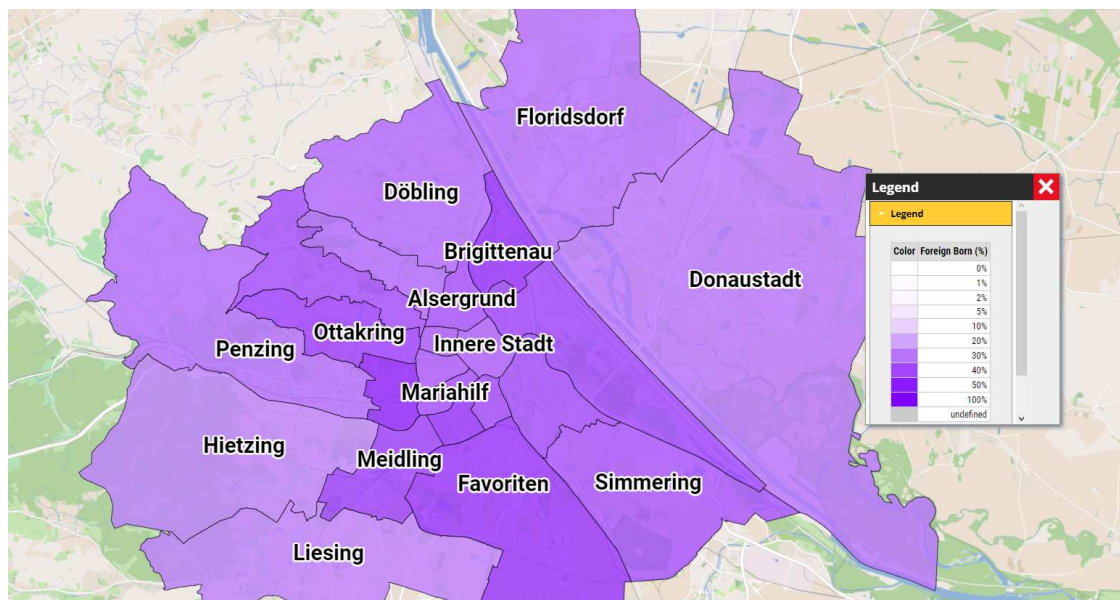


Fig. 1: The map of Vienna with foreign percentage (City Population, 2022)

As can be seen in Fig.2 the modal split percentages are shown for Vienna for the year until 2020. Types of transportation that are taken into account in urban transportation; walking, public transportation (tramway, subway, train), bicycle, and motor vehicle use. In 2020, car usage, walking, cycling and public transportation usage are 27%, 37%, 7% and 27%, respectively.

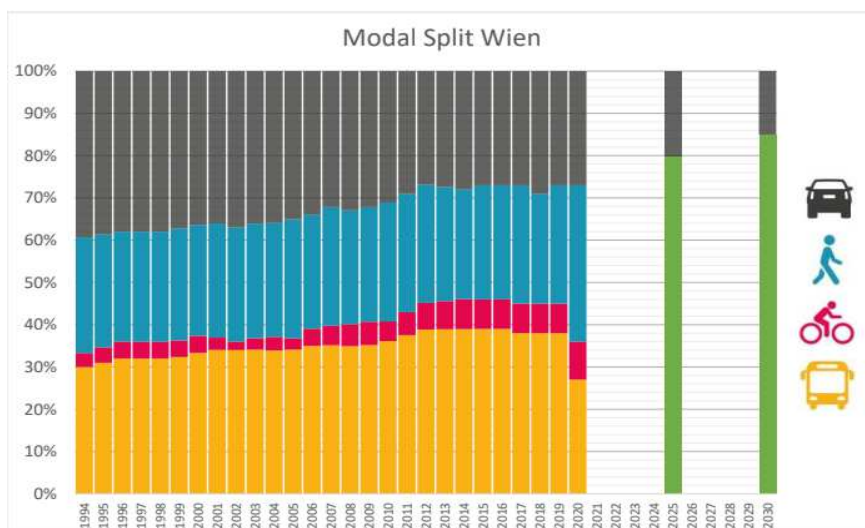


Fig. 2: Modal split of Vienna by years (Stadt Wien, 2021)

