Immigrants´ Travel Behavior in Vienna, Austria: A Mixed-Methods Approach

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Dissertation submitted to the faculty of the Virginia Polytechnic Institute and State University
in partial fulfillment of the requirements for the degree of

Doctor of Philosophy
in
Planning, Governance, and Globalization

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April 18th, 2023
Arlington, VA

Keywords: Immigration, Vienna, Public Transit, Attitudes, Mode Choice
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Abstract

This dissertation employs a mixed methods research design to examine the travel behavior of immigrants (individuals with an immigration background) in Vienna, Austria. Almost half of the city´s population has an immigration background. This study aims to understand the motivations, perceptions and attitudes influencing the travel behavior of individuals with an immigration background. The two main dependent variables in the analysis throughout the dissertation are mode choice and the satisfaction with six aspects of public transit: costs, travel time, equipment, connectivity, waiting times and safety. The first part of the dissertation will present a quantitative analysis of two datasets, one provided by *Statistik Austria*, and one self-conducted survey, in which overall trends and predicting factors of travel behavior in Vienna will be presented. The second part of the dissertation offers a qualitative view on travel behavior. 21 semi-structured interviews have been conducted with individuals with and without an immigration background to further the understanding of the underlying factors leading to their travel behavior. The quantitative analysis has shown that individuals with an immigration background from Turkey or former Yugoslavia in general drive more and ride public transit less than individuals without an immigration background. This effect is especially prevalent for work-trips. Individuals with an immigration background from Turkey or former Yugoslavia are also less satisfied with the majority of the six aspects of public transit. The interviews have shown that the rationale between driving more for individuals with an immigration background from Turkey or former Yugoslavia do not stem from transportation or land-use related factors, but rather from political attitudes and viewing the car as a status symbol. Policies set out by the government, such as introducing a cheap annual pass compared with most other cities, are seen negatively as a push to make people give up their cars and use public transit exclusively. The interviews have also found that perceptions of public transit for individuals with an immigration background are greatly influenced by previous experiences regarding public transit in other countries.

This dissertation fills a methodological and substantial gap. First, it employs mixed-methods research design using phenomenology in the qualitative analysis to capture the experiences of the interview participants in an accurate way. Substantially, this research has shown, that policies which aim at incentivizing individuals to switch to public transit by offering affordable annual passes do not reach some individuals with an immigration background due to government skepticism. Cities employing transportation policies should not view transportation as a mere technical realm, but rather as a construct filled with social, cultural, and economic aspects.

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GENERAL AUDIENCE ABSTRACT

Most large cities in the world have large immigrant populations. However, there is not much scholarly research on how these people travel within these cities in daily life. Additionally, the perceptions of immigrants and non-immigrants regarding public transit will be examined. In this dissertation, there will be four main research topics. First, through statistical analysis, the differences of travelling within the city between immigrants and non-immigrants is analyzed. Second, the reasons and motivations behind these travel patterns will be investigated through interviews with immigrants and non-immigrants. Third, the differences in the perceptions of public transit between immigrants and non-immigrants will be understood. Finally, the underlying reasons behind the perceptions of public transit will be investigated. In this study, I am using statistical analysis as well as interviews to address the four research topics. The statistical analysis has shown that Turkish or former Yugoslavian immigrants are more likely to drive regularly, particularly when travelling for work-related purposes, compared to non-immigrants. The interviews have showed that the reason behind this travel behavior lies in a skeptical attitude towards public transit, which has primarily political reasons. Additionally, these immigrants see the car as a high-status symbol representing economic success

Acknowledgement

First, I would like to thank Tika, my wife and love. I cannot thank you enough for the continuous support you gave me and the sacrifices you made so that I can pursue my PhD. Your knowledge in urban planning and you challenging my ideas made me a better scholar. To my four-month-old son Dario: You gave me the energy and happiness that I needed for the final stretch of my dissertation.

I would like to thank my parents, who unconditionally supported me throughout my studies. Without their guidance in academic and all other matters, I would have not chosen to come to the US but have rather stayed in my comfort zone in Europe. Thank you for always reminding me to look at the bright side of life. Thank you to my brother, Attila, his wife Hanna and my wonderful niece Mavie and nephew Elliot. My brother´s intellectual curiosity always inspired me and who always challenged my intellectual endeavors, which made me a critical thinker of my own work.

I would like to thank my mother-in law Mei, who helped us taking care of our son when we needed her help the most.

Of course, I would like to thank my committee and especially to my chair, Dr. Ralph Buehler for being a wonderful mentor and guide for not only the dissertation itself, but all matters related to academia. I enjoyed working with you and I am incredibly thankful for all the support you gave me. I would like to also thank Dr. Tom Sanchez, Dr. Michael Smart, Dr. Janina Welsch and Dr. Wernstedt for their academic guidance throughout this process. You all have contributed immensely and in very different ways to this achievement, and I am very thankful to you.

Even though not on my committee, I would like to express my great appreciation for the mentorship that Dr. Sonja Schmid has provided me in the last few years. I greatly enjoyed our discussions about academia and Austrian matters!

I would like to thank Mr. Sacha Baud from *Statistik Austria* to provide me with the datasets regarding the travel behavior of immigrants in Vienna. Without you, I would have not been able to pursue this research. Unfortunately, the scope of an acknowledgement section is too

short to thank all my friends and colleagues whose friendship has motivated me every day to pursue my academic and life goals. I would not be here without you.

However, I would like to thank my two best friends in life, Ben (and his partner Maria) who live in Munich, Germany, and Florian and his wife Georgia, who are my local family in DC. Their friendship and their patience will never be forgotten by me. Thank you for everything.

Table of Contents

Table of Contents vii

List of Figures xi

List Of Tables xii

List of Abbreviations xiv

1 Introduction 1

1.1. Why Is It Important to Understand the Travel Behavior Of Immigrants (People with an IB) In Vienna, Austria? 2

1.2. Dissertation Outline 4

2 Overview 9

2.1. Who Counts As An Immigrant in Vienna? 9

2.2. Study Area: Vienna, Austria 12

2.3. Demographic and Socio-Economic Overview in Vienna 14

2.4. History of Immigration in Vienna 19

3 Literature Review 22

3.1. United States 23

3.2. Europe 28

3.3. A Comparative Perspective 30

3.4. Possible Explanations for Immigrants' Travel Behavior 32

3.4.1 Spatial Assimilation 33

3.4.2 Ethnic-Specific Resources 33

3.4.3 Ethnic Labor Market Niches 33

3.4.4 Culture 34

3.4.5 Regulation 34

3.5. Research Gaps and Limitations of Current Research 34

4 Theoretical Framework and Research Design 36

4.1. Theoretical Framework: Ontologies and Epistemologies of Travel Behavior 36

4.2. Research Design 43

5 Methodology, Research Questions and Descriptive Statistics 47

5.1. Methodology 47

5.1.1 Research Questions and Hypotheses 48

5.2. Descriptive Statistics of the *Statistik Austria Mikrozensus* Survey 51

5.2.1 Composition and Interdependencies of Predictor Variables 51

5.2.2 Demographic, Socio-Economic, and Spatial Composition of The Mikrozensus. 52

5.3. Socio-Economic Composition by various demographic groups 54

5.4. Mode Choice by population groups 58

5.4.1 Satisfaction (Perceptions) of public transit 59

5.5. Descriptive statistics of the self-conducted dataset 60

5.5.1 Sampling Strategy 60

5.5.2 Composition of The Self-Conducted Dataset 62

5.5.3 Demographic, Socio-Economic, And Spatial Characteristics by Population Groups 63

5.5.4 Mode Choice by population groups 66

5.6. Perception (Satisfaction Rates) of public transit 68

5.7. Discussion of the descriptive results of both datasets 69

6. Inferential Statistics: Predicting Immigrants Travel Behavior 71

6.1. Regression Analysis (*Mikrozensus*) 71

6.1.1. Dependent Variables 72

6.1.2. Independent Variables included in the regression analysis 72

6.1.3. Regular Car (Driver) and Public Transit Usage as Dependent Variables 75

6.1.4. Regular Bike Usage (Table 6.3) 77

6.1.5. Regular mode usage of each population group as a dependent variable 79

6.1.6. Regular Car Usage (Driver) (Table 6.4) 79

6.1.7. Regular Public Transit Usage (Table 6.5) 81

6.1.8. Multicollinearity 86

6.1.9. Limitations 87

6.2. Regression Analysis (Self-Conducted Survey) 88

6.2.1. Dependent Variables 88

6.2.2. Independent Variables 89

6.2.3. Transportation Related Variables 92

6.2.4. Spatial/Land-Use Variables 93
6.2.5. Regular Car Usage 93
6.2.6. Discussion of Results of Regular Car Usage 99
6.2.7. Public Transit Usage 101
6.2.8. Discussion of Results of Regular Public Transit Ridership 106
6.2.9. Regular Biking and Walking (Active Transportation Modes) 107
6.2.10. Discussion of Regular Public Transit Usage 107
6.2.11. Perception (Satisfaction-Rates) of Public Transit (Table 6.12) 109
6.2.12. Multicollinearity in he Self-Conducted Dataset 112
6.2.13. Limitations 112
7. Discussion and comparison of both datasets 114
8. Qualitative Section/Interviews 118
8.1. Overview of the Chapter 120
8.2. Research Approach 120
8.3. Ontological and Epistemological Approach 120
8.4. Mixed-Methods Research Using Phenomenology. 125
8.5. Data Analysis 128
8.5.1 Selection of Participants 129
8.6. Colaizzi's Method of Data Analysis 131
8.6.1 Step 1: The Researcher Has to Read Through the Whole Protocol in Order to become familiar with the data 131
8.6.2 Step 2: The Researcher Highlights Significant Statements in the Protocol 136
8.6.2.1 Significant Statements 137
8.6.3 Step 3: Formulate the Meanings of Each Statement 148
8.6.3.1 Mode Choice 149
8.6.3.2 Satisfaction (Perceptions) of Public Transit 149
8.6.4 Step 4: Classification of Formulated Meanings Into Clusters of Themes And Emergent Themes 158
8.6.4.1 Mode Choice 158
8.6.4.2 Perceptions (Satisfaction) of Public Transit 159
8.6.4.3 Mode Choice 160

8.6.5 Step 5: Exhaustive Description of The Formulated Meanings, The Cluster of Themes, And Emergent Themes 165
8.6.5.1 First Cluster of Themes 165
8.6.5.1.1 Mode Choice 165
8.6.5.1.2 Satisfaction (Perceptions) of Public Transit 166
8.6.5.2 Second Cluster of Themes 167
8.6.5.2.1 Mode Choice 167
8.6.5.2.2 Perceptions (Satisfaction) of public transit 168
8.6.5.3 Third Cluster of Themes 169
8.6.5.3.1 Mode Choice 169
8.6.5.3.2 Perceptions (Satisfaction with Public Transit) 170
8.6.5.4 Emergent Themes 171
8.6.5.4.1 Mode Choice 174
8.6.5.4.2 Perceptions (Satisfaction) of Public Transit 175
8.6.5.4.3 Mode Choice and Perceptions (Satisfaction) of public transit combined 176
8.5.5.5.4 Mode Choice 177
8.5.5.5.1 Perceptions (Satisfaction) of public transit 178
8.6.5 Step 6: General Structure (Includes Mode-Choice and Perceptions of Public Transit) 178
8.7. Summary of the Research Questions 181
8.7.1 Limitations 184
9. Bridging the Quantitative and Qualitative parts 186
9.1. Validity and Reliability in Mixed-Methods Research 186
9.2. Bridging the Contextual Gap 189
10. Conclusion 196
10.1. Implications for Planning and Policy 196
10.2. Implications for Further Research 198
References 200

List of Figures

Figure 1.1 Mixed Methods Design Of The Dissertation.....7

Figure 2.1 Modal Split In Vienna 2019- 2021.....11

Figure 2.2 Vienna´S 23 Districts ..... **FEHLER! TEXTMARKE NICHT DEFINIERT.**

Figure 2.3 Car-Ownership Rates In Austria 2022 14

Figure 2.4 Share Of The Population With "Foreign Citizenship In Vienna´S 23 Districts In 2022 17

Figure 2.5 Detailed Description Of Immigrant Population Share By Citizenship In Vienna´S 23 Districts.....17

Figure 2.6 Population Shares Of People With "Migration-Background" From 2002-2020 In % 21

Figure 5.1 Mode Share Usages (In Percentages) Of Three Demographic Groups.....59

Figure 5.2 Satisfaction With Six Aspects Of Public Transit 60

Figure 5.3 Regular Mode Usage For Work Trips.....66

Figure 5.4 Regular Mode Usage For Non-Work Trips.....67

Figure 5.5 Satisfaction Rates Among Three Population Groups.....69

Figure 8. 1 Flow Of Data Analysis Following The Method Of Colaizzi (1978).....136

Figure 8. 2 Emergent Themes.....173

Figure 10. 1 Language Options At A Ticketing Machine At The Metro Stop Schwedenplatz In November, 2022 (Own-Illustration).....197

List of Tables

Table 4.1 Epistemological And Ontological Framework 41

Table 5.1 Socio-Demographic Composition Of The Mikrozensus 54

Table 5.2 Socio-Economic Composition Of Three Demographic Groups 56

Table 5.3 Demographic, Socio-Economic And Spatial Composition Of The Dataset 63

Table 5.4 Socio-Economic Composition Of Three Demographic Groups (Ibs) 65

Table 6.1 Relationship Between Ib And Country Of Birth (Mikrozensus) 73

Table 6.2 Determinants Of Regular Car Usage (Driver) And Public Transit Usage 75

Table 6.3 Determinants Of Regular Bike Usage 77

Table 6.4 Determinants Of Regular Car Usage (Driver) For Each Population Group (Odds-Ratios) 79

Table 6.5 Determinants Of Regular Car Usage (Driver) For Each Population Group (Average Marginal Effects) 80

Table 6. 6 Determinants Of Public Transit Usage For Each Population Group (Odds-Ratios) 83

Table 6.7 Determinants Of Public Transit Usage For Each Population Group (Average Marginal Effects) 84

Table 6.8 Predictors Of The Satisfaction With Safety Of Public Transit (Mikrozensus) (Odds-Ratios And Average Marginal Effects) 85

Table 6.9 Differences In The Self-Reported Immigration Status And Immigration Status According To *Statistik Austria* In The Self-Conducted Dataset 90

Table 6.10 Relationship Between Ib And Country Of Birth 91

Table 6.11 Determinants Of Regular Car Usage (Odds-Ratios) 95

Table 6.12 Determinants Of Regular Car Usage (Average Marginal Effects) 97

Table 6.13 Determinants Of Regular Public Transit Usage (Odds-Ratios) 103

Table 6.14 Determinants Of Regular Public Transit Usage (Average Marginal Effects) 104

Table 6.15 Predictors Of The Costs And Connectivity Of Public Transit (Self-Conducted Survey) (Odds-Ratios) 110

Table 6.16 Predictors Of The Costs And Connectivity Of Public Transit (Self-Conducted Dataset) (Average-Marginal Effects) 111

Table 8.1 Overview Of The Demographics Of The Interviewees 129

Table 8.2 Survey/Interview Questions Related To The First Research Question 132

Table 8.3 Survey/Interview Questions Related To The Second Research Question 133

Table 8.4 Survey/Interview Questions Related To The Third Research Question 133

Table 8.5 Significant Statements Regarding Mode Choice 138

Table 8.6 Significant Statements Regarding Satisfaction Rates (Perceptions) Of Public Transit 145

Table 8.7 Formulated Meanings Regarding Mode Choice Derived From Significant Statements 150

Table 8.8 Formulated Meanings Related Perceptions Of Public Transit 155

Table 8.9 Cluster Of Themes And Emergent Themes Developed From Formulated Meanings (Mode-Choice) 160

Table 8.10 Cluster Of Themes And Emergent Themes Developed From Formulated Meanings (Perceptions) 163

List of Abbreviations

IB	Immigration background
NIB	No immigration background
OIB	Other immigration background
FYIB	Former Yugoslavian immigration background
TFYIB	Turkish or former yugoslavian immigration background
TIB	Turkish immigration background
EU	European Union
NHTS	National Household Travel Survey

Chapter 1

Introduction

This dissertation explores the travel behavior of individuals [1] with an immigration background (IB)[2] in Vienna, Austria. Here, immigrant refers to people who immigrated to a host country to live there for an extended period. Travel behavior here entails all aspects of traveling in daily life. It does not only encompass the mere physical movement from one point to another, but rather holistically captures the experiences, challenges, and decision-making processes related to the physical movement of getting from point A to B. By including experiences, challenges, and decision-making processes into the analysis of travel behavior, this dissertation aims to move away from merely asking the question: Which transportation modes do people with an IB use in daily life? Instead, this dissertation intends to answer the question: In what social, cultural, and economic contexts is the daily travel of people with an IB embedded? This question will be tackled through a case study of Vienna, Austria.

[1] Note: This dissertation will reveal the semantic and substantial differences regarding the terms IB and immigrants.

[2] Note: The terms *immigrants* and *IB* are both used throughout the dissertation. *Immigrants* will be used as a term when talking about immigration on a global scale and in comparison, with other countries. The term IB is a specific definition translated from the German word: *Migrationshintergrund* and will be used regarding content related to Germany and Austria. See Chapter 2.1 for a detailed account of the term *Migrationshintergrund (IB)*

1.1. Why Is It Important to Understand the Travel Behavior of Immigrants (People with an IB) in Vienna, Austria?

Immigrants in many cities across the globe account for substantial population shares, they are therefore not to be seen as small minority groups. Consequently, understanding immigrants' travel behavior is beneficial for receiving a completer and more realistic picture of most residents of a city. Often, only the majority groups' [3] travel behaviors are being considered for analytical and practical policy purposes. For city governments and people engaged in Transportation Planning, understanding immigrants' travel needs can assist them to predict residents' needs more precisely (Barajas et al., 2020). Additionally, the travel behavior of immigrants can inform various audiences of the processes to society by immigrants. Shirgakoar and Nobler (2021) analyze and compare immigrants´ and non-immigrants' social and recreational trips as a measure of social integration. The travel behavior of immigrants can also influence how accessible specific resources are, such as education or labor (Bloemraad & De Graauw; Shirgaokar & Nobler, 2021). Mobility restraints are not only transportation constraints, but they can lead to economic, social, and participatory constraints for immigrants in a society (Shirgaokar & Nobler, 2021). The travel behavior of immigrants, especially regarding public transit can also enhance our understanding of how transportation facilitates or obstructs the task of mastering daily life challenges for immigrants and their communities (Smart, 2011).

As many countries in Europe, specifically in Central and Western Europe, plan to complete the clean energy transition and fully transform transportation into a sustainable domain, it is vital to reach different immigrant communities which have deviating travel behaviors from non-immigrants. US research has shown that immigrants in the US use (at least in the first

[3] In the North American Context-White

years of their arrival) many more green travel modes compared to non-immigrants (Smart, 2015).

However, these trends cannot be convincingly stated for all communities with an IB in Austria, as this dissertation will display. Therefore, if governments are keen on transforming travel, they ought to make sustainable and green travel attractive to most people, accounting for the diversity in the population regarding their strategies and plans.

1.2. Dissertation Outline

This dissertation is comprised of five larger parts:

1. Overview/Literature Review/Theoretical Framework (this section will be referred to as Overview)
2. Quantitative Analysis
3. Qualitative Interviews
4. Bridging the Quantitative and Qualitative Parts
5. Implications/Conclusion

This mixed methods approach aims to broaden the analytical and conceptual understanding of travel behavior.

The first part (1.) consists of three sub-sections capturing a comprehensive overview of Vienna´s socio-spatial configuration, detailed account of the literature and an examination of this dissertation´s theoretical framework. It highlights the importance of this research and its academic and practical merit, as well as a brief introduction to the scholarly field of travel behavior. The first sub-section of part I gives an overview of the case study area, Vienna, Austria and introduces the different districts in Vienna and provides a holistic overview of their demographic and socio-economic composition, whereas the literature review (second subsection) will highlight the importance of this research and its academic and practical merit, as well as a brief introduction to the scholarly subfield of travel behavior. The third sub-section of part 1 forms the theoretical backbone of this dissertation. Unlike most other travel behavior-related dissertations and scholarly articles, this dissertation will dive unusually deep into the ontological and epistemological basis of travel behavior. This quest hopes to situate this transportation planning dissertation in the scientific realm of the humanities and give individual humans more agency, rather than solely exposing them to the

more realist, statistical realm of the reaction-action conceptual framework (Bieri, 2015). I argue, that especially when dealing with a complex demographic group such as immigrants, one ought not to rely exclusively on statistical definitions and large-scale definitions as our primary source of knowledge derivation. Qualitative interviews can complement quantitative analysis in that they can try to explain the relationships that quantitative analysis initially finds (Mars et al. 2016). Combining quantitative and qualitative data and methods can provide a more complete picture of the analyzed information.

The second part (2.) of this dissertation provides a comprehensive quantitative statistical analysis of immigrants' travel behavior. This dissertation covers the analysis of two different datasets. The first dataset is named *Mikrozensus* and is provided by *Statistik Austria*, which provides a representative annual survey. The second dataset was specifically collected for this dissertation. The quantitative section of this dissertation preludes with a descriptive overview of the dataset, discusses the merits of each dataset and how they complement each other, presents an inferential statistical analysis, and concludes with a discussion of the results.

In the third part (3.) this dissertation includes an extensive qualitative survey, which aims to broaden the understanding of the perceptions, motivations, and attitudes towards transportation in general and public transit more particularly. The interviews were conducted in a semi-structured fashion, and they included three different demographic groups, to account for comparability.

In the fourth part (4.) of this dissertation, I will provide a detailed account of the intersection of the two parts from a theoretical and methodological standpoint.

The fifth part (5.) concludes the dissertation with policy/planning and theoretical/methodological implications and an outlook for future research.

As noted in the previous paragraphs, this dissertation employs a mixed-methods design. An important advantage of the mixed-methods design is that it permits the researcher to compare, analyze, and validate results from and across different datasets (Creswell, 2014; Plano Clark, 2010). Beyond merely comparing differences between two datasets, this mixed-method approach also empowers the researcher to use quantitative results more accurately and purposively through qualitative research and vice versa (Creswell, 2014). In more practical terms, mixed-method approaches allow one method to complement and mitigate the other method's weaknesses (Johnson & Onwuegbuzie, 2004). For example, with the addition of quantitative research methods, a qualitative study, which focuses on a very small group, can

potentially become more generalizable and better contextualized (Johnson & Onwuegbuzie, 2004). In contrast, a qualitative study can enhance quantitative results to be interpreted in a more differentiated and nuanced fashion (Creswell, 2014). Mixed-Methods approaches also allow research questions to have a broader range and entail a wider range of conceptual and theoretical frameworks (Johnson & Onwuegbuzie, 2004).

The mixed methods design of this study is driven by the following research questions.

1. What are the differences in travel mode choices between people with and without IB in Vienna?
2. How do the perceptions of public transit differ between people with and without an IB in Vienna?
3. What motivations, attitudes, and socio-cultural factors determine immigrants (specifically immigrants from present-day Turkey and people with a Turkish or former Yugoslavian and its successor countries IB) mode choice in Vienna?

(Figure 1.1) below illustrates the research questions embedded in the mixed methods research

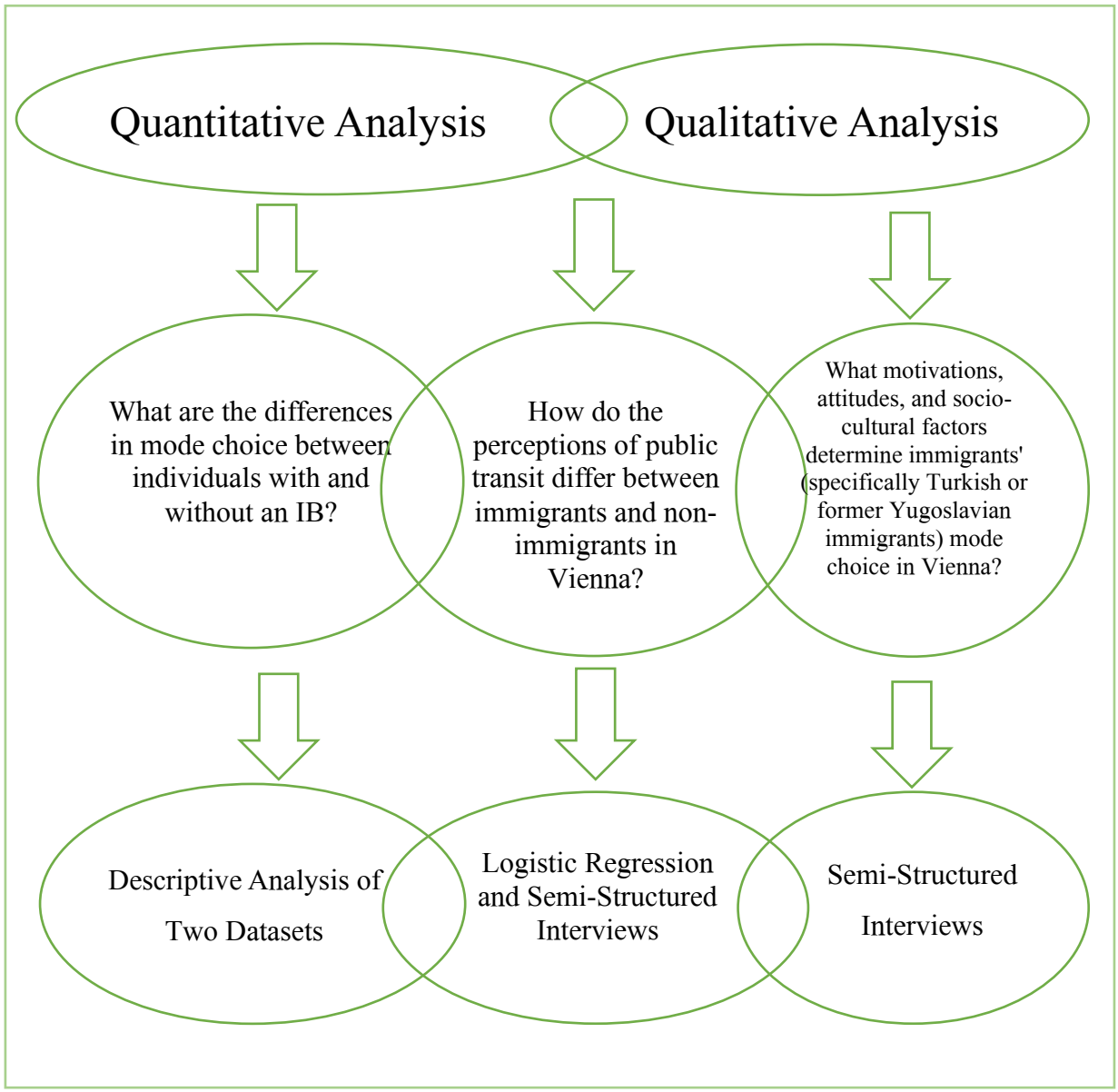

FIGURE 1.1 MIXED METHODS DESIGN OF THE DISSERTATION

The first question will primarily be answered through the analysis of two quantitative surveys in part 2 of the dissertation. These surveys give a larger scale and more generalizable insight into the overall mode choice trends of immigrants.

The second research question challenges the capabilities of large surveys. Perceptions and attitudes are very rarely used variables in travel surveys (Cao et al., 2009). One study which extensively used perceptions to understand travel behavior, more specifically cycling, is presented in Barajas's article (2019). He has shown that perceptions play a large role in cycling behavior for immigrants. Usually, when perceptions are included as dependent

variables in surveys (such as in the *Statistik Austria Mikrozensus*), they remain rather superficial and do not go beyond binary descriptions.[4] For a more nuanced, analytically, and theoretically grounded examination of perceptions of public transit, qualitative interviews were conducted with various immigrants and non-immigrants. Unlike most North American cities, public transportation in European cities is more frequently used by non-immigrants and higher-income groups and is often less socially stigmatized. Public transit in Vienna can therefore be seen as a social reflection of immigrants and non-immigrants living together. Asking people with an IB in Vienna about their experience taking public transit can be utilized as a proxy for asking individuals with an IB about their interactions with individuals who do not have an IB (and vice versa) in daily life. The scholarly quest for understanding interaction dynamics when using public transit can only be achieved through systematic and efficient qualitative interviews, and not merely through quantitative analysis.

The third research question will be fully analyzed and answered through qualitative interviews. The particular focus on individuals with a TFYIB stems from previous literature findings that these two immigrant groups (which are historically one of the earlier immigrants' groups), and from their historic standing as being "Guest-workers").[5]

[4] in this case, the satisfaction of six different aspects of Public Transit is asked- with only two possible answer choices: "Satisfactory and "Non-Satisfactory"

[5] More details to follow in the following paragraphs

Chapter 2

Overview

Vienna is the capital of Austria with an approximate population of 1.9 million. This city is often acclaimed for its high quality of life through its extensive public transit, robust public health system, and equitable social housing provision (Buehler et al., 2017). However, the most prominent among these rankings, performed by the asset management firm Mercer Rankings, faced widespread criticism due to their sampling strategy (focusing on ex-pats living in Vienna). Therefore, these rankings somewhat lean on the ontological concept of realism. They treat Vienna's quality of life as an objective reality independent of the subjects' perceptions, feelings, and knowledge, even though these rankings are a clear expression of biases and perceptions. This approach conceptualizes the city as a homogenous, single entity that inherently presumes that every process in the city carries the same meaning for its residents. The shortcomings of these conceptualizations and rankings are visible in their substantive claim of what " quality of life" is and in their obliviousness of the diverse populations that live in cities, such as Vienna.

2.1. Who Counts as an Immigrant in Vienna?

The most common term used regarding immigrants in Vienna (and most other parts of German-speaking countries) is the immigration background (in German: Migrationshintergrund). This term was formally introduced in the Austrian "*Mikrozensus*" presented by the *Statistik Austria* in 2008 (Perchinig & Troger, 2011). Individuals with an immigrant background are people whose both parents are born abroad. This group can be divided into first-generation (people who were born abroad) and second-generation (children of immigrants who were born in Austria). These individuals can be further grouped into first-generation (people who were themselves born abroad) and second-generation (children of immigrants who were themselves born in Austria). Austria follows the "Recommendation for

the 2020 censuses of population and housing", authored by the United Nations Economic Commission for Europe (*Statistik Austria* 2022). Before 2008, citizenship was the main criterion used to classify immigrants to Austria (Perchinig & Troger, 2011).

The definition and statistical capturing of immigrants do not only vary between countries but also between institutions. Therefore, the exact number of the share of people with an IB cannot be ubiquitously stated. The municipality of Vienna uses different parameters to define people who immigrated to Austria, compared to the definition used by *Statistik Austria*. The municipality of Vienna in its reports uses four different parameters to characterize immigrants who came to Austria: Foreign citizenship, foreign country of birth, origin, and IB. While the first two parameters are self-explanatory, the latter two require further explanation. The term foreign origin is applied to individuals who have either foreign citizenship or are Austrian citizens who were born abroad. The definition of the IB used by the municipality of Vienna is identical to the definition utilized by *Statistik Austria*. Therefore, when providing immigrant share percentages for Vienna, it is important to clearly state which parameter and definition is utilized.

In 2022, 32.2% of inhabitants in Vienna possessed foreign citizenship, 37.6% were born abroad and 42.6% had a foreign origin (Stadt Wien, 2022).

The analysis in this dissertation will exclusively use the *Mikrozensus* definition. In 2022[6], according to the *Mikrozensus* definition, approximately 49 % of the population had an IB.

This dissertation confronts the idea that Vienna is livable for everyone from a travel behavior and transportation planning perspective. Prior research has been done investigating the integration of people with an IB into society in Vienna through sociological and policy frameworks. Travel behavior, however, has been only analyzed in more strictly positivist, large-scale datasets analyzing travel mode shares and modal splits of immigrants. These

[6] The municipality of Vienna only provides the percentage of Vienna´s inhabitants for 2019, therefore the more recent statistics provided by Statistik Austria are used.

analyses do not fully account for the perceptions and motivations of immigrants using various transportation modes.

To achieve a holistic picture of all factors possibly influencing the travel behavior of immigrants, qualitative research is urgently needed. When considering transportation modes, the discourse in a European context can be seen as more diverse and less car oriented. In Vienna (in 2021), walking was the most popular means of transport with a modal share of 35%, followed by public transportation and driving (both 27%) and cycling (9%) (Wiener Linien, 2021) (Figure 2.1). In comparison to 2019, which was pre-Covid times, the share of public transit usage has decreased by 8%, whereas the modal share of cars has increased decreased by 1%. The share of bicycle usage has increased by 2%, Interestingly, the COVID crisis did not seem to have an accelerating effect on car use in Vienna, at least not short-term (Wiener Linien, 2021)

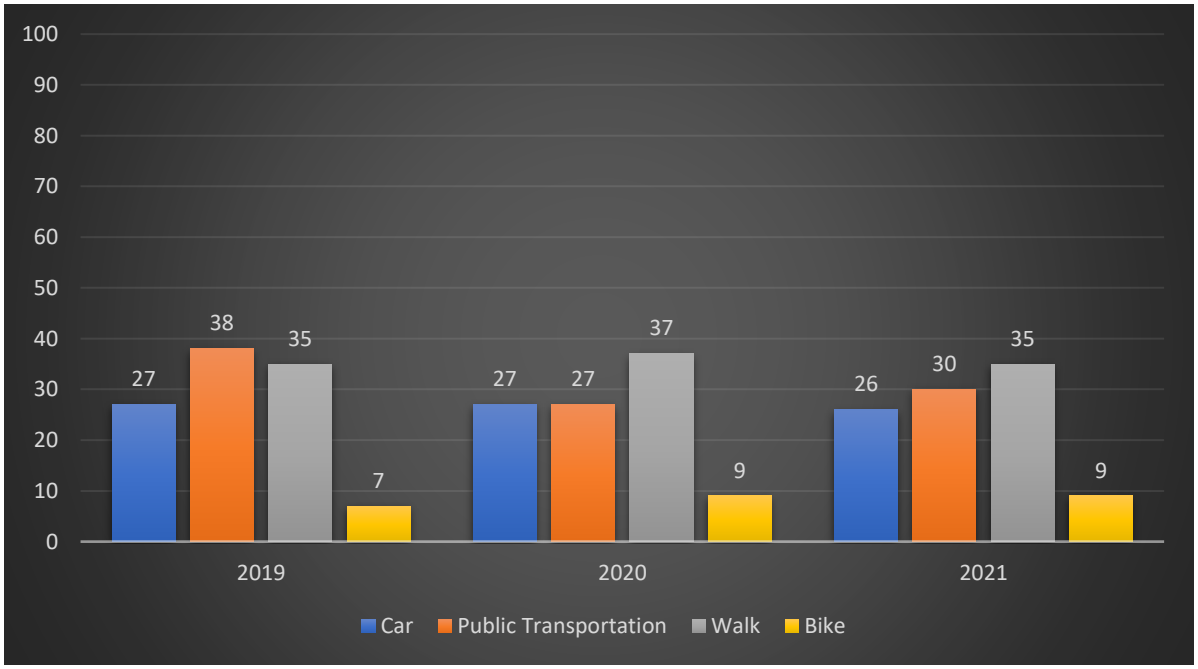

FIGURE 2.1 MODAL SPLIT IN VIENNA 2019- 2021

Source: Own illustration based on data provided by Wiener Linien, 2021

All four modes for the year 2021 show a slight rebounding effect from 2020, albeit not reaching the mode share levels of 2019 regarding Car and Public Transit usage. Bike usage has interestingly reached 2019 levels after a slight increase during 2020, whereas walk levels stayed consistent since 2020.

2.2. Study Area: Vienna, Austria

Vienna consists of 23 districts, with the 1st district being the city's old town and commercial center.

As Table 2.1 displays, the districts vary in population size and area, the smallest being the 8th District (Josefstadt) with a size of 0.81 mi2 (2.09) and the largest being the 22nd District (Donaustadt) with a size of 39.49 mi2 (102.3 km²) (Stadt Wien, 2022). Similarly, the population of the districts displays large variation, from the 1st district with around 16,000 residents to the district (10th) with about 207,000 residents. The car ownership rate in Vienna in 2021 is 370370 per 1000 inhabitants, making it the state in Austria with the lowest car ownership rate[7] (Figure 2.3) (*Statistik Austria*, 2022).

The largest immigrant group with an IB in Vienna are Serbians, with a population of 101,577, followed by immigrants from Turkey/Turkish (76,025) and Germany/Germans (64,025) (Stadt Wien, 2022).

[7] The average car- ownership rate in Austria is 572 per 1000 inhabitants.