Blumenberg (2007) used the descriptive statistics method in his study by using the data of the United States national transportation survey and took into account the integration status of the immigrant population and culture by years, and produced a result. However, it is very difficult to determine the impact of cultural differences, since this study was only able to consider limited information such as ethnicity and place of birth. Although it is very difficult to examine the effect of culture, these communities generally live close to each other, keep their kinship relations strong, due to the immigration that developed with the effect of cultural differences. This is due to the difficulty of sometimes being recognised indirectly or directly by the culture of the geography they live in (Haustein et al., 2020).

A study conducted in Offenbach am Main in Germany revealed that the use of cars and public transportation is not related to cultural difference, but only creates a difference in cycling. It shows that cultural codes can be effective in modes such as bicycles and scooters within the scope of sustainable transportation that have emerged as a new incentive and orientation in the world (Welsch et al., 2018). In addition to all this preliminary information, it is necessary to think about how understanding of culture can be completed. Culture can be defined as general values, beliefs and behaviours (Ashmore et al., 2017). At the same time, it

is thought that daily activities can be taken into this context and some symbolic indicators can also participate in this situation. The fact that the public transportation infrastructure of developing countries (the global south) is generally weak and the car is seen as a status symbol is another phenomenon that permeates cultural codes (Ashmore et al., 2018). Where diversity is created can be accelerated with a better transportation plan and infrastructure, rapid integration of the current situation, decisions to be taken and policies to be implemented.

3 LITERATURE REVIEW

3.1 Transportation mode choice and travel behaviour

Travel behaviour, understanding, and forecasting are very important in terms of creating a city's transportation network in a way that will benefit policy makers for their decision-making and policy making in transportation planning, (Abdullah et al., 2020). The perception and status of people's mobility can also change according to their habits, activities, and lifestyles (Shamshiripour et al., 2020). The effect of the built environment on travel behaviour is also considered a highly studied subject. Wang and Zhou (2017) listed the built environment scales as follows: home-work relationship, transportation access, neighborhood structure, population density, living area, and street structure.

The mode choice is another significant aspect in terms of estimating demands encountered in travel planning and understanding how much area is allocated for transportation in the city (Cheng et al., 2019). The parameters affecting the mode choice can be shown as age, gender, income level, vehicle ownership, education level and household structure (Li et al., 2012). It will be more effective and usable to establish the transportation structure and infrastructure of the cities by combining the alternatives to be selected in the mode choice with travel behaviour. For this reason, besides the existing factors affecting these two terms, it is very important to create decisions or policies that will cover all segments of the society and bring them to reality.

3.2 Travel Behaviour with Immigration and Cultural Differences

Immigrants or international communities decide their travel behaviour depending on the parameters of individual or household, spatial assimilation, ethnic origins, employment status, legal regulations, and culture (Dingil et al., 2019). As for the cultural impact, the prominent situation, the transportation status in the country or city where a person grew up or in which he/she carried his culture, and the gender relationship came to the fore (Bloomberg, 2009). In their study Haustein et al. (2020) examined the travel behaviours of international communities in Denmark and the Netherlands but only in terms of bicycle use under the concept of immigration. Danish citizens used bicycles 21% more than non-Western immigrants, while Dutch citizens preferred 23% more bicycle use compared to non locals. In their analysis based on the Survey of American Communities Ruggles et al. (2008) revealed the transportation distribution of native and immigrant populations in this direction, as can be seen in Figure 3.

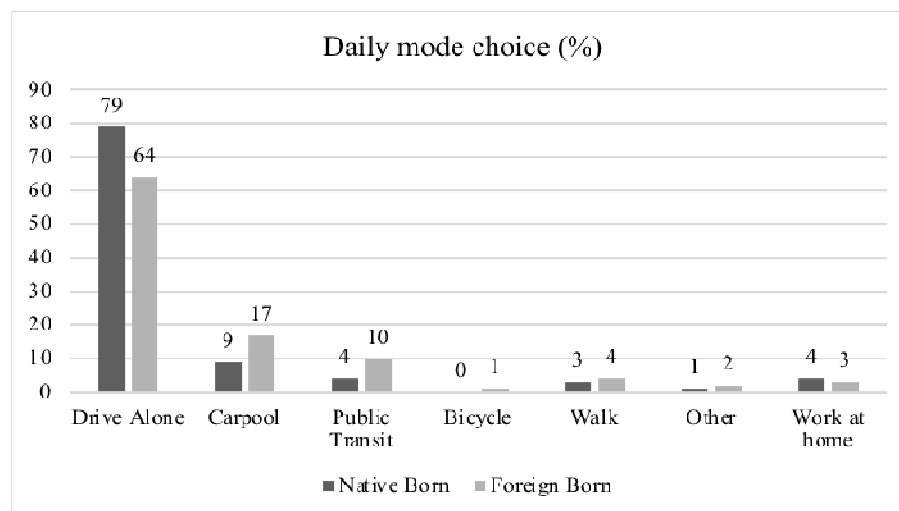


Fig. 3: Survey of American communities, mode choice (Ruggles et al., 2008)

In a study they conducted in Germany Welsch et al. (2018) noted that compared to non-immigrants, immigrants have fewer cars or bicycles per household, and are also less likely to cycle or drive and have access to such modes of transportation. They stated that the most important mode of transportation is the private car and that immigrants, especially women, use public transportation more frequently, second after using the private car, while bicycle transportation tends to be a typical mode of transportation, especially for men and non-immigrants. Chatman (2014) used a telephone survey with immigrants living in New Jersey and the local people in his study investigating the issue of car use by immigrants and showed that immigrants tend to drive less, but this use may change over time, which is possible with the change of the living environment and neighbourhood. Emphasising that the immigrants' background and culture will be to first use cars, he stated that they will be less likely to drive. Ashmore et al. (2019) evaluated the mode choice of train and road bus systems in public transportation. They tried to deal with cultural and geographical differences by making a distinction between country category, Global North and Global South, and by making use of Hofstede's distinctions. They tried to analyse the type choice by including the distinction between individualist, collective and divisive communities and stated that rail system use is more common in the global north. They described this situation as the 'poor cousin' of vehicles such as buses used in Asian regions.

In a study he conducted in the United States, Barajas (2020) hypothesised that the cycling behaviours of individuals of foreign or immigrant origin may differ, and then investigated this issue with 23 interviews in the southern region of San Francisco. He suggested that new policies and practices should be developed in cooperation with immigration institutions to encourage the use of bicycles depending on the effects of neighbourhood culture and structure as well as gender factors. Handling the immigration issue from many aspects and its relationship with the transportation type preference has been made in a very limited way and only according to ethnic origins, and it has been tried to be explained with the results that emerged as a result of the general national surveys. The effect of transporting the codes of the country of origin on travel behaviour and type preference has been a phenomenon that is rarely mentioned.

4 METHODOLOGY APPROACH

213 people responded to an online survey about their socio-demographic, mobility, and cultural backgrounds, throughout the survey, which was designed and distributed using the online survey platform SurveyMonkey. 150 valid responses were used for analysis after data cleaning. Incomplete responses from people who skipped questions without completing all the survey questions were excluded. Participation in the survey was limited to those who were at least 18 years old. Respondents had the choice of answering in German, Turkish, Croatian/Serbian/Bosnian, Croatian, or English. To ensure that roughly half of the participants were female, a quota was established. The survey data includes socio-demographic details such as household size, the number of cars per home, net household income, and the location of each household by postal codes. The majority of the respondents (89 percent) live in Vienna. To ascertain their immigration history, we questioned them about their home nation in different ways, such as asking about their education language until university used mostly, the language within households or family, the country where they grew up, and their parents' backgrounds as an immigrant. This way made us distinguish respondents into three categories. Participants were asked to identify whether they had a driver's license, whether they knew someone who had a bicycle. Participants also rated both behavioural questions and perceptions in terms of traffic and daily routines regarding their cultural background. These items and additional statements about the perception of the neighbourhood were measured.