TABLE 2. 1 POPULATION AND AREA INFORMATION FOR VIENNA'S 23 DISTRICTS

District	Population	Population Share in %	Area Size in square kilometers	Area Size in square miles
1	16,047	0.8%	2.869	1.11
2	105,848	5.5%	19.24	7.43
3	91,680	4.8%	7.403	2.86
4	33,212	1.7%	1.776	0.69
5	55,123	2.9%	2.012	0.78
6	31,651	1.7%	1.455	0.56
7	31,961	1.7%	1.608	0.62
8	25,021	1.3%	2.09	0.81
9	41,884	2.2%	2.979	1.15
10	207,193	10.8%	31.82	12.29
11	104,434	5.5%	23.26	8.98
12	97,078	5.1%	8.103	3.13
13	54,040	2.8%	37.71	14.56
14	93,634	4.9%	33.76	13.03
15	76,813	4.0%	3.92	1.51
16	103,117	5.4%	8.67	3.35
17	57,027	3.0%	11.40	4.40
18	51,497	2.7%	6.35	2.45
19	73,901	3.9%	24.94	9.63
20	86,368	4.5%	5.71	2.20
21	167,968	8.8%	44.44	17.16
22	195,230	10.2%	102.30	39.50
23	110,464	5.8%	32.06	12.38
Total	1,911,191	100%	414.87	160.18

Source: Integrations und Diversitätsmonitor, Own Illustration based on Data provided by Stadt Wien, 2020,2022

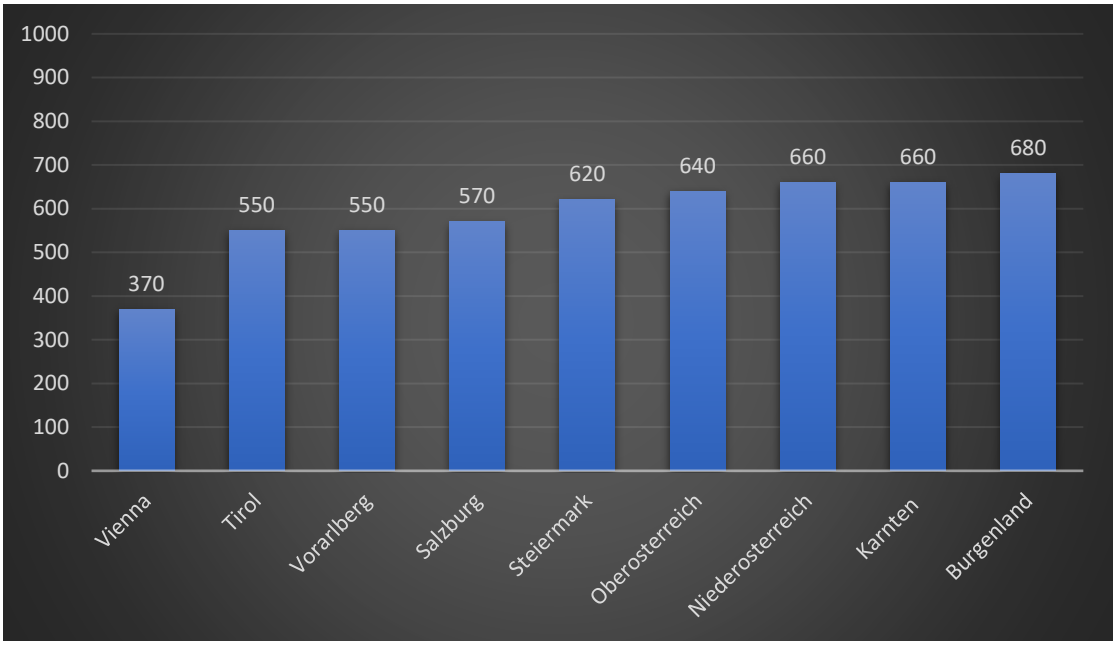

FIGURE 2.2 CAR-OWNERSHIP RATES IN AUSTRIA 2022

Source: Own illustration based on Statista Austria, 2022

2.3 Demographic and Socio-economic Overview of Vienna, Austria

The following sub-chapter provides an overview of various demographic and socio-economic indicators of individuals with and without an IB in Vienna.

Data for this analysis was obtained from the "*Integrations und Diversitätsmonitor"*, which is a report completed by the city government of Vienna providing a comprehensive overview of education, employment, and economic statistics across immigrant and non-immigrant groups (Stadt Wien, 2020). The following paragraphs will utilize the data from this report for analysis. In this report, immigrants are divided into the following groups: Immigrants from European Union (EU) countries which joined the EU before 2003 ("Old EU countries"); immigrants from European Union countries which joined the EU in 2004 ("New EU countries") and immigrants from non-EU countries. Using this report's definitions, in 2020, 58.7% of Vienna´s population was classified as people without a foreign origin, 11.4% with a

foreign origin from "New EU countries", 5.7 % from "Old EU countries" and 24.4% from non-EU countries, which can be further divided into people with a foreign origin from geographically European but institutionally non-EU countries (14.4%) and non-European non-EU countries (9.9 %)

The duration of stay and the time of arrival of immigrants in Austria varies between immigrant groups. They represent certain specific periods of arrivals of immigration, which happened due to economic, political, and social tensions and crises in other countries in Europe and globally. While immigrants often share certain characteristics in the host country (in this case Austria), they come from vastly different social, cultural, and economic backgrounds. Often, immigrants, especially from lower-income countries are overqualified for the jobs that they are holding in Austria (Krause & Liebig, 2011). The following sub-chapter delivers an overview of various socio-economic, demographic, and land-use characteristics regarding immigrants and non-immigrants[8]. These aspects shall not be viewed singularly in a vacuum, but rather interdependently.

Figure 2.4 and Figure 2.5 provide detailed account of the distribution of individuals wih foreign citizenships across the 23 districts in Vienna. There are four districts (5th, 10th, 15th and 20th), in which the population of individuals with a foreign citizenship is higher than 50% of the toral population in those districts. Figure 2.5 shows the origin of these individuals. The four districts with the highest share of population holding foreign citizenship are also the districts with high shares of individuals with a foreign citizenship from Turkey or former Yugoslavia.

[8] Here, the term immigrants are used instead of IB, because the historical analysis in 2.3 investigates the history of immigration since WW2 and therefore a long time before the term IB was established in 2005.

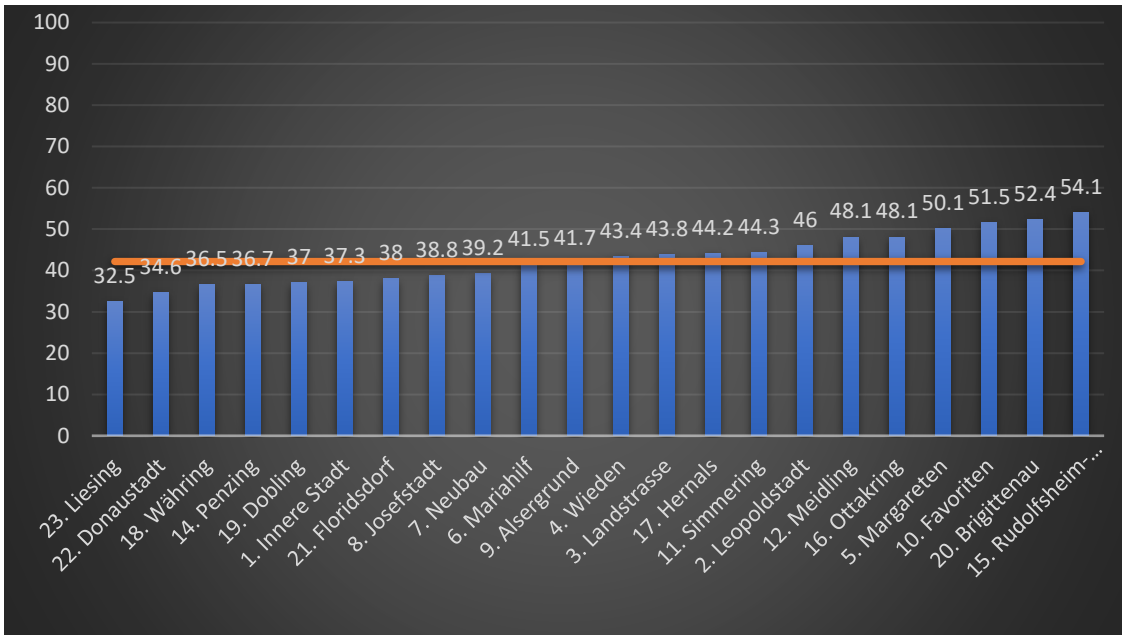

FIGURE 2.3 SHARE OF THE POPULATION WITH "FOREIGN CITIZENSHIP IN VIENNA´S 23 DISTRICTS IN 2022

Source: Own Illustration based on Data provided by the Integritäts and Diversitätsmonitor, 2020

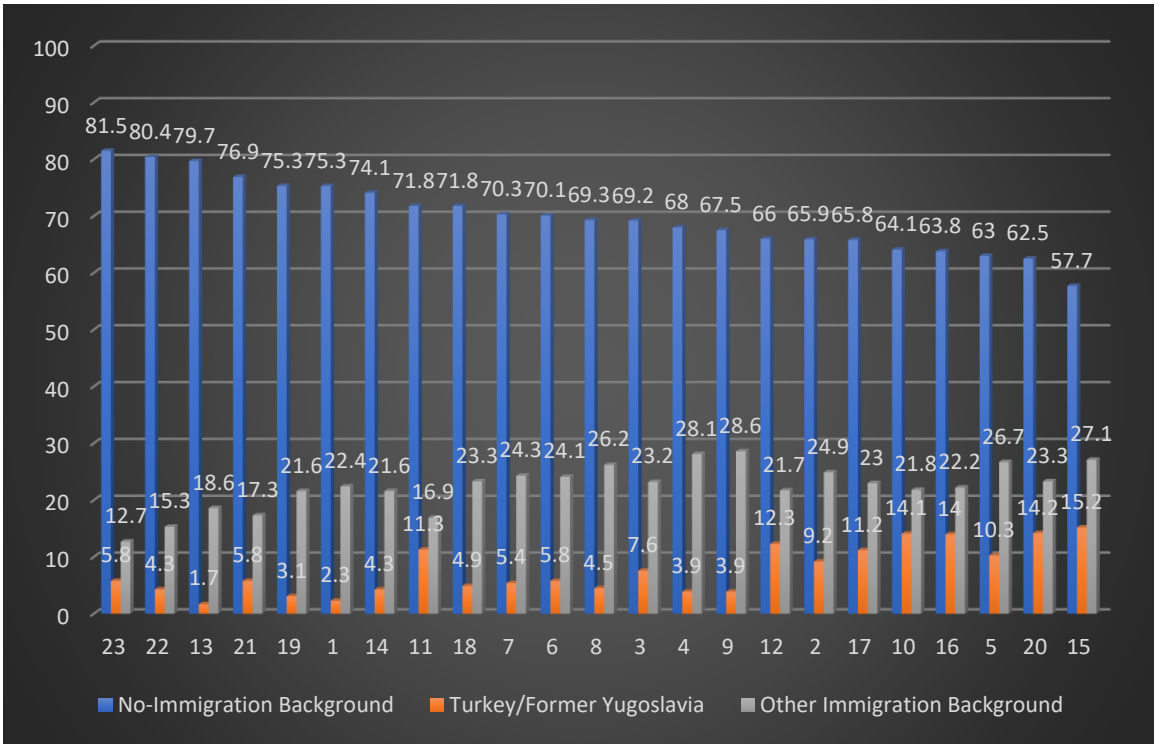

FIGURE 2.4 DETAILED DESCRIPTION OF IMMIGRANT POPULATION SHARE BY CITIZENSHIP IN VIENNA'S 23 DISTRICTS

Source: Own Illustration based on Data provided by the Integritäts and Diversitätsmonitor, 2020

Austria only allows dual citizenship in rare circumstances (*Statistik Austria*, 2022). The definition of immigrants in Austria (and other parts of Europe) is thus more nuanced than the binary concept of being born in the US (native-born) and not born in the US (immigrant). The percentage of the population with an IB in Vienna has seen an immense increase over the last decade. In 2002, 27% of Vienna's population had an IB, whereas almost 20 years later, the percentage increased to approximately 49 (*Statistik Austria*, 20222). Not only quantitatively, but also the countries of origin of the population with an IB have changed considerably.

In 2002, Ex- Yugoslavian and Turkish immigrants dominated the countries of origin of immigrants. These two countries were the origin of large-scale immigration beginning in the early 1960s and extending into late 1980, in which so-called "Gastarbeiter" (guest-workers), namely workers with various skill-levels were recruited from these two geographic areas. It was expected that those guest workers would only stay and work in Austria for a limited number of months or years and then would return to their countries of origin. (Faßmann et al., 1997). In reality, many of those workers stayed in Austria and settled there (with their families). Thus, the expectations and the long-lasting labeling of these immigrants as guest workers, in many years to follow, led to policy and society treating these immigrants as a peripheral group not belonging to Austrian society. Only at the beginning of the 2000s did politics slowly start to generally accept that these guest workers did not return to their respective countries of origin (Faßmann & Münz, 1995).

However, this process has been troubling and filled with resistance from various parts of society. Unlike in the US or Canada, there is no long-term societal self-conception of being an immigrant country in Austria (Faßmann & Münz, 1995). Immigration is therefore occasionally viewed by some with a certain discomfort and suspicion (Stecker & Debus, 2019). Due to the high number of inhabitants who are not Austrian citizens, around 31% of Vienna's population were not eligible to vote in federal elections in 2019 (Stadt Wien, 2020). In local elections, non-Austrian citizens holding an EU passport are allowed to vote.

2.4 History of Immigration in Vienna

This part will present an overview of the demographic statistics of immigrants and non-immigrants in Vienna.

Immigration, especially when occurring in high numbers, affects the demographic composition of a city or country. Demographic change is not only an abstract statistical concept but rather a stringent change of force that affects various thematic issues and challenges in urban planning. As Hatz (2008) states, demographic changes and shifts cannot be discussed separately from socio-spatial and economic processes in cities. In Vienna, demographic changes, together with social and ethnic factors have significantly shaped socio-spatial patterns (Hatz 2008).

Arrivals of immigrants and consequently, demographic shifts are typically connected to specific, large-scale political, social, and economical events both abroad and domestically, which trigger migration out of countries. Vienna has been a common destination for immigrants from various countries. Historically Vienna´s proximity (around 70 km (44 miles)) to the former iron curtain has made it an accessible prioritized destination for immigrants from Eastern European Countries. Major events, which has sparked immigration into Austria, and particularly Vienna, have been reflected through periods of remarkably high employment as of 1961, the 1973 oil crisis, the fall of the iron curtain in 1989, and the Yugoslav wars starting in 1991. As Hatz (2008) mentions, there were five distinct phases of extensive immigration into Vienna since the second world war:

The first phase (1961-1973) is characterized by so-called" guest-worker" immigrants, due to a strong Austrian economy with a high number of jobs and the wish to compensate for the low birth rates. These immigrants were recruited at all skill levels from mainly (then) Yugoslavia and Turkey. The Oil Crisis in 1973 led to a stop in the recruitment of "guest-worker" immigrants due to the economic recession. However, many "guest-worker" immigrants brought their families to Austria to join them during that time. Following approximately 15 years of demographic growth stagnation at a low level, the fall of the iron curtain and the Yugoslav wars and accordingly high rates of immigration led to positive demographic growth, albeit not enough to fully compensate for the city's low birth rate. The enlargement of the European Union in 2004, in which pre-dominantly eastern and south-eastern countries joined the EU has led to another increase of immigrants from those

countries, which continues until today. Following wars in Afghanistan and Syria, refugees from these countries have immigrated to Austria/Vienna as of 2015. 2015 marked a year of large numbers of refugees and immigrants from Syria, Afghanistan, and Iraq who have moved toward many Central and European countries. Consequently, immigration into Vienna did and does not take a linear and constant form but is dependent on interior and exterior triggers.

In this – and most other- reports, immigrants are not analyzed as a holistic and homogenous group, but rather divided into several types and classifications. The most common way to create a classification of immigrant groups is by their country of origin or some cultural trait they share. In this figure, immigrants were grouped into four groups: European Union immigrants, immigrants from Ex-Yugoslavia, Turkey, and other non-EU Countries. Immigration from EU countries has seen a steady linear increase since 2002, which can be attributed to the liberalization of the labor market in the European Union and to the 2004 enlargement of the European Union through the addition of eastern and southeast-European countries. Interestingly, the population trends of the two immigrant groups, which both can be historically categorized as the "Guest-Worker" immigrant groups (Turkey and Ex-Yugoslavia), have decreased respectively and stagnated.

These trends can be explained through the strong increase in immigration from the European Union, and therefore a percent drop could be seen in the immigrant share percentage of immigrants from Turkey and Ex-Yugoslavia (Figure 2.6). 2015 marked the year when the share of immigrants from Ex-Yugoslavia surpassed the percentage of immigrants from Turkey. This statistical turnaround could be explained by the increased tendency of Turkish immigrants to return to Turkey and the decreased migration from Turkey during that period due to increased economic opportunities in Turkey. It can be said therefore, that immigration in Austria is not dominated by "guest-worker" countries, but rather dominated by immigrants from European Union countries. European Union countries in this chart include both "old" and "new" European Union members, covering a wide range of economic, social, and cultural varieties.

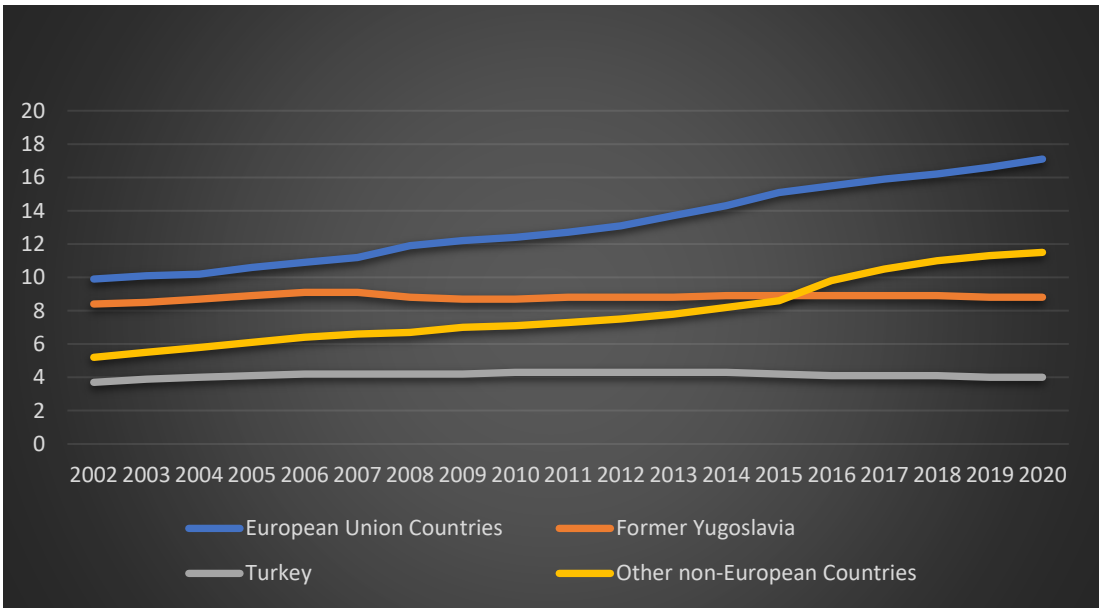

Figure 2.5 Population Shares Of People With "Migration-Background" From 2002-2020 In %

Source: Own Illustration based on Data provided by the Integritäts and Diversitätsmonitor, 2020

Chapter 3

Literature Review

This section provides a review of the research conducted about the travel behavior of immigrants in North America and Europe. This scholarly subfield has been more extensively explored in North America, albeit a recent increase in scholarly interest in Europe for this topic. This section gives an overview of the currently existing literature in each area and concludes with a comparison of the literature on both sides of the Atlantic and a brief discussion about the comparability of scholarly research in North America and Europe.

There are several reasons why it is important to study various population groups' travel behavior, specifically ethnic minorities, and immigrant groups. Understanding anyone's travel behavior can inform about the conditions and constraints under which someone lives their daily lives (M.J. Smart, 2010; M. J. Smart, 2011). Therefore, travel behavior does not constitute an isolated process that can be singularly analyzed but rather a process embedded in social, economic, cultural, and environmental structures. The purpose of traveling is rarely transport by itself, but instead traveling to reach a destination and perform certain activities (Charypar, 2008). Traveling, then, becomes the medium that people use to manage their lives and fulfill their needs and goals. The literature search was conducted through various channels. First, websites such as Google and Google Scholar were used, and additionally academic databases, mainly Scopus Web of Sciences were searched. Further, online libraries and databases of various North American and European Universities were searched to gain access to dissertations in the field of immigrants' travel behavior. Dissertations proved to be valuable resources for literature and also suitable for using a snowballing technique. The search terms included "immigrants' travel behavior". "immigrants 'travel", and "immigrants' travel modes". mode choice", "immigrants' public transportation", "immigrants' car", "Einwanderer Verkehrsverhalten", "Immigranten Verkehrsverhalten", "Zuwanderer Verkehrsverhalten", "Migrationshintergrund Verkehrsverhalten", and "Migrationshintergrund Öffentlicher Verkehr".

3.1. United States

An immigrant in the US statistical realm is a person born outside the US. Immigrants' travel behavior in the US and other English-speaking countries such as Canada, the UK, and Australia is usually investigated under the lens of race and ethnicity, which fundamentally differs from the approach in continental European scholarly discussions regarding immigrants. In continental Europe, specifically in the German-speaking countries, race and ethnicity are not prevalent as a concept of analyzing immigrants' travel behavior. Instead, German-speaking countries use “Migrationshintergrund” (Immigration-Background) to define immigrants and analyze conceptual differences between them. The concept of immigration-background combines the place of birth and origin of parents but does not include any race or ethnicity categorizations. Diversity in society in the US is often defined through race and ethnicity (Welsch, 2014). The conceptualization of race in travel behavior analysis however has been limited to its descriptive role in travel behavior (Barajas, 2021).

Race as a causal factor of travel behavior has not been established as an explanatory factor for travel behavior. As Barajas (2021) strongly asserts, race often serves as an indirect determinant of travel behavior in combination with socio-economic variables such as income or the social and built environment. Travel behavior analysis rarely includes racial identity and racism as intersecting with socioeconomic and land-use characteristics (Barajas, 2021, Chowdhury & van Wee, 2020). As Barajas (2021, pp. 21) states: "*First, it is important to account for race not just as a control variable in transportation models, but to center it in analysis to appropriately account for its effects on travel behavior. This includes incorporating information about racial identity in any models that are used to support planning and policy efforts. It also includes identifying how race information is specified. The way we measure and interpret race can change how we fundamentally understand the relationships between measurement and outcome*." Travel behavior analysis should include racial identity systematically and institutionally rather than treating racial identity as an optional variable that is not inherently used in the analysis (Barajas, 2021) Within the realm of scholarship interested in the urban and environmental realm, the term environmental racism is probably one of the most established terms which cover the intersection of environmental issues and marginalized groups (Pulido, 1996). Additionally, in the realm of urban studies, studies analyzing Detroit demonstrate how institutional racism through spatial mechanisms has played a large role in the economic and physical decline of the city (Sugrue,

2005; Thomas, 2013). Barajas (2021) calls for a systematic inclusion of racial identity in travel behavior studies, which would come closer to understanding how racial identity is constructed in travel behavior analysis.

An essential rationale for investigating different population groups' travel behavior is the transforming demographic composition of urban areas in the US, Europe, and other parts of the world. For example, in today's largest metropolitan areas in the US, one can see a racially diverse demographic structure. Los Angeles (29%), Chicago (33%), and Phoenix (43%) show us that these cities are not predominantly white anymore, even though white still might constitute quantitatively the largest single racial group (United States Census Bureau, 2019); the foreign-born population in New York (37%), Houston (30%), Philadelphia (14%), Los Angeles (37%), Chicago (21%), and Phoenix (19.5%) can also give a clearer picture of the demographic impact of immigration (United States Census Bureau, 2019). Demographic trends estimate that about 47% of the population growth until 2050 will stem from immigrants arriving in the United States (Passel & Cohn, 2008).2008). By 2050, the U.S. population will grow by approximately 100 million if immigration consistently stays at current levels (Gest et al., 2021).

From a spatial perspective, one cannot understand immigration to be a specific phenomenon in exclusively historically major gateway cities like New York, Chicago, or Boston, which have had large immigrant populations for many decades (Chatman & Klein, 2009).

Cities such as Houston, Phoenix, Dallas, Atlanta, and Washington DC have also experienced large immigrant population growth, albeit still lower in absolute terms than the historically significant immigrant gateway cities (Chatman & Klein, 2009). As Blumenberg (2009) notes, most communities in the US experience immigration. Therefore, urban planning in general and transportation planning, in particular, shall substantially prepare for population growth without taking immigrants into account (Chatman & Klein, 2009).

On a micro-level, the analysis of immigrants' travel behavior can serve as a medium to understand several important issues and concepts, such as employment and the economy, job characteristics, and spatial mismatch (Chatman & Klein, 2009). For example, to prepare adequately for population growth, city governments must increasingly comprehend the dynamics of immigrants' jobs, commute patterns, and the job industries in which they are employed (Chatman & Klein, 2009). Additionally, immigrants' location choices and neighborhood characteristics shall not be unheeded (Chatman & Klein, 2009). The concepts

mentioned above are intrinsically related to travel behavior. Travel behavior research therefore must answer two crucial questions:

1. How much of the variation in the travel behavior of immigrants is related to and influenced by the location of their residence, job characteristics, commute patterns, and neighborhood characteristics?

2. What are the motivations, cultural factors, and emotions of immigrants and ethnic minorities behind their travel behavior? (A more detailed account of the second question will be given in the later stages of this dissertation).

Generally, the immigrants travel behavior research in the US has mainly focused on understanding the differences in mode choice between immigrants and non-immigrants. Mode choice is therefore the vastly dominant dependent variable used in the majority of scholarly work on immigrants' travel behavior.

Analyzing immigrants' and ethnic minorities' travel behavior can also dissolve the assumption that ethnic minorities and immigrants are homogeneous groups (Chatman, 2014; Smart, 2010; Welsch et al., 2018). They do not only differ between groups but also within each group. A systematic and detailed account of different ethnic minorities and immigrants' travel behavior can overcome the dualism of immigrant/non-immigrant or majority/minority and create a more diverse understanding of various immigrant groups and ethnic minorities' travel behavior. When immigrants are presented in a singular, not diverse form, policymakers and planners might introduce inadequate policies that do not address the needs of a particular immigrant community or neighborhood with a large ethnic minority. This can lead to severe implications for the community, affecting jobs and employment, and being detrimental to sustainable development. Research has not concentrated extensively on the non-work trip mode choices of immigrants (Chatman & Klein, 2009), also due to limited data. California has been the preferred location of analysis for many researchers studying the travel behavior of immigrants (Blumenberg, 2008; Fink & Taylor, 2010; Handy, 2009; Joh et al., 2008, Lovejoy & Handy, 2007, 2008; Shin, 2017)

Immigrants are less likely to use cars in the first 5-10 years in the US; however, this changes after about ten years, when immigrants' car usage increases and reaches similar levels to natives' car usage (Chatman & Klein, 2009; Hu, 2017; M. Smart, 2010; M. J. Smart, 2015; Tal & Handy, 2010; Valenzuela et al., 2005). Interestingly, Shafi et al. (2020) have found in Australia, that immigrants view all modes equally positively at the beginning of their stay,

but switched to driving cars over the years. This process is called transportation assimilation, which means that over time, immigrants' and minorities' travel behavior becomes similar to majorities' travel behavior (Smart, 2010). However, immigrants are more likely to carpool and ride bicycles than people born in the US (Blumenberg & Smart, 2010; Smart, 2010). Southeast Asian and European immigrants are more likely to ride bicycles than US-born (Smart, 2010). In contrast, immigrants from Central and South America have the highest share of carpooling (Liu & Painter, 2012). Immigrants ride public transit four times, bike 3.5 times, and walk twice as much as US-born (Smart, 2015).

As already mentioned, immigrants and ethnic minorities are heterogeneous groups. Therefore, it is also important to analyze specific groups. Many US studies focus on Latin immigrants (Liu & Painter, 2012; Lovejoy & Handy, 2008). Regardless of their duration of stay in the United States, Latinx immigrants tend to drive alone to work much less than people born in the US, which is not precisely the case for non-work travel (Chatman, 2014). Even though their car usage increases over time, it is still lower compared to people born in the US and compared to Asian immigrants (Blumenberg & Shiki, 2007). However, a sole dependency on public transit cannot be derived due to Latino immigrants' higher usage of carpooling or using their social networks to use someone else's cars (Handy, 2009).

An immigrant group/racial minority, which has not been studied as extensively, is Asian immigrants. Asian automobile usage reaches the US-born level much quicker than other immigrant groups, especially compared to Latino groups (Hu, 2017). The quicker assimilation might stem from the fact that Asians have the highest average income among all ethnic/racial groups and have more similar residential patterns (Hu, 2017). Additionally, Asian immigrants are less inclined to use public transit than Asians born in the United States (Hu,2017). However, compared to other immigrant groups and the overall population (given comparable household size and income level), Asian immigrants seem to be more likely to use public transit. This willingness to ride public transit might stem from a less socio-economically influenced and stigmatized view of public transit usage in many East Asian countries.

A term often appearing in immigrants' travel behavior studies is the immigrant (or immigration) effect. The immigrant effect describes the phenomenon that immigrants are less likely to drive than people born in the US even after controlling for demographic and spatial variables as accurately as possible. Therefore, the effect refers to the difference that these analyses cannot explain (Chatman, 2014). The immigrant effect also occurs concerning

cycling, but in the opposite direction (Smart, 2010). Lee et al. (2021) have found in a recent study that an immigrant effect is also present for bike-sharing and car-sharing programs, reflecting the higher likelihood of immigrants using these two modes more frequently.

There have been several attempts to find an explanation for the immigrant effect. One explanation for the immigrant effect could be that (recent) immigrants tend to live in ethnic enclaves, in which all the infrastructure needed for daily life is within walking distance and where social networks might be more robust, and therefore, other arrangements such as carpools are easier to organize (Liu & Painter, 2012; M.J. Smart, 2010; M. J. Smart, 2015). However, it can also apply to non-immigrants living in those neighborhoods, who adapt their travel behavior to their fellow residents (Smart, 2015). This behavior can also be seen with immigrants, who move to auto-oriented suburbs and adapt their lifestyle to the lifestyle of other residents in the neighborhood (Smart, 2015).

Therefore, the neighborhood effect might also explain immigrants' transportation assimilation, as immigrants might move away from ethnic enclaves (after several years) to a more car-dependent suburb (Blumenberg, 2009; Chatman, 2014). Smart (2015) sees a strong relationship between high rates of walking and bicycling and many immigrants in a neighborhood. Another attempt to explain the immigration effect is to use cultural factors as an explanatory variable. Immigrants might not feel comfortable driving and might not have been exposed to driving before coming to the US (Blumenberg, 2009). This might also explain lower car ownership levels for recent immigrants.

However, there is not enough evidence to support the claim that cultural factors play a role in transportation assimilation (particularly with cars) (Chatman and Klein, 2013). Although cultural factors alone are not likely to explain the immigration effect, they still might affect other travel-related factors such as e.g.residential location choices (Chatman, 2009). Romano et al. (2021) however have found, that especially Latino men in Dade County/Miami drive much more after they arrive in the US compared to what literature has shown with immigrant groups. They also conclude that after arriving in the US, immigrants' travel behavior is strongly influenced by their past travel behavior in their country of origin. Lastly, the fact that many immigrants cannot legally obtain a driver's license might explain lower automobile usage, especially in the first years after arrival in the US (Barajas, 2021; Blumenberg 2008, 2009; Chatman & Klein 2009, 2014; Handy et al. 2008). Furthermore, many states continue to restrict the possibility of obtaining a driver's license for undocumented immigrants, posing safety risks (Allen & Wang, 2020; Barajas, 2021).

3.2. Europe

Compared to the US literature on travel behavior, studies focusing on immigrants' travel behavior have been relatively scarce in Europe. However, there have been some efforts systematically analyze this issue in recent years.

In Germany and Austria, immigrants tend to use public transit more often than non-immigrants. Car ridership (as a driver) (and ownership) and bicycle usage is lower for immigrants than non-immigrants (Faßmann & Reeger, 2014; Kasper et al., 2007; Welsch et al., 2016,2018). While the lower car ridership and higher public transit usage align with results from the US, the same cannot be stated about bicycle usage (Faßmann & Reeger, 2014; Kasper et al., 2007; Welsch et al., 20142014). Similar patterns can be grasped in the Netherlands and Denmark, where overall cycling levels are much higher than in the US. Specifically, non-western immigrants tend to cycle less than non-immigrants, which can be explained - besides other factors - through cultural factors (Haustein et al. 2020; Welsch, 2022). This contrasting pattern could stem from the much higher usage of bicycles in many European countries, especially countries like the Netherlands and Denmark. Furthermore, Faßmann and Reeger (2014) have ascribed cyclists in Austria as young males with higher

education, not immigrants. They have also shown, that mostly male immigrants tend to drive more and bicycle more than women in German-speaking countries.

In contrast, female immigrants tend to ride public transit more (Faßmann & Reeger, 2014; Kasper et al., 2007; Welsch et al., 2014)), which has been attributed to possible cultural factors, such as Turkish women making fewer trips than their German or Austrian counterparts (Faßmann & Reeger, 2014; Kasper et al., 2007; Welsch et al., 2014) Interestingly, when cars are available, it seems likely that both immigrants and non-immigrants will use them regularly; however, immigrants often do not have access to cars as much as non-immigrants (Welsch, 2014). Nevertheless, compared to other travel modes, the car is the most used travel mode, regardless of immigrant status (Faßmann & Reeger, 2014, Welsch,2014).

Interestingly and similarly to many US studies, Faßmann & Reeger (2014, p.29) explicitly mention the presence of an immigrant effect, which they call an "autonomous factor." After controlling for various demographic and socioeconomic variables, there still seems to be a difference in car use and public transit ridership (Faßmann & Reeger, 2014). The authors note that a more detailed qualitative study is needed to account for this "autonomous" factor.

Like their German and Austrian counterparts, Harms (2007) has found that immigrants tend to drive less frequently than non-immigrants in the Netherlands. However, there is one exception to this: Turkish immigrants. Turkish immigrants use the car even more than Dutch-born, which is primarily a result of 2nd generation Turkish women driving much more than their counterparts in the 1st generation (Harms, 2007). From a social perspective, the desire to own a car seems to decline with rising socio-economic status and seems to be also greater in families of non-Dutch origin (Kopnina & Williams, 2002).

Similarly, to what Smart (2010) postulated, an immigration effect can also be noticed concerning cycling in Denmark (Haustein et al., 2020). However, the immigrant effect in the Danish case is related to lower bicycle usage among immigrants compared to non-immigrants, which is unlike the US case, where this relation shows opposite effects. Additionally, there are some initiatives and programs in the Netherlands and Germany to encourage and incentivize female immigrants and refugees to cycle (Mohammadi, 2018; Van der Kloof, 2015).

3.3. A Comparative Perspective

In both the US and (Central Europe), immigrants use the car less on average than non-immigrants, even if there are some exceptions to this in the Netherlands. Immigrants also tend to use public transit more, both in the US and in Central Europe. However, immigrants using more public transit than non-immigrants have different effects in the two contexts because most non-immigrants do not use public transit in the US. In contrast, public transit in Germany attracts a broader range of society (Buehler & Pucher, 2012). Public transit is also much more widely available in central European countries, such as Germany, compared to the US (Buehler & Pucher, 2012).

Therefore, when comparing mode choices for immigrants in the US and Europe, it is essential to analyze the results and the impacts of these results on the overall transportation systems. Perhaps the most intriguing difference in travel behavior between immigrants in central Europe and the US can be seen in bicycle usage. While immigrants in the US are more likely to ride bicycles than US-born, this is not the case in Central Europe, where immigrants tend to bike less than non-immigrants. These results must also be scrutinized from a bicycling culture perspective rather than from an individual standpoint. For example, bicycling in central Europe is much more common for the general population, which is dominated by non-immigrants (especially if they are more educated and have higher incomes) than their US-American counterparts. Therefore, when studying 'immigrants' travel mode choices, it is essential to remember that they should be viewed in relative, not in absolute terms. The comparisons of immigrants' mode choice in Central Europe and the US demonstrate how immigrants' mode choice in each part of the world relates to non-immigrant mode choice but do not refer to absolute numbers e.g., of certain trips.

Additionally, certain concepts that use the same or similar terms in both contexts might not precisely convey the same meanings, such as the terms immigrant and immigrant background. For example, even within Europe, many countries have different definitions of who counts as an immigrant and who does not count as an immigrant. In most travel behavior studies in the United States, immigrants are being compared to people born in the US. Additionally, unlike in the US, most European countries do not statistically capture different races and ethnicities, but rather nationalities and citizenships. Therefore, when comparing immigrants' travel behavior between European countries and the United States, these

somewhat different definitions and group classifications must be considered. While in most European countries, the vast majority of the non-immigrants would be considered as “white” in US terminology, US non-immigrants, albeit also majority white, are more diverse regarding race and ethnicity. When analyzing immigrants' travel behavior, it is essential to understand the dimension in which immigrants' travel behavior is examined. Immigrants' travel behavior is commonly understood as the travel mode choice of immigrants compared to non-immigrants. However, this binary analytical category has significant shortcomings in heterogeneous and diverse societies, in which non-immigrants consist of different racial and ethnic groups.

The question arising here is: To which non-immigrants are immigrants being compared? Hu et al. (2021) are tackling this issue in their paper, in which they attempt to deconstruct the overall notion of comparing immigrants' travel behavior to white non-immigrants, as whites are the largest racial group in the US and instead focus on comparison across or within racial and ethnic groups. At this point, another potential analytical shortcoming becomes more apparent. In US literature and many statistical analyses, non-immigrants are people who were born in the US. This categorization is valuable and vital regarding integration into American society from a societal and policy perspective. The following paragraph gives an overview of the differences the immigrant travel behavior research on both sides of the Atlantic Ocean on a substantive and methodological level. However, several limitations have to be considered when comparing the travel behavior of immigrant research across the Atlantic.