Among the methods used to understand the cultural backgrounds of the participants, parameters such as the language spoken in the family, the language of education they received until the age of 18, and the categories of the languages they preferred for the videos they watched for entertainment were brought together. Among the analysis, these data were extracted as tables with the frequentist system. To begin with, we prepared the descriptive statistical analysis to include the samples and variables of the questionnaire including socio-demographic structures such as age, gender, and income. Then, these socio-demographic structures were presented using crosstab methods determined in line with the purpose of each activity in terms of daily transportation mode choices and travel behaviours. Also, the predicted modal split was given under the condition of the international communities' perspective.

Statistics revealing the differential distribution between local people and international communities, work, general shopping, grocery shopping and leisure activities are given as a comparative statistical analysis for each mode of transportation. Regarding the cultural background, the t-test analysis, and factor analysis according to the answers of the participants have revealed which variable of traffic and transportation behaviours is significant and how much of it will be explanatory if a possible model is established. As the last step, t-tests and factor analysis were applied to determine the impact of different communities' transportation mode choices and cultural differences, through the impact of demographic variables of perceptions. In addition, the participants' daily transportation uses have been revealed.

5 RESULTS

In Vienna, 48.6% of the participants constitute international communities, while 67.2% of these communities represent the Turkish community. The remaining 32.8% of the participants have their backgrounds from countries such as Iran, the Czech Republic, Serbia, Romania, and Bosnia and Herzegovina. Almost 50% of the Turkish community have lived in Vienna for more than three years. More than 50% of the respondents of other international communities have lived in the city of Vienna for less than three years. When we asked how the international communities felt while living in Vienna, 60% of the Turkish community participants felt comfortable and accepted in Vienna, while nearly 20% described themselves as natives of Vienna. Very few of the participants stated that they felt lonely or isolated. Although a similar situation is observed in other international communities, the rate of feeling like a native is quite low at 7%.

	Viennese	Turkish	Other
Gender [%]			
Female	48	57	45
Male	52	43	55
Age			
Average	32	28	26
Max.	62	58	53
Min.	18	18	18
Std. Dev.	3,248	2,471	2,186
Education status[%]			
Under Secondary	22	22	42
Job oriented	9	18	
Bachelor	24	33	12
Master	45	27	46
Occupation [%]			
Full or part time employee	61	64	50
Unemployed	4	14	4
In education	27	16	42
Retired	8	6	4
Average household income per year [€]	40.000	42.000	35.000
Average household size	2,45	2,72	2,83
Percentage of vehicles in household (having one vehicle or more) [%]			
Car	48	64	25
Bicycle	95	58	63
E-Bike	8	0	0
E-Scooter	3	8	8
Having driving license [%]	91	81	79

Table 1: Sample description by communities

Daily travel behaviour and mode choice are asked in relation to four different trip purposes: commuting, grocery shopping, occasional shopping (shopping other than grocery, such as clothes, sports tools, etc.), and leisure activities. In the category of commuting mode, natives tend to choose mostly to bike and to use public transportation (PT) while the Turkish community choose mostly PT and 'other' communities tend to use PT, walking, and cycling respectively. Interestingly, people in the Turkish community are much more likely to use a personal car when going to work on their daily travels, while none in this community uses a bike. For grocery shopping, all communities are supporters of walking probably due to the grocery stores in near

proximity of the living places of participants. As for the personal car, the Turkish community has the highest percentage of use, and the same applies to PT. This might mean that the Turkish community chooses different supermarkets for their groceries. For general shopping and leisure activities, two different modes are getting the attention for daily travel behaviour: car and bike. The Turkish community tends to use the car more than others. On the other hand, when the topic is using the bike for shopping or leisure, natives are a higher proportion. For each activity, other modes have no significant difference.