First, there is a certain asymmetry when examining the number of studies that focus on immigrants' travel behavior, as the United States literature on this topic is much more extensive than the European literature on the same topic. This difference in quantity stems mainly from two factors. First, countries such as the United States and Canada have been destinations for immigrants since those countries have been founded. Therefore, the self-image of being a destination country for immigrants has been much more established compared to most European countries. Second, the historical negligence of accepting immigrants as a vital part of society (Faßmann & Münz, 1995). Due to this disregard, the interest in various aspects of immigrants in Europe has also been limited. Only in recent years, sociological and policy research has started to address and study immigrants' integration into society.

Despite all tension and issues of racism in the United States, the self-image of a "country of immigrants" finds much more recognition than in most European countries.

Second, the term non-immigrant can falsely give the impression of non-immigrants being a homogenous group consisting of mostly white people. This is not the case in many regions in the United States. Statistical categories can be overly simplified and misleading. Immigrants' travel behavior is commonly understood as the travel mode choice of immigrants compared to non-immigrants. However, this binary analytical category has significant shortcomings in heterogeneous and diverse societies, in which non-immigrants consist of different racial and ethnic groups. For example, according to the National Household Travel Survey (NHTS), a person born in the US to parents from country X would not be called an immigrant, whereas their cousin who came to the US one month after their birth abroad would be considered an immigrant. We, as researchers use the term immigrants as statistical categories, but these categorizations, albeit necessary for research, create an implied picture that gives only limited for nuanced analysis.

Third, when the travel behavior of immigrants as a whole in comparison to non-immigrants is analyzed, the demographic and racial/ethnic composition of immigrants in that particular country has to be analyzed. For example, the largest immigrant groups in Norway consist of eastern and northern Europeans, which are expected to have a similar travel behavior to non-immigrants in Norway. However, the largest immigrant group in Germany are people of Turkish origin, whose travel behavior deviates significantly from non-immigrants. At this moment, in large statistical analysis, the demographic composition of the major immigrant groups can strongly influence the statistical output. Therefore, it is also important and valuable to analyze specific immigrant groups rather than solely relying on the analysis of immigrants as one group.

3.4. Possible Explanations for Immigrants' Travel Behavior

For the US, Blumenberg (2009) listed five possible explanatory factors for the difference in travel behavior between immigrants and non-immigrants, which are not captured by individual and household characteristics in statistical analysis: Spatial Assimilation, Ethnic-Specific Resources, Ethnic Labour Market Niches, Culture, and Regulation. She states that these factors explain the "immigrant effect", which is a term that is often used in studies about immigrants' travel behavior, especially in the US. Even after controlling for

demographic and spatial variables as accurately as possible, immigrants are less likely to drive than people born in the US. Therefore, the effect refers to the difference that these analyses cannot explain (Chatman, 2014; Smart, 2010). The following section will analyze each aspect Blumenberg has proposed and discusses its comparability with immigrants' travel behavior in Vienna/Austria (Blumenberg, 2009).

3.4.1 Spatial Assimilation

Blumenberg states that many immigrants first settle in ethnic neighborhoods, where groups of people with similar origins represent a significantly higher share of the population than on average (Blumenberg 2009). Most of these neighborhoods are found in inner cities (Blumenberg, 2009). However, as immigrants' income increases, they tend to purchase more cars and move to more car-oriented/lower-density suburbs (Alba et al., 1999; Blumenberg, 2009).

3.4.2 Ethnic-Specific Resources

Many immigrants use transportation resources specific to the ethnic neighborhoods they are located (Blumenberg, 2009). One prominent example of this trend is carpooling, which can be found more extensively among residents in ethnic neighborhoods (Blumenberg & Smart, 2010. Social and family networks enable the exchange of resources and allow cars to be shared with household members and among residents (Blumenberg & Smart, 2010; Blumenberg, 2009).

3.4.3 Ethnic Labor Market Niches

Blumenberg presents this factor more suggestively, but it is still worth mentioning. Residents of ethnic neighborhoods might also work at similar locations (Blumenberg, 2009). Therefore, residents living in the same neighborhood and working at the same workplace locations can take advantage of specific transportation modes, such as carpooling (Blumenberg, 2009).

3.4.4 Culture

As Blumenberg (2009) notes, culture is a difficult concept to measure and define. However, she shares some assumptions about the influence of culture on the travel behavior of immigrants. For example, low car ridership levels can be attributed to the unfamiliarity of driving and minor or no car use in their home country. In general, cultural and other factors that influenced travel behavior in the previous residence could also affect travel behavior in the US. However, it is challenging to test for culture in statistical models due to the difficulty of defining and measuring culture and missing data on immigrants' travel behavior in their country of origin (Blumenberg, 2009). However, exposure to transit during adolescence is linked to a stronger tendency to use green transportation modes during adulthood (Smart & Klein, 2018).

3.4.5 Regulation

Different types of regulations can impact immigrants' life and, of course, their travel behavior. For example, many immigrants might not obtain a driver's license if they cannot provide specific documentation due to their immigrant status or other reasons (Blumenberg, 2009). As Allen & Wang (2020) show, almost 2/3 of undocumented Hispanic immigrants still drive despite not having a driver's license, which can reduce public traffic safety. Moreover, immigrants face different laws at separate government levels. Another factor that might lead to lower car usage by immigrants might be the fear of targeted policing and the removal of the driver's license (Chatman & Klein, 2013; Lovejoy & Handy, 2008).

3.5. Research Gaps and Limitations of Current Research

The literature review has outlined the overall dominance of quantitative analysis, based on large-scale datasets. They mostly focus on the travel mode usage of immigrants. Qualitative studies in the field of immigrant travel behavior are rather rare. Most scholarly studies from the United States use national or federal state datasets to analyze national trends. In the instances when specific regions are the focus of the studies, the studies concentrate on specific geographic and demographic units, mainly Latinx in California. However, in the

central European literature about immigrant travel behavior, the vast majority of the studies are geographically and analytically located on the national level. This study closes this gap by providing analysis at the city-level (Vienna). The sole focus on Vienna has the advantage of being able to meticulously understand city-specific phenomena without any statistical distortions from dissimilar geographic areas.

A limitation of the studies in all geographical areas is the lack of a standardized definition of what an immigrant is. Quantitative researchers are naturally constrained by formal definitions of immigrants provided by statistical agencies. The core issue to the issue of definition also lies in the fact, that immigrants themselves might possess varying ideas of what an immigrant is and if they perceive themselves as immigrants or not. People born in the US might not automatically perceive themselves as US-Americans and on the other hand, people not born in the US might not intuitively feel like immigrants. The US definition of immigrants is closely linked to citizenship, as US-born people automatically acquire US citizenship. In the self-conducted dataset of this dissertation, however, the self-ascribed IB of respondents will be used for descriptive and inferential analysis.

Finally, this dissertation attempts to close a theoretical gap as much as it aims to fill a contextual and analytical gap. Transportation Planning, and in particular travel behavior has historically not taken advantage of any classical urban theory, but rather borrowed from economics, psychology, sociology, and public health (Barajas, 2021). This dissertation, however, draws on an extensive ontological and epistemological account of immigrants' travel behavior. The main purpose of such an intensive and rather unusual attempt lies in the author´s scholarly urge to try to shift the theoretical understanding of transportation planning in general and travel behavior into a more humanistic, qualitative, and theoretical realm within urban planning.

Chapter 4

Theoretical Framework and Research Design

4.1. Theoretical Framework: Ontologies and Epistemologies of Travel Behavior

The first part of the project will introduce immigrants' travel behavior through statistical analysis. In contrast, the second part will examine immigrants' travel behavior through qualitative techniques, such as interviews and surveys. I do not view the two approaches in my study as contradictory or non-compatible. Certainly, these two large techniques rely on different ontologies, or in simpler terms, the structure of reality and being. Through an analysis of Popper´s three worlds and critical rationalism versus Schütz´s phenomenology, the following paragraphs will examine the different conceptions of being and what would be considered real. Ontological debates in Human Geography (and to a lesser extent in Urban Planning) have mostly focused on the object-subject theme, ascribing physical and material structures objective characteristics, and mental, and cognitive processes to subjects (Werlen, 2017). However, quantitative and qualitative studies use different ontological categorizations to understand object-subject dualism. Quantitative analysis is ontologically based on, what Popper calls, the *realism postulate* (Werlen, 1993). The *realism postulate* states that an objective reality exists independently of the subject and its perceptions (Sale et al., 2002). In quantitative and statistical analysis, data is treated as the independent, objective truth that one cannot influence or ascribe value to (Slevitch, 2011). Popper elegantly arrives at this conclusion through the employment of his three-world model (Werlen, 1993). The three worlds are:

1. World 1: The world of physical structures/states
2. World 2: The World of mental states
3. World 3: The World of objective ideas

Here it becomes clear that Popper turns away from an object-subject dualism in a cartesian sense. World 1 and World 2 are examples of object-subject dualism, in which World 1 represents objects and World 2 subjects. Popper, however, added a third world, the world of objective ideas. World 3 is a more complex structure compared to World 1 and World 2. World 3 can be described as the formulated and communicated results of World 2 processes. In simpler terms, the products of our thoughts and thinking can be specified as World 3 objects. Examples of World 3 objects can be institutions, theories, ideas, and arguments in an objective sense. The word *objective* is essential in this context, as World 3 objects are entirely objective and exist independently (Werlen, 1993). Both the physical world and the objective world exist as autonomous from the world of mental states, but at the same time, world 3 and World 1 are only connected through the world of mental states (Werlen, 1993). For example, in quantitative travel behavior studies, one can use statistical methods to analyze the effect of immigration status (being an immigrant or not) on mode choice. Before one is actively performing the regression analysis in our statistical software, one is engaging in typical World 2 processes. One is thinking about the problem we aim to analyze and the decision to analyze certain aspects and not analyze other aspects. After completing the regression analysis, the results appear.

When one interprets these results, one commonly attempts to relate them to specific theories and understanding frameworks. At that moment, in which one established a framework for understanding our statistical results, that knowledge becomes objective and independent of the user. Now, the physical object (world 1) in this example would be our regression output. One can print out our regression output and physically touch it and characterize it as a physical object. However, through thought processes, one can relate the physical object; in this case, a regression output, to related theories and ideas concerning this output.

Concludingly, Popper's three worlds can give us a more nuanced understanding of objective knowledge as compared to the dualist Cartesian dualism of object and subject (Werlen, 1993).

In contrast to quantitative studies, *qualitative* studies' ontological bases rest on the assumption that objective reality, if it exists, can only emerge through the construction of individuals. Ascriptions of meanings and thought processes always construct reality (Slevitch, 2011). This notion is closely related to phenomenologists, such as Schütz or Heidegger. In phenomenology, knowledge cannot exist without comprehending its *meaning* of it. According to phenomenologists, objective reality can only be understood through the

thought process of humans. Unlike quantitative studies' ontologies, qualitative studies are grounded on the principle that objects themselves cannot have any meaning in themselves; they can only carry meaning per our cognitive processes (Werlen, 2017). However, this does not result in a denial of what Popper would call World 3, but Schütz assumes that these worlds cannot be independently *meaningful* (Werlen, 1993). Phenomenology has had a problematic past in social sciences in the United States (Pula, 2022). As Pula (2022, pp. 511) states: "The phenomenological method is not deployed, as some social scientists and philosophical detractors erroneously assume, to reduce objects of the social world into artifacts of mental representation". This troubled past also not escaped Urban Planning (Whittemore, 2014). In Planning, a phenomenological approach would result in the context-dependent understanding and evaluation of planning processes dependent on the frame of references and what different meanings different objects in urban planning have to different people (Whittemore, 2014). Guided by the phenomenological approach, I will contextualize the meaning that survey respondents and interview partners ascribe to various aspects of (public) transportation in Vienna.

Reflecting on these assumptions on qualitative research, one can postulate that qualitative research operates with an ontological logic, which assumes no absolute or objective truth (Table 4.1). However, that truth is embedded in a socio-cultural context (Slevitch, 2011). In more precise terms, in qualitative research, what is real and what does not significantly depend on the subjects and their attached meaning to this reality. Therefore, in qualitative studies, researchers are interested in learning about the motives and reasons for certain beliefs or actions, rather than aiming for a general assumption about what is objectively true and real (Slevitch, 2011). For example, qualitative studies about immigrants' travel behavior would not assume that the travel behavior of immigrants can be expressed in data and numbers, but rather through understanding the reasons and motivations behind decisions on travel (or rather on how to travel).

Consequently, there will not be one reality of travel patterns, but somewhat different realities within immigrant groups. For example, statistically, migrant group X and migrant group Y might appear to have the same or similar patterns of using public transit over the car. The factors leading to these two immigrant groups' choices of how to travel might be significantly different. A person who employs quantitative research methods will be content with the objective reality, that the statistical output has produced. However, the qualitative researcher

does not believe that the statistical software's output has produced a reliable account of objectivity.

Epistemology is a field within the science philosophy that aims to understand questions of knowledge. Epistemology tries to find the answers to questions about truth (Friedmann et al.,1978). Epistemologies cannot be analyzed separately from ontologies, as ontologies set the framework for epistemologies. Therefore, to explain quantitative studies' epistemologies, I will build on the previous questions' ontological descriptions.

As mentioned, the first question examined the ontological framework employed by Karl Popper's critical rationalism and its applicability to quantitative research. While the first paragraphs have discussed what constitutes reality, the following paragraphs will tackle the concept of truth and how it relates to quantitative study. According to Popper, world 3 itself (the world of objective ideas) is the nearest one can ever be to the truth. Therefore, Popper aims for an objective truth without the inclusion of the subject (Werlen, 1993). However, how can this truth be validated? Critical rationalism (which was the philosophical stream Popper founded) states that knowledge can only be attained (and maintained) through constant falsification and hypothesis testing. Subsequently, a theory, postulate, or argument (all parts of world 3) has to be falsifiable (Werlen, 1993). Our knowledge and the products of our knowledge are, therefore, the results of constant falsification processes. In more quantitative terms, hypothesis testing is the reflection of the critical rationalist approach. One starts with the null hypothesis, and if the null hypothesis gets rejected, we continue our quest for the truth with the alternative hypothesis, which might well be refuted in the next step. For example, if one has a statistical sample with 4 different groups of immigrants from four different countries and one employs a theory that all immigrants from country X in the sample drive to work, one can falsify this claim by performing a statistical analysis to find out the mode that immigrants from country X chose to get to work. If our results suggest that one immigrant of group X does not drive to work, one can refute the theory. Popper sees this process as a vital factor in advancing science. This approach can only hold validity if one can make general assumptions from the theory.

For qualitative studies, it is essential to look at the phenomenological utilization of epistemologies. Unlike critical rationalists like Popper, phenomenologists such as Schütz or Husserl do not formally test a hypothesis to falsify statements. Instead, they characterize truth as related to specific contexts and meanings and, most importantly, subjects. Therefore, in qualitative research, the path to truth lies in the qualitative researcher's interpretation and

assessment of the groups' expressions and observations. Here, the researcher plays a vital role because the researcher must accurately convey the messages and meanings embedded in the realities that the researched groups have constructed (Slevitch, 2011). Werlen calls this process meaning-adequacy (Werlen, 1993). Therefore, qualitative research's epistemology is based on the belief that truth, therefore can be validated only through a specific agreement or consensus. The epistemology of qualitative studies can, therefore, be characterized as *subjectivist* (Slevitch, 2011)

TABLE 4.1 EPISTEMOLOGICAL AND ONTOLOGICAL FRAMEWORK

Type of Study	Quantitative Study	Qualitative Study
Ontology	There is only one objective reality, which is independent of the subject. The object has an independent meaning from the subject and is value-free.	Reality is always dependent on the context and the meaning ascribed by the subject. Reality cannot be value-free. Reality can therefore not exist without the subject. Objects themselves cannot have any meaning.
Epistemology	Knowledge can only be attained through constant falsification and hypothesis testing. Therefore, theories and arguments must be falsifiable. Truth can only be achieved through objective knowledge. One must be able to make accurate general assumptions from this knowledge.	Truth is always related to specific meanings, values, and contexts. There is no absolute truth that can be applied across different realms. There cannot be any general assumptions made with this kind of study. Rather, the meaning of the realities described must be understood.
Important Questions	How do the patterns of travel differ for immigrants versus non-immigrants?	What are the motivations of immigrants for using certain travel choices?
Methods used	Descriptive Statistics, significance tests, Binomial Regression	Interviews and Survey
Policy Implications	Planners and city officials need to know immigrants' perceptions of public transit	Understanding reasons for not choosing certain travel modes. These reasons can be racism,

Type of Study	Quantitative Study	Qualitative Study
	(contingent on available data). The mode choices of immigrants can be beneficial in understanding if any specific modes are being pre-dominantly used and if some modes are not being utilized at all.	discrimination, or other personal histories in the home or host country. Immigrants are not a uniform group. Even within migrant groups, there can be large socio-economic and other differences. This is important for city officials and planners to know to create more effective policies.

Source: Own Illustration

4.2. Research Design

As previously mentioned, this dissertation employs a mixed-methods research design. Table 4.1 has contrasted the ontological and epistemological assumptions that quantitative and qualitative research(ers) make. From an ontological and epistemological perspective, the two parts of this dissertation are compatible if one understands the quantitative section as post-positivist and the qualitative section as phenomenological. These two philosophies might seem incompatible with each other at first. However, at a second, more detailed glance, these two philosophies share more in common than one would assume, as Racher & Robinson, (2003, pp. 475) elegantly outline: "*Many of the assumptions that underpin a postpositive perspective, particularly as it has evolved, are similar to the philosophy of phenomenology in general and the stance of Merleau Ponty in particular. For example, reality exists before our consciousness and is perceived by our consciousness. Through embodiment, the world and consciousness are inseparable. Reality is only imperfectly apprehendable, and unobservable have the capacity of explaining the functioning of observable data. The researcher is not detached from the inquiry and indeed shapes the research process. The goal of research may be description, understanding, explanation, and/or prediction*."

Even though as mentioned, qualitative research cannot claim generalizability from their research, an *essence* in the phenomenological sense can create a "common understanding", which can be seen as compatible to post-positivist research (Racher & Robinson, 2003, pp.476). The term *essence* will be discussed in detail in chapter 8.

Two approaches are commonly used to analyze qualitative data: The deductive and the inductive approach. The deductive approach applies theory to the collected data and tests hypotheses that I formulated (Bingham & Witkovsky, 2022). In contrast, the inductive approach uses existing data that emerge from the actual research to create concepts, theories, and frameworks (Azungah, 2018). While the deductive approach is theory-driven, the inductive approach can be categorized as data-driven.

This qualitative research will rely on the inductive approach and use phenomenology as a theoretical, conceptual and mainly methodological framework to understand the data collected in the interviews. Phenomenology is not only considered a theory, but also a research methodology (Abales et al. 2016) It was founded as a countermovement to positivism (Giorgi, 2005). As Abales et al. (2016) highlight, from an ontological perspective,

phenomenology differs from positivism in that phenomenologists do not assume that an objective reality independent from the individual exists, but that rather reality is constructed by individuals and can vary among subjects.

Regarding their epistemology, positivist would argue that findings in research are (and exist) independent of the researcher and are not influenced in any way by the researcher. In contrast, the phenomenologist researcher would assert that research outputs result from an interactive process between the participants and the researcher (Abales et al. 2016).

In order to gain a better understanding of the phenomenological interview, it is essential to systematically comprehend the unique characteristics of interviews (Høffding & Martiny, 2016). As Hammersley and Atkins (2007, p..97) assert: "It is a distinctive feature of social research that the 'objects' studied are in fact 'subjects', in the sense that they have consciousness and agency. Moreover, unlike physical objects or animals, they produce accounts of themselves and their worlds."

Phenomenological researchers performing qualitative analysis work under the assumption that the focus of the analytical quest is to understand the meanings attached to certain phenomena and the daily experiences associated with certain phenomena, whereas quantitative positivist researchers work under the assumption that the analysis consists of an investigation of a causality or correlation between independent and dependent variables (Englander, 2012). The *essence* of any phenomenological research is the understanding that the relation between researcher and participant (interviewer-interviewee) moves away from a subject-subject relation to a subject-phenomena relation (Englander, 2012). Further, this author expands the previous quote from Hammersley and Atkins (2007) and asserts the importance of seeing the phenomena that the subject is experiencing as the first and foremost object of inquiry, not the subject itself. While this methodological conceptualization is commonly used in psychology research, I will combine the approaches presented by Hammersley and Atkins (2007) and the approach highlighted by Englander (2012), in that I will consider both the phenomena of the respondents and the respondents themselves. Especially regarding the experiences of individuals with an IB, I cannot exclude the identities that the subjects carry, even if they are independent or unrelated to the described phenomena at a first glance. Individuals with an IB often must endure many difficult and challenging situations before arriving at the respective country, in this case Austria. Therefore, in the interviews in this dissertation, subjects and their experiences will be the center of the analytical quest.

Phenomenology has been widely used as a theory and resulting as a method to perform interviews in qualitative research, due to this theory´s focus on the lived experience and the importance of meanings in daily experiences. However, there are different streams within phenomenology which can lead to differences in designing the qualitative research and performing interviews with respondents. This research partly follows the tradition of Edmund Husserl's notion of phenomenology, which emphasizes the importance of bracketing. Bracketing refers to researchers suspending their own beliefs, prejudices and pre-conceptions during the interview process and rather fully focus on the lived experience on the experience of the person interviewed (Englander, 2012).

While it is impossible to fully restrain oneself regarding own perceptions and ideas, it is important for the researcher not to let those beliefs and prejudices affect the interpretation of the respondents lived experience to an extent that the experiences get altered in their interpretation, which can only be achieved if researchers are aware of their attitudes and prejudices (Mapp, 2008). Bracketing is an important tool to ensure a certain level of validity in phenomenological research (Beck et al., 1994).

Bracketing is a form of reduction which ensures that the researcher considers present knowledge as non-influential to the active research process. This way, imposition of prior knowledge from the researcher on the participant can be prevented and therefore reduce the risk of altered or invalid responses from the participant. Essentially, this reduction has the goal to minimize error (Beck et al., 1994). This reduction, or bracketing, is also a strategy to ensure validity, and is closely related to what Husserl calls the *Epoché*. *Epoché* more specifically refers to the phenomenological attitude, which requires the researcher to take a critical attitude towards one´s own belief.

In addition to validity, reliability is another important concept that shall not be ignored in qualitative research. In phenomenological research, reliability is achieved (or at least attempted to achieve) through what Husserl calls the search for *essence* (Giorgi, 1988). The search for *essence* or invariant meanings constitutes is performed through what Husserl calls an imaginative variation (Husserl, 1970). Imaginative variation refers to a process in which the researcher attempts to vary the frame of references, the contexts and certain descriptive phenomena and then observes any potential change in the meanings attributed by the participant (Turley et al., 2016).

The invariant meaning is the ascribed meaning that stays constant and unchanged after changing the frame of reference or other descriptive characteristics of the phenomena. If the meanings attached to certain phenomena change after the change of those frame of references, the changes, phenomenological theory assumes that the change of the frame of references has caused a change in identity of the researchers (Giorgi, 1988). In contrast, the phenomenological approach developed by Heidegger however claimed that bracketing is simply an impossible task for human beings, as humans cannot act independent of their attitudes and predispositions (Wimpenny & Gass, 2000).

Semi-structured interviews have been selected as the most suitable tool for the interviews in this research, due to it being aligned with phenomenological principles (Lauterbach, 2018). They allow the respondents to answer questions in a more flexible manner since the researcher does not strictly follow a chronological order of questions, but rather uses questions as triggers to inspire the respondent to talk (Henriksen et al., 2022). The interviews must be seen as a part of a larger phenomenological research framework. Phenomenological research frameworks have been most extensively researched in the scientific field of psychology (Giorgi et al., 2003). While diving methodologically and conceptually deep into the ontological and epistemological implications of the phenomenological research practices would go well beyond the scope of this dissertation, I will draw from the phenomenological psychological method in the analysis of the interviews.

Chapter 5

Methodology, Research Questions and Descriptive Statistics

This chapter introduces the methodology, research questions and descriptive statistics for the two datasets that will be used in this dissertation. It will section will cover the quantitative part of the dissertation. The methodology and research questions pertaining to the qualitative section will be discussed in-detail in chapter 8. Methodology and the formulation of the research questions are closely knit to each other, as different types of research questions have to be answered through a different set of methodologies.

5.1. Methodology

For this dissertation, the 2019 *Statistik Austria Mikrozensus* was used. The "*Mikrozensus*" is a yearly survey conducted by *Statistik Austria*, the official statistical agency of the Republic of Austria. The survey's focus is to collect data on employment and housing in Austria. However, each year *Statistik Austria* conducts an "Extra-Module" in which a specific additional substantive content area is surveyed. In 2019, the additional module was called: '*Umweltbedingungen und Umweltverhalten"*, which translates to *environmental conditions and behavior*. This extra survey contained information about travel behavior and the perception of public transit. Each Quarter, around 22,500 households were interviewed. The participants were randomly drawn (and regionally stratified) through the ZMS ("Zentrales Melderegister"), in which every Austrian resident is registered into a centralized, online system.

The *Mikrozensus* is a rotating sample, in which every household stays in the sample for five quarters. In every Quarter, households which were surveyed for the fifth time, are being dropped from the survey, and approximately 4,500 households are being added to the sample in each Quarter.

While the first interviews are being conducted in-person, subsequent interviews (as of the second Quarter) are conducted mainly via telephone or online. Unlike the NHTS, this dataset is not primary a travel or traffic-related survey. Therefore, there are fewer travel-related variables available compared to the NHTS dataset.

Additionally, the dataset was modified regarding its geography. All respondents who do not live in Vienna were dropped from the sample, as the research focuses solely on Vienna. After this modification, the sample sizewas n=572. In the extra module mentioned above, two questions from the survey form the backbone of the statistical analysis of this dissertation. The first question is: How often do you use the following travel modes: Public transit (Train, Bus, Tram, Metro), Car (Driver), Car (as a passenger), Car Sharing (as a Driver), Motorcycle, Bicycle, Walking and other modes. Car Sharing here refers to individuals renting a car for hourly or daily purposes. Each respondent was asked to provide information about the frequency of their usage of the modes mentioned above. Respondents were offered the following frequency options: *Daily, Several Times a Week, Several Times a Month, Rarely, and Never.*

The second main question in the extra module survey was: Please rate your satisfaction regarding the following six aspects of Public transit: *Costs, Travel Time, Connection, Equipment, Headways, and Safety.* Respondents were offered to choose *Attractive and Not Attractive* as response options.

5.1.1 Research Questions and Hypotheses

The two questions outlined in the last paragraph above form the basis for the research questions for the statistical analysis of the *Mikrozensus* in this dissertation . NIBNIB

The following paragraph will provide a more detailed account of the research questions for the quantitative section of the dissertation.

1. What are the differences in travel mode choice between individuals with an IB and NIB individuals?

In my first research question, I would like to investigate the differences in mode choice in regard to ’individuals IB in Vienna. Fortunately, I am able to use the 2020 *Mikrozensus* data and therefore have a more updated dataset available. Faßmann & Reeger (2014) have found that even after controlling for all socio-economic, demographic, and geographical variables,

individuals with an IB still use cars less and public transportation more than NIB individuals in Vienna. However, it is essential to note that this census only asks about car usage frequency, not about car-ownership. Therefore, as Faßmann & Reeger (2014) state, people with an IBmight show similar patterns of car-ownership compared to people NIB, albeit a lesser usage of the car.

Based on the previous research and frameworks, I have developed the following hypothesis relating to my first research question:

1. *H1a:* Having an IB in Vienna is associated with lower regular car usage (as drivers) compared to not having an IB.
2. *H1b:* Individuals with an in Vienna are more likely ride public transit compared to individuals with NIB.
3. *H1c:* Individuals with an IB in Vienna are less likely to ride the bicycle compared to individuals with no NIB.
4. *H1d:* There is an "immigration effect" for cars usage, public transit usage and bicycling, which means that, even after controlling for various variables, there is a difference in travel mode usage between individuals who have an IB and people who do not have an IB.

To test these hypotheses, I will conduct a binary logistic regression. My dependent variable will be the regular usage (binary conceptualization) of different travel modes (car usage, public transit usage, walking, bicycling). Seven sub-categories describe the dependent variable (frequency): *Daily, several times a week, several times a month, relatively rarely, never, do not know, and no answer* (*Statistik Austria*, 2020). It is important to note, that respondents are not asked to state the most frequently used mode, but rather the frequency for each mode. I will group the variables *daily*, *several times a week* and *several times a month* into a new variable called regular usage (for the various transportation modes) and conduct a logistic regression in which I will analyze the likelihood of people with an IB using a particular travel mode compared to people NIB using the same mode. My independent variables will include various demographic, socio-economic, and spatial variables (age, gender, income, density).

There are several options to test the Hypothesis in logistic regression. First, if the p-value is $p<0.05$, it can be stated that an individualcoefficient is statistically significant (and therefore

not 0). Another statistic that can be interpreted rather straightforwardly is the z-statistic (Agresti, 2018).

Additionally, after the exponentiation of the coefficient, I get the odds-ratio. Suppose the odds-ratio of any variable is 1. In that case, one cannot reject the null Hypothesis (given statistical significance of the coefficients) because the two odds would be seen as equal, and therefore the variable is not sufficient for estimation. A more complex approach to assess a model´s fit would be the likelihood ratio test, which compares two models (one model with all variables and one model with only a few variables) and finds out which model would be a better fit. However, this approach usually is only used in nested models (Agresti, 2018).

1. How does having an IB influence the perceptions of public transit in Vienna?

   The perception of travel modes for people with an IB has not been studied extensively compared to immigrants´ travel mode choice. In the European context, these studies are almost non-existing. In the US, experiences rather than perceptions have been studied in some qualitative studies (Barajas et al., 2018; Fink & Taylor, 2010). Due to the scarce literature on immigrants' perceptions regarding public transit (and modes in general), I drew on general knowledge and literature from other fields to conduct the following hypotheses regarding immigrants' perception of public transit in Austria.

   H2: The perceptions of public transit differ among various population groups

In my hypothesis, I have stated that perceptions of public transit varies between people with and NIB. I am constructing my hypothesis on the assumption that for individuals with an IB, taking public transit is connected to more hurdles compared to individuals with NIB. For individuals with an IB, taking public transit means that they are in public space, and therefore subjected to various serious issues, such as discrimination or racism, this applies particularly individuals who e.g. wear hijabs (headscarves) or speak a language other than German on a bus or tram for individuals with NIB, taking public transit might be less associated with

burdens. Furthermore, as people with an IB tend to ride public transit more often than non-immigrants (Faßmann & Reeger, 2014), they might have different perceptions and notice things differently than individuals with NIB. Knowing their perceptions of public transit is not an end in itself but can rather provide us with possibly valuable information about the issues and challenges immigrants face in their daily lives. There must be qualitative research addressing these issues to get an even deeper and more thorough understanding.

5.2. Descriptive Statistics of the *Statistik Austria Mikrozensus* Survey

This section will discuss and highlight some descriptive characteristics of the dataset. The independent variables can be grouped into two large categories: Demographic/Socio-Economic variables and Spatial Development and Land Use variables. Figure 5.1 displays the composition and relationships of the different variables used in this dataset and more broadly in the quantitative analysis in this dissertation. The *immigrant effect* plays an important role in that it suggests a specific characteristic about travel of individuals with an IB that is not captured by conventionally used socio-economic and demographic variables.

5.2.1 Composition and Interdependencies of Predictor Variables

Demographic and socio-economic variables form the backbone of the analysis, as they have been traditionally established as the only truly independent predictor variables for travel behavior (Buehler, 2008). Spatial development variables and land- use variables as well as the perception of public transit all have interactions with each other and can greatly influence each other. I argue that spatial development patterns and the land-use of residential location for example can have an influence on the perceptions of public transit, as public transit in suburban areas tend to be traditionally less developed compared to inner city areas. Reversely, the perception of public transit can influence residential location choice, as a positive perception of Public transit might lead to residential self-selection of more transit oriented and walkable neighborhoods. Demographic and socio-economic variables can also influence the perceptions of Public transit, such as e.g. income, employment, or age.

This model obviously could be applied to general travel behavior analysis as well. However, the role of perceptions in this quantitative model will be attributed a greater weight than

commonly performed travel behavior analysis, as the perception of six different aspects of public transit will be included in the model. Additionally, the immigration b-Background unsurprisingly carries a much heavier importance in travel behavior analysis. This "immigrant effect" has been the center of scholarly discussion of immigrants travel behavior. In later stages of the qualitative analysis, the concept of perceptions will be greatly expanded and added on by motivations and cultural influences. These variables however are not available in the statistical dataset.

5.2.2 Demographic, Socio-Economic, and Spatial Composition of The *Mikrozensus*

Table 5.1 provides an overview of the socio-demographic composition of the *Statistik Austria* dataset. Weights were included in the analysis to account for any sampling imbalances in the dataset. 73.1% of the respondents in this sample are between 17-49 old, whereas 27% of the sample are older than 50 years. For income (net monthly Euros), four groups were divided by the author to enhance clarity: 0-1500 (Low Income), 1501-3000 (Lower Middle Income), 3000-4500 (Higher Middle Income) and 4501+ (Higher Income). Unfortunately, though, income was only collected for respondents, who were employed. Therefore, accounting for this limitation and for some low-response rates, only 223 respondents (n=572) were willing to disclose their income. 01- 300048.8 % of the dataset sample are men, whereas 51.2 % are women, which exactly matches the overall gender distribution in the population in Vienna.

As alluded to briefly in chapter 3, the self-conducted dataset differs from the *Mikrozensus* in that it uses a self-reported IB rather than using pre-defined conceptions of the IB provided by Statistics Austria. The added value of self-reported IBs lies in the accuracy of analyzing individuals who identify as people with an IB rather than analyzing individuals who might not feel as having an IB, even though statistical institutions ascribe them an IB.

Individuals without an self-ascribed IB constitute 63.6% of the sample. Therefore, 34.6% of the sample respondents consider themselves as individuals with an IB. This number is lower than the immigrant statistics of various statistical institutions and local and federal governments, which range between 41 and 49 percent, dependent on the definition of immigrants. People who hold university degrees are overrepresented in the sample (40.1%), as the percentage of the population in Vienna holding university degrees is only around 29%. The majority of the respondents are employees (69.8%). Around 70.1% of the respondents in

the sample were born in Austria, which is slightly higher compared to the people born in Austria in the overall population in Vienna (62.9%). Austrian Citizens in the sample (73.3%) are slightly overrepresented compared to Austrian Citizens in the overall population in Vienna (68.5%). Over half of the survey's respondents live in very dense neighborhoods with multi story housing. The mean size of the respondents residence is 82m^2, which is slightly higher compared to the average residence size of inhabitants in Vienna (75 m^2).

In summary, respondents in the *Statistik Austria* have higher incomes, are less diverse, have higher education and live in larger apartments and houses than in the self-conducted survey.

TABLE 5.1 SOCIO-DEMOGRAPHIC COMPOSITION OF THE MIKROZENSUS

Variables	Categories	Percentages
Age	17-35	26.92
	36-49	38.29
	50-59	26.40
	60+	8.39
Net Monthly Income in Euros	0-1999	26.01
	2000-5000	52.91
	5000+	21.08
		0.00
		0.00
Gender	Male	48.78
	Female	51.20
Population	No Immigration Background	63.59
	Turkish/Former Yugoslavian Immigration Background	14.50
	Other Immigration Background	21.90
Highest Educational Attainment	Middle/High School	19.23
	Vocational School	41.26
	University Degree	39.51
Occupation	Employed	91.05
	Student	4.74
	Retired	2.11
	Unemployed	2.11
Place of Birth	Austria	70.10
	Turkey/Ex-Yugoslavia	7.70
	Other Countries	22.10
Citizenship	Austria	73.32
	Turkey/Ex-Yugoslavia	6.66
	Other Countries	19.62
Residence Location Characteristics	Very Dense with Multi Story Housing	52.45
	Very Dense with Single Story Housing	2.62
	Less Dense with Multi Story Housing	26.92
	Mixed Use Commercial Residential	8.39
	Residential Area Single Duplex Housing	9.60
Size of Residence in m²	Mean Size of Residence	81.61
	Median Size of Residence	79.00

5.3. Socio-Economic Composition by Various Demographic Groups

Table 5.2 analyzes the three demographic groups examined in this study regarding their socio-economic standing. The demographic differences of the three groups were tested for significance (bold results indicate significance) with a chi^2 test of dependence for categorical dependent variables (Age, Income, Gender and Education) and a one-way ANOVA test for the size of residence. Individuals with a TFYIB in this sample are younger than individuals with OIBs and individual without any IB. The income distribution as well as the residential location characteristics of the three demographic groups does not offer any conclusive differences. The gender distribution, however, varies greatly between the groups. While the

gender distribution of people with NIBs and people with an OIB are somewhat evenly distributed in this sample, male with a TFYIB dominate that demographic groups sample.

Highest Educational Attainment and Size of Residence are the only variables that show significance. The percentage of respondents with middle–and vocational school degrees is much higher for TFYIBs, whereas the percentage of respondents with university degrees is almost twice as high for individuals NIB and other immigrant background holders compared to Turkish and Ex-Yugoslavian immigrants. The population group with the highest percentage of respondents with university degrees are other immigrant groups. Regarding employment, individuals with a TFYIB are overrepresented in the "worker" category compared to the other two demographic groups.

Individuals with a TFYIB in this sample on average live in smaller apartment sizes compared the other two population groups. The mean residence size of individuals with an OIB lie approximately between TFIYB individuals and NIB individuals´ residence size.