As shown in Table 1, socio-demographic factors differ among the three groups. These three groups were named. The following terms were used: for local people 'Viennese', for Turkish community 'Turkish' and for all foreign people 'Other'. International communities (Turkish and Other) are younger than natives and participation of the female population is higher in the Turkish community than in natives and other categories. Higher education status is much higher for natives rather than international communities. When the international communities are compared, the rate of those who continue their master's education seems to be quite high among the participants in the 'other' category, which shows that there is more participation from the student group in the low average age. Interestingly, the average annual earnings of the Turkish community were higher than those of the indigenous and 'other' communities. Another point of interest is that the Turkish community has more personal car ownership than 'other' communities and natives, but in bike ownership natives outnumber international communities (almost every native participant owns a bike).

	Viennese	Turkish	Other
Commuting mode			
Car	5	19	0
Public transportation	48	71	50
Walking	7	4	30
Bike	35	0	12
Other	5	6	8
Grocery mode			
Car	10	23	12
Public transportation	2	12	0
Walking	78	65	80
Bike	10	0	4
Other	0	0	4
Occasional shopping mode			
Car	16	29	12
Public transportation	41	49	54
Walking	19	14	21
Bike	23	0	9
Other	2	8	5
Leisure activity mode			
Car	9	21	4
Public transportation	38	51	63
Walking	13	22	17
Bike	40	2	16
Other	0	4	0

Table 2: Daily mode choices of communities by activities

Looking at the daily travel behaviour from a general perspective it may be sufficient to understand the comparison of native and international communities. Yet, in Fig. 4, when the results are split by gender of the respondents, understanding of the daily travel behaviour gets clearer. As for commuting, while natives have almost an equal distribution to the transportation modes among both genders, the females of the Turkish community tend to walk much more than the males (Fig. 4.a). For grocery shopping, none of the native female respondents report the use of PT, and Turkish and other males never cycle (Fig. 4.b.). Turkish, native and other community males are more likely to walk at the same percentage when they are going shopping. The native and other community female's choice is the private car at the same level of daily routines for shopping activity (Fig. 4.c.). For the leisure activities, while natives and Turkish males are sharing the same walking usage as other category's females, native females and other community males have the same proportion of car usage. The difference between Turkish males and females is that the males tend to use cycling while heading to leisure activities (Fig. 4.d.).

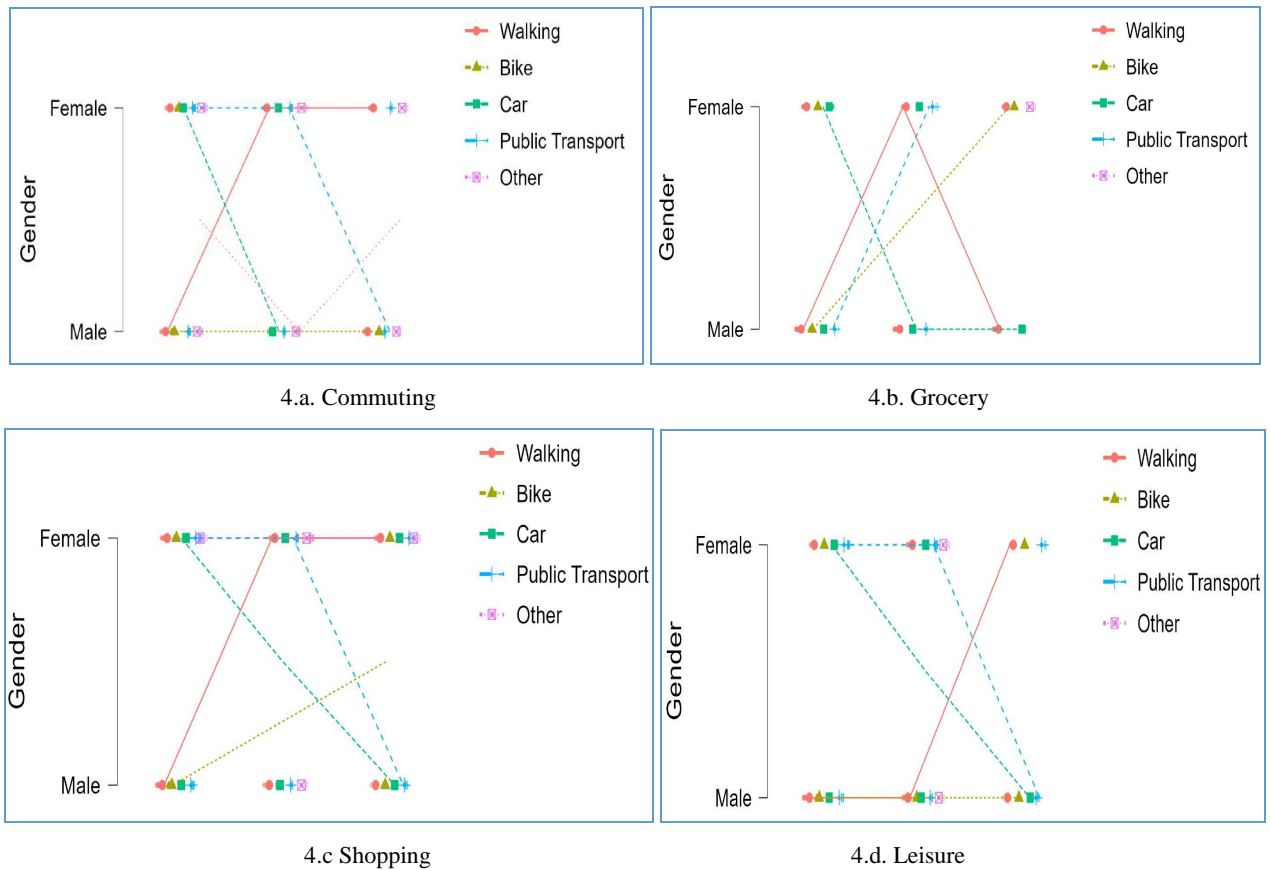
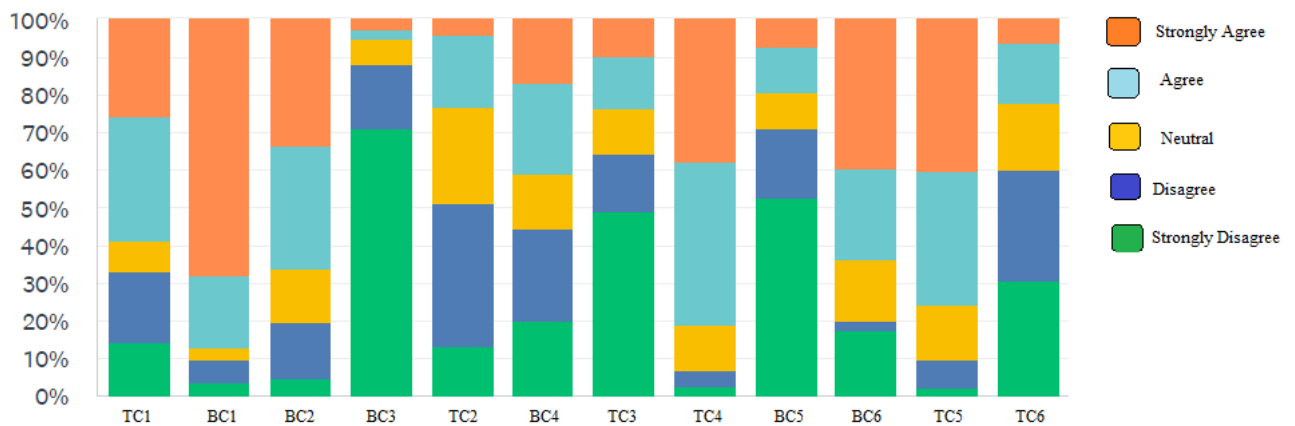


Fig. 4: Daily mode choice by gender and origin (for each figure: left: Viennese; middle: Turkish; right: other).