TABLE 5.2 SOCIO-ECONOMIC COMPOSITION OF THREE DEMOGRAPHIC GROUPS

Variables	Categories	Percentages
Age	17-35	26.92
	36-49	38.29
	50-59	26.40
	60+	8.39
Net Monthly Income in Euros	0-1999	26.01
	2000-5000	52.91
	5000+	21.08
		0.00
		0.00
Gender	Male	48.78
	Female	51.20
Population	No Immigration Background	63.59
	Turkish/Former Yugoslavian Immigration Background	14.50
	Other Immigration Background	21.90
Highest Educational Attainment	Middle/High School	19.23
	Vocational School	41.26
	University Degree	39.51

Occupation	Employed	91.05
	Student	4.74
	Retired	2.11
	Unemployed	2.11
Place of Birth	Austria	70.10
	Turkey/Ex-Yugoslavia	7.70
	Other Countries	22.10
Citizenship	Austria	73.32
	Turkey/Ex-Yugoslavia	6.66
	Other Countries	19.62
Residence Location Characteristics	Very Dense with Multi Story Housing	52.45
	Very Dense with Single Story Housing	2.62
	Less Dense with Multi Story Housing	26.92
	Mixed Use Commercial Residential	8.39
	Residential Area Single Duplex Housing	9.60
Size of Residence in m²	Mean Size of Residence	81.61
	Median Size of Residence	79.00

Source: Own illustration based on Statistik Austria, 2022

5.4 Mode Choice by Population Groups

In order to adequately answer the research question: *What are the differences in travel mode choice between individuals with an IB and individuals with NIB?*, descriptive statistics regarding the mode-choice by population groups will be presented.

Figure 5.1 presents regular mode usage of people NIB and people with an IB. Regular usage here refers to a usage of at least several times a week. The survey questions in the *Mikrozensus* do not specify what *several times* entail. Car-usage of individuals with an IB from Turkey/Ex-Yugoslavia is much higher than the car-usage of the other two population groups, whereas their public transit usage is considerably lower compared to the other groups. Walking levels for all groups high. Bike usage is lower for people with a TFYIB compared to the two other population groups. The differences in the percentages of mode choice usages between individuals with non-TFYIBs and individuals with no NIB is generally lower compared to differences between individuals with a Turkish/Former Yugoslavian IB and people without any IB albeit still existent, especially regarding car and public transit usage.

The differences in the between the three demographic groups regarding regular car usage (Pr = 0.041) , regular public transit usage (Pr = 0.042) and regular biking (Pr = 0.031) are significant at a P - value of <0.05, whereas the differences in regular walking are significant at a P- value of <0.1 (Pr=0.078) (Chi-Square Test).

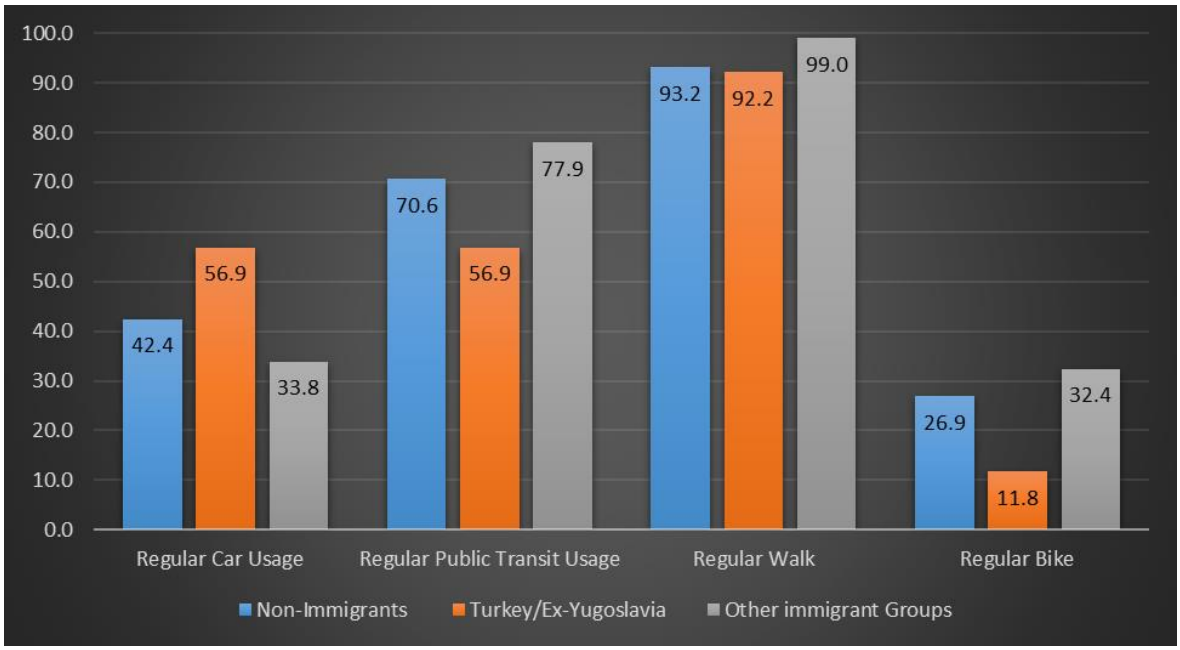

FIGURE 5.1 MODE SHARE USAGES (IN PERCENTAGES) OF THREE DEMOGRAPHIC GROUPS

Source: Own illustration based on Statistik Austria, 2022

5.4.1 Satisfaction (Perceptions) of public transit

In relation to the research question: *How do the perceptions of public transit differ between individuals with an IB and individuals NIB in Vienna*? the descriptive statistics regarding the satisfaction with public transit will be presented.

Satisfaction with Public transit are generally rather high for all six aspects of public transit (Figure 5.2) Costs, Travel Time, Equipment, Connectivity, Headways/Waiting Times and Safety. However, the satisfaction withdiinviduals with a Turkish or former Yugoslavian background are generally lower than for the other two groups. People with a TFYIB on average were the least satisfied with travel times and safety on public transit among the three population groups. Individuals with an OIB represent the most satisfied demographic group for five out of six aspects. For most aspects, the similarity between individuals NIB and individuals with an OIB is greater than between individuals with no NIB individuals with a TFYIB. The differences in the satisfaction with the travel time (Pr=0.048) and safety aspects (Pr = 0.016) of public transit between the three demographic groups are statistically significant at a P value <0.05 ((Chi-Square Test).

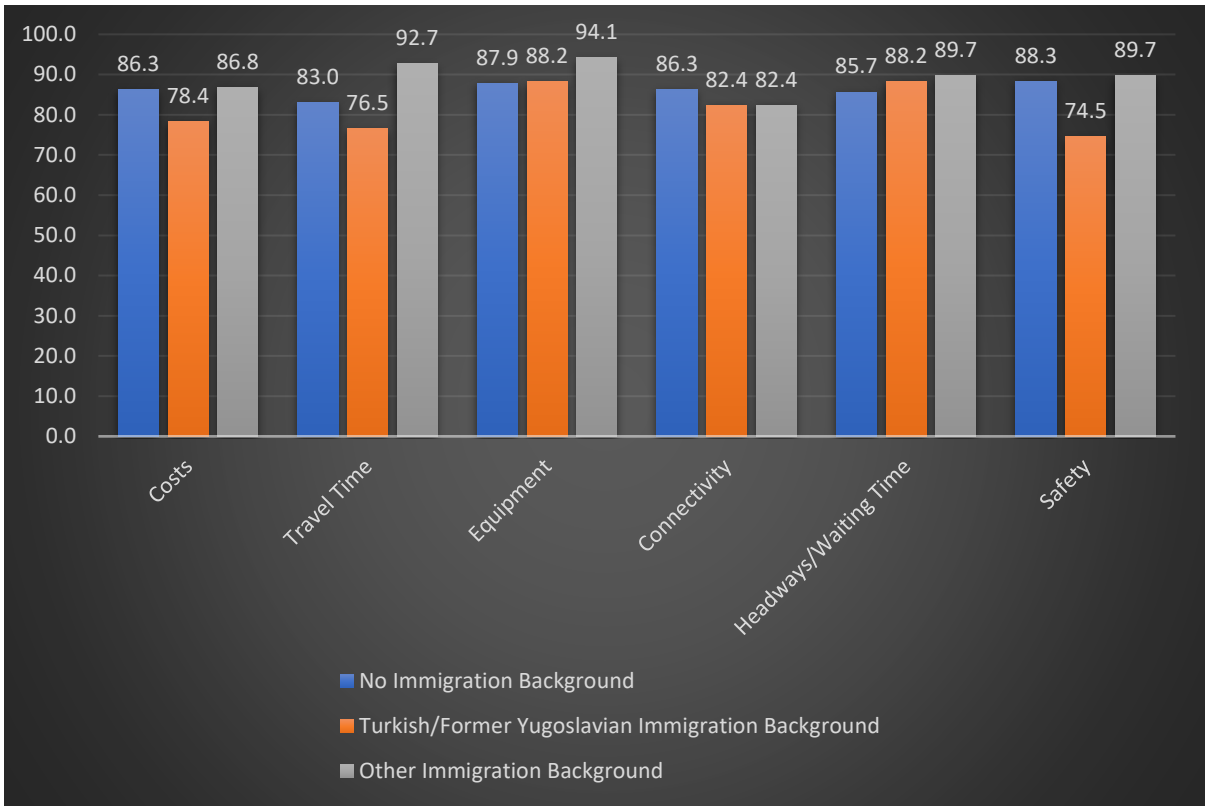

FIGURE 5.2 SATISFACTION WITH SIX ASPECTS OF PUBLIC TRANSIT

Source: Own illustration based on Statistik Austria, 2022

5.4. Descriptive Statistics of the Self-Conducted Dataset

5.5.1 Sampling Strategy

A self- conducted survey of residents of Vienna[9] over the age of 18, starting in October 2021 and lasting until November 2022 was conducted. My survey consists of 493 responses, of which roughly 75% were completely and 25% partially answered. The survey can be divided into two major parts. The first ten questions specifically ask about regular mode usage, perceptions of public transit and attached meanings to various modes. The remaining

[9] People who work in Vienna but reside in Niederösterreich or Burgenland were also included in the survey.

questions were contextually situated within a demographic and socio-economic realm, in which I attempted to gain an understanding of the overall socio-economic and demographic background of the respondent. Out of the 493 surveys collected, 447 were completed online and 46 were completed manually by hand. For those 46 responses, I inserted and coded the survey responses into the software STATA.

For the survey[10], the non-probability sampling method called snowball sampling was employed. Snowballing technique refers to a sampling strategy in which researchers recruit participants for the research, which then in turn recommend or recruit other potential participants for the research (Parker et al., 2020). This technique also bears the advantage that already recruited participants might have a more accurate understanding of which potential respondents might be a good fit (King & Horrocks, 2010; Yin, 2016). For the self-conducted survey convenience sampling was also used in some stages of the data collection. Convenience sampling is a non-probability sampling strategy where research participants are included based on certain criteria, such as easy accessibility or geographic proximity to the researcher (Etikan et al., 2016). However, convenience sampling only constitutes a complementary sampling strategy rather than the backbone of the recruitment process in the interviews. Convenience sampling strategies have to be used with great caution[11], as this sampling strategies tend to be biased (Mackey & Gass, 2005).

Participants were recruited through various channels. First, various sports clubs or immigrant community clubs in Vienna were tactedconducted viaemails with a formal request by me have the survey distributed through various online channels. Second, many student organizations of various universities in Vienna, such as the University of Vienna, University of Natural and Life Sciences in Vienna, Technical University Vienna University of Economics and Business were contacted through online channels and also through personal visits from me. The recruitment process through universities and their student organizations had the advantage of reaching large populations with a diverse population of individuals with and without IB. As my survey intends to include people with and without IB, institutions that had access to both population groups were specifically contacted. Third, personal social networks were used to recruit survey participants. This technique had the advantage that I

[10] And Interviews, which will be further discussed in Chapter 8

[11] Particularly for qualitative research

was able to reach population groups, which might not have responded to online recruitment materials.

5.5.2 Composition of The Self-Conducted Dataset

Table 5.3 offers a general view of the independent variables present in the conducted survey.

Around 70% of the respondents are under the age of 36, making it a very young sample in age. Only 6.6% of the respondents are above the age of 60. Given the young average age of respondents in the sample, it is not entirely surprising that more than half of the respondents have an average net monthly income of under 2000 Euros per month. Almost 30% of the respondents earn between 2000 and 4999 Euros per month. Approximately 20% of the respondents earned more than 5000 Euros per month.

Despite the overall young age of the respondents in the sample, only approximately 31% of the respondents indicated that they are students. Almost two thirds of the respondents are employed, whereas only about 2% are retired and almost 3% unemployed. Respondents who are self-employed or who work part-time are being included in the "*employed*" variable.

Around 54% of the respondents are females, whereas around 44% are males. 2% of respondents have indicated that they identify as non-binary. Around two thirds of the sample do not have an IB, whereas around 17% have an IB from Turkey or former Yugoslavia and another 17% from other countries 50.8% of respondents were born in Austria, while 49.2% were born in another country.

More than half of the respondents (51.8%) in the sample are university graduates (including undergraduate and graduate degrees), whereas roughly 37% are middle or high school graduates. Around 11% of the respondents have vocational degrees. Respondents in the survey were also asked if they have a car available to them on a regular basis in their household. Respondents who replied "yes" to this questions had a slight majority. Although only around 51% of the respondents have cars available to them on a regular basis, almost 80% of respondents have a driver's license.

Exactly half of the respondents live in the non-dense districts of the outer city, whereas around 13% of the respondents live in the denser areas of the outer city. Approximately 37% of respondents live in inner districts.

TABLE 5.3 DEMOGRAPHIC, SOCIO-ECONOMIC AND SPATIAL COMPOSITION OF THE DATASET

Variables	Categories	Percentages
Age	17-35	71.43
	36-49	14.88
	50-59	7.14
	60+	6.55
Net Monthly Income in Euros	0-1999	51.59
	2000-4999	28.7
	5000+	19.71
Gender	Male	43.78
	Female	54.32
	Non-Binary	1.89
Population	No Immigration Background	65.72
	Turkish/Former Yugoslavian Immigration Background	16.84
	Other Immigration Background	17.44
Highest Educational Attainment	Middle/High School	36.65
	Vocational School	11.52
	University Degree	51.83
Occupation	Employed	64.9
	Student	30.64
	Retired	1.67
	Unemployed	2.79
Availability of Car in Household	Yes	51.81
	No	48.19
Driver's License	Yes	79.5
	No	20.5
Place of Birth	Austria	50.79
	Foreign Country	49.21
Residence Location Characteristics	Inner City	36.62
	Outer City (Dense)	13.38
	Outer City	50

Source: Own illustration based on the self-conducted survey

5.5.3 Demographic, Socio-Economic, And Spatial Characteristics by Population Groups

This subchapter will analyze the differences in the variables in the self-conducted dataset across the three demographic groups used in this dissertation (Table 5.4).

The differences of age and income between the three population groups are not statistically significant, similarly to the analysis in the *Mikrozensus* dataset. While the distribution of age groups shows similar patterns across the three population groups, the income distribution slightly differs across the population groups. Lower incomes are more represented among people with IB compared to people without an IB. The differences in *Gender* are statistically significant. Females are the majority among individuals with NIB and individuals with an OIB whereas more than half of individuals with a TFYIB are males

The second statistically significant variable is *highest educational attainment*. More than two-thirds of individuals with individuals with an OIB are university graduates, whereas only 37% of their TFYIB counterparts have university degrees. Around half of the respondents who do not have an IB obtained university degrees. Individuals with a ,TFYIB however, are the largest population group with Middle/High School graduates. The occupation of respondents did not display any statistically significant differences among three demographic groups. The occupational characteristics does not vary much between the groups. In all population groups, the around two thirds of the respondents are employed and almost one third are students. Retired and unemployed respondents only constitute a small group in the sample. Two questions in the sample asked about car-related issues. The first question asked about the availability of a car in the household, while the second question asked respondents if they have a driver's license. Around 60% of people with NIB have a car in the household, whereas more than half of individuals with a TFYIB have a car available to them on a regular basis. Remarkably, only 30.5% of individuals with an OIB said that they have a car available to them. These difference in car availability showed statistical significance. Differences in the possession of a driver´s license did not show significant results. Between 75% and 80% of respondents in all population groups have drivers' licenses. The locational characteristics of the respondent's residences do not show any statistically significant differences. While more than half of the respondents NIB and individuals with a TFYIB live in outer cities, only 37% of individuals with OIBs live in outer cities.

TABLE 5.4 SOCIO-ECONOMIC COMPOSITION OF THREE DEMOGRAPHIC GROUPS (IBS)

Variables	Categories	Percentages of each population group		
		Non-Immigrants	Turkey/Ex-Yugoslavia	Other immigrant Groups
Age	17-35	72.38	67.11	73.42
	35-49	12.15	18.42	17.72
	50-59	7.18	9.21	5.06
	60+	8.29	5.26	3.80
Income	0-1999	46.49	63.29	51.85
	2000-5000	31.89	21.52	28.40
	5000+	21.62	15.19	19.75
Gender	**Male**	**44.55**	**54.88**	**31.40**
	Female	**53.96**	**43.90**	**65.12**
	Non-Binary	**1.49**	**1.22**	**3.49**
Highest Educational Attainment	**Middle/High School**	**37.09**	**49.40**	**23.26**
	Vocational School	**12.21**	**13.25**	**8.14**
	University Degree	**50.70**	**37.35**	**68.60**
Occupation	Employed	66.15	63.75	63.10
	Student	30.26	31.25	30.95
	Retired	1.03	2.50	2.38
	Unemployed	2.56	2.50	3.57
Availability of car in household	**Yes**	59.69	54.32	30.49
	No	40.31	45.68	69.51
Driver´License	Yes	81.44	76.54	78.05
	No	18.56	23.46	21.95
Residence Location Characteristics	Inner City	34.00	33.33	46.15
	Outer City (Dense)	11.33	14.49	16.92
	Outer City	54.67	52.17	36.92

Source: Own illustration based on the self-conducted survey

5.5.4 Mode Choice by population groups

Unlike the *Mikrozensus* dataset, trips in the self-conducted survey are divided into work-trips and non-work trips to provide a more differentiated and nuanced understanding of trips. Figure 5.3 displays regular mode usage for work trips among population groups. The design of the question allowed respondents to select more than one answer in the question, allowing me to account for multi-modality for individuals.

Overall, most respondents in the dataset ride public transit to work. Individuals with a self-reported TFYIB are the population group which has the highest percentage of people driving to work. Their counterparts, with a self-reported OIB however, are the population group which drives the least to work. In contrast, immigrants, who do not have a self-reported TFYIB use active transportation modes such as biking and walking much more compared to the other two population groups. Exactly 50% of respondents with an OIB either bike or walk to work, whereas only 25% of individuals with a TFYIB bike or walk to their workplace. Approximately 47% of individuals with NIB bike or walk to their workplace.

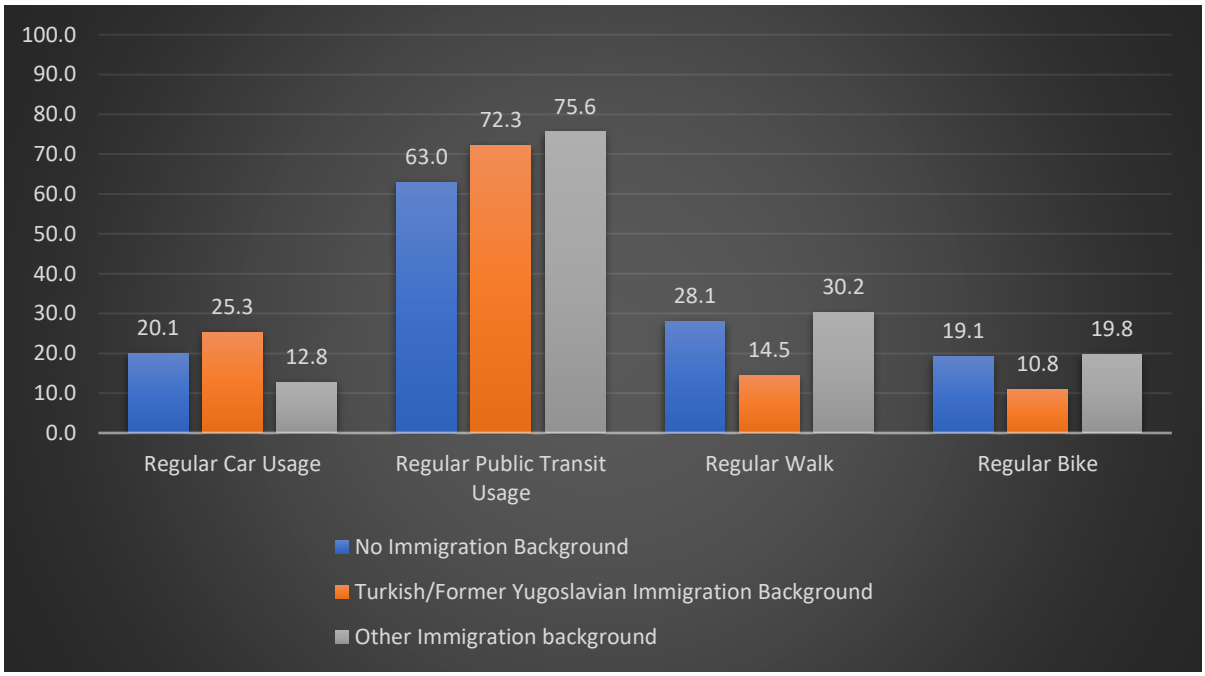

FIGURE 5.3 REGULAR MODE USAGE FOR WORK TRIPS

Source: Own illustration based on the self-conducted survey

The percentages of mode usage for non-work trips differ from work trips for all population groups (Figure 5.5). In general, regular car usage for non-work trips is significantly higher

than for work trips. Almost 97.5% of individuals without an IB and 91% of individuals with an OIB

drive to non-work destinations, while only 52% of individuals with a TFYIB drive for non-work trips. Stunningly, 84% of individuals with an OIB walk or bike to non-work-related destinations. Respondents with a TFYIB use active transportation modes such as biking and walking much more compared to their usage on work-trips. Remarkably, they represent the population group with the lowest percentage of regular drivers for non-work trips (52.1%). In general, the percentages for all modes of all population groups for non-work trips are higher compared to the percentages of work trips, which suggests stronger multimodality for non-work trips. In contrast to the percentage of regular bike usage percentages in the *Mikrozensus* dataset, regular bike usage on non-work trips is rather evenly distributed among population groups. The differences in work-related public transit usage and regular walking between the three demographic groups are statistically significant different (at a p-value <0.05) as the results of a Chi-Square test has revealed.

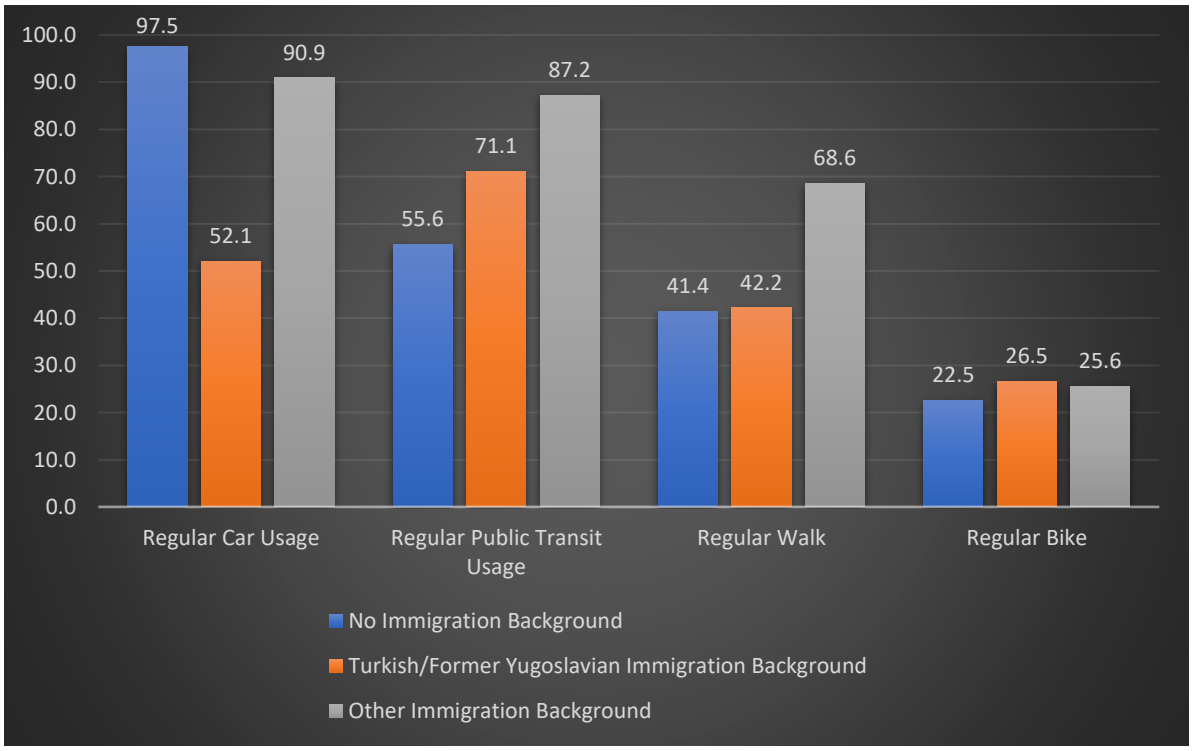

FIGURE 5.4 REGULAR MODE USAGE FOR NON-WORK TRIPS

Source: Own illustration based on the self-conducted survey

The differences in regular car usage (Pr = 0.000), public transit usage (Pr=0.001) and walking (Pr = 0.000) for non-work purposes across the three population groups are statistically significant at a p-value <0.05, whereas the differences in regular biking are not statistically significant, as chi-square tests have revealed.

5.5. Perception (Satisfaction Rates) of Public Transit

To account for comparability across the two s-dataset analyzed, the same six aspects (costs, travel time, equipment, connectivity, waiting times and safety) of public transit that were selected in the *Mikrozensus* were also used in the self-conducted survey questions. Figure 5.7 provides an overview of the differences in the satisfaction rates among population groups.

Overall, the satisfaction of individuals with a TFYIB background for all six aspects of public transit are the lowest between the three population groups. The lowest satisfaction rates among them can be found regarding headways/waiting times. Only around 55% of this population group are satisfied with waiting times. On average, respondents NIB have the highest satisfaction for all six aspects. However, the single highest satisfaction percentage can be found for respondents who have an IB other than from Turkey or former Yugoslavia. Almost 84% of respondents in this group are content with the safety aspect of public transit. Travel time is the aspect which shows the least percentage gaps between the three population groups analyzed in this sample.

In general, satisfaction rates of individuals with non-Turkish or former Yugoslavian immigrants are statistically similar to satisfaction with people NIB. Costs are the only aspect of public transit in which the satisfaction rates within both IB groups are similar. In general, the overall satisfaction between individuals NIB and individuals with an OIB are similar.

The differences in the satisfaction regarding costs (Pr=0.005) travel time (Pr=0.000), equipment (Pr=0,33), waiting times (Pr=0.004) and safety (Pr=0.000) across the three demographic groups are statistically significant at a p-value <0.05, whereas the differences regarding the connectivity aspect of public transit is statistically significant at a p-value < 0.1.

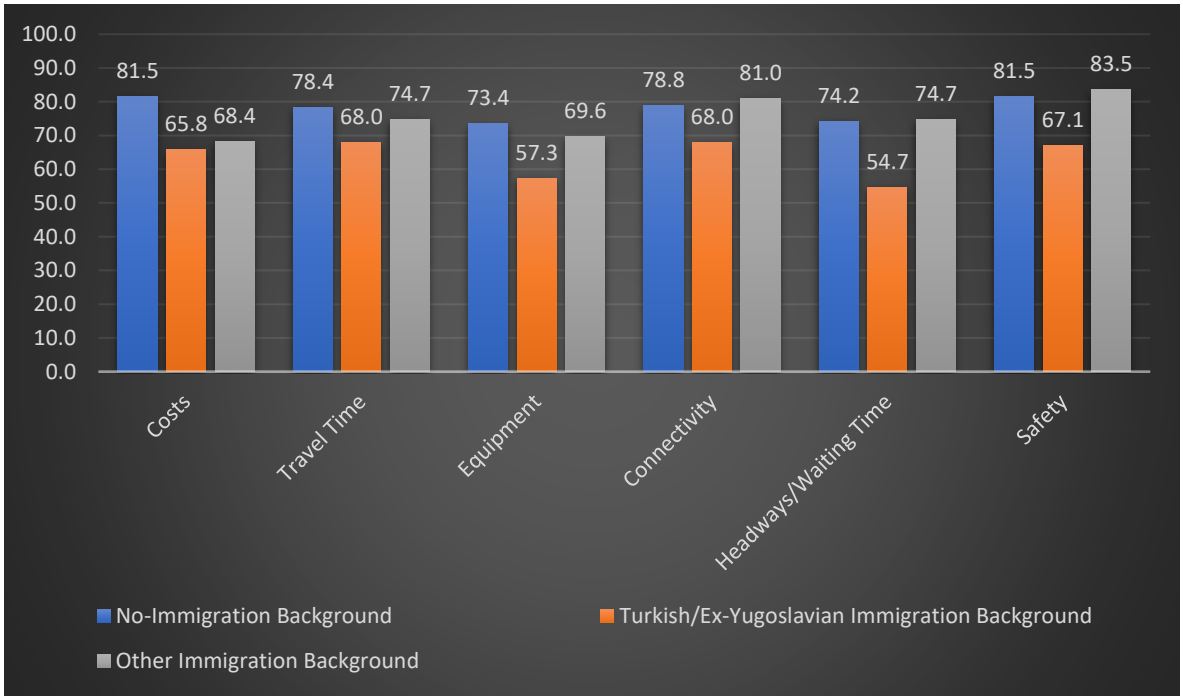

FIGURE 5.5 SATISFACTION RATES AMONG THREE POPULATION GROUPS

Source: Own illustration based on the self-conducted survey

5.6. Discussion of the Descriptive Results of Both Datasets

Due to the fact that both datasets do not contain exactly the same variable, only a few variables can be compared across the two models. Overall, the respondents in the self-conducted survey are much younger and have higher income on average compared to the respondents in the *Mikrozensus*. The share of the population that is born in Austria is much higher in the *Mikrozensus* than in the self-conducted survey. (70% vs 50%). In the self-conducted survey, approximately half of the respondents have an IB. The self-conducted survey has more female respondents than the *Mikrozensus*, even though the difference is merely around 5%.

The results of the descriptive statistics regarding both datasets already hint at large differences in the travel behavior and satisfaction rates among the three demographic groups. In general, these statistics show that in these samples, individuals with a TFYIB drive more than NIB individual, except for non-work-related trips in the self-conducted survey. In both datasets, TFIYB individuals are the demographic group with the lowest public transit usage

among the three groups. The share of biking is relatively similar across the two datasets. However, due to mode-choice being divided into work and non-work purposes, a comparison with the *Mikrozensus* has to be performed with a certain caution. The overall percentages of walking for all demographic groups is much higher in the *Mikrozensus* compared to the self-conducted dataset. This large discrepancy might possibly stem from varying understanding of what walking means. For some individuals, the trip from home to the next bus or tram stop might constitute a walking trip, whereas for others, a walking trip might be only a trip where a certain distance is covered on foot.

The satisfaction rates across statistically both datasets show similar trends, in that individuals with a TFYIB are the least satisfied with the majority of aspects. However, overall perception levels are higher in the *Mikrozensus*.

Chapter 6

Inferential Statistics: Predicting Immigrants Travel Behavior

This chapter will move away from the descriptive analysis of the two datasets analyzed and use logistic regression to make assumptions about the general population and explain the odds of occurrences in the models. This chapter will include logistic regression for both datasets, which were already descriptively covered in the previous paragraph.

6.1. Regression Analysis (*Mikrozensus*)

This subchapter will present results from various logistic regression analyses based on *Mikrozensus* data. The analysis can be divided into two parts. The first part of the analysis will focus on mode usage, whereas the second part will focus on the perceptions of public transit. The two analyses will be further divided into two sub-sections. The analysis in the first sub-section will estimate the predicted effect of various independent variables on regular mode usage and on perceptions of public transit (dependent variables). The dependent variables are regular car usage, regular public transit usage, regular bike usage, and regular walking for the first part, and for the second part the satisfaction rates regarding cost, travel time, equipment, connectivity, travel time, and safety of public transit. Particular attention will be given to the estimated effect of immigration status on mode usage and respondents with and without an IB comparison regarding their probability of using various travel modes. The second sub-section will use regular mode usage of each population group as a dependent variable and investigate and compare the effects of independent effects for each population group. The regression models will not only display the results in odds-ratios, but also in average marginal effects. Average marginal effects display the average effect “The average effect of an independent variable on probability itself and are therefore much easier to interpret.

Marginal effects measure the change in the expected value of Y as one independent variable increases by unity or in comparison to the reference group while all other variables are kept constant" (Welsch et al. , 2018, pp. 739). By including odds-ratios and average marginal effects, I provide a comprehensive overview of various ways to understand the effects of the independent variables on the dependent variables. However, the average-marginal effects won't be discussed in detail. In the vast majority of the variables, the significance and direction of each coefficient did not change when displaying the average marginal effects.

6.1.1. Dependent Variables

The dependent variables in the first part of the analysis are regular car usage, regular public transit usage, regular biking, and regular walking in general and for each population group specifically (see Chapter 5 for the explanation of the composition of the dependent variables).

Therefore, the sample sizes in those regression models reflect the number of respondents in each population group. The goal of these regression models is to compare the effects of each independent variable on each individual's mode share usage regarding their strengths and directions.

Questions guiding the analysis here are (among others): What is the difference between the effect of income, age, or gender on people with IB (individuals with TFIYB or OIB compared to individuals without IBs (NIB)?

The dependent variables in the second part of the analysis are the perceptions (satisfaction rates) of public transit.

6.1.2. Independent Variables included in the regression analysis

Independent predictors included in the regression analysis of the *Mikrozensus* data can be grouped into socio-economic and demographic and spatial/land use factors. Satisfaction with public transit was not included in the regression models as an independent variable due to high multicollinearity with other variables. Due to multi-correlation in general, not every independent variable is included consistently across all travel modes models.

Socio-economic and demographic variables

Age, Gender, population groups (IB), born in Austria, income, and household size are included in all of the regression models. o

Age is divided into three subcategories, which can be roughly characterized as young adults (17-35), middle-aged adults (36-49), and elderly (50+), due to distributional constraints of the variable, 50 had to be chosen as a cutoff for the elderly category, understanding that many people would not consider people aged 50-60 as elderly. Gender was categorized binarily in the dataset, not allowing respondents to choose options other than Male or Female. The variable population groups are divided into three sub-categories: NIB, TFYIB, and OIB

Additionally, the variable Born in Austria is also included in the model. Even though these two variables might seem similar and potentially correlated with each other, it is important to include Born in Austria as a separate variable to understand the exclusive effect of being born in Austria, independent of one´s immigration background and one`s parents' origin. Therefore, similarly to the widely known immigration or IB effect, this variable aims to understand, if there is a Born in Austria effect remaining after controlling for all other variables, including migration background, which includes the birthplace of one`s parents. The question here arises: Is there any effect on people born in Austria, independent of their origin or their parents` origin? Is there a locational effect on mode usage, which might have institutional and legal implications, which is apparent for people born in Austria independent of their country of origin?

Table 6.1 displays the relation between the variable's IB and Born in Austria. This table clearly shows that these two variables overlap, in that they are not mutually exclusive. Almost 20% of respondents, who are classified as not having an IB are not born in Austria, whereas around 25% of respondents with a TFYIB and approximately 20% of OIB individuals are born in Austria. Therefore, the effect of being born in Austria should be separated in the model. While the US statistical institutions solely use the country of birth as an indicator for immigration status, EU countries additionally also use the immigration background as a way to define who is an immigrant and who is not.

TABLE 6.1 RELATIONSHIP BETWEEN IB AND COUNTRY OF BIRTH (MIKROZENSUS)

Born in Austria	**No IB (N=453)**	**Turkish/former Yugoslavia IB (N=51)**	**Other IB (N=68)**

Yes	80.77	25.41	20.83
No	19.23	74.51	79.17

Finally, household size is included in this model, in which single-person households are the reference category.

Spatial/ Land-use Variables

Spatial and land-use variables included in this analysis are residence size (living in a large apartment), type of housing (living in a multistory building), and density. Residence size was originally measured as a continuous variable, whereas in the current analysis residence size is being presented as a binary variable living in a large apartment vs. not living in a large apartment, due to the latter being easier and clearer to understand and interpret. Apartment sizes larger than 80 m2. The original data collection categorized the type of housing according to their apartment size as follows: one apartment (single-story family house), duplex, 3-9 apartments, 10-19 apartments, and 20+ buildings. The type of housing (living in a multistory building) was also clarified as a binary variable for the reasons mentioned regarding residence size. People who live in buildings with apartment sizes larger than three were categorized as living in a multistory building. The variable labeled single-story family house also includes duplex houses.

The variable density (living in a dense neighborhood) was created through the regrouping of the original variable called Umgebung (environment). The sub-categories of the original variable are very dense with multistory buildings, very dense single-story housing, less dense multistory housing, mixed-use commercial residential, residential area with single-family homes and duplex homes, and non-developed areas. Respondents who lived in the first two mentioned categories were categorized as living in a dense neighborhood, whereas all other respondents were categorized as not living in dense neighborhoods. However, a shortcoming of the original definition in the *Mikrozensus* is that density was not quantified or measured in any way. Interestingly, in the models living in a multistory building and residence size variables did not produce large VIF scores, which indicates small multicollinearity.