TC1: Even if there is no traffic, I would prefer waiting at a red light.
 BC1: Even if Vienna has no ticket control of the entrance, I take myself for granted that I buy a public transport ticket.
 BC2: I miss attending crowded events with my friends.
 BC3: I regret to use public transport, bicycle or walking because I cannot afford to buy a car.
 TC2: The destination is more important than the entire trip.
 BC4: Cars are more comfortable than the other modes of transport.
 TC3: Building more roads and parking for cars would help to ease the traffic situation in Vienna.
 TC4: In Vienna, I can change transportation modes easily.
 BC5: I feel more successful if I own a car.
 BC6: I want to park my car as close as to my home.
 TC5: I feel myself contributing to the environment when I ride a bicycle and also when I use public transport.
 TC6: Cycling and walks are sport, not transport!

Fig. 5: Behavioral and traffic culture perceptions in general

	TC1	BC1	BC2	BC3	TC2	BC4	TC3	TC4	BC5	BC6	TC5	TC6
t-test	7.12	23.4	12.75	-13.6	1.62	3.61	-2.92	22.78	-4.64	9.31	19.97	-0.97
Factor analysis	0.54 0	N/A	N/A*	0.679	N/A	0.79	0.821	N/A	0.82	0.759	-0.594	0.473

Table 3: T-test and factor analysis of perception

The questionnaire included several questions asking about attitude and behaviours using the Likert scale of the participants' daily travel behaviour in terms of traffic and cultural backgrounds. In Fig. 5, the general perceptions of the participants were shown in two separate categories: behaviour and traffic culture (BC and TC). As a result of the t-test and factor analysis (Table 3), BC1 and BC2 in behavioural culture and TC2 and TC4 in traffic culture were statistically insignificant ($p < 0.05$). In addition to the general situation of the other results in these two categories, a distinction was made according to cultural differences. The most important differences vary from the general opinion on BC6, parking the car near the home and TC1, waiting at red light, according to the cultural background (Fig. 6 and 7). Although most of the participants stated that they gave a positive answer for BC6, a substantial number of locals chose the option "strongly disagree (represented as 1)", while the majority of the Turkish community turned to the answer "strongly agree (represented as 5)" (Fig.6.).

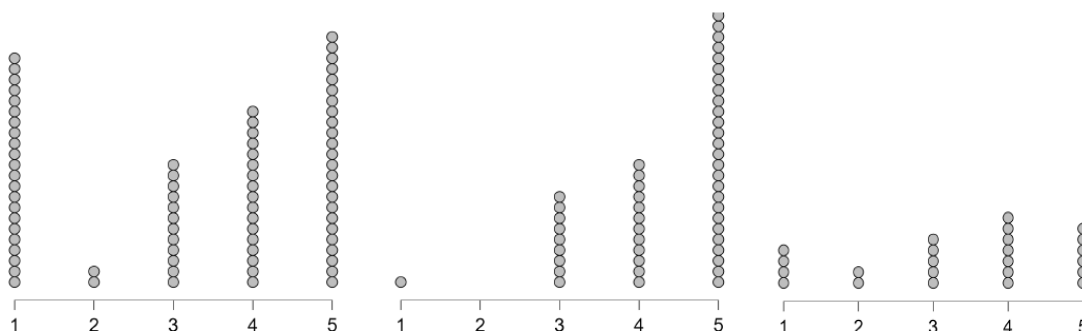


Fig. 6: "Parking car to near at home" (BC6) perception by origin (left: Viennese; middle: Turkish; right: other)