6.1.3. Regular Car (Driver) and Public Transit Usage as Dependent Variables

Table 6.2 displays the results of a logistic regression examining the independent variables' effect on regular car users (drivers) public transit usage including all population groups (N=572). Unsurprisingly, the direction of the coefficients shows in the opposite direction for the two dependent variables. People with a Turkish or former Yugoslavian IB have almost twice the odds to drive compared to ($p<0.05$) individuals with NIB, but only roughly half of the odds to ride public transit regularly. Having an IB other than from Turkey or former Yugoslavia does not seem to be a statistically significant predictor for regular car usage as a driver and riding public transit compared to not having an IB. In general, males have more than twice higher odds to drive compared to females but only have the odds to ride public transit regularly compared to females. Wwhereas the youngest age group only has half the odds of driving and almost three times higher odds to ride public transit compared to the middle-aged group. Living in a dense neighborhood is only significantly associated with driving regularly. There is no significant association between living in a dense neighborhood and raking public transit regularly.

The odds of individuals with a TFYIB riding public transit after controlling for all other independent variables in the dataset are only half of the odds compared to non-immigrants riding public transit regularly. Similarly, to the previous analysis, individuals with an OIB do not display the same "immigrant effect", but an IB from Turkey or former Yugoslavia is associated with lower odds of riding public transit compared to OIB groups (not displayed in the table). Being born in Austria is not significantly associated with a regular car or regular public transit usage. In general, males are less likely to ride public transit regularly compared to females. People in the youngest age groups have almost three times higher odds to ride public transit regularly compared to people aged 36-49.

TABLE 6.2 DETERMINANTS OF REGULAR CAR USAGE (DRIVER) AND PUBLIC TRANSIT USAGE

VARIABLES (REFERENCE GROUP)	**REGULAR CAR USAGE** ***ODDS-RATIOS***	**REGULAR CAR USAGE** ***AVERAGE MARGINAL EFFECTS***	**REGULAR PUBLIC TRANSIT USAGE** ***ODDS-RATIOS***	**REGULAR PUBLIC TRANSIT USAGE** ***AVERAGE MARGINAL EFFECTS***

VARIABLES (REFERENCE GROUP)	REGULAR CAR USAGE *ODDS-RATIOS*	REGULAR CAR USAGE *AVERAGE MARGINAL EFFECTS*	REGULAR PUBLIC TRANSIT USAGE *ODDS-RATIOS*	REGULAR PUBLIC TRANSIT USAGE *AVERAGE MARGINAL EFFECTS*
Gender (Female)	2.453***	0.190***	0.558***	-0,109***
Male	(0.458)	(0.367)	(0.109)	(0.036)
Population Groups (NIB)				
TFYIB	1.807*	0.037*	0.493**	-0.200**
	(0.605)	(0.091)	(0.164)	(0.828)
OIB	0.723	0.151	1.322	-0.329
	(0.21)	(0.994)	(0.428)	(0.955)
Born in Austria (Born abroad)	1.223	-0.037	0.552	-0.101
	(0.526)	(0.913)	(0.245)	(0.865)
Highest Educational Attainment (University Degree)				
Middle-and High School Degrees	0.985	0.068	1.012	0.004
	(0.257)	(-0.055)	(0.285)	(0.539)
Vocational School Degree	1.274	-0.147	0.717	-0.061
	(0.268)	(0.445)	(0.158)	(0.042)
Age Groups (36-49)				
17-35	0.460***	-0.167***	2.808***	0.205**
	(0.113)	(0.507)	(0.771)	(0.051)
50+	1.178	0.034	1.054	0.010
	(0.257)	(0.0461)	(0.236)	(0.042)
Residence Size (Living in a small apartment)				
Living in a large apartment	1.378	0.068	0.812	-0.038
	(0.299)	(0.456)	(0.186)	(0.043)
Type of Housing (Single Family Housing)				
Living in a multistory building	0.494**	-0.147**	0.812	0.087
	(0.154)	(0.064)	(0.186)	(0.058)
Household Size (Single Person Household)				
Two-Person Household	1.191	0.037	0.962	-0.006
	(0.278)	(0.494)	(0.235)	(0.046)
Three-to-Four Person Household	1.304	0.055	1.577	0.092
	(0.350)	(0.0568)	(0.452)	(0.054)
More than 4 Person Household	1.673	0.105	0.842	-0.019
	(0.876)	(0.111)	(0.445)	(0.102)
Density				
Living in a dense neighborhood	0.635**	-0.096**	1.283	0.051
	(0.122)	(0.041)	(0.262)	(0.389)
Constant	0.857		1.699	

VARIABLES (REFERENCE GROUP)	REGULAR CAR USAGE *ODDS-RATIOS*	REGULAR CAR USAGE *AVERAGE MARGINAL EFFECTS*	REGULAR PUBLIC TRANSIT USAGE *ODDS-RATIOS*	REGULAR PUBLIC TRANSIT USAGE *AVERAGE MARGINAL EFFECTS*
	(0.348)		(0.704)	
Observations	572		572	
LR chi2(12)	75.62		47.42	
Prob > chi2	0		0	
Log likelihood	-352.48188		-324.33736	
Pseudo R2	0.0969		0.0681	

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6.1.4. Regular Bike Usage (Table 6.3)

Following the literature, the sample reflects lower odds for immigrants with a TFYIB IB to use the bicycle regularly compared to people without an IB. Consistent with the other modes, having an IB other than from Turkey or former Yugoslavia does not show any statistically different effect compared to having NIB regarding regular bike usage However, people with a TFYIB IB are also much less likely to ride the bicycle regularly compared to their counterparts from OIBs. The other immigration-related variable, born in Austria, does not show any statistical association with regular biking. People with a vocational school background only have half the odds of biking compared to university degree holders. In general, only very few variables proved to be statistically significant in explaining regular bike usage.

TABLE 6.3 DETERMINANTS OF REGULAR BIKE USAGE

VARIABLES (REFERENCE GROUP)	REGULAR BIKE USAGE *ODDS-RATIOS*	REGULAR BIKE USAGE *AVERAGE MARGINAL EFFECTS*
Gender (Female)	1.638**	0.093**
Male	(0.326)	(0.036)
Population Groups (NIB)		
TFYIB	0.228***	-0.267***
	(0.135)	(0.107)

VARIABLES (REFERENCE GROUP)	REGULAR BIKE USAGE *ODDS-RATIOS*	REGULAR BIKE USAGE *AVERAGE MARGINAL EFFECTS*
OIB	0.664	-0.074
	(0.344)	(0.955)
Born in Austria (Born abroad)	0.439	-0.133
	(0.245)	(0.091)
Highest Educational Attainment (University Degree)		
Middle and High School Degree	0.933	-0.011
	(0.246)	(0.048)
Vocational School Degree	0.533***	-0.113***
	(0.123)	(0.041)
Age Groups (36-49)	1.070	0.019
17-35	(0.268)	(0.046)
50+	0.764	-0.050
	(0.185)	(0.044)
Residence Size (Living in a small Apartment)		
Living in a large apartment	1.378	0.021
	(0.299)	(0.043)
Type of Housing	0.699	-0.066
Living in a multistory building	(0.223)	(0.058)
Household Size		
Two-Person Household	1.296	0.047
	(0.319)	(0.045)
Three-to-Four Person Household	0.947	-0.11
	(0.237)	(0.054)
More than 4 Person Household	0.913	0.003
	(0.273)	(0.109)
Density		
Living in a dense neighborhood	0.976	-0.032
	(0.574)	(0.038)
Constant	0.832	
	(0.175)	
Observations	572	
LR chi2 (13)	27.58	
Prob > chi2	0.0103	
Log likelihood	-315.32836	
Pseudo R2	0.0419	

Standard Errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.1.5. Regular mode usage of each population group as a dependent variable

This part will analyze each independent variable's effect (odds-ratio) on various mode usages for each of the three population groups. The comparability between each population group's predictor variables is somewhat limited, due to varying variables in the models (e.g generational variables for people with an IB) influencing the overall strengths and magnitude of the model. However, a comparison of three models with the same variables (without the variables which are only present for some of the population groups) concluded, that the signs and magnitude of the coefficients did not show any statistically significant differences to the original model with the varying variables.

6.1.6. Regular Car Usage (Driver) (Table 6.4/Table 6.5)

For individuals without an IB and people with a TFYIB IB, males have higher odds to drive regularly than females; The odds ratio for males with a TFYIB background to drive compared to females however is much larger than for people without an IB. For individuals with an OIB, there is no statistical difference between the genders´ odds ratios for regular drivers.

Age as a statically significant predictor for regular car usage is only prevalent for young residents without an IB, whose odds are only half the odds of middle-aged people without IB.

Household size is not a strong predictor of regular car usage, except for people with OIBs who live in two-person households, who have seven times the odds of driving regularly compared to single-person household residents who do not have an IB. Living in a dense neighborhood is only a statistically significant predictor of regular car usage for people without IBs. Unsurprisingly, residents without an IB who live in dense neighborhoods are less likely to drive regularly.

TABLE 6.4 DETERMINANTS OF REGULAR CAR USAGE (DRIVER) FOR EACH POPULATION GROUP (ODDS-RATIOS)

VARIABLES (REFERENCE GROUP)	(1) NIB	(2) TFYIB	(3) OIB
Gender (Females)			
Males	2.477***	7.651**	1.603
	(0.516)	(6.553)	(1.093)

VARIABLES (REFERENCE GROUP)	(1) NIB	(2) TFYIB	(3) OIB
Born In Austria	1.781	7.925**	0.315
	(1.563)	(6.553)	0.357
Living in a Large Apartment (Small Apartment)	1.501*	0.856	2.436
	(0.365)	(0.750)	(1.764)
Age Groups (35-49)			
17-35	0.480***	0.200	0.244
	(0.137)	(0.202)	(0.220)
50+	1.278	0.538	1.258
	(0.307)	(0.610)	(0.914)
Highest Educational Attainment (University Degree Graduates)			
Middle or High School Graduate	1.013	0.672	3.142
	(0.299)	(0.780)	(1.189)
Vocational School Graduate	1.215	6.159	1.189
	(0.282)	(6.766)	(0.860)
Household Size (Single person household)			
Two Person Household	0.911	8.057	7.5660**
	(0.233)	(11.561)	(7.264)
Three Or More Person Household	1.233	2.918	3.668
	(0.375)	(3.321)	(3.943)
Density			
Living in a dense neighborhood	0.571***	0.285	0.508
	(0.120)	(0.264)	(0.338)
Constant	0.2816	1.002	0.043*
	(0.256)	(1.642)	(0.073)
Observations	453	51	68
LR chi2(9) =	57.99	22.65	13.49
Prob > chi2 =	0.0000	0.0198	0.2628
Log likelihood =	- 36.767788	-279.72737	-23.5435
Pseudo R2 =	0.0939	0.3248	0.1550

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 6.5 DETERMINANTS OF REGULAR CAR USAGE (DRIVER) FOR EACH POPULATION GROUP (AVERAGE MARGINAL EFFECTS)

VARIABLES (REFERENCE GROUP)	NIB	TFYIB	OIB
Gender (Females)			
Males	0.197***	0.319**	1.603
	(0.040)	(0.999)	(1.093)
Born In Austria	0.127	0.242 **	0.080
	(0.188)	(0.130)	0.121
Living in a Large Apartment (Small Apartment)	0.087*	-0.015	0.155
	(0.515)	(0.137)	(0.125)

VARIABLES (REFERENCE GROUP)	NIB	TFYIB	OIB
Age Groups (35-49)			
17-35	-0.159***	-0.239	-0.265*
	(0.059)	(0.146)	(0.153)
50+	0.051	-0.043	0.043
	(0.051)	(0.204)	(0.133)
Highest Educational Attainment (University Degree Graduates)			
Middle or High School Graduate	1.013	-0.086	0.202
	(0.299)	(0.187)	(0.147)
Vocational School Graduate	1.215	0.206	0.031
	(0.282)	(0.146)	(0.133)
Household Size (Single person household)			
Two Person Household	-0.019	0.275	0.371**
	(0.055)	(0.204)	(0.152)
Three Or More Person Household	0.0576	0.066	0.226
	(0.0637)	(0.155)	(1.859)
Density			
Living in a dense neighborhood	-0.016***	-0.189	-0.126
	(0.043)	(0.137)	(0.118)
Observations	453	51	68
LR chi2(9) =	57.99	22.65	13.49
Prob > chi2 =	0.0000	0.0198	0.2628
Log likelihood =	- 36.767788	-279.72737	-23.5435
Pseudo R2 =	0.0939	0.3248	0.1550

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6.1.7. Regular Public Transit Usage (Table 6.5)

Gender is only a significant predictor for people without an IB. Males without an IB only have half the odds to ride public transit regularly compared to females without an IB.

The highest educational attainment is a significant predictor of regular public transit usage for people with an IB of all origins. For vocational school graduates without an IB, the odds of taking public transit regularly are lower compared to people without an IB who have a university degree. People with a TFYIB IB who have a vocational school degree are more likely to ride public transit compared to university degree holders of the same demographic group.

The size of the household in which individuals live plays a significant role in predicting regular public transit usage for all three demographic groups. For all three demographic

groups, people living in more than four-person households are more likely to ride public transit compared to people living in single-person households, albeit at different strengths for all population groups.

Interestingly, the direction of the odds ratio for two-person and three to four-person households is different for people without an IB compared to people of any IB. For people without an IB, living in a two-person or three to four-person household is associated with lower odds of regular public transit usage compared to non-immigrants who live in single-person households. For people with IB from any origin, living in a two-person or three-to-four-person household is associated with higher odds of taking public transit compared to people with IBs who live in single-person households. Being aged 17-35 is positively associated with higher public transit usage (compared to being aged 50+) for people without an IB and individuals with a TFYIB.

VARIABLES (REFERENCE GROUP)	NIB	TFYIB	OIB
Gender (Females)			
Males	0.508***	1.033	0.950
	(0.111)	(0.702)	(0.814)
Born in Austria (Born abroad)		0.347	1.931
		(0.274)	(2.400)
Age Groups (35-49)			
17-35	2.758***	7.143**	1.036
	(0.876)	(6.235)	(1.171)
50+	1.145	1.843	0.260
	(0.285)	(1.641)	(0.220)
Highest Educational Attainment (University Degree)			
Middle or High School	1.007	1.097	1.889
Graduate	(0.324)	(1.154)	(1.839)
Vocational School Graduate	0.648*	0.609	0.929
	(0.158)	(0.550)	(0.934)
Household Size (Single person household)			
Two Person Household	0.972	0.347	2.037
	(0.263)	(0.377)	(1.883)
Three Or More Person	1.176	1.159	20.81**
Household	(0.372)	(1.083)	(29.92)
Apartment Size			
Living in a Large Apartment	0.846	0.674	0.487
(Small Apartment)	(0.220)	(0.480)	(0.467)
Density			
Living in a dense neighborhood	1.352	1.691	0.642
	(0.309)	(1.263)	(0.517)
Constant	2.068	0.445	6.039
	(0.945)	(0.641)	(10.13)
Observations	453	51	68
LR chi2 (9/9/10) =	33.32	8.88	16.78
Prob > chi2 =	0.0001	0.5436	0.0793
Log likelihood =	-257.55784	-30.429049	-27.48827
Pseudo R2 =	0.0608	0.1273	0.2339

TABLE 6. 6 DETERMINANTS OF PUBLIC TRANSIT USAGE FOR EACH POPULATION GROUP (ODDS-RATIOS)

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 6.7 DETERMINANTS OF PUBLIC TRANSIT USAGE FOR EACH POPULATION GROUP (AVERAGE MARGINAL EFFECTS)

VARIABLES (REFERENCE GROUP)	NIB	TFYIB	OIB
Gender (Females)			
Males	-0.127 ***	0.006	-0.006
	(0.040)	(0.140)	(0.111)
Born in Austria (Born abroad)		-0.221	0.085
		(0.151)	(0.161)
Age Groups (35-49)			
17-35	0.199***	0.405**	0.004
	(0.059)	(0.144)	(0.147)
50+	0.018	0.126	-0.176
	(0.048)	(0.180)	(0.101)
Highest Educational Attainment (University Degree)			
Middle or High School	0.001	0.019	0.083
Graduate	(0.062)	(0.216)	(0.125)
Vocational School Graduate	-0.084*	-0.102	-0.009
	(0.469)	(0.168)	(0.116)
Household Size (Single person household)			
Two Person Household	0.003	0.347	0.092
	(0.061)	(0.377)	(0.118)
Three Or More Person	0.031	1.159	0.396**
Household	(0.061)	(1.083)	(29.92)
Apartment Size			
Living in a Large Apartment	-0.039	-0.081	0.487
(Small Apartment)	(0.049)	(0.145)	(0.170)
Density			
Living in a dense neighborhood	0.069	0.108	-0.057
	(0.042)	(0.151)	(0.104)
Observations	453	51	68

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

So far, this dissertation has focused on regular mode usage as a dependent variable. In this part, the influence of predictor variables on satisfaction with public transit in terms of their cost, travel time, equipment, connectivity, and safety will be investigated. For better clarity and organization, the focus will lie on the aspects of public transit which yielded significant results for the population variables and therefore displayed an immigration effect on the satisfaction (perception) rates[12]. The immigration effect is only prevalent for the satisfaction with safety.

People with an IB from Turkey or former Yugoslavia only have half the odds of being satisfied with the safety aspect of public transit compared to people without an IB. The second immigration-related variable, born in Austria, also shows a negative association with regular public transit usage compared to individuals who are not born in Austria. This effect might reveal that second-generation TFYIB individuals are less satisfied with the safety aspect compared to their first-generation counterparts. Vocational school graduates of all backgrounds are also much less likely to be satisfied with safety compared to university graduates of all backgrounds. Safety is very subjective, and therefore it might be hard to analytically capture meaningful outcomes of this statistic. However, these magnitudes and directions of the coefficients can suggest overall trends. The second part of this dissertation will qualitatively shed light on the reasons behind various safety perceptions.

TABLE 6.8 PREDICTORS OF THE SATISFACTION WITH SAFETY OF PUBLIC TRANSIT (MIKROZENSUS) (ODDS-RATIOS AND AVERAGE MARGINAL EFFECTS)

VARIABLES (REFERENCE GROUP)	SAFETY ODDS-RATIOS	SAFETY AVERAGE MARGINAL EFFECTS
Gender (Female)	1.267	0.027
Male	(0.332)	(0.028)
Population Groups (NIB)		
Turkish IB	0.254**	-0,137**
	(0.128)	(0.052)
OIB	0.532	-0.061

[12] The variable satisfaction with public transit is available in the Microsensors, however, this variable is not used in the analysis due to its high correlation with other variables (High VIF scores)

VARIABLES (REFERENCE GROUP)	SAFETY ODDS-RATIOS	SAFETY AVERAGE MARGINAL EFFECTS
	(0.588)	(0.064)
Born in Austria (Born abroad)	0.373**	-0.090**
	(0.204)	(0.057)
Highest Educational Attainment (University Degree)		
Middle and High School Degree	0.567	-0-532
	(0.221)	(0.416)
Vocational School Degree	0.399***	-0.935***
	(0.125)	0.341
Age Groups (36-49)		
17-35	1.130	0.212
	(0.378)	(0.036)
50+	0.982	0.008
	(0.308)	(0.035)
Residence Size (Living in a small Apartment)		
Living in a large apartment	1.129	0.229
	(0.344)	(0.324)
Type of Housing		
Living in a multistory building	0.482	-0.798
	(0.248)	(0.054)
Household Size (Single-Person Household)		
Two-Person Household	1.090	0.008
	(0.366)	(0.035)
Three-to-Four Person Household	0.715	-0.030
	(0.261)	(0.391)
More than 4 Person Household	1.558	0.069
	(1.285)	(0.0904)
Density		
Living in a dense neighborhood	1.141	0.020
	(0.307)	(0.028)
Constant	20.55***	
	(13.49)	
Observations	572	572
LR chi2(13)	, 21.46	
Prob > chi2	0.0643	
Log likelihood	207.68427	
Pseudo R2	0.0491	

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

6.1.8. Multicollinearity

To test for multicollinearity in the model, the VIF (Variance Influence Factor) was used. The VIF is a standard tool to measure the extent to which the predictor variables are correlated

with each other. In general, a VIF score of 5 or higher for a variable is considered to indicate a high collinearity with other independent variables in the model (Daoud, 2017) .

For independent variables in the models predicting regular car usage usage, the mean VIF was 2.07, whereas the variable with the highest individual VIF *three or more-person household,* with a score if 2.93 which is still below the critical mark of 5 or 10. For regular public transit and regular biking, the mean VIF score is 2.4. The variable *Born in Austria* shows the highest individual VIF score is 6.83. All other variables in the model have values below 3. For regular walking, the mean VIF was 2.13, whereas again the variable *Born in Austria* had a individual VIF of over 5 (6.8). Therefore, it can be concluded that the variables in these models are not highly correlated with each other.

The average VIF´s for the predictor variables in the regression models of each population group´s mode usage ranges between 2-3, indicating low collinearity between the variables.

For the regression analysis regarding the perceptions of public trends, similar VIF´s were found. The mean average VIF for all the perception-based regression analysis ranged from 2.05-2.11, without any individual VIF exceeding an individual score of 6.61. The variable which consistently has the highest VIF score across all regression models is Born in Austria, albeit below a score of 10.

High VIF scores were also found in regression models, in which satisfaction rates and the duration of stay in Austria were controlled for in the analysis for regression models for regular car usage and vice versa. For that reason, those regression model results are not presented in this analysis.

6.1.9. Limitations

There are several limitations to the *Mikrozensus* dataset and consequently the regression analysis. First, income was only reported for respondents who were employed. Therefore, income cannot be a reliable predictor in these models, as it leaves out substantial parts of the sample and it would cut the sample size by more than half and also exclude individuals wo are not employed, but rather work as self-employed or freelance. Second, the percentages of respondents with an IB is lower than in the general population. While using weights can mask some of this analytical deficiency for descriptive statistics, the regression analysis could have been performed more systematically precise and comprehensive.

For example, detailed logistic regression analyzing the impact of each predictor variables on regular walking and regular biking could not be performed due to the unevenly distributed independent variables across immigrant groups. A larger sample size would have contributed to a more even distribution sufficient for more detailed analysis. Third, despite the fact, that the survey data was obtained mainly through telephone interviews on landlines, the sample is much more educated, younger and socio-economically stronger than the population. This is surprising, as one would assume that a landline telephone interview would reach more unemployed and retired respondents.

Fourth, the Austrian *Mikrozensus* is not a travel diary survey, but rather a large-scale census with an additional module including some travel related questions. Therefore, a large amount of spatial and land-use variables which are typically incorporated in travel surveys are missing in this survey.

6.2. Regression Analysis (Self-Conducted Survey)

This subchapter will present regression analysis of the self-conducted survey that follow the same logic as in subchapter 6.1.1 described for the analysis of the *Mikrozensus* dataset. As already highlighted in previous sections, the variables in the two datasets are not completely identical.

6.2.1. Dependent Variables

For regular car usage (driving), the dependent variables used in this model are *regular car usage on work trips* (includes multi-modal trips), *regular car usage* (work and non-work-related trips) and *mono-modal regular car usage*. Regular car usage on non-work trips as a dependent variable is not used in this model due to some variables predicting the outcome of the model perfectly. The question in the surveys asked participants which modes they use for regular trips to work and on non-work trips without further specifying the frequencies or the meaning of "regular car/public transit/walk/bike usage". Regarding public transit usage, the dependent variables utilized in this model are regular public transit on work trips, regular

public transit on non-work trips, and mono-modal public transit usage. All dependent variables are dummy variables with a 0/1 distribution.

6.2.2. Independent Variables

Independent variables from the self-conducted survey/dataset are grouped into socio-economic/demographic, spatial and land-use, and transportation-related factors. In contrast to the *Mikrozensus*, the self-conducted survey is transportation-focused, and therefore some variables can be classified as transportation related.

Socio-economic/demographic variables

Gender, immigration background (population groups), net monthly income, highest educational attainment, age, and being born in Austria (country of birth) is the socio-economic/demographic variables across all models in the self-conducted dataset. Gender was initially coded: as Male, Female, Non-Binary, Self-Identification, and Other to provide for a more inclusive analysis. However, due to very low response numbers for categories other than males and females, the regression analysis only uses the binary male/female dummy variable in analysis. The categories other than male and female did not have enough responses to be included in the logit models.

The variable immigrant status in the self-conducted dataset varies slightly from the definition in the *Mikrozensus*. As revealed earlier in the dissertation, the strength of the self-conducted dataset is that it does not only follow the definition set by *Statistik Austria* but rather allows respondents to self-report their IB. Respondents who indicate that they are born abroad or born in Austria to (at least one parent abroad), are asked to self-report their IB.[13] In the

[13] This differs from the *Mikrozensus* definition, in which immigrants are people who are either born abroad or born in Austria to parents who were both born abroad. Respondents are then asked to self-report their immigration background selecting following answer choices: Turkey/Former Yugoslavia and other. While the

regression models in this chapter, the self-reported IB is used primarily, as it is important to give agency and power to the respondents rather than the researcher defining respondents' IB on their behalf. Table 6.10 displays the percentages of self-reported immigration status compared to the definition according to the *Statistik Austria* dataset.

TABLE 6.9 DIFFERENCES IN THE SELF-REPORTED IMMIGRATION STATUS AND IMMIGRATION STATUS ACCORDING TO *STATISTIK AUSTRIA* IN THE SELF-CONDUCTED DATASET

Population Groups	Definition	
	Self-Reported	Statistik Austria
No Immigration Background	65.72	59.63
Turkish and former Yugoslavian Immigration Background	16.84	20.89
Other Immigration Background	17.44	19.47

This table displays lower percentages for the self-reported categories in comparison to the definitions laid out by *Statistik Austria*. According to the *Statistik Austria* definition, around 21% of the respondents would have a TFYIB IB, whereas only roughly 17% of the respondents self-identified as having a TFYIB IB. Similarly, almost 20% of the dataset would be classified as having an IB other than from Turkey or former Yugoslavia, whereas only approximately 17% of the respondents self-reported having an IB other than from Turkey or former Yugoslavia. There are two central issues with using pre-defined concepts of IB (Froehlich 2021). First, the term Migrationshintergrund (migration-background) is often associated with negative developments in society in general, and therefore often seen as a driver for various problems in society. Second, due to the inclusion of one`s parents' origin in defining the migration background, people are defined through the ancestry of their parents, even though they might themselves not identify with their parents' origins and also already

response choice other does not specify what it exactly means, it cannot be excluded that people who do not view themselves as immigrants chose the category other.

have acquired German (or Austrian) citizenship. Table x6.10 confirms the second notion, as the percentage of people with an IB is approximately 7% lower for the self-reported group compared to the statistically defined group. Therefore, the statistical definition still labels some people as having an IB although they might view themselves as not having an IB. The variable born in Austria was recorded for the same reasons that were already explained in detail in Chapter 6.1.2. The self-reported IB can be "blurry " in that there are no standard categories to which individuals ascribe themselves an IB. Table 6.11 displays one example of this "blurriness" by showing the relationship between the variables born in Austria and the self-ascribed IB. Around 16% of individuals who self-reported not having any IB were abroad, whereas almost 16% of individuals who self-report an IB from Turkey or former Yugoslavia were born in Austria. Therefore, it can be seen that these variables are not mutually exclusive.

TABLE 6.10 RELATIONSHIP BETWEEN IB AND COUNTRY OF BIRTH

Born in Austria:	**No IB (N=212)**	**Turkish/former Yugoslavia IB (N=82)**	**OIB (N=86)**
Yes	83.96	15.85	2.33
No	16.04	84.15	97.67

The variable self-conducted dataset follows hereby the logic of the NHTS, in which the born-in-the-US variable is being understood as a parameter for immigration, and the self-reported race and/or ethnicity is being additionally used for further analysis. In the self-conducted survey, the variable born in Austria follows a US-American immigration logic whereas the self-reported IB variable can be conceptually and analytically compared to the self-reported race variable. A limitation of using the variable born in Austria is, that of course it somewhat artificially draws a line in that a child who immigrated to Austria at the age of 1 might not have different travel behavior from someone who was born in Austria to parents who arrived in Austria shortly before their birth.

The variable net monthly income was created by asking participants to choose from the following options: 0-1999, 2000-4999, 5000-7999, 8000-11999, and 12000+. Due to very

few responses in the higher income categories, the variable was recoded and three categories emerged: 0-2000, 2001-4999, and 5000+. These three categories can be therefore roughly grouped into Low, middle- and higher-income groups.

Respondents were also asked to report their highest educational attainment. Respondents had to choose from the following options: Less than high school, high school, vocational school, undergraduate degree, and graduate/professional degree. Due to different population groups strongly differing distribution within this variable, difficulties resulted in including this variable with all five categories. For example, almost 20% of respondents with a Turkish or former Yugoslavia IB have a middle school degree, while the other population groups are barely represented in this category. Therefore, for example, the categories of middle school and high school were combined. In total, after recording the variables, three final highest educational attainment variables were created: Middle or High School, Vocational School, and University. The variable age was recorded through the reporting of the date of birth. The age categories in the self-conducted categories are identical to the age categories recorded in the analysis of the *Mikrozensus* dataset. Occupation/Employment was not included in the model as the majority of the respondents were employed or students (or both).

6.2.3. Transportation Related Variables

The transportation-related variables in this dataset are satisfaction with public transit and the type of transit pass. The satisfaction rates with public transit were reported by indicating an individual`s satisfaction with the six aspects of public transit that were already used in the *Mikrozensus* analysis: Costs, Travel Time, Equipment, Connectivity, Waiting Times, and Safety. Even though in the regression analysis, these six aspects are coded binarily as dummy variables, respondents had the option to select on a Likert scale their satisfaction as very satisfying, satisfying, neutral, dissatisfying, and very dissatisfying. However, for easier interpretation and comparability with the *Mikrozensus* dataset, the groups were combined and recoded as dummy variables (satisfied/not satisfied).

Participants in the survey were asked to specify the types of transit pass they use when using public transit. All respondents, independent of their public transit ridership frequency, were asked to respond to the question: Please highlight which option applies to you: I buy single

fares, I have a “Streifenkarte”, I have a monthly pass, I have a yearly transportation pass and other. Streifenkarte is so-called stripe tickets which are usually 4 or 8 single fare tickets printed together on larger paper, where each stripe represents a single fare. For the regression analysis, these types of tickets were combined with single tickets for more accurate analysis, as stripe tickets are single tickets in a different form. Semester-Tickets for university students were not a response option provided in the survey, however, every respondent who selected the category other reported that they have semester tickets, which are provided to university students in Austria (the fee for this ticket is included in the student´s tuition). Therefore, the category other was renamed to student tickets. Weekly and monthly tickets are also combined into one category. The categories used in the regression models are therefore: weekly/monthly passes, annual passes, single fares, and student tickets.

6.2.4. Spatial/Land-Use Variables

Another variable captured in this dataset is called “Type of District”. The three categories of this variable are: Inner City, Outer City (Dense), and Outer City. As a measurement of this category, I used density and geographical location per km² in Vienna´s 23 districts. Districts which have a population of less than 5,000 km² are classified as outer city districts. Districts, in which the population density ranges from 5,001-9,999 km² were categorized as outer city (dense), whereas districts with population densities of more than 10,000 km² were labeled as outer city districts. Inner city districts are located within the so-called “Gürtel” (Belt), which is one of the most important arterial roads dividing inner and outer districts. However, some of the outer districts have densities like inner districts. For that reason, it is analytically more accurate to move away from this binary categorization and utilize a more nuanced classification.

6.2.5. Regular Car Usage

As mentioned previously, the self-conducted survey distinguishes between work and non-work trips. Three models will be presented regarding regular car usage for all population groups. The first column will display the coefficient strength and direction of regular car usage for work trips. The second column will present the results for both work and non-work

trips combined, whereas the third column will present results for people who only use the car regularly without using any modes. As is the case in the *Mikrozensus*, respondents in the self-conducted can select more than one mode, allowing therefore multi-modality. Regression models for non-work regular car trips are not presented here due to many omitted variables caused by multi-collinearity.

In contrast to the regression models analyzing regular mode usage in the *Mikrozensus*, satisfaction rates were included in the regular car usage models, and regular mode usage was included in the satisfaction rate models. Individual VIF Scores below 10 and mean VIF scores of around 3.5 allowed for inclusion in the model for a more accurate analysis, as some studies showed that VIF scores below 10 are still tolerable (Franke, 2010).

The following paragraph will describe the results of the three models regarding regular car usage. Gender only plays a significant role in combined work and non-work-related regular car usage. Males are less likely to drive compared to females.

The self-reported IB and country of birth are both strong predictors for regular car usage. However, for non-work and work trips combined usage, both immigration-related variables are not strong predictors of regular driving. Intriguingly, individuals with a self-reported IB from Turkey or former Yugoslavia have lower odds of driving regularly compared to individuals with no self-reported IB. Due to the absence of a model analyzing non-work related regular car usage, this specific relationship cannot be analyzed adequately. It can only be speculated, that the low odds of regular driving for individuals with a self-reported IB lead to this result. For work-related car usage and mono-modal car usage, individuals of all self-reported IBs have higher odds of driving regularly compared to individuals without self-reported IB. For mono-modal trips, individuals with a self-reported IB other than those from Turkey or former Yugoslavia have approximately 40 times higher odds of regular mono-modal driving compared to individuals who did not self-report any IB.

For work-related regular car usage, individuals with a self-reported IB from Turkey or former Yugoslavia have 10 times higher odds of driving compared to individuals without a self-reported IB, whereas individuals with self a self-reported IB from other countries have 18 times higher odds of driving compared to individuals without a self-reported IB. The other immigration-related variable, born in Austria shows that individuals, who were born in

Austria, are more likely to drive on work trips and mono-modal trips regularly compared to individuals who are not born in Austria. Net monthly income is not a strong predictor of travel behavior. Individuals with a net monthly income of 5000 Euros or more have lower odds of driving regularly (for both trip types) compared to individuals who earn between 2001-4999 Euros a month.

The availability of a car in a household and the possession of a driver´s license are both significant predictors for regular driving (except for car availability for mono-modal trips). The effect of having a driver´s license however is stronger across three models compared to the effect of having a car available in the household. Individuals aged 50+ have over ten times higher odds of driving for both work and non-work trips and also for mono-modal trips compared to individuals aged 36-49. Out of the six aspects regarding satisfaction with public transit, satisfaction with travel time, connectivity, and safety are significantly associated with regular car usage. Individuals who are satisfied with the travel time aspect are less likely to drive regularly for work and non-work trips combined. Individuals who are satisfied with the connectivity aspect of public transit are less likely to drive on work trips and mono-modally. Being satisfied with the safety aspect of public transit, however, is positively associated with work-related regular driving and mono-modal car usage.