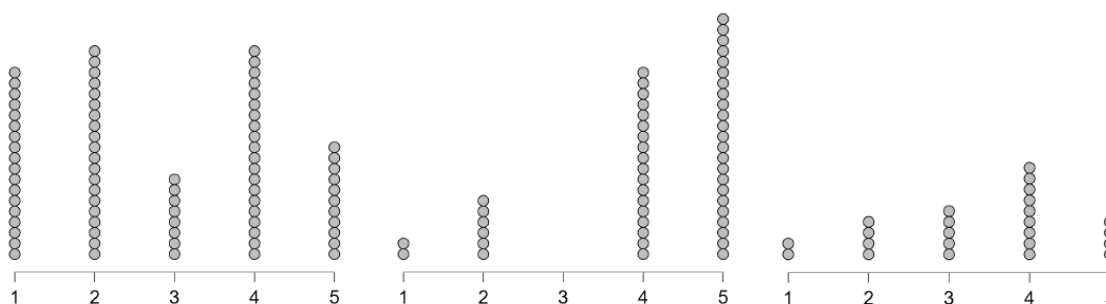


Fig. 7: "Even if there's no traffic, I'd rather wait at a red light." (TC1) perception by origin (left: Viennese; middle: Turkish; right: other)

with "even if there's no traffic, I'd rather wait at a red light." The percentage of the participants who said so are around 60% in general. In this regard, when the cultural differences are examined, the "disagree (represented as 2)" and "strongly disagree (represented as 1)" options of the natives seem to be higher than the rate of those who agree with this opinion, while the rate of saying "agree (represented as 4)" is quite high for Turkish and other communities (Fig. 7). Another difference was realised in the TC3 question, building more roads and parking spaces, although it was not as obvious as in the given graphs. While the vast majority of locals respond to this statement by saying "strongly disagree", in international communities, agreeing and disagreeing seems to be almost equal.

6 CONCLUSION

The findings of this study provided fresh perspectives on the parallels and variations in travel habits between non-immigrants and immigrants in Vienna. Our findings are comparable to those in the US when it comes to the use of automobiles or public transportation. International communities are less likely to own a driving license but more likely own a car than natives. This may be explained by the tendency of being conscious of sustainability as regards the use of cars by the native community. Especially in the Turkish community, the usage of personal cars is much higher than other groups. Bicycle ownership and usage are often higher among non-immigrants than among immigrants. The group of women in the international community that also has the biggest proportion of non-cyclists is the exception in this regard. The findings suggest that local users are aware of sustainable transportation concerns and have a positive and accurate opinion of them as a

result of their social interactions. In this regard, the presentation to, and education about the produced policies of the general public can be made more effective by using brief, informative booklets and website advertisements in the languages of the populations with a migration background.

We conducted our survey because there was no national survey available; it is somewhat exploratory and relatively small because it only covers one location (Vienna) and a small number of respondents. The participants' general level of education is above average, which can be attributed to the fact that educated persons are more likely to be willing to participate in a survey. Additionally, we believe that immigrants who speak English well are more likely to take part in a survey. When analysing the findings, it is important to keep these restrictions in mind. Additionally, Vienna's international communities are a population that is becoming more and more diversified. They vary in terms of their countries of origin, geographic dispersion, cultural backgrounds, and educational levels.

Despite these caveats, our study offers new empirical findings about the travel habits of individuals with an international background living in Vienna, a population that has been largely overlooked by mobility research but whose numbers have increased recently and will likely continue to do so in the future. There is an urgent need for more research because many facets of immigrants' travel behaviour are currently poorly understood or perhaps completely unknown. All demographic groups must have their mobility demands and travel habits known; otherwise, it increases the likelihood that decisions about transportation planning or policy would be ineffective. Vienna has a large population of immigrants, and public transportation is generally reliable in the city. Promoting the use of this and non-motorised modes of transportation helps ensure the independent mobility of immigrants who do not have a driver's license and/or do not have a car. For low-income households, encouraging walking and bicycle use can provide affordable options for short trips. In Vienna, several organisations offer cycling courses for immigrants, especially for women. Together with improved cycling infrastructure, these initiatives should be supported more fully and extended to other groups of people to encourage cycling use. emphasising that immigrants, especially recent refugees, would greatly benefit from improvements towards an easily accessible, barrier-free, affordable, sustainable, and intermodal transportation system.

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