TABLE 6.11 DETERMINANTS OF REGULAR CAR USAGE (ODDS-RATIOS)

VARIABLES (REFERENCE GROUP)	REGULAR CAR USAGE (WORK TRIPS)	REGULAR CAR USAGE (WORK AND NON/-WORK COMBINED)	MONO-MODAL CAR USAGE
Gender (Female)			
Male	0.315	0.139***	0.585
	(0.230)	0.0815)	(0.455)
Self-Reported IB (No self-reported IB)			
TFYIB	10.56*	0.149*	7.49*
	(14.89)	(0.149)	(25.69)
OIB	18.51*	2.490	40.54**
	(28.62)	(2.503)	(69.01)
Born in Austria	7.591*	1.433	16.55**
	(9.167)	(1.190)	(21.40)
Net Monthly Income in Euros (2001-4999)			
0-2000	1.900	1.892	1.313
	(1.639)	(1.247)	(1.190)

VARIABLES (REFERENCE GROUP)	REGULAR CAR USAGE (WORK TRIPS)	REGULAR CAR USAGE (WORK AND NON/-WORK COMBINED)	MONO-MODAL CAR USAGE
5000+	1.003	0.171*	1.180
	(1.058)	(0.162)	(1.286)
Highest Educational Attainment (University Degree)			
Middle or High School			
	1.409	1.086	2.090
Vocational School	(1.065)	(1.065)	(1.800)
	2.770	1.448	3.653
	(3.825)	(1.739)	(5.315)
Car available in household	5.606**	13.78***	2.365
	(4.746)	(9.342)	(2.134)
Driver´s license	19.46**	45.27***	22.47**
	(27.45)	(55.49)	(34.06)
Age Groups (36-49)			
17-35	0.467	1.271	0.616
	(0.424)	(1.096)	(0.613)
50+	3.691	15.57**	10.08*
	(4.158)	(19.42)	(13.00)
Type of district (outer district)			
Inner-City	0.527	0.782	0.342
	(0.423)	(0.441)	(0.326)
Outer Districts-Dense	0.335	0.414	0.596
	(0.366)	(0.347)	(0.650)
Satisfaction with Public Transit			
Costs	0.429	1.541	0.677
	(0.378)	(1.137)	(0.657)
Travel Time	0.348	0.057***	0.211
	(0.311)	(0.0451)	(0.212)
Equipment	1.751	1.044	1.875
	(1.397)	(0.613)	(1.579)
Connectivity	0.131*	0.538	0.143*
	(0.139)	(0.499)	(0.154)
Waiting Times	0.987	0.349	0.577
	(0.932)	(0.263)	(0.583)
Safety	6.355*	7.831**	5.078
	(6.943)	(7.529)	(5.615)
Type of Public Transit Pass (Single Fare)			
Weekly/Monthly Pass	0.112	0.406	0.187
	(0.140)	(0.579)	(0.267)
Annual Pass	0.741	2.172	1.517
	(0.536)	(1.969)	(1.572)

VARIABLES (REFERENCE GROUP)	REGULAR CAR USAGE (WORK TRIPS)	REGULAR CAR USAGE (WORK AND NON/-WORK COMBINED)	MONO-MODAL CAR USAGE
Student Ticket	1.114	3.979	2.166
	(1.338)	(4.311)	(2.673)
Constant	0.00171**	0.00724**	0.000364***
	(0.00439)	(0.0162)	(0.00105)
Observations	183	183	172
LR chi2(23)	0.17	100.63	53.21
Prob > chi2	0.000	0.0000	0.0003
Log likelihood	-42.888902	-61.393798	-39.937768
Pseudo R2	0.4123	0.4504	0.395

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 6.12 DETERMINANTS OF REGULAR CAR USAGE (AVERAGE MARGINAL EFFECTS)

VARIABLES (REFERENCE GROUP)	REGULAR CAR USAGE (WORK TRIPS)	REGULAR CAR USAGE (WORK AND NON/-WORK COMBINED)	MONO-MODAL CAR USAGE
Gender (Female)			
Male	-0.080	-0.210***	-0.034
	(0.050)	(0.054)	(0.050)
Self-Reported IB (No self-reported IB)			
TFYIB	0.166*	-0.203*	0.186*
	(0.097)	(0.102)	(0.915)
OIB	0.207*	0.097	0.240**
	(0.106)	(0.106)	(0.104)
Born in Austria	0.143*	0.038	0.182**
	(0.082)	(0.085)	(0.799)
Net Monthly Income in Euros (2001-4999)			
0-2000	0.044	0.068	0.017
	(0.060)	(0.069)	(0.058)
5000+	-0.000	-0.188*	0.010
	(0.074)	(0.974)	(0.070)
Highest Educational Attainment (University Degree)			
Middle or High School	0.023	0.008	0.047

VARIABLES (REFERENCE GROUP)	REGULAR CAR USAGE (WORK TRIPS)	REGULAR CAR USAGE (WORK AND NON/-WORK COMBINED)	MONO-MODAL CAR USAGE
	(0.053)	(0.064)	(0.055)
Vocational School	0.073	0.039	0.084
	(0.097)	(0.218)	(5.315)
Car available in household	0.121**	0.281***	0.055
	(0.057)	(0.058)	(0.057)
Driver´s license	0.207**	0.046***	0.202**
	(0.093)	(0.188)	(0.093)
Age Groups (36-49)	-0.054	0.025	-0.031
17-35	(0.064)	(0.919)	(0.064)
	0.091	0.126**	0.150*
50+	(0.078)	(19.42)	(0.081)
Type of district (outer district)			
Inner-City	-0.044	-0.026	-0.069
	(0.056)	(0.060)	(0.061)
Outer Districts-Dense	0.076	-0.049	-0.033
	(0.763)	(0.088)	(0.070)
Satisfaction with Public Transit			
Costs	-0.059	0.0461	-0.025
	(0.061)	(0.078)	(0.062)
Travel Time	-0.075	-0.305***	-0.101
	(0.062)	(0.0451)	(0.063)
Equipment	0.041	0.004	0.040
	(0.056)	(0.026)	(0.054)
Connectivity	-0.142*	-0.066	-0.126*
	(0.072)	(0.986)	(0.067)
Waiting Times	-0.000	-0.112	-0.035
	(0.064)	(0.078)	(0.065)
Safety	0.130*	0.219**	0.105
	(0.756)	(0.097)	(0.699)
Type of Public Transit Pass (Single Fare)			
Weekly/Monthly Pass	-0.151	-0.096	-0.108
	(0.915)	(0.151)	(0.913)
Annual Pass	-0.017	0.082	0.027
	(0.066)	(0.096)	(0.067)
Student Ticket	0.007	0.014	0.057
	(0.084)	(0.113)	(0.0709)
Observations	183	183	172

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6.2.6. Discussion of Results of Regular Car Usage

The results of the three regression models regarding regular car usage presented here indicate that the strengths and directions of some coefficients have slightly different effects for each of the different models. The factors statistically influencing regular car usage for only work trips, for all trips, and for people who exclusively use the car, therefore vary. However, some variables showed consistency in strength or direction across at least two of the models.

The immigration effect for a self-reported TFYIB is statistically present in all three models, albeit varying in the direction of the coefficient. While the immigration effect for people with a self-described TFYIB suggests more car regular car usage for work trips and monomodal car usage in comparison to people without an IB, having a self-reported TFIYB is associated with lower odds of using the car regularly for all trips.

Therefore, it is important to analytically distinguish different types of regular car usage, to get a more nuanced understanding of the immigration effect. People with a self-reported TFYIB, therefore, tend to be more mono-modal car users compared to people without an IB. Having a self-reported IB other than from Turkey and former Yugoslavia is positively associated with increased regular car usage only for work-related trips and for mono-modal trips. A self-reported IB in general seems to be stronger associated with mono-modal regular car travel for all purposes. As it was not possible to analyze solely non-work related trips due to issues in the uneven distribution of some variables, it can be only speculated related to the exact variables' effects on non-work related regular car usage. However, the discrepancies and varying directions in the immigration effect between work-related regular car usage and regular car usage for all purposes suggest, that the effect of various independent variables and the immigration effect on non-work related travel differs vastly from work-related trips.

Interestingly, being born in Austria in general display identical effects in strength and direction to the self-reported IB. However, unlike the IB, being born in Austria is not significantly associated with less overall regular car usage. Low VIF scores of both variables (and all the models in general) indicate that these two variables are not correlated with each other in a meaningful way. While it might seem counter-intuitive that the variables self-reported IB and being born in Austria show the same direction and strength regarding car

usage, these two variables are not mutually exclusive as a self-reported IB does not exclude that these participants were born in Austria. As mentioned earlier, the variables being born in Austria are conceptually similar to the North American statistical definition of immigrants, whereas the variable self-reported IB reflects individuals' own perception of their own identity. The effect of income also showed different strengths across the three models. The highest income group showed a negative association with regular car usage for work and non-work trips combined. The effect of Gender on regular car usage however was only significant for work and non-work trips combined, displaying a negative association.

While both the availability of a car and the possession of a driver´s license unsurprisingly displayed a positive association with more regular car usage, the stronger effect of a driver´s license compared to having a car available in the household might seem surprising. I argue, that this effect might stem from the fact, that individuals might have a car available in the household, but for practical reasons (such as other people in the household needing the car more urgently) not being able to, whereas the possession of a driver´s license gives individuals the flexibility to take car-sharing. rent a car for certain trips or borrow a car from a friend.

There were a few variables that did not show any significant effect across all three models: Highest educational attainment, location of residence (type of district), and type of public transit pass. Being over the age of 50 (compared to being 46-59) also is associated with more car usage for regular car usage for all trips and mono-modal trips. Age did not show any significant effect on work-related trips. Only three of the six aspects of public transit showed significant effects for all models: Travel Time, Connectivity, and Safety. Being satisfied with travel time was only significant regarding regular car usage for all trips, showing a negative association, which is not surprising. However, interestingly, being satisfied with the travel time of public transit was not associated with lower car usage for work trips or mono-modal trips, which might seem counter-intuitive due to the assumption that time constraints are more apparent for work-related trips. Satisfaction with the connectivity of public transit however was negatively associated with regular car usage for work trips and mono-model trips. The assumption here would be that mono-modal car trips might occur more if the respondents needed to transit often and not be able to reach their destination easily. The absence of a significant effect regarding regular car usage for all purposes suggests, that the

effect of satisfaction for connectivity for non-work trips is probably not significant. Being satisfied with the safety aspect of public transit, however, is positively associated with regular car usage for work-related car usage and combined work and non-work-related car usage. This positive association can be possibly explained due to individuals who drive not regularly take public transit, and therefore not have experiences anything negative regarding public transit. Even though the regular car usage variables do include multi-modal usage, these other modes might also reflect walking or biking or include public transit but at a much less frequent level. Another reason for this association might be that even though individuals might be satisfied with the safety aspect, other aspects of public transit might deter or lead these individuals to regularly drive.

6.2.7. Public Transit Usage

Table 6.13 presents the results of the binary logit regression for three types of public transit travel: Work-related travel, non-work trips, and mono-modal public transit usage. Mono-modal public transit usage is classified as a separate type of travel, as the dependent variables work-related and non-work-related public transit usage consists of responses from individuals who also use other modes on their daily travel and possibly on the same trip. The dependent variable mono-modal public transit usage however only includes responses from individuals who exclusively took public transit on their trips.

The self-reported IB is only significantly associated with non-work-related public transit usage. Individuals with a self-reported IB of all origins have much lower odds of riding public transit on non-work trips compared to individuals who did not self-report any IB. The other immigration-related variable, being born in Austria is a stronger (significant) predictor of public transit across all three different types. Consistent across all three different public transit models, individuals who are born in Austria are less likely to ride public transit for all trips and mono-modally compared to individuals who were not born in Austria.

Net monthly income is not a strong predictor of public transit usage. Solely individuals who have a net monthly income between 0-2000 are statistically significantly more likely to ride public transit for work trips compared to individuals who earn 20001-4999 euros per month.

Similarly, age is a significant predictor only for individuals aged 17-35, who have around 3 times higher odds of riding public transit to work compared to

individuals aged 36-49. Middle or high-school graduates are less likely to ride public transit for non-work-related purposes compared to university degree holders. Living in an inner city is significantly associated with regular public transit for non-work trips and mono-modal trips, albeit in varying directions. While living in an inner-city

the neighborhood is associated with approximately 22 times higher odds of taking public transit compared to outer district residents, individuals who live in inner-city districts are associated with lower odds of riding public transit mono-modal compared to those living in an outer district. Having a driver´s license is only negatively associated with non-work-related public transit usage. Regarding satisfaction with the six aspects of public transit, connectivity, waiting times, and safety showed significance concerning public transit usage., albeit in various directions for the three different models. Individuals who are satisfied with the connectivity aspect of public transit are more likely to ride public transit for work-related trips but less likely to ride for non-work-related public transit usage.

Individuals who are satisfied with the waiting times aspect of public transit have around 27 times higher odds of riding public transit for non-work related transit compared to individuals who are dissatisfied with the waiting times of public transit. Satisfaction with the safety aspect of public transit is a significant predictor for all three types of public transit travel. While individuals who are satisfied with the safety aspect of public transit are less likely to travel for work-related public transit usage and mono-modal usage, they are more likely to ride public transit for non-work related public transit trips. The negative association between satisfaction with the safety of public transit with work-related and mono-modal regular public transit usage might stem from the fact, that individuals might think that public transit is safe because they are not riding it very often. Individuals, who only ride public transit or ride public transit regularly to work might experience more discomfort due to just the higher number of overall trips taken.

TABLE 6.13 DETERMINANTS OF REGULAR PUBLIC TRANSIT USAGE (ODDS-RATIOS)

VARIABLES (REFERENCE GROUPS)	REGULAR PUBLIC TRANSIT USAGE (WORK TRIPS)	REGULAR PUBLIC TRANSIT (NON-WORK TRIPS)	REGULAR PUBLIC TRANSIT USAGE (MONO-MODAL TRIPS
Gender (Female)	2.007	0.399	1.903
Male	(0.947)	(0.350)	(0.849)
Self-Reported IB (No self-reported IB)			
Turkish or former Yugoslavian IB	0.276	0.010***	0.882
	(0.243)	(0.017)	(0.715)
OIB	0.784	0.005***	0.335
	(0.718)	(0.010)	(0.255)
Born in Austria	0.264**	0.02***	0.165***
	(0.212)	(0.03)	(0.108)
Net Monthly Income in Euros (2001-4999)			
0-2000	2.691*	0.260	1.364
	(1.498)	(0.286)	(0.766)
5000+	1.096	0.339	1.383
	(0.707)	(0.443)	(0.980)
Age Groups (36-49)			
17-35	3.239*	1.145	1.183
	(1.968)	(1.107)	(0.788)
50+	2.416	0.170	1.301
	(1.879)	(0.232)	(1.242)
Highest Educational Attainment (University Degree)			
Middle or High School	1.041	0.194*	1.818
	(0.591)	(0.162)	(0.892)
Vocational School	0.542	0.184	1.156
	(0.485)	(0.248)	(0.950)
Location of Residence (Outer Districts)			
Inner-City	0.778	22.16**	0.269**
	(0.385)	(30.67)	(0.145)
Outer Districts-Dense	2.095	0.681	2.873*
	(1.571)	(0.708)	(1.556)
Car available in household (No car available)	0.838	1.717	0.431
	(0.451)	(1.573)	(0.240)
Driver´s license (No Driver´s License)	0.928	0.077**	0.472
	(0.640)	(0.090)	(0.246)
Satisfaction with Public Transit (Not being satisfied)			
Costs	1.705	0.537	1.091

VARIABLES (REFERENCE GROUPS)	REGULAR PUBLIC TRANSIT USAGE (WORK TRIPS)	REGULAR PUBLIC TRANSIT (NON-WORK TRIPS)	REGULAR PUBLIC TRANSIT USAGE (MONO-MODAL TRIPS
	(1.00)	(0.490)	(0.567)
Travel Time	0.492	0.985	0.562
	(0.322)	(1.084)	(0.381)
Equipment	1.984	1.093	1.197
	(1.044)	(0.824)	(0.595)
Connectivity	6.795***	0.122*	0.516
	(4.406)	(0.141)	(0.322)
Waiting Times	1.027	27.85***	2.343
	(0.577)	(30.37)	(1.350)
Safety	0.183**	8.725**	0.305*
	(0.140)	(8.595)	(0.198)
Constant	3.062	14.556***	1.735
	(4.060)	(43,048)	(2.348)
Observations	209	202	202
LR chi2(19)	40.02	46.20	48.32.
Prob > chi2	0.0032	0.0008	0.0004
Log likelihood	-74.423309	-30.334336	-80.701393
Pseudo R2	0.2119	0.4323	0.2304

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

TABLE 6.14 DETERMINANTS OF REGULAR PUBLIC TRANSIT USAGE (AVERAGE MARGINAL EFFECTS)

VARIABLES (REFERENCE GROUPS)	REGULAR PUBLIC TRANSIT USAGE (WORK TRIPS)	REGULAR PUBLIC TRANSIT (NON-WORK TRIPS)	REGULAR PUBLIC TRANSIT USAGE (MONO-MODAL TRIPS
Gender (Female)	0.071	-0.045	0.078
Male	(0.050)	(0.043)	(0.053)
Self-Reported IB (No self-reported IB)			
TFYIB	-0.138	0.022***	-0.015
	(0.094)	(0.076)	(0.098)
OIB	-0.026	0.025***	-0.132
	(0.100)	(0.091)	(0.091)

VARIABLES (REFERENCE GROUPS)	REGULAR PUBLIC TRANSIT USAGE (WORK TRIPS)	REGULAR PUBLIC TRANSIT (NON-WORK TRIPS)	REGULAR PUBLIC TRANSIT USAGE (MONO-MODAL TRIPS
Born in Austria	-0.014**	-0.019***	-0.021***
	(0.082)	(0.069)	(0.075)
Net Monthly Income in Euros (2001-4999)			
0-2000	0.012*	-0.066	0.037
	(0.004)	(0.0538)	(0.068)
5000+	0.004	-0.053	0.039
	(0.070)	(0.064)	(0.086)
Age Groups (36-49)			
17-35	0.134*	0.006	0.020
	(0.065)	(0.047)	(0.080)
50+	0.150	-0.087	0.031
	(0.840)	(0.066)	(0.015)
Highest Educational Attainment (University Degree)			
Middle or High School	0.004	-0.081*	0.072
	(0.006)	(0.040)	(0.058)
Vocational School	-0.076	-0.083	0.071
	(0.095)	(0.066)	(0.099)
Location of Residence (Outer Districts)			
Inner-City	-0.030	0.153**	-0.159**
	(0.053)	(0.067)	(0.062)
Outer Districts-Dense	0.093	-0.019	0.128*
	(0.839)	(0.053)	(0.063)
Car available in household (No car available)	-0.029	1.717	.0,102
	(0.595)	(1.573)	(0.066)
Driver´s license (No Driver´s License)	-0.004	0.026**	0.472
	(0.075)	(0.045)	(-0.091)
Satisfaction with Public Transit (Not being satisfied)			
Costs	0.058	-0.030	0.010
	(0.063)	(0.044)	(0.063)
Travel Time	-0.076	0.000	-0.069
	(0.070)	(0.054)	(0.082)
Equipment	0.073	0.004	0.021
	(0.056)	(0.037)	(0.060)
Connectivity	0.019***	-0.103*	-0.080
	(0.068)	(0.056)	(0.753)
Waiting Times	-0.002	0.164***	0.103
	(0.061)	(0.051)	(0.068)
Safety	-0.192**	0.107**	-0.144*
	(0.081)	(0.046)	(0.076)
Observations	209	202	202

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

6.2.8. Discussion of Results of Regular Public Transit Ridership

The three models presented here have unique dynamics when it comes to the effects of the predictor variables. Among the significant variables, only the effect of being born in Austria and the perceptions of public transit regarding safety shows the same effect in strength and direction across the three models. That shows that the three models have distinctive characteristics in terms of influencing factors.

Unlike the case of regular car usage, gender does not seem to play any statistically significant role across the models for regular public transit usage in all its distinctions. Also, the immigration effect is much less apparent for public transit compared to regular car usage. Only non-work related regular public transit trips show a negative immigration effect, which indicates lower odds of riding public transit for non-work purposes for people with an IB compared to people with no self-reported IB. The differences in public transit ridership therefore across self-reported IBs are much lower for public transit usage in general than it is for regular car usage. The country of birth therefore is a stronger predictor of regular public transit usage across all three models compared to the self-reported IB. Income is not a strong estimator of regular public transit usage in its different form. Only having a lower income is associated with higher odds of riding public transit to work. Interestingly, income only plays a role, albeit a limited one, for work-related public transit trips, but not for other trips purposes or for mono-modal trips. Highest educational attainment (middle or high school graduate) however is. The highest educational attainment might strongly correlate with current employment and type of job. Middle or high school graduates might work in factories or companies, which are in lesser dense neighborhoods in Vienna, in which driving might be the most attractive option. The type of district in which people live plays a role in non-work-related public transit ridership and mono-modal public transit ridership. While the positive association of living in an inner city district with higher usage of public transit usage seems intuitive and plausible, lower mono-modal public transit usage for residents in inner-cities compared to residents in outer districts might seem surprising at first. However, at a second glance, there might be some plausible explanation for this pattern. This result might stem

from a higher walkability in inner city neighborhoods and therefore lower odds of just riding public transit. Living in an outer district, which is dense, however, is associated with almost three times higher odds of mono-modally riding public transit. Outer district residents might be forced to drive more and might not be able to ride solely public transit. Car Availability in the household does not significantly predict regular public transit usage across all three models, whereas the possession of a driver´s license is only a statistically significant (negative association) for non-work-related public transit trips. The effect of being satisfied with various aspects of public transit shows differences in quality, strength and direction across the three models, while the significant aspects of public transit in these models are connectivity, waiting times and safety. The negative association between satisfaction with safety of public transit with work-related and mono-modal regular public transit usage might stem from the fact, that individuals might think that the public transit is safe because they are not riding it very often. Individuals, who only ride public transit or ride public transit regularly to work might experience more discomfort due to just the higher number of overall trips taken. In general, a negative association between being satisfied with aspect of public transit and regular public transit usage across all models could stem from the fact that individuals might be satisfied with public transit but not use it for other reasons. People who ride public transit daily or regularly might just have a higher number of experiences, including negative ones.

6.2.9. Regular Biking and Walking (Active Transportation Modes)

No immigration effect was found for biking and walking (including the various forms of travel such as work vs- non-work travel, combined travel, and mono-modal travel) when controlling for the same variables that were utilized in the previous models. There was an immigration effect for people with a Turkish or former Yugoslavian IB only visible when not controlling for satisfaction with various aspects of public transit.

6.2.10. Discussion of Regular Public Transit Usage

Overall, the immigration effect is less apparent for public transit usage compared to regular car usage. Only for non-work related regular public transit usage an immigration effect is

apparent. An IB (of all origins) is associated with lower non-work-related public transit usage compared to not having an IB. However, there is a being born in Austria effect consistent across all three public transit models. Across all three models, being born in Austria is negatively associated with regular public transit usage compared to people who are not born in Austria. Interestingly, the IB (which includes the origin and place of birth of people) plays a smaller role in explaining public transit usage compared to just being born in Austria without including information on the origin of one´s parents. The question arising here, is, what legal, institutional, and economic implications does being born in Austria entail? Unlike in the US, being born in Austria does not automatically lead to the acquisition of Austrian citizenship.

Income and age only play significant roles in predicting work-related public transit, both showing positive relationships. Highest educational attainment is not a strong predictor across the three models, with a small exception regarding middle and high-school students on non-work-related trips. The type of districts, in which residents live is a significant predictor for non-work public transit usage and mono-modal public transit usage. Interestingly, the direction of the effects is different, as living in an inner-city district is associated with higher odds of riding public transit for non-work purposes, whereas living in an inner-city neighborhood is significantly associated with much lower odds of riding regular public transit mono-modally (both compared to living in an outer district). This negative effect might stem from higher walkability in inner-city districts and therefore less dependency on exclusively riding public transit. The higher odds (almost three times) for residents in the outer city, but dense districts might stem from the fact, that even though those districts are dense, they are still further away from central commodities, but at the same time not attractive for car usage due to limited parking space. Intriguingly, car availability and the possession of a driver´s license only have a limited statistical effect on regular public transit usage. Satisfaction with public transit shows different patterns across the six aspects. Interestingly, the effects of connectivity and safety are the opposite for work-related and non-work-related public transit usage. The negative coefficients for increased public transit might seem counter-intuitive at first, but it might be affected by varying ridership frequency. People who ride public transit less often might be more satisfied based on less lived experiences and therefore less subjectively experienced safety issues e.g. Similarly, people who do not ride public transit

frequently might be content with the connectivity aspect, due to fewer trips that involve transfers or a lower personal coverage of the public transit networks. Even though people who do not ride public transit regularly were not asked in the survey about their satisfaction, taking public transit "regularly" was not further defined by the researcher and therefore there might exist some variability in this variable, which might cause slight discrepancies in the satisfaction rates.

6.2.11. Perception (Satisfaction-Rates) of Public Transit (Table 6.12)

In this section, the analysis moves away from the investigation of regular mode choice and turns to the estimation of predicting variables regarding the satisfaction (perceptions) of six aspects of public transit, which are identical to the *Mikrozensus*. Satisfaction with the cost and connectivity aspects of public transit are the only two factors, which reveal a statistically significant immigration effect.

Overall, males only have half the odds to be satisfied with the cost aspect of public transit compared to females, which contrasts the findings of an analysis of the *Mikrozensus* survey, which did not expose any significant effect of gender. However, this comparison has to be viewed with caution, as the controlling variables across the two datasets are not identical. Like the results in the *Mikrozensus*, a self-reported IB from Turkey or former Yugoslavia is negatively associated with being satisfied with the cost aspect of public transit (in comparison with individuals without IB). This trend is interesting because the distribution of income among the three population groups does not significantly statistically vary. The satisfaction with immigrants from OIBs however does not statistically vary from the satisfaction with individuals without an IB regarding the cost aspect of public transit.

Similar to the cost aspect of public transit, males have around 74% lower odds of being satisfied with the connectivity of public transit in Vienna compared to females. Again, consistent with the cost aspect, having a self-reported IB from Turkey or former Yugoslavia is associated with around 70% lower odds compared to not having any self-reported IB. In addition, being born in Austria is associated with lower odds of being satisfied with the connectivity of public transit. Respondents with a vocational degree have almost 92% lower odds of being satisfied with the connectivity aspect of public transit compared to individuals

who graduated from university. Lower-income individuals have higher odds of being satisfied with the connectivity aspect of public transit compared to middle-income individuals. Individuals older than the age of 50 have almost 6 times higher odds of being satisfied with the connectivity of public transit compared to middle-aged individuals. Lastly, having a car available in the household is negatively associated with being satisfied with the connectivity of public transit in Vienna.

TABLE 6.15 PREDICTORS OF THE COSTS AND CONNECTIVITY OF PUBLIC TRANSIT (SELF-CONDUCTED SURVEY) (ODDS-RATIOS)

VARIABLES (REFERENCE GROUPS)	COSTS	CONNECTIVITY
Gender (Female)		
Male	-0.108*	0.263***
	(0.589)	(0.120)
Self-Reported IB (No self-reported IB)		
TFYIB	-0.188*	0.298*
	(0.920)	(0.209)
OIB	-0.145	0.283
	(0.099)	(0.221)
Born in Austria (Born abroad)	-0.011	0.270*
	(0.090)	(-0.186)
Highest Educational Attainment (University Degree)		
Middle and High School Degree	-0.041	0.706
	(0.065)	(-0.324)
Vocational School Degree	-0.078	0.086**
	(0.108)	(-0.063***)
Net Monthly Income in Euros (2001-4999)		
0-2000	0.109	2.480*
	(0.701)	(1.228)
5000+	0.118	0.935
	(0.105)	(0.553)
Age Groups (36-49)		
17-35	-0.108	0.865
	(0.914)	(0.463)
50+	-0.007	5.848**
	(0.1368)	(5.027)
Location of Residence (Outer Districts)		
Inner-City	0.085	-0.693
	(0.065)	(-1.019)
Outer Districts-Dense		
	-0.056	0.822

VARIABLES (REFERENCE GROUPS)	COSTS	CONNECTIVITY
	(0.080)	(-0.454)
Observations	209	203

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.

TABLE 6.16 PREDICTORS OF THE COSTS AND CONNECTIVITY OF PUBLIC TRANSIT (SELF-CONDUCTED DATASET) (AVERAGE-MARGINAL EFFECTS)

VARIABLES (REFERENCE GROUPS)	COSTS	CONNECTIVITY
Gender (Female)	0.512*	0.263***
Male	(0.190)	(0.120)
Self-Reported IB (No self-reported IB)		0.298*
TFYIB	0.312*	(0.209)
	(0.182)	
OIB	0.406	0.283
	(0.253)	(0.221)
Born in Austria (Born abroad)	0.500	0.270*
	(-0.283)	(-0.186)
Highest Educational Attainment (University Degree)		
Middle and High School Degree	0.784	0.706
	(-0.313)	(-0.324)
Vocational School Degree	0.632	0.086**
	(-0.421)	(-0.063***)
Net Monthly Income in Euros (2001-4999)		
0-2000	1.083	2.480*
	(0.472)	(1.228)
5000+	2.126	0.935
	(1.386)	(0.553)
Age Groups (36-49)		
17-35	0.514	0.865
	(0.292)	(0.463)
50+	0.972	5.848**
	(0.819)	(5.027)
Location of Residence (Outer Districts)		
Inner-City	1.698	-0.693
	(-0.693)	(-1.019)
Outer Districts-Dense	0.695	0.822
	(-0.345)	(-0.454)
Constant	15.670***	48.121***
	(-13.07)	(-53.45)
Observations	209	203
LR chi2(14)	-14.60	53.79
Prob > chi2	0.0748	0.0000

VARIABLES (REFERENCE GROUPS)	COSTS	CONNECTIVITY
Log likelihood	108.853	89.270598
Pseudo R2	0.0748	0.2315

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.

6.2.12. Multicollinearity int he Self-Conducted Dataset

The individual VIF scores and consequently the collective mean VIF score is slightly higher in the self-conducted dataset. The mean VIF scores across all models regarding regular mode usage are 3.32. The two highest individual VIF scores belong to the mean satisfaction with safety and connectivity, with scores of 8.18 and 7.32 respectively. Scores below 10 can be still tolerable, even though scores below 5 are considered to be a more reliable predictor for lower multicollinearity (Daoud, 2017; Franke, 2010).

The individual VIF scores in the models estimating various effects on satisfaction (perceptions) are all below 6. The mean VIF score for all individual variables in the satisfaction (perception) based models is 2.65, indicating low multicollinearity. Several limitations of the self-conducted dataset and its variables have to be noted.

6.2.13. Limitations

Several limitations of the self-conducted dataset and its variables have to be noted. First, as a researcher not based in Vienna, collecting survey responses online without being institutionally based in Vienna inevitably led to certain challenges. Additionally, most of the research was being performed during the COVID-19 Pandemic, which additionally impeded access to certain institutions. Even though I was able to travel to Vienna to do fieldwork and collect survey responses, these travels and fieldwork would have been more extensive during pre-pandemic times.

Second, because most of the recruiting of survey participants took place online, certain demographic groups, such as the elderly population, is underrepresented in the survey, and other demographic groups, such as students, are overrepresented.

Third, the share of people with an IB (self-reported and according to the *Statistik Austria* definition) is lower than what I had initially expected. The lower response rates of people with an IB is a well-researched phenomenon, which continuously poses challenges for researchers (Reichel & Morales, 2017).

Fourth, unlike the *Mikrozensus*, the self-conducted survey does not aim directly at representativeness, but rather at aiming to reach specifically reach immigrant communities. The self-conducted survey is not in a strict sense a survey solely quantitative in nature, as the interviews, which form the backbones of the qualitative part of the dissertation, emerge from the survey. Only participants who completed the survey were asked to participate in the interviews. The interviews and the survey results therefore cannot be seen as entities independent from each other.

Chapter 7

Discussion and Comparison of Both Datasets

This chapter will provide answers to the research questions presented in Chapter 5 by providing a comprehensive comparison of the results of both datasets.

Based on the literature that has shown that regular car usage, in general, is lower for immigrants or people with an IB, the following hypothesis was tested in the previous chapter through the inferential analysis of regular car usage in both datasets:

H1a: Having an IB in Vienna is associated with lower regular car usage (as drivers) compared to not having an IB.

Previous literature has shown the hypothesis that inhabitants with an IB are associated with lower regular car usage. This research, however, has shown that this hypothesis can firmly be rejected, the analysis of two datasets leads to a very nuanced and detailed account of the travel behavior of individuals by IB. Yet, due to some variation of the dependent variables between the two datasets, these datasets should be rather viewed as complementary. The self-conducted dataset allowed for a more detailed analysis of the nature of the trips, as it differed between non-work and work trips. While the regression models of the *Mikrozensus* have shown, that an IB from Turkey or former Yugoslavia is positively associated with higher regular car usage, the analysis of the self-conducted analysis has shown opposite effects. However, the self-conducted dataset has displayed a strong positive effect of having an IB on regular-car usage for work trips and even stronger for mono-modal trips independent of any origin. The characteristics of mono-modal trips also vary greatly across the two datasets. While 84% of drivers in the *Mikrozensus* use the car mono-modally, only 45% of the drivers in the self-conducted dataset solely drive without using any other modes for their regular travel. Therefore, the *Mikrozensus* regular car usage sample can be somewhat seen as a mono-modal regular car usage sample, albeit with caution. Regarding the effect of the origin of the IB, it can be noted that the results from the *Mikrozensus* are more aligned with

previous literature from Vienna in the German-speaking realm, in which regular car usage has been ascribed as particularly high for people with a Turkish IB (Faßmann & Reeger, 2014, Welsch, 2014). The self-conducted survey however reveals, that while individuals with a TFYIB IB do have higher odds of driving regularly compared to individuals with NIB, the strength of odds of individuals with OIBs driving are even stronger (compared to people without an IB).

H1b: Individuals with an IB in Vienna are more likely to ride public transit compared to individuals without an IB.

This hypothesis can be rejected (albeit with restrictions) based on the analysis of the two datasets. In contrast, the *Mikrozensus* results suggest that a Turkish or former Yugoslavian IB is found to be negatively associated with regular public transit usage in general. The self-conducted dataset did not confirm this trend for general public transit usage but has found similar effects for non-work related regular public transit usage and mono-modal regular public transit usage. Similarly, to the analysis of regular car usage, the share of mono-modal public transit usage is higher in the *Mikrozensus* than in the self-conducted dataset.

All models are consistent in that no statistical significance was found for the effect of individuals with an OIB (compared to NIB). Therefore, one cannot infer that immigrants of all backgrounds have lower odds of riding public transit, but rather specific population groups (individuals with a TFYIB), which show deviating travel behavior from groups with OIBs. These results somewhat challenge previous findings from the literature, which have shown that an IB is generally positively associated with higher public transit usage (Faßmann & Reeger 2014, Welsch 2018).

H1c: Individuals with an IB in Vienna are less likely to ride a bicycle compared to individuals without an IB.

Due to the rather smaller sample sizes, a comprehensive analysis of regular biking was not possible similar to the extent of regular car usage and regular public transit usage. The *Mikrozensus* offered more possibilities to estimate slightly more detailed accounts of regular bike usage, whereas the self-conducted dataset only provided an overall estimation of the determinants of regular bike usage. The logistic regression results of the *Mikrozensus*

confirm previous research, that has found that individuals with an IB in German-speaking countries tend to cycle less compared to individuals without an IB, controlling for all other variables. (Faßmann & Reeger, 2014; Welsch, 2014, 2018,2022). However, this immigration effect is only prevalent among individuals with a TFYIB IB. In general, there were challenges regarding analyzing active transportation modes, particularly in the self-conducted dataset. For regular biking, the challenge presented itself through the uneven distribution in the sample due to most people with an IB (particularly from Turkey or former Yugoslavia) not riding the bike regularly. Regarding regular walking, the uneven distribution showed opposite effects, as the majority of respondents in the sample walked regularly. Therefore, not enough variability in the dataset was given to comprehensively conduct logistic regression models to an extent that was performed regarding regular car usage and regular public transit usage. Concludingly, this quantitative research has revealed that individuals with a TFYIB IB are less likely to use green transportation modes compared to individuals without an IB and also individuals with OIBs. The Austrian government has announced the goal to reduce per capita CO2 emissions from the transport sector by 50% by 2030 and by 100% by 2040 (base year) (BMEIA, 2021). However, the government has to consider the low rates of green transportation ridership by individuals with IB, especially in urban areas, such as Vienna. The government, therefore, has to set clear goals and initiatives of how to make green transportation modes attractive for some population groups. As this research has shown, the lower tendency to use green transportation modes (particularly by individuals with a TFYIB IB) does not stem from locational characteristics of their residence or other socio-economic or demographic characteristics. Consequently, the higher propensity of regular car usage of individuals from Turkey or former Yugoslavia has to be analyzed through qualitative work, which will be performed and presented in the final section of the dissertation.

H2: The perceptions of public transit differ among various population groups

Across the two datasets, three of the six aspects of public transit showed an immigration effect for individuals with an IB from Turkey or former Yugoslavia: Costs, Connectivity, and Safety. Various interesting observations can be derived from these three models. First, one cannot postulate that satisfaction with these three aspects differs between people with and

without an IB. The differences in satisfaction with public transit can be rather described in an IB from Turkey or former Yugoslavia and everyone else. Individuals with a TFYIB IB are the least satisfied population group in this sample, as having an IB from Turkey or former Yugoslavia is negatively associated with being satisfied with the costs, connectivity, and safety aspect of public transit. Interestingly, even after controlling for income, individuals with an IB from Turkey or former Yugoslavia are nevertheless less satisfied with the cost aspect of public transit.

This dissatisfaction might stem from overall lower satisfaction with various aspects of daily life among people with a TFYIB. However, the lower satisfaction with the safety aspect of public transit can hint at discrimination in their daily lives. The safety aspect of public transit will be also a focus of the qualitative part in the following stages of this dissertation. In general, individuals with an IB from Turkey or former Yugoslavia face many negative stereotypes that can impact many areas of their daily lives. Individuals with a non-TFYIB IB do not differ from people without IB in terms of their satisfaction (perception) of public transit. Second, being born in Austria consistently displays negative effects on satisfaction on the three aspects of public transit, showing similar effects in strength and direction with the satisfaction rates with individuals with a Turkish or former or Yugoslavian IB.

This might seem, counter-intuitive at first, as one would assume that having an IB is associated with lower odds of being born in Austria. However, given the fact that having an IB does not exclude the possibility to be born in Austria and that individuals without an IB (who are predominantly born in Austria) are the majority in the dataset. Further, the variable of being *born in Austria* is a variable independent of an individual's immigration background. This variable is therefore a location-based variable rather than an origin-based variable. Additionally, males overall (independent of their IB) seem to be less satisfied with various aspects of public transit compared to females.

Chapter 8

Qualitative Section/Interviews

The analysis in the previous sections have shown that the differences in mode choice and satisfaction with public transit (perception) between individuals with and without an IB cannot be entirely explained through statistical modelling. The so-called “immigration” effect is particularly prevalent for individuals with a TFYIB. Statistical analyses were helpful in that they can statistically capture the IB. However, statistical analyses reach their limits in that they cannot provide possible explanations for the existence of this immigration effect. This dissertation research aims to find explanations for the “immigration” effect through semi-structured interviews that were conducted. The overarching research question in this part of the study is:

What motivations, attitudes, and socio-cultural factors determine individuals´ (specifically people with a TFYIB) mode choice in Vienna?

Following additional and underlying research questions will frame the analytical and conceptual pursuit in this section:

What are the differences in the meanings associated with each travel mode?

What are the reasons behind the differences in the satisfaction with public transit in Vienna?

The face-to-face interviews and the self-conducted survey cannot be seen as two completely independent entities from each other, as only individuals who completed the survey were asked to participate in the interviews. There was considerable variability in the response rates regarding the willingness to participate in interviews across the three population groups in the survey. Among the three demographic groups, only 23% of the respondents with a TYFIB background agreed to being interviewed, whereas 38% of people with an OIB were willing to talk with me. Around 31% of people NIB agreed to participate in an interview.

Based on this data, it cannot be assumed that people with an IB are less willing to participate in interviews. However, people with a TFYIB seem to be less inclined to agree to participate in an interview.

Interviews are a commonly used research technique that seek to advance an understanding of perceptions, opinions, and motivations, among other factors (Rowley, 2012). I conducted semi-structured interviews in my dissertation research due to their adaptive nature and "openness" to some unforeseen changes (Rowley, 2012). Interviews have a particular advantage compared to questionnaire design, especially when exploring the respondents' thought processes and motivations. In questionnaires, pre-given answer choices might be limiting respondents to tell the "full story." With my fluent Turkish skills, I was able to conduct interviews with individuals with a TIB, who did not speak German fluently or might have not been comfortable giving interviews in German language.

Sub-Chapter 5.2 describes the sampling strategies for the self-conducted survey. Since the interviewees belong to the same sample as the survey respondents, the sample strategies for the interviews are inherently identical as to the survey. However, the recruitment process of potential interviewees and consequently the organization of the interview was impacted due to the COVID-19 pandemic. First, out of the 21 interviews, 15 interviews were conducted via Zoom, and 6 were conducted in-person in Vienna. In pre-Covid times, I would have assumed these numbers to show the opposite direction. The dominance of zoom interviews might cause a bias towards more educated and young respondents with easier online access.

Second, due to constantly changing travel requirements, field trips to Vienna were only planned rather spontaneously which in turn affected scheduling with potential interviewees in Vienna. Third, while the survey did not specifically ask about pre-covid travel, the interviewees occasionally touched upon the differences between pre-covid and post-covid daily travel. However, since the time of the interviewees varied greatly, different stages of COVID policies also effected daily life situations and therefore particularly respondents, who were interviewed during lockdowns, mostly reported about pre-pandemic travel, as they were not able to leave their house much during lockdowns.

8.1. Overview of the Chapter

Sub-Chapter 8.2 will provide an overview of the research approach, whereas 8.3 will set the ontological and epistemological foundation of this qualitative part. 8.4 will introduce phenomenology and 8.5 will present the conceptualization of the data analysis. 8.6 is the backbone of this chapter and provides a systematic and comprehensive analysis of the interviews. 8.7 will conclude the chapter with some limitations of the research.

8.2. Research Approach

Two approaches are commonly used to analyze qualitative data: The deductive and the inductive approach. The deductive approach applies theory to the collected data and tests hypotheses that I formulated (Bingham & Witkovsky, 2022). In contrast, the inductive approach uses existing data that emerge from the actual research to create concepts, theories, and frameworks (Azungah, 2018). While the deductive approach is theory-driven, the inductive approach can be categorized as data-driven.

8.3. Ontological and Epistemological Approach

This qualitative research will rely on the inductive approach and use phenomenology as a theoretical, conceptual, and mainly methodological framework to understand the data collected in the interviews. Phenomenology is not only considered a theory, but also a research methodology (Abales et al. 2016). It was founded as a countermovement to positivism (Giorgi, 2005). As Abales et al. (2016) highlight, from an ontological perspective, phenomenology differs from positivism in that phenomenologists do not assume that an objective reality independent from the individual exists, but that reality is rather constructed by individuals and can vary among subjects.

Regarding their epistemology, positivist would argue that findings in research are (and exist) independent of the researcher and are not influenced in any way by the researcher. In contrast, the phenomenologist researcher would assert that research outputs result from an interactive process between the participants and the researcher (Abales et al. 2016).

To gain a better understanding of the phenomenological interview, it is essential to systematically comprehend the unique characteristics of interviews (Høffding & Martiny, 2016). As Hammersley and Atkins (2007, p..97) assert: "It is a distinctive feature of social research that the 'objects' studied are in fact 'subjects', in the sense that they have consciousness and agency. Moreover, unlike physical objects or animals, they produce accounts of themselves and their worlds."

Phenomenological researchers performing qualitative analysis work under the assumption that the focus of the analytical quest is to understand the meanings attached to certain phenomena and the daily experiences associated with certain phenomena, whereas quantitative positivist researchers work under the assumption that the analysis consists of an investigation of a causality or correlation between independent and dependent variables (Englander, 2012). The *essence* of any phenomenological research is the understanding that the relation between researcher and participant (interviewer-interviewee) moves away from a subject-subject relation to a subject-phenomena relation (Englander, 2012). Further, this author expands the previous quote from Hammersley and Atkins (2007) and asserts the importance of seeing the phenomena that the subject is experiencing as the first and foremost object of inquiry, not the subject itself. While this methodological conceptualization is commonly used in psychology research, I will combine the approaches presented by Hammersley and Atkins (2007) and the approach highlighted by Englander (2012), in that I will consider both the phenomena of the respondents and the respondents themselves. Especially regarding the experiences of individuals with an IB, I cannot exclude the identities that the subjects carry, even if they are independent or unrelated to the described phenomena at a first glance. Individuals with an IB often must endure many difficult and challenging situations before arriving at the respective country, in this case Austria. Therefore, in the interviews in this dissertation, subjects and their experiences will be the center of the analytical quest.

Phenomenology has been widely used as a theory and resulting as a method to perform interviews in qualitative research, due to this theory´s focus on the lived experience and the importance of meanings in daily experiences. However, there are different streams within

phenomenology which can lead to differences in designing the qualitative research and performing interviews with respondents. This research partly follows the tradition of Edmund Husserl's notion of phenomenology, which emphasizes the importance of *bracketing*. *Bracketing* refers to researchers suspending their own beliefs, prejudices and pre-conceptions during the interview process and rather fully focus on the lived experience on the experience of the person interviewed (Englander, 2012).

While it is impossible to fully restrain oneself regarding own perceptions and ideas, it is important for the researcher not to let those beliefs and prejudices affect the interpretation of the respondents lived experience to an extent that the experiences get altered in their interpretation, which can only be achieved if researchers are aware of their attitudes and prejudices (Mapp, 2008). Bracketing is an important tool to ensure a certain level of validity in phenomenological research (Beck et al., 1994).

Bracketing is a form of reduction which ensures that the researcher considers present knowledge as non-influential to the active research process. This way, imposition of prior knowledge from the researcher on the participant can be prevented and therefore reduce the risk of altered or invalid responses from the participant. Essentially, this reduction has the goal to minimize error (Beck et al., 1994). This reduction, or bracketing, is also a strategy to ensure validity, and is closely related to what Husserl calls the *Epoché*. *Epoché* more specifically refers to the phenomenological attitude, which requires the researcher to take a critical attitude towards one´s own belief.

In addition to validity, reliability is another important concept that shall not be ignored in qualitative research. In phenomenological research, reliability is achieved (or at least attempted to be achieved) through what Husserl calls the *search for essence* (Giorgi, 1988). The search for *essence* or invariant meanings constituted is performed through what Husserl calls an *imaginative variation* (Husserl, 1970). *Imaginative variation* refers to a process in which the researcher attempts to vary the frame of references, the contexts and certain descriptive phenomena and then observes any potential change in the meanings attributed by the participant (Turley et al., 2016).

The invariant meaning is the ascribed meaning that stays constant and unchanged after changing the frame of reference or other descriptive characteristics of the phenomena. If the meanings attached to certain phenomena change after the change of those frame of references, the changes, phenomenological theory assumes that the change of the frame of

references has caused a change in identity of the researchers (Giorgi, 1988). In contrast, the phenomenological approach developed by Heidegger however claimed that bracketing is simply an impossible task for human beings, as humans cannot act independent of their attitudes and predispositions (Wimpenny & Gass, 2000).

Semi-structured interviews have been selected as the most suitable tool for the interviews in this research, due to it being aligned with phenomenological principles (Lauterbach, 2018). They allow the respondents to answer questions in a more flexible manner since the researcher does not strictly follow a chronological order of questions, but rather uses questions as triggers to inspire the respondent to talk (Henriksen et al., 2022). The interviews must be seen as a segment of a larger phenomenological research framework. Phenomenological research frameworks have been most extensively researched in the scientific field of psychology (Giorgi et al., 2003). While diving methodologically and conceptually deep into the ontological and epistemological implications of the phenomenological research practices would move well beyond the scope of this dissertation, I will draw from the phenomenological psychological method in the analysis of the interviews.

As mentioned earlier, phenomenology is not exclusively a theory, but also a research methodology commonly used in qualitative research, including interviews. The theoretical aspect of phenomenology was covered in this chapter by delving into the scholarly work of Edmund Husserl. However, the research methodology aspect of phenomenology will be analyzed through the investigation of the scholarly work done by Paul Francis Colaizzi. Colaizzi's (1978) method of data analysis for phenomenological data has served as a guide for how to use phenomenology as a research method.

The analytical method by Colaizzi (1978) consists of seven steps:

1. The researcher has to read through the whole protocol in order to become familiar with the data.
2. The researcher highlights significant statements in the protocol. The researcher decides what is a significant statement. These statements are excerpts from the protocol which the researcher asserts to be contributing to the understanding of meaning in the participants responses (Halling et al., 1994). These statements are being identified through codes. These codes can be categorized by the participants code ID number or page numbers.

3. Formulate the meanings of each statement excerpted in step 2. In this process, the statements are being transformed into meanings. In order to account for validity, the aforementioned bracketing is an important tool is being used specifically in this step. The meanings reflect the significant statements.
4. In this step, the researcher groups the meaning according to their themes into clusters of themes. In a next step, emergent themes are being formulated from the clusters of themes. While in a strict sense, this step would require the researchers to cross check their emergent themes and clusters of themes, the large number of interview respondents and the geographical distance to the respondents did not allow me to include respondents in this step.
5. The fifth step of the phenomenological data analysis consist of an exhaustive description of the emergent themes, formulated meanings and meaning clusters. This exhaustive description creates an overall structure reflecting the most important phenomena arising in the study.
6. The sixth step consists of a comprehensive summary and analysis of the descriptions created in the fifth step. Additionally, the results are being organized in a way that no repetitions are present in the analysis. In this step-in *essence*, the conceptual framework which entails various aspects of the lived experiences and the phenomena that the respondents have reported on. This framework is called general structure in phenomenological structure, and it serves as a tool to achieve representativeness, as described later.

7. The last chronological step consists of the researchers to return to the participants and validate the findings and summarized meanings. In my dissertation, due to the reasons presented in step 4, I could not return to the participants and validate my findings. However, at the end of every interview, I asked participants to clarify some of their reported experiences, whenever I was not sure about the meanings of some phenomena described.

As indicated earlier, the application of the phenomenological method has been more prevalent in psychology and nursing research. Scholarly research in urban planning in general and in transportation planning has refrained from drawing from phenomenological theory. I argue that most urban and transportation planning scholars' hesitancy or refusal to integrate phenomenology into their theoretical and analytical world stems from the erroneous assumption, that phenomenology as a research method is used to "reduce objects of the social world into artefacts of mental representation". (Pula, 2022, p. 511).

Critiques of phenomenology argue that phenomenology constructs social reality only through its "reflection of mental events" (Pula, 2022, p.511). However, these critiques neglect the fact that the phenomenologist tradition under Husserl essentially accounts for a pluralistic approach to reality, which the researcher captures through the meanings of the participating subjects. These realities do not consist of singular objects but are rather expressed in a diverse way.

The previous pages have given a detailed account of the phenomenological tradition with a strong focus on the original conceptions that Edmund Husserl had developed. The advantage and disadvantage of phenomenology is reflected through its different streams and susceptibility to various interpretations and conceptual blurriness (Mapp, 2008).

8.4. Mixed-Methods Research Using Phenomenology

As noted in previous sections, I do not strictly confer to the classical phenomenological theory, due to the employment of a mixed-methods methodology in my dissertation work. As Englander (2012) notes, a common error that researchers find themselves committing is treating qualitative research as a single methodological entity. The risk of doing so lies in combining various methodologies that are premised in different philosophical traditions. Therefore, the first and foremost important endeavor before embarking on mastering the

mixed-methods pursuit is to understand the conceptual and theoretical premises that not only exist within qualitative methods, but also across the mixed-methods study.

The previous paragraphs of this dissertation have provided a detailed account of the main differences of the ontological and epistemological assumptions that quantitative and qualitative methods rely on, such as the existence of an objective reality versus multiple construction of realities. Perhaps within phenomenology, the traditional, descriptive form of phenomenology developed by Edmund Husserl is the most compatible form of phenomenology with positivist or more likely with post- positivist quantitative research[14]. The argument supporting this statement is being laid out most elegantly by Mayoh & Onwuegbuzie (2015), who assert that there are two components of phenomenological research that are compatible with (post)-positivist research.

First, the *essence*, which has been explained previously, can take the same form or essentially produce identical meanings across various experiences. Unlike common misconceptions, Husserl never denies objectivity as such, but rather just views objectivity as dependent on the extent of the truth of the phenomenon and reality as constructed multi-dimensionally. The *essence* which can be horizontally described across experiences therefore acts as an object, which takes an independent form, but can only be understood through the mental processes of subjects (Mayoh & Onwuegbuzie, 2015). The second compatible characteristics of phenomenological research with quantitative research is the process of bracketing and reduction, which also have been widely discussed previously in this dissertation. In fact, phenomenological research differs from other types of qualitative researcher in that phenomenological research requires the researcher to consciously take an objective stance and withhold from interfering with the subjects studied (Mayoh & Onwuegbuzie, 2015).

The following paragraph will provide models for mixing phenomenological research with post-positivist quantitative research. Three different classifications of mixed-methods research can be constructed. The first type of mixed-methods research is called equal status-mixed research, in which equal weight is given to quantitative and qualitative parts. The

[14] As (Mayoh & Onwuegbuzie, (2015) correctly assert, the two founders of phenomenological thought, Husserl and Heidegger, were mathematicians.

second type of mixed-methods research is the qualitative dominant mixed-research, in which the priority lies in the qualitative section. Finally, the quantitative dominant mixed-research puts more emphasis on the quantitative components of the research.

For phenomenological research specifically, Mayoh & Onwuegbuzie (2015) developed the mixed- methods phenomenological research (MMPR). The MMPR is "defined as research that combines phenomenological methods with methods grounded in an alternative paradigm within a single study" (Mayoh & Onwuegbuzie, 2015, pp. 98). The authors present a framework with five different models for conducting mixed-methods phenomenological research. While the five different models will not be explained in detail in this dissertation, the *sequential mixed methods approach* will be guiding this dissertation´s conceptual framework. While it is methodologically and theoretically feasible to give priority to either qualitative or quantitative methods in this design, this research will treat both sections equally from a methodological perspective. **The sequential mixed-methods design** is particularly appropriate for studies such as this dissertation, in which quantitative analysis precedes further phenomenological inquiry and investigation of the theories that the explanatory quantitative analysis have presented (Mayoh & Onwuegbuzie, 2015). As Mayoh & Onwuegbuzie (2015, pp. 98) state: "Within these quan → PHEN studies, preliminary quantitative findings are used to inform the phenomenological focus within the second phase of the research.". This statement captures the *essence* of my research design. The qualitative analysis in the second part of this dissertation use the quantitative findings in the first part for further phenomenological investigation of the experiences emerging from the interviews. My study fits into what Creswell would call a *sequential explanatory design* (Creswell, 2009).

The critiques aimed at the mixed-methods phenomenological research essential target the phenomenological component of it not being analytically understood in its pure form (Mayoh & Onwuegbuzie, 2015, pp. 98). The phenomenological method is therefore being seen as compromised and adapted according to the needs of the quantitative research.

The question widely discussed regarding the *sequential mixed-methods approach* is the complexity of the relationship between sequence and dominance in mixed-methods approach, which created confusion due to a lack of systematic literature on this specific topic (Walker & Baxter, 2019).

Some agreement in the literature however exists in that sequential explanatory designs are associated with a dominance of quantitative analysis, whereas less agreement exists regarding sequential exploratory designs. However, Mayoh & Onwuegbuzie (2015) note that specifically for sequential exploratory designs utilizing phenomenology, priority is commonly given to the qualitative research strands. However, the discussion of sequence and dominance does not adequately cover the prioritization within the mixed-methods design.

Walker & Baxter (2019) falsely assume that dominance and priority constitute the same meaning in that they assume that the dominance of one approach inherently translates into a higher priority of that approach. I argue that in my dissertation, the quantitative part dominates the analysis as it precedes the qualitative analysis and lays the foundation for the qualitative phenomenological analysis. However, my mixed-methods research does not prioritize one research strand over the other. In contrast, I ascribe what Creswell (2009) characterizes as *equal weight* to both research strands within the mixed-methods approach. This distinction is important because it is important to not inherently ascribe lower priority to the research strand which is not used first. As Walker & Baxter (2019) have laid out, qualitative research is often marginalized due to sequence design and other elements.

8.5. Data Analysis

The previous sub-chapter attempted to present the theoretical framework of this qualitative part of this dissertation. This sub-chapter will delve into the data analysis steps regarding the interviews from a phenomenological perceptive. This dissertation is using a mixed-methods methodology, in which the two parts actively engage with each other, rather than a mere juxtaposition without any interaction. Therefore, the data analysis of the interviews cannot be analyzed completely independent of the quantitative section of this dissertation.

The number of participants in quantitative study is of vital importance as quantitative research operates under the assumption that results have to be generalizable, and a larger sample size is required to achieve this goal. For qualitative research in general, but

phenomenological research in particular, sample size is not of great interest. Englander (2012) asserts, that the question of "how many" (pp. 21) is not important in phenomenological research, as not the quantitated of results is essential, but the quality and in-depth analysis of the results.

8.5.1 Selection of Participants

In phenomenological research, the number of selected participants and the statistical overview of their demographic characteristics is usually not considered, as the importance of phenomenological research lies in the in-depth analysis of the experiences rather than the statistical distribution of the sample. This dissertation will break with this tradition, as this phenomenological work is deeply embedded in the mixed-methods design which is also comprised of a quantitative analysis. The overview of demographic characteristics here does not aim to fulfill any claims of representativeness, it rather just gives a descriptive overview of who was selected for the interviews.

TABLE 8.1 OVERVIEW OF THE DEMOGRAPHICS OF THE INTERVIEWEES

		No-Immigration Background	Turkish or former Yugoslavian Immigration Background	Other Immigration Background
Gender	Male	25%	60%	38%
	Female	75%	40%	63%
Age	Average Age	45	35	37
Net Monthly Income	0-1999	50%	40%	38%
	2000-4999	25%	40%	50%
	5000+	25%	10%	12%

While quantitative research aims for high participant numbers and randomness to achieve representativeness, qualitative research is more concerned with in-depth analysis. However, the researcher should choose at least three participants for the phenomenological research, in order to be able to compare the results (Englander, 2012). A fundamental difference between qualitative and quantitative work is the way participants are selected for a study. The quantitative researcher is interested in the quantifying and seeking representability within results and phenomena, whereas qualitative phenomenological researchers. In phenomenological research, the *essence* lies not in the number of experiences, but rather about the quality of the experiences of the participants (Englander, 2012). As Englander (2012. Pp.19) states, the core question of selecting participants in phenomenological research is: *Do you have the experience that I am looking for?*. Giorgi (2009, pp.198-199) sums up the differences in sampling strategies between quantitative research and qualitative

(phenomenological) research as: “Research based upon depth strategies should not be confused with research based upon sampling strategies.”

In this research, the experiences that Giorgi (2009) refers to is related to the experiences on public transit and driving mainly[15]. Specifically, I wanted to understand the meanings of the strengths and directions, that the coefficients in the regression models hinted at, such as e.g., the motivations of individuals with a TFYIB who be more likely to drive compared to individuals NIB or the consistently lower satisfaction with various public transit aspects and the inter-generational differences in mode-usage.

The question arising naturally here is, how representativeness is achieved in phenomenological studies. As Englander (2012) expresses, the representativeness is achieved through the establishment of a general structure (Giorgi, 1988). This general structure was already mentioned in step 6 of the data analytics methodology presented by Colaizzi (1977). The general structure consists of meaning units which are not tied to a specific situation but are rather the invariant aspects of the experiences that are trans situational, meaning that they are independent of specific situations (Englander,2012). For example, a certain cultural background might be an inherent part of the structure (Englander, 2012). Cultural factors also will play an important role in the interview analysis.

[15] Green Transportation modes such as walking and biking are also mentioned in the interviews, albeit less frequently than driving and public transit.

8.6. Colaizzi's Method of Data Analysis

The previous paragraphs have tried to introduce the phenomenological research method for the qualitative part of this dissertation. While these paragraphs rather abstractly delved into the *essence* of phenomenological research, this sub-section will specifically analyze the interviews from a phenomenological perspective. As a guidance, the already presented method of data analysis by Colaizzi will be utilized.

8.6.1 Step 1: The Researcher Has to Read Through the Whole Protocol in Order to Become Familiar with the Data

Interview data can be fuzzy and difficult to easily sort out. Therefore, it is important to read through the whole protocol to get a sense of the data results. However, in this step, I also read through the interview guide, which I had designed prior to conducting the interviews.

Table 8.1 displays the interview guide. The interview questions were based on the survey questions. I asked follow-up questions based on the respondents answer in the survey and focused on the experience and meaning aspect of their travel, aligning with phenomenological methodology. Table 8.2 shows the relationship of the interview questions to the survey questions.

The interview questions regarding mode share and perceptions of public transit are guided by each research question already highlighted in the beginning of this chapter. However, this is an interview guide and therefore not every question in this guide were asked in its entirety due to time constraints and also due to varying flows and contextual differences between interviews.

1. *What are the differences in the meanings associated with each travel mode?*

TABLE 8.2 SURVEY/INTERVIEW QUESTIONS RELATED TO THE FIRST RESEARCH QUESTION

Survey Questions	***Interview Questions***
How do you get to work? Please mark all options that apply to you.	Why do you choose to drive/ride public transit/walk/bike?
Which of these ways to get around for activities except work do you usually take? Please mark all options that apply to you.	Why do you not choose to drive/ride public transit/walk/bike?
	Do you choose different modes for different purposes? If yes, why?
	What are the advantages and disadvantages of the modes you use, based on your experiences?
	What does driving/riding public transit/biking/walking mean to you?

2. *How much do the differences in meaning contribute to the differences in travel mode usage?* [16]

[16] The meaning of public transit will be analyzed concurrently with the analysis of the satisfaction of the six aspects of public transit

TABLE 8.3 SURVEY/INTERVIEW QUESTIONS RELATED TO THE SECOND RESEARCH QUESTION

Survey Questions	*Interview Questions*
What does driving mean to you?	For how long have you had these meanings associated to the travel modes?
What does walking mean to you?	Have these associations changed over time?
What does biking mean to you	How did you get to those meaning associations?

3. *What are the reasons behind the differences in the satisfaction withpublic transit in Vienna?*

TABLE 8.4 SURVEY/INTERVIEW QUESTIONS RELATED TO THE THIRD RESEARCH QUESTION

Survey Questions	*Interview Questions*
Please rate the importance of these aspects regarding Public transit for you: • **Cost** • **Travel Time** • **Equipment** • **Connectivity** • **Waiting Times (Headways)** • **Safety**	**Costs**: What price are you willing to pay for the annual/monthly/24-hour ticket and single trip fare? Do you think the price of the transit passes are adequate? **Travel Time**: How long do you usually travel from home to work? Do you ride public transit because it is the fastest cheapest, or for other reasons? **Equipment:** Are you content with the condition and interior of the trams, metro, and busses? Have you had any negative experiences with the equipment in trams/bus/metro? **Waiting Times (Headways):** How long do you wait on average for a bus/tram/metro? How long are you willing to wait?

Survey Questions	*Interview Questions*
	Safety: What does safety mean to you? Do you feel safe when travelling on the bus/tram/metro? What experiences have you had regarding the safety of public transit?

Especially he third set of comparisons between the survey questions and the interview questions display the importance of employing a phenomenological framework for the interviews. The quantitative analyses have suggested that individuals with a TFYIB are on average less satisfied with various aspects of public transit. However, the exact meanings that these aspects convey to the survey respondents cannot be captured by the quantitative analysis. The quantitative analysis is not able to convey to us, if individuals with an IB have the same meanings ascribed to these aspects e.g., safety or costs compared to individuals NIB.

To ask the correct and adequate questions to the participants, I looked up the survey protocol of each respondent before the interview and had it open during the interviews. The interviewees were first coded according to their response ID to identify them. After the completion of all interviews, I coded the interview identifiers according to the time they were interviewed by me, for me to gain a certain overview at the end of all. The first interviewee was therefore coded A1, the second A2, the third A3 etc. Due to various IRB related regulations and after careful analytical and theoretical considerations, I was not able to record the in-person and the zoom conversations. While many scholars would argue that the omission of audio recording during interview affect validity and reliability, under certain circumstances, not recording can prove more efficient and useful (Rutakumwa et al., 2020). Recording interviews exclusively focuses on the interview data itself, but not on the overall experiences which consist of interactions on an intersubjective level (Glaser, 2002). Therefore, for phenomenological research and interviews, not recording might prove to be a more accurate way of conducting interviews in order to capture the *essence* of the experiences and resulting meanings attached to it. The concern that Glaser (2002) has expressed becomes more apparent regarding interviews with participants with an IB, since they might feel uncomfortable with being recorded while reporting their experiences.

In general, not recording an interview does not necessarily reduce the quality or analytical value of the interviews (Knott et al., 2022). Due to the interviews not being recorded, it is impossible to take notes of every word spoken. During the interview therefore, only the most important statements were written down. After the interview however, a summary entailing three sections was prepared, based on the suggestion of Knott et. al (2022). In the first section, I wrote down important moments of the interview. I noted down what happened in those moments. These moments can entail the mimics or different tones of the participant. In the second section, I summarized how the response of that participant is situated within the context of the previous interviews and I try to establish theoretical and analytical grounds for comparability. In the third section, I reflect on the relationship between me and the participant and the overall atmosphere of the interview (Knott et. al, 2022). These methods essentially are methods of transcription. They do not however reach the level of detail that transcriptions of audio-recorded data provide. In general, a full transcription of the interview has been utilized for interviews, especially regarding audio-recorded interviews. Nevertheless, transcription as a method has not be immune from scholarly critique. Common disadvantages mentioned are the time-consuming nature of transcribing interviews and the risk of "suffering a data death" due to the difficulties associated with sorting and organizing enormous amount of data (Clausen, 2015, pp. 13). Additionally, especially verbatim is susceptible to the misreading of the data, and insensitivity to cultural differences (Halcomb & Davidson, 2006).

Finally, a recorder is a highly political tool, as Rutakumwa et al. (2020, pp. 579) has asserted: "Without it, the research community may deem its absence a threat to the apparent validity and credibility of the data. Yet, using it may enhance both the potential vulnerability and circumspect nature of data produced through the interview encounter". Halcomb & Davidson (2006, pp.40) delicately use the phenomenological research logic when they assert:" Considering that the process of transcription should be more about interpretation and generation of meanings from the data rather than being a simple clerical task, the need for verbatim transcription in every research project that generates verbal interview data must be questioned."

The use of field notes, which were also used in this research extensively, therefore can provide for a more analytically accurate account of the capturing of meanings. For that reason, it cannot be seen as an analytically flawed to not use verbatim transcription.

In my research, I was only able to transcribe verbatim transcription in some limited instances, but not in all, due to external factors influencing the interview, such as time and space constraints or noise from surrounding streets. On zoom interviews, it was slightly easier to transcribe quotes as I was able to ask participants more easily to repeat some statements if deemed important by me.

The structure of the analysis of the data after step 1 will follow the process highlighted in table 8.5, which is a visual representation of the seven steps laid out by Colaizzi (1978), which has been discussed earlier in this chapter. Step 1 has already been presented here whereas step 7 is not being considered in this dissertation, for reasons already outlined above.

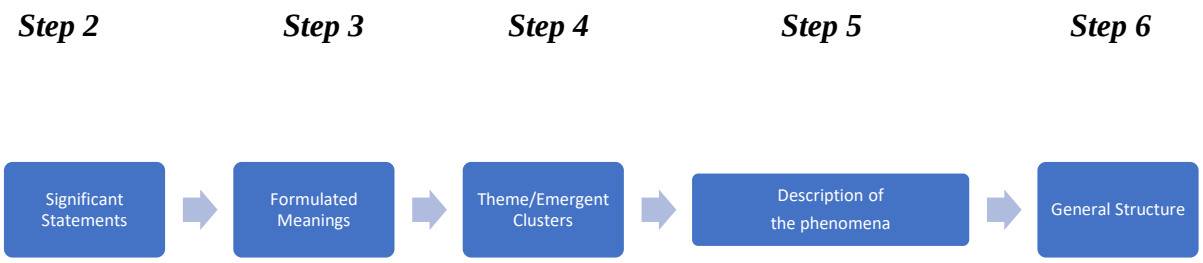

FIGURE 8. 1 FLOW OF DATA ANALYSIS FOLLOWING THE METHOD OF COLAIZZI (1978)

8.6.2 Step 2: The Researcher Highlights Significant Statements in the Protocol

The significant statements of the interview were selected through processes which were explained in step 1. The significant statements will be grouped regarding the thematic concept that the statement is related to. The thematic concepts in the interviews are *meanings ascribed to mode share* (Regular Car Usage, Regular Public transit Usage, Regular Biking and Regular Walking) and *meanings ascribed to the six aspects of public transit.* Since the interviews were semi-structured, not every question regarding every mode was discussed in length with every participant, since the structure of the interview allowed participants to decide on the level of detail and somewhat the topic (within the larger framework of daily travel) that they chose to report on.

8.6.2.1 Significant Statements

The significant statements that were selected consist of the field notes that were taken during the interviews. Using the phenomenological research logic, I focused on the statements that reflected experiences in daily life and general ideas about travel which are derived from daily travel experiences. Tables 8.5 and table 8.6 provide an overview of the significant statements regarding mode choice and satisfaction (perceptions) of public transit of the 21 interviewees. The first column displays the significant statements extracted from the interviews, the second column shows the identifier for each interviewee, whereas the third column provides information about their IB.[17] In this step, significant statements selected are only presented, whereas in the next step, formulated meanings will be established through these significant statements. Due to the semi-structure nature of the interviews, the statements delve into depth in various ways, and not every specific topic is being addressed in the same intensity throughout the interviews, as the respondents in depth-coverage of a topic was preferred to a broad coverage of many topics.

Additionally, the length of an answer and the willingness of respondents to answer questions also vary greatly, and the interviewer has to refrain from pushing the respondents to reply to a question against their will.

TABLE 8.5 SIGNIFICANT STATEMENTS REGARDING MODE CHOICE

SIGNIFICANT STATEMENTS	ID	IB	SIGNIFICANT STATEMENTS	ID	IB
A1 only drives to work. PT is very expensive if one does not get the Annual Pass. He doesn't want to get forced to buy the annual pass.	A1	TFYIB	For work travel, driving is much faster compared to any other mode, even though overall A5 is not in principle against public transit. In my free time, I also walk and bike sometimes, although I only bike with my child together. I see biking more of a fun leisure activity, but it's not a travel mode for him.	A5	TFYIB
A2 mostly drives to work but takes PT in his free time. PT is expensive except for the annual pass. "The system "forces" me to buy the Annual Pass. "	A2	TFYIB	A6 only takes public transit to work if her car is broken. With public transit, it would take A6 around 60 minutes to her workplace, whereas if she drives, it takes her around 30 minutes to work.	A6	OIB
A3 drives to work, and she does not like to take PT to work because it takes too long. If the car is broken, then she rides the bike to work. Public transit is more associated as a travel mode for free time. If fuel prices continue to rise, A3 thinks of fully switching to PT for work, even if takes very long.	A3	OIB	A7 generally walks or rides PT to go to work. She rides the bike for short trips, usually on weekdays after works. On the weekends, A7 generally drives her kids to soccer practice or to go for a walk in a forest, mountain, or park. She only drives on weekends. Public transit is very cheap and effective.	A7	NIB

SIGNIFICANT STATEMENTS	ID	IB	SIGNIFICANT STATEMENTS	ID	IB
Public transit is not bad, but driving is by far the best option, despite the parking-related challenges. Even if gas prices continue to rise, A4 wont switch to another mode. A4 would rather save on other things in daily life (except his children).	A4	TFYIB	A8 mostly walks or takes public transit. If the weather is warm, then she also bikes to work and for other purposes. She reports that biking is fun and its healthy, and therefore she likes to do it. Before the outbreak for COVID, A8 reports that she did not really walk in daily life, whereas she does walk now for during the week.	A8	OIB
A9 only walks and takes the scooter (for the last two years). A9 never rides the bike. A9 walks even long distances. Walking is for him "freedom", without being dependent on anyone. Walking infrastructure in Vienna very good. PT is good in Vienna. The cost of public transit is very cheap when compared to other cities globally. A9 would prefer if there is more information at stations regarding the arrival of trains. A9 does not have a driver's license. He would only get a driver's license if he moves to a rural area, which he doesn't exclude as a possibility. He never takes uber or taxi, as he does not like to pay so much for mobility, and he is generally opposed to cars in the city.	A9	OIB	A11 Only Bikes to Work, even though the biking infrastructure could and should be improved. Only in bad weather conditions, A11 takes public transit to work. For non-work trips, A11 takes more public transit. For trips less than (one-way) 10 minutes, A11 also walks. A11 is generally happy with Public transit, it's very reliable and can get you to many places. A11 owns a car, and sometimes uses it on the weekends. However, metro is faster than the bus.	A11	OIB

SIGNIFICANT STATEMENTS	ID	IB	SIGNIFICANT STATEMENTS	ID	IB
I only take PT to work. For A10, taking PT reflects flexibility because driving is only stress, especially regarding the parking situation. A10 only drives if she has to do a large grocery shopping, and if the supermarket she goes to has a parking garage. The higher fuel prices are also a deterrent to drive generally. For shorter distances, A10 uses e-bikes. Biking infrastructure in Vienna very good. Generally happy with public transit, only criticism is the plastic seats	A10	NIB	A12 usually rides PT to work. For non-work-related trips, A12 likes to walk, also due to the health aspect of walking. PT generally okay, but there are many things to improve. The S-Bahn (Suburban train) is not as reliable as the Vienna Metro. Often, trains are running late or don't show up.	A12	TFYIB
A13 bikes to work, because walking is too far. Biking gives A13 the most flexibility and is the most convenient travel mode. The environmental aspect is not the first priority. Rather it is healthy, and comfortable. Biking infrastructure in Vienna is good. A13 started biking since the COVID pandemic outbreak. Before that, A13 never biked. Even though public transit in Vienna is very good, A13 bikes almost everywhere. Only for very long distances, A13 might ride public transit, but this is an exception rather than a rule.	A13	OIB	For work trips, A15 only walks and takes public transit. For non-work trips, especially in the evenings, A15 reports that he drives occasionally, but mostly only to outer districts, and only if he anticipates parking to not be a problem. A15 does not see the car as a status symbol, he rather just sees it as a mode of convenience for certain, but not all purposes. He thinks that bike lanes should be more protected.	A15	TFYIB

SIGNIFICANT STATEMENTS	ID	IB	SIGNIFICANT STATEMENTS	ID	IB
A13 bikes to work, because walking is too far. Biking gives A13 the most flexibility and is the most convenient travel mode. The environmental aspect is not the first priority. Rather it is healthy, and comfortable. Biking infrastructure in Vienna is good. A13 started biking since the COVID pandemic outbreak. Before that, A13 never biked. Even though public transit in Vienna is very good, A13 bikes almost everywhere. Only for very long distances, A13 might ride public transit, but this is an exception rather than a rule.	A13	OIB	For work trips, A15 only walks and takes public transit. For non-work trips, especially in the evenings, A15 reports that he drives occasionally, but mostly only to outer districts, and only if he anticipates parking to not be a problem. A15 does not see the car as a status symbol, he rather just sees it as a mode of convenience for certain, but not all purposes. He thinks that bike lanes should be more protected.	A15	TFYIB
A14 mostly walks to work. For trips less than 1 km away, A14 takes the scooter For non-work trips, A14 also rides public transit and occasionally drives. However, A14 only uses the car for longer distance trips on the weekend. A14 thinks that cars do not belong to cities: " I don't think a car belongs to any city in the world. Cars should be banned, as they occupy roughly 10m² in the cities, they are wasting a lot of space". Biking infrastructure is not satisfactory, it should be better. There should be more bike lanes and they should be more protective. It's too noisy for A14 to ride the bike. There are too many cars in Vienna.	A14	NIB	A16 mostly takes public transit and the e-scooter to school, as well as walk for non-work/school purposes.	A16	OIB

SIGNIFICANT STATEMENTS	ID	IB	SIGNIFICANT STATEMENTS	ID	IB
A13 bikes to work, because walking is too far. Biking gives A13 the most flexibility and is the most convenient travel mode. The environmental aspect is not the first priority. Rather it is healthy, and comfortable. Biking infrastructure in Vienna is good. A13 started biking since the COVID pandemic outbreak. Before that, A13 never biked. Even though public transit in Vienna is very good, A13 bikes almost everywhere. Only for very long distances, A13 might ride public transit, but this is an exception rather than a rule.	A13	OIB	For work trips, A15 only walks and takes public transit. For non-work trips, especially in the evenings, A15 reports that he drives occasionally, but mostly only to outer districts, and only if he anticipates parking to not be a problem. A15 does not see the car as a status symbol, he rather just sees it as a mode of convenience for certain, but not all purposes. He thinks that bike lanes should be more protected.	A15	TFYIB
A14 mostly walks to work. For trips less than 1 km away, A14 takes the scooter For non-work trips, A14 also rides public transit and occasionally drives. However, A14 only uses the car for longer distance trips on the weekend. A14 thinks that cars do not belong to cities: " I don't think a car belongs to any city in the world. Cars should be banned, as they occupy roughly 10m² in the cities, they are wasting a lot of space". Biking infrastructure is not satisfactory, it should be better. There should be more bike lanes and they should be more protective. It's too noisy for A14 to ride the bike. There are too many cars in Vienna.	A14	NIB	A16 mostly takes public transit and the e-scooter to school, as well as walk for non-work/school purposes.	A16	OIB

SIGNIFICANT STATEMENTS	ID	IB	SIGNIFICANT STATEMENTS	ID	IB
A17 bikes and takes public transit to work. Convenience most important factor. The environmental issue is present, but not really a factor that influences the travel behavior. For A17, a good public transit system is a system where one can just leave the house without having to check the schedule of the bus or tram. As an immigrant from North America, A1 7appreciate the easy access to all amenities without having to drive for basic errands. Easy access includes short distances and very good walking and biking infrastructure.	A17	OIB	A20 mostly works from home office. If A20 goes to work, she bikes, walks or public transit. She cycles if the distance is not more than 20-25 minutes. She only bikes on separate bike lanes. Vienna's bike infrastructure is good, but there are many cyclists so more bike lanes are needed. For non-work-related trips, she and her family sometimes take a car, especially when going to the swimming pool or to other leisurely activities in the outer districts. She finds the green transportation modes more convenient, faster, more environmentally friendly and also safer than driving.	A20	OIB
90% of all trips biking, 10% walking. A18 prefers these modes because they are the healthiest modes, and she gets to enjoy fresh air. She feels safe riding the bike. The environmental aspect of travel is important, but the health aspect is more important to her. For her, Vienna has a very high life quality. Cars should only work as social services for people who need assistance in travelling. The city should not design their policies towards cars. In countries she lived previously, she	A18	TFYIB	A21 mostly takes public transit and walks to work. However, A21 is not happy with the bus interval where she lives (she lives in the outer districts). She goes to the office three times a week. A21 has the Klimaticket, which is similar to an annual pass, but valid for the whole country. The prices for those annual passes are great, very cheap. For short errands, A21 bikes. A21 only uses the car for errands on the weekends, such as	A21	NIB

SIGNIFICANT STATEMENTS	ID	IB	SIGNIFICANT STATEMENTS	ID	IB
used more cars and less cycling, since the public transit and cycling infrastructure in most cities around the world is less high quality compared to Vienna, Austria.			taking her kids to swimming practice or go to a suburban location. The environmental aspect is the most important aspect of travelling for A21. A21 doesn't believe that cars belong in cities, especially in inner cities. A21 adds, that all policies in the cities are directed towards drivers. In recent years, the parking policies (maximum parking 2 hour anywhere) has led to less car in the cities. However, some outer districts have not adopted those policies.		
A19 only walks to work and takes PT for non-work-related purposes. A19 only takes 15 minutes on foot to work.	A19	NIB			

TABLE 8.6 SIGNIFICANT STATEMENTS REGARDING SATISFACTION RATES (PERCEPTIONS) OF PUBLIC TRANSIT

SIGNIFICANT STATEMENTS	ID	IB
A2 has generally a negative perception of public transit: “I don’t like the vibe on Public transit, people don’t know how to behave”	A2	TFYIB
PT generally okay, but there are many things to improve. The S-Bahn (Suburban train) is not as reliable as the Vienna Metro. Often, trains are running late or don’t show up. Also, the plastic seats are not good. Waiting times in general are good, except in the evenings. At night, A12 does not always feel comfortable. Nothing has happened personally to her, but rather she saw other people harassing other people, which made A12 very uncomfortable.	A12	TFYIB
PT is very good, especially the cost aspect of it. Equipment is not very good, especially the fact that there is no AC in some of the trams. The travel time, connectivity and safety aspect is satisfactory	A15	TFYIB
A16 mostly takes public transit and the e-scooter to school, as well as walk for non-work/school purposes. A16 has a yearly public transit pass and finds the costs adequate. A16 also finds the average travel time very satisfying, especially when travelling within the city. The equipment is generally good, but the only issue is the missing AC in some trams, especially in the summer months. Safety-Depends on where you are. For A16-safety is context and location-dependent. “For me, safety means that wherever I am, I can walk without looking back or to the sides”. Walking infrastructure is	A16	OIB

very good, there is no reason not to walk. Infrastructure for micro-mobility is also good. I wear a hijab (headscarf), so sometimes I feel like people stare at me, but I got used to it and it does not really affect my overall safety perceptions.		
Costs are very good, 365 Euro per year is extremely safe. Travel time also satisfactory. AC in the summer is a big issue on the trams. Connectivity is good, but for A17, connectivity is highly related to the concept of self-selection. People can chose where they live based on how long they want to get to various places and amenities. A17 never looks at the schedule for waiting time. For A17, a good public transit system is a system where one can just leave the house without having to check the schedule of the bus or tram.	A17	OIB
The cost-aspect of PT is very good, but travel time is not that good. A19 reports that she lives in an outer district, and its more difficult to get to other outer districts, whereas its easy to get to the inner city. I still look at the schedule, because I am used to do that from my time in the US. A19 is also not satisfied with the AC situation in public transit in Vienna. A19 feels unsafe with the suburban railway (S-Bahn), especially at nights. Generally, A19 feels safer on the bus than on the train, because of the closer proximity to the driver.	A19	NIB

A20 is happy with the costs, which she is very satisfied with. Travel time is also good, although most of her travels are shorter than 30 minutes. The equipment is generally okay, however, the AC not working is an issue for her. Connectivity is okay, but busses are much slower than trams. Waiting times are okay, because A20 looks at google maps for waiting times. She does not start a trip without looking at the schedule prior to starting her trip. “I used to live in New York, so I am always very aware of my surroundings”. Generally, the awareness in New York is much higher compared to Vienna.	A20	OIB
A21 has the Klimaticket, which is similar to an annual pass, but valid for the whole country. The prices for those annual passes are great, very cheap. The waiting times are not good in the outer districts, especially for busses, However, A21 is aware that compared to most other cities, the waiting times for busses in Vienna are still good (15 minutes in an outer district). A21 generally feels very safe, however sometimes there are some intoxicated people which makes riding public transit at night especially, a little uncomfortable. The equipment infrastructure is getting better, there are now cleaning times who clean up the mess.	A21	NIB

8.6.3 Step 3: Formulate the Meanings of Each Statement

As exhaustively outlined in the previous paragraphs, the core concept of phenomenological research is to capture the meanings that participants associate with experiences and the researched topic, in this case travel mode choice and perceptions of public transit. This step displays the distinguishing characteristics and the added value of the qualitative research, While the significant statements were reflected in the quantitative analysis on a basic level, the formulated meanings serve as a in-depth analysis of the attached meanings of the phenomena stated in the significant statements. The formulated meanings provide a broader understanding, within which cultural settings and ideological frameworks participants with and without an IB manage their daily travel in particular and daily life more general. The formulated meanings also show, that the travel behavior is tied to certain economic conditions and cultural norms, and that some of the travel behavior is dynamic in that it might change if certain structural conditions allow for it or change.

The quantitative analysis does not account for any post-structural or phenomenological conceptualization of travel and therefore neglects the conditions under which the respondents travel. Therefore, especially in a heterogenous society, the qualitative phenomenological research is an essential complement to quantitative analysis. The crucial step in formulating meanings from the significant statements is to apply bracketing, which has been extensively discussed earlier in this chapter.

To achieve bracketing, I employed a semi-structured interview in order to not limit the influence of my own pre-conceptions in the question and subsequently the answer. Therefore, I did not interfere when the participants' responses did not relate to my questions to a full extent. Rather, I listened to their experiences with as little prejudice as possible, and tried to ask follow-up questions only for clarification, rather than to bring in my view and start a discussion with them. In my case, being familiar with some immigrant communities in Vienna, I had to be particular careful in not letting my preconceptions guide my interpretation of the meanings (Chan et al., 2015).

8.6.3.1 Mode Choice

Table 8.7 provides an overview of the formulated meanings of the significant meanings grouped for mode choice. The left column displays the significant statements, that were already stated in Table 8.5. The center column shows the IB of the respondents, while the right comment contains the formulated meanings, that I have composed about the significant statements. The IB did not play a role in forming the meanings initially, as I am not per se interested in what experiences various groups have, but rather taking the experiences as a starting point and accordingly analyzing the IBs associated with those experiences. Table 8.7 however shows that some formulated meanings contain responses from the same IBs, possibly paving the way for some general assumptions. Out of the 15 significant statements regarding mode choice, 6 formulated meanings were created. The first formulated meaning (M1) was created from two statements by individuals with a TIB. M2 and M3 capture the experiences of two participants with a TYFIB and one participant individual with a TFYIB. M4 and M5, however, were derived from statements from individuals with a TYFIB and one NIB individual. M6 consists of meanings formulated that were derived solely from statements made by NIB participants.

8.6.3.2 Satisfaction (Perceptions) of Public Transit

Table 8.8 provides an overview of the formulated meanings of the significant meanings grouped for mode choice. Similar to the analysis of mode choice, the IB did not play a role in forming the meanings concerning perceptions of public transit initially. . Out of 15 significant statements concerning the perceptions of public transit, also 6 meanings were formulated (M1a-M6a).

The first formulated meaning (M1a) emerged from significant statements given by an individual with a TIB, while M2a captures the experiences of an individual with a NIB and one respondent with an OIB. M3a entails significant statements by one NIB individual and one individual with a TIB. M4a contains two statements from OIB individuals, one NIB individual and one individual from former Yugoslavia, whereas M5a consists of statements given by one individual of each demographic group. M6a captures individuals with an OIB IB.

TABLE 8.7 FORMULATED MEANINGS REGARDING MODE CHOICE DERIVED FROM SIGNIFICANT STATEMENTS

SIGNIFICANT STATEMENTS	IB	FORMULATED MEANINGS
A1 only drives to work. PT is very expensive if one does not get the Annual Pass. He doesn't want to get forced to buy the annual pass.	**TFYIB**	**M1**
A2 mostly drives to work and rarely takes PT in his free time. PT is expensive except for the annual pass. "The system "forces" me to buy the Annual Pass. "	**TFIYB**	**The respondents have the feeling that the government wants to dictate the way they travel. They don't mind taking public transit occasionally, but they don't want to commit themselves only to public transit.**
A3 drives to work, and she does not like to take PT to work because it takes too long. If the car is broken, then she rides the bike to work. If fuel prices continue to rise, A3 thinks of fully switching to PT for work, even if takes a very long.	**OIB**	**M2**
A6 only takes public transit to work if her car is broken. With public transit, it would take her around 60 minutes to her workplace, whereas if she drives, it takes her around 30 minutes to work.	**OIB**	**The respondents drive to work because it is by far the fastest travel mode for them to get to work. The discrepancy in time between driving and taking public transit is very large. Public transit for work trips is only seen as a travel mode in emergencies. They don't mind taking public transit for leisurely activities if they have fewer time constraints.**
For work travel, driving is much faster compared to any other mode, even		

SIGNIFICANT STATEMENTS	IB	FORMULATED MEANINGS
though overall A5 is not in principle against public transit.	**TFYIB**	
A3: Public transit is more associated as a travel mode for free time. A5: I also walk and bike sometimes, although I only bike with my child together. I see biking as more of a fun leisure activity, but it's not a travel mode for him. A5 feels embarrassed to ride public transit because he does not want other people from his neighborhood to see him on the tram or the bus. He said that he sees it as a socio-economic "defeat" to ride the bus.	**OIB** **TFYIB**	**M3** **Driving is being ascribed an "important" status as a travel mode for work or business activities. Other modes, especially riding public transit or biking, are associated with leisurely activities. Travel modes are being seen as a reflection of the purpose of the trip**
A14 mostly walks to work. For trips less than 1 km away, A14 takes the scooter for non-work trips, and A14 also rides public transit and occasionally drives. However, A14 only uses the car for long-distance trips on the weekend. A14 thinks that cars do not belong to cities: "I don't think a car belongs to any city in the world. Cars should be banned, as they occupy roughly 10m² in the cities, and they are wasting a lot of space.	**NIB**	**M4** **These respondents mostly walk, and ride public transit to work and for non-work-related purposes and rarely the car for leisurely activities only.** **The ultimate goal of any city policy should be to reduce or ban the presence of cars in cities, especially in inner districts. Cars take up too much space in the city and harm the**

SIGNIFICANT STATEMENTS	IB	FORMULATED MEANINGS
		aesthetics of the city. The car is the "enemy" of a healthy, sustainable city. Driving in a city is not freedom, but rather a large restriction. Cities do not do enough to push for sustainable solutions in the city
A21 mostly takes public transit and walks to work. The environmental aspect is the most important aspect of traveling for A21. A21 doesn't believe that cars belong in cities, especially in inner cities. A21 adds, that all policies in the cities are directed toward drivers. In recent years, the parking policies (maximum parking 2 hours anywhere) have led to fewer cars in the cities. However, some outer districts have not adopted those policies. One of those districts is in her proximity, she was scared of "parking-space tourism".	**NIB**	
A9 only walks and takes the scooter (for the last two years). A9 never rides the bike. A9 walks even long distances. Walking is for him "freedom", without being dependent on anyone. The walking infrastructure in Vienna is very good. A9 never takes Uber or a taxi, as A9 does not like to pay so much for mobility, and is generally opposed to cars in the city.	**NIB**	

SIGNIFICANT STATEMENTS	IB	FORMULATED MEANINGS
A18: 90% of all trips biking, 10% walking. A18 prefers these modes because they are the healthiest modes and A18 can enjoy the fresh air. Cars should only work as social services for people who need assistance in traveling. The city should not design its policies towards cars.	**TFYIB**	
For A10, taking PT reflects flexibility, because driving is only stressful, especially regarding the parking situation. A10 only drives if she has to do a large grocery shopping, and if the supermarket she goes to has a parking garage. The higher fuel prices are also a deterrent to driving generally.	**NIB**	**M5**
For work trips, A15 only walks and takes public transit. For non-work trips, especially in the evenings, A15 reports that he drives occasionally, but mostly only to outer districts, and only if he anticipates parking to not be a problem. A15 does not see the car as a status symbol, he rather just sees it as a mode of convenience for certain, but not all purposes. He thinks that bike lanes should be more protected.	**TFYIB**	**Parking is a deterrent for regular driving, although driving is in general not a popular travel mode choice. The car is only seen as a mode choice if no other choice for that specific choice is available.**
A17 bikes and takes public transit to		**M6**

SIGNIFICANT STATEMENTS	IB	FORMULATED MEANINGS
work. Convenience most important factor. The environmental issue is present, but not a factor that influences travel behavior. For A17, a good public transit system is a system where one can just leave the house without having to check the schedule of the bus or tram. As an immigrant from North America, A17 appreciates the easy access to all amenities without having to drive for basic errands. Easy access includes short distances and very good walking and biking infrastructure.	**OIB**	**For these respondents, the choice of taking green transportation modes does not stem mainly from environmental concerns, but rather from health reasons. The environmental concern is present, but not the main factor for choosing walking or biking. The aspect of having fun and just enjoying the lifestyle of being able to ride bikes and walks for errands is also appealing to these respondents. COVID was also a factor that led to some travel mode-related changes. These respondents acknowledge the efficiency of the PT system in Vienna, but for them, getting around healthy and in a fun way means walking or biking, not necessarily taking PT. Walking is more than a transportation mode, it is a way of life and a part of local culture.**
A13 bikes to work, because walking is too far. Biking gives A13 the most flexibility and is the most convenient travel mode. The environmental aspect is not the priority. Rather it is healthy and comfortable. The biking infrastructure in Vienna is good. A13 started biking after the COVID pandemic outbreak. Before that, A13 never biked. Even though public transit in Vienna is very good, A13 bikes are almost everywhere. Only for very long distances, A13 might ride public transit, but this is an exception	**OIB**	

SIGNIFICANT STATEMENTS	IB	FORMULATED MEANINGS
rather than a rule.		

TABLE 8.8 FORMULATED MEANINGS RELATED PERCEPTIONS OF PUBLIC TRANSIT

Significant Statements	IB	Formulated Meaning
At night, A12 does not always feel comfortable. Nothing has happened personally to her, but rather she saw other people harassing other people, which made A12 very uncomfortable.	TFYIB	**M1a** The perception of personal safety is being negatively affected by perceived negative actions by other individuals in the same bus, tram, or metro, which do not have a direct influence on their safety.
Generally, A19 feels safer on the bus than on the train, because of the closer proximity to the driver.		**M2a** The perception of personal safety is inherently a very subjective feeling, and also context-dependent. There is no general feeling of safety, it changes depending on various factors such as the location, time of travel, and which mode is used.
"I used to live in New York, so I am always very aware of my surroundings". The awareness in New York is much higher compared to Vienna.	NIB	
A21 generally feels very safe, however, sometimes there are some intoxicated people which makes riding public transit at night especially, a little uncomfortable for her	OIB	
A2 has generally a negative perception of public transit: "I don't like the vibe on Public transit, people don't know how to behave there"	NIB	**M3a** The perception of public transit is influenced by previous experiences in other countries. The perception of safety is therefore also seen as a

Significant Statements	IB	Formulated Meaning
	TYFIB	comparison to previous experiences.
Equipment is not particularly good, especially the fact that there is no AC in some of the trams. The equipment is generally good, but the only issue is the missing AC in some trams, especially in the summer months. The missing AC in the summer is a big issue on the trams. A19 is also not satisfied with the AC situation in public transit in Vienna.	TFYIB OIB OIB NIB	**M4a** Travel on trams, especially in the summer, is burdensome for many respondents due to the lack of AC units in some trams. This was one of the most pressing concerns for individuals.
Waiting times in general are good, except in the evenings. Waiting times are okay because A20 looks at google maps for waiting times before she starts a trip. The waiting times are not good in the outer districts, especially for busses, However, A21 is aware that compared to most other cities, the waiting times for busses in Vienna are still good (15 minutes in an outer district).	TFYIB OIB NIB	**M5a** Compared to other cities, the waiting time for buses is short. However, the overall expectations of the public transit system in Vienna are very high, so that especially the waiting times at night or in suburban areas are not satisfactory.

Significant Statements	IB	Formulated Meaning
Connectivity is good, but for A17, connectivity is highly related to the concept of self-selection. People can choose where they live based on how long they want to get to various places and amenities.	OIB	**M6a** Connectivity is location dependent. The meaning of connectivity is highly dependent on the spatial arrangement of one´s daily life.
Connectivity is okay, but buses are much slower than trams. The connectivity between outer districts/suburban locations is not satisfactory.	OIB	

8.6.4 Step 4: Classification of Formulated Meanings Into Clusters of Themes And Emergent Themes

Table 8.9 and Table 8.10 displays provide an overview of the themes that emerged from the cluster of themes, which in turn emerged from the meaning formulation through the phenomenological methods outlined in detail earlier in this chapter (for mode choice and perceptions/satisfaction). One important feature of this systematic method of analysis is that different significant statements of one respondent can be ascribed to a different formulation of meanings since different responses by one respondent can have different meanings. Clusters of themes were conceptualized from formulated meanings, and emergent themes were subsequently formulated from a cluster of themes. This is a sort of reduction that aims to find the *essence* of the responses of the participants about the experiences in their daily travel, and more specifically mode choice and perceptions of public transit.

8.6.4.1 Mode Choice

The cluster of themes shows us that, for TFYIB, mode choice is an expression of freedom and an expression of social status, and that public transit is insufficient, especially as a mode for work-related purposes. However, the interviews and the significant statements have shown, that TFYIB respondents are not planning to switch to public transit even if the public transit network is being expanded. The second cluster of themes I labeled as *Sustainable and environmentally friendly travel is not yet possible to a full extent. City residents should not need a car at all, but the reality shows that, especially in certain circumstances, such as travel with family or suburban travel, green travel might not be possible.* I created these clusters of themes emerging from formulated meanings of responses by NIB and TFYIB individuals.

The third cluster of themes is related to the health and cultural aspect of travel. This cluster emerged from formulated meanings that were ascribed to travel mode choice by individuals with OIB. For these respondents, environmentally friendly travel is important, but not the most important reason for mostly walking and biking for all purposes. The meaning ascribed to these active travel modes are related to the health and cultural aspect of travel.

The emergent themes that I have created from the themes of clusters are *The perceived role of the local government in shaping daily travel*, *the perceived role of the local government in ensuring equitable travel without disregarding sustainability*, and *the cultural aspect of daily travel in diverse cities with a high percentage of an immigrant population*. The interviewee´s experiences showed, that the daily travel of these individuals was situated in a political and socio-economic context stronger than expected. The daily travel of individuals is also strongly connected with the political demands of individuals.

8.6.4.2 Perceptions (Satisfaction) of Public Transit

As outlined in Table 8.10, the cluster of themes that emerged from the formulation of meanings contains the aspects of safety, equipment, and travel time/connectivity/waiting times combined. The cost aspect was not considered here, since all respondents were very happy with the costs, particularly with the annual pass (365 Euros). The slight disagreements with the costs, especially expressed by individuals with a TIB are discussed in the mode-choice section under *the role of the government in shaping travel,* as they reported that the costs of public transit would not in any way influence their travel behavior, but it reflects an overall political statement on their behalf.

The first cluster of themes contains the location (space) and time-dependency of the subjective sense of safety. The second cluster of themes entails that the suburban areas/outer districts are being given less attention to public transport coverage compared to inner city districts. Here, the aspects of connectivity and waiting time were clustered together due to their relationship with each other. The third cluster of the theme contains the equipment aspect of public transit and more abstractly, how the transportation agencies can provide for more comfortable travel, especially with rising temperatures and insufficient AC unit provision.

The emergent, larger conceptual themes are the *spatial-temporal aspect of safety perception*, coverage, or ridership and how can transportation agencies prepare better for climate change.

8.6.4.3 Mode Choice

TABLE 8.9 CLUSTER OF THEMES AND EMERGENT THEMES DEVELOPED FROM FORMULATED MEANINGS (MODE-CHOICE)

FORMULATED MEANINGS	CLUSTER OF THEMES	EMERGENT THEMES
M1/M3 The respondents have the feeling that the government wants to dictate the way they travel. They don't mind taking public transit maybe occasionally, but they don't want to commit themselves only to public transit.	Mode Choice is an expression of freedom of choice and an expression of social status.	**The perceived role of the local government in shaping daily travel**
Driving is being ascribed an "important" status as a travel mode for work or business activities. Other modes, especially riding public transit or biking, are associated with leisurely activities. Travel modes are seen as a reflection of the purpose of the trip which everyone should decide bottom-up and not top-down.	Public transit is insufficient, especially in suburban areas. Even with improved public transit coverage in urban areas, the car remains a travel mode option nr 1.	How much government interference is tolerable regarding individuals´ mode choice?
M2 The respondents drive to work because it is by far the fastest travel mode for them to get to work. The discrepancy in time between driving and taking public transit is very large. Public		

FORMULATED MEANINGS	CLUSTER OF THEMES	EMERGENT THEMES
transit for work trips is only seen as a travel mode in emergencies. They don't mind taking public transit for leisurely activities if there are no time constraints.		
M4/M5		
These respondents mostly walk, and ride public transit to work and for non-work-related purposes and rarely the car for leisurely activities only. The goal of any city policy should be to reduce or ban the presence of cars in cities, especially in inner districts. Cars take up too much space in the city and harm the aesthetics of the city. The car is the "enemy" of a healthy, sustainable city. Driving in a city is not freedom, but rather a large restriction. Cities do not do enough to push for sustainable solutions in the city	Sustainable and environmentally friendly travel is not yet possible to a full extent. City residents should not need a car at all, but the reality shows that, especially in certain circumstances, such as travel with family or suburban travel, green travel might not be possible.	**The role of the local government in ensuring efficient and equitable travel without disregarding sustainability** Sustainable, efficient, and equitable travel-how can cities deal with this triangle?
M6		
For these respondents, the choice of taking green transportation modes does not stem mainly from environmental concerns, but rather from health reasons. The environmental concern is present, but not the main factor for choosing walking or biking. The aspect of having fun and just enjoying the lifestyle of being able	Various travel modes reflect various cultures. Active transportation modes are being seen as active, fun, and most importantly healthy modes and walking/biking are not only means of mobility but rather a reflection of a certain way of life and	**The cultural aspect of daily travel in diverse cities with a high percentage of an immigrant population**

FORMULATED MEANINGS	CLUSTER OF THEMES	EMERGENT THEMES
to ride bikes and walks for errands is also appealing to these respondents. COVID was also a factor that led to some travel mode-related changes. These respondents acknowledge the efficiency of the PT system in Vienna, but for them, getting around healthy and in a fun way means walking or biking, not necessarily taking PT. Walking is more than a transportation mode, it is a way of life and a part of local culture.	reflection of local culture.	

TABLE 8.10 CLUSTER OF THEMES AND EMERGENT THEMES DEVELOPED FROM FORMULATED MEANINGS (PERCEPTIONS)

FORMULATED MEANINGS	CLUSTER OF THEMES	EMERGENT THEMES
M1a The perception of personal safety is being negatively affected by perceived negative actions by other individuals in the same bus, tram, or metro, which do not have a direct influence on their safety.		
M2a The perception of personal safety is inherently a very subjective feeling, and also context-dependent. There is no general feeling of safety, it changes depending on various factors such as the location, time of travel, and which mode is used.	Individuals 'safety perceptions are location and time dependent. Cultural factors also might play a role in how to deal with certain safety issues in certain situations. Safety is always dependent on a certain situation, there is no overall safety feeling in a vacuum	The spatial-temporal aspect of safety perception
M3a The perception of perception is influenced by previous experiences in other countries. The perception of safety is therefore also seen as a comparison to previous experiences.		
M5a Compared to other cities, the waiting time for buses is short. However, the overall expectations of the public transit system in Vienna are very	Suburban areas/outer districts are being given less attention to coverage compared to inner	

FORMULATED MEANINGS	CLUSTER OF THEMES	EMERGENT THEMES
high, so that especially the waiting times at night or in suburban areas are not satisfactory.	city districts.	Coverage or Ridership?
M4a Travel on trams, especially in the summer, is burdensome for many respondents due to the lack of AC units in some trams. This was one of the most pressing concerns for individuals.	The Wiener Linien (Transportation Agency of Vienna) does not properly equip its trams with the necessary amenities and infrastructure, specifically in times of climate change.	How can transportation agencies prepare better for climate change? Trams have to be redesigned to accommodate passengers in warm summers

8.6.5 Step 5: Exhaustive Description of The Formulated Meanings, The Cluster of Themes, And Emergent Themes

8.6.5.1 First Cluster of Themes

8.6.5.1.1 Mode Choice

The first cluster of themes regarding mode-choice: *Mode Choice as an expression of freedom of choice and an expression of social status* contains the formulated meanings M1 and M2.

These responses showed, that regarding the first themes of cluster and emergent themes, the car has strong importance and represents much more than just a travel mode, it represents socio-economic success, expression of freedom, and being successful in life. Nevertheless, it was still important for these respondents to mention that they were not dissatisfied in principle with the public transit system in Vienna. Further, this cluster of thoughts entails statements and meanings of daily travel which show a political dimension of traveling, as summed up in M1.

As the various themes have shown, the political dimension of daily travel shows very different characteristics across the respondents. As respondent A2, a worker with a vocational school degree with a TIB has stated: "The system forces me to buy the Annual Pass. "This statement reflects a conflict of the individual with the political system and the local government. In this case, the affordable public transit annual pass (365 Euros a year=1 Euro per day) is being interpreted as an agenda by the government to push and "force" people to ride public transit, which is being seen as conflicting with individual expression and freedom. Personal expression and freedom can be expressed in various ways, such as voting, expression of opinions, etc. From a mobility perspective, these respondents view the car as an expression of freedom.

This conflict is also visible with respondent A1, who also express dissatisfaction with the cheap annual public transit pass. A1, also a factory worker with Turkish immigration, background additionally asserts, that he wished the single rides would be cheaper, as he is not opposed to riding public transit occasionally. However, for work-related purposes, he would

only drive to work as he does not associate work-related travel with riding public transit. M2 consists of meanings that emerged from significant statements which emphasized the importance of status regarding travel mode choice, specifically driving. A5, also asserts that for him, he feels embarrassed to ride public transit, because he does not want other people from his neighborhood to see him on the tram or the bus. He said that he sees riding the bus as equal to an "economic defeat". He also said that he would ride the bike with his children around the block, as he sees riding the bike only as a leisurely activity that is associated with fun and spending time with children, but not as a travel mode for work or business-related activities. In addition, A3, an OIB individual claims, that even if she were willing to ride public transit, she could not ride it to work because of the insufficient network coverage in her suburban neighborhood.

8.6.5.1.2 Satisfaction (Perceptions) of Public Transit

The first cluster regarding the perceptions of public transit, Individuals *'safety perceptions are location and time-dependent* consisting of the formulated meanings M1a, M2a, and M3a. These meanings were derived from significant statements from individuals of all three demographic groups. This cluster, therefore, is diverse in that it incorporated not only individuals from across demographic groups but also in terms of their highest educational attainment. The respondent with a TIB has a vocational school degree, whereas the other respondents are graduate school degree holders. The title of the theme cluster which summed up various formulated meanings already hints at the conditional character of subjective safety. A19, a female NIB, reports that her subjective feeling of safety is much higher when she rides the bus than the metro or in the second car of a tram. She explains this feeling by pointing out that on the bus, the proximity to the bus driver increases her sense of security because the bus driver could potentially intervene in case of an emergency. In the metro or the second car of a tram, A19 reports that she would feel helpless and be more isolated from the driver/tram conductor and therefore more vulnerable. Additionally, A19 reports that her previous living experience in New York has made her more aware of safety issues on public transit.

A12, a female with a FYIB adds that while she has not had any negative experiences while riding public transit, she has occasionally witnessed other riders on the tram getting harassed

by a group of people. These occurrences have raised her awareness while riding public transit, particularly at night.

A2, an individual with a TIB who has a vocational degree and is a factory worker, does not comment specifically on his safety awareness or perceptions, but is rather critical of other riders generally, referring to his discomfort as not being happy with the "vibe" on public transit. A21, a female NIB with a graduate degree shares somewhat similar sentiments, albeit more nuanced. She reports, that the only instances in which she feels uncomfortable or uneasy while riding public transit is if visibly intoxicated passengers board the bus.

8.6.5.2 Second Cluster of Themes

8.6.5.2.1 Mode Choice

I summarize the second cluster of themes concerning mode choice as *Sustainable and environmentally friendly travel is not yet possible to a full extent. City residents should not need a car at all, but the reality shows that, especially in certain circumstances, such as travel with family or suburban travel, green travel might not be possible.*

Unlike the first theme of clusters, the second cluster of themes emerged from formulated meanings which in turn emerged from respondents who try to take green transportation modes (biking, walking, and riding public transit) as much as they can, but still must rely on cars for leisurely trips or trips with the family. Unlike in the first cluster of themes, here, the car does not represent any freedom or social status, but rather a burden. The city is urged to implement sustainable solutions to transportation-related issues. in the cities, namely, to reduce the presence of vehicles in the city to a minimum. These respondents see daily travel as part of a larger, sustainable, and healthy style in which the environment plays an especially important role. This second theme of clusters emerged from the formulated meanings of M4 and M5. M4 and M5 consist of significant statements made by 4 individuals without any IB (and all graduate degree holders), one individual with a TIB with a graduate degree, and one individual with a FYIB, who has a graduate degree.

On a less abstract level, A14, a male individual without IB who holds a graduate degree has stated: "I don't think a car belongs to any city in the world. Cars should be banned, as they

occupy roughly 10m² in the cities, and they are wasting a lot of space. " A21, a female NIB, who also holds a graduate degree shares similar sentiments, (see the significant statements) in that she doesn't believe that cars belong in cities, especially in inner cities. A21 adds, that all policies in the cities are directed toward drivers. In recent years, the parking policies (maximum parking 2 hours anywhere) have led to fewer cars in the cities. However, some outer districts have not adopted those policies. One of those districts is in her proximity, she feared "parking-space tourism". A18, a female with a TIB who holds a graduate degree, states that out of all trips: 90% trips are biking, and 10% are walking. A18 prefers these modes because they are the healthiest modes in her opinion and she can enjoy the fresh air. She further asserts that cars should only work as social services for people who need assistance in traveling. Cities should refrain from designing and implementing car-related policies.

8.6.5.2.2 Perceptions (Satisfaction) of public transit

The second cluster of themes regarding mode choice can be summarized as:

Suburban areas/outer districts are being given less attention to coverage compared to inner city districts.

This cluster again is diverse in terms of its respondents' IBs, but less diverse in terms of their highest educational attainment (all respondents have graduate degrees). This cluster was established through the merger of formulated meanings which entailed perceptions regarding connectivity and waiting times of public transit. Unsurprisingly, these two aspects are closely interrelated. These clusters of themes are somewhat similar to previous themes of clusters in the mode-choice section and therefore will not be exhaustively repeated in this section. However, what stuck out was that one respondent, who is a female with an OIB said that her perception of the bus being slower than the tram or metro inherently makes her choose other travel modes, if possible.

8.6.5.3 Third Cluster of Themes

8.6.5.3.1 Mode Choice

The third cluster of themes regarding mode choice can be summarized as *Various travel modes reflecting various cultures. Active transportation modes are being seen as active, fun, and most importantly healthy modes. Walking/biking is not only a means of mobility but rather a reflection of a certain way of life and a reflection of local culture.*

The health aspect is the driver of walking and biking for these respondents. These respondents link the health aspect to the cultural aspect of daily travel in Vienna. These individuals are both females with graduate degrees with an OIB and associate Vienna as a city where individuals walk every day not only as a means of getting from A to B but rather as a means to participate in the societal processes in the city and interact with fellow residents. The health aspect here does not only refer to the physical health aspect but also to mental health. For A17, an efficient public transit system is a system where individuals can start their trip without having to check the schedule of the bus or tram before leaving for the trip. As an immigrant from North America, A17 appreciates the easy access to all amenities without having to drive for basic errands. Easy access includes short distances and very good walking and biking infrastructure.

A13 bikes to work because walking to work would be too far for her. Biking provides A13 with the most flexibility and is the most convenient travel mode for her. The environmental aspect is not the priority, but the emphasis is on health and comfort. The biking infrastructure in Vienna is good. A13 started biking after the COVID pandemic outbreak. Before that, A13 never biked. Even though public transit in Vienna is very good, A13 bikes are almost everywhere. Only for very long distances, A13 might ride public transit, but this is an exception rather than a rule. The core meanings ascribed to active transportation modes by these respondents are, that walking and biking to a lesser extent are healthy in every way and an integral part of life in the city. As A16, an OIB individual has stated: "I walk or take the e-scooter everywhere. I do not even have a driver´s license. However, I am wondering if I should move to a small village outside of the city when I am retired. In that case, I will get a driver´s license, and consequently buy a car, because, in rural areas, it is very difficult to get around without a car. I will adapt to the local conditions there": This statement is intriguing,

as it shows that this seemingly firm insistence on active travel modes is spatially confined to the urban, and not being spatially extended outside of administrative city borders".

A9 only walks and takes the scooter (for the last two years). A9, a male NIB who holds a graduate degree, never rides a bike but walks even long distances. Walking for him represents "freedom". He sees the walking-related infrastructure in Vienna as very satisfactory. He reports that he never takes Uber or a taxi, as he does not like to pay much for inner-city travel and is generally opposed to cars in the city.

Another aspect that was shared by two respondents is that parking is a deterrent for regular driving, although driving is in general not a popular travel mode choice in any way. The car is only seen as a mode choice if no other choice for that specific choice is available.

A15, who has an FYIB with a graduate degree, addresses similar concerns. For work trips, A15 exclusively walks and rides public transit, whereas for non-work trips, especially in the evenings, A15 reports that he drives occasionally, albeit only to outer districts, where parking is usually not a large problem. He does not view driving as a status symbol, he rather just sees it as a mode of convenience for certain, but not all purposes. He thinks that bike lanes should be more protected.

8.6.5.3.2 Perceptions (Satisfaction with Public Transit)

I summarize the third cluster of themes concerning mode choice regarding perceptions (satisfaction) of public transit as *The Wiener Linien (Transportation Agency of Vienna) does not properly equip their trams with necessary amenities and infrastructure, specifically in the time of climate change.* This cluster was established through formulated meanings that emerged through significant statements made by one individual NIB, one individual with a TIB, and two individuals with an OIB. This cluster of themes summarized all formulated meanings related to significant statements which were made related to their perception of the equipment of public transit Vienna.

The replies regarding equipment among all the individuals, which represented all demographic groups, were the most homogenous among all the six aspects. All respondents reported that their dissatisfaction with the equipment of public transit in Vienna stems mainly from the lack of Air Conditioning units in some of the trams, which poses challenges, particularly in warm summer months. According to the official website of Vienna´s

transportation authority *Wiener Linien*, two-thirds of metro trains operate with air-conditioning units, whereas only half of all trains operate with an AC unit (Wiener Linien, 2022)[18]. Without specifying the exact year, the transportation authority has announced that within the next few years, every single ride on Vienna´s public transit will be air-conditioned.

8.6.5.4 Emergent Themes

Figure 8.2 presents the three emergent themes regarding mode choice and perceptions (satisfaction) of public transit. For TFYIB (especially with a TIB), the perceived role of the local government (Theme 1 (Mode Choice)) is rather negatively connoted. The first emergent theme of mode choice is the only emergent theme, which was derived from significant statements and a cluster of themes that exclusively belonged to TFYIB[19]. The first emergent theme of the perception of public transit relates to the conditions and spatial-temporal dimensions that the perceptions of safety regarding public transit are being produced. The second emergent theme (The role of the local government in ensuring efficient, equitable travel without disregarding sustainability and ridership vs. coverage) for mode choice and perceptions of public transit is identical. This identical character shows that sustainability and the dualism of ridership vs. coverage, particularly in outer districts was an important topic and issue for a lot of respondents, especially OIB and NIB individuals. The third emergent theme regarding mode choice investigates the cultural aspects of daily life and specifically the meanings that respondents ascribe to certain travel modes. This theme showed that respondents, especially NIB and to some extent, OIB individuals have a clear idea of which travel mode "belongs" to a city´s culture and which does not. The third emergent theme regarding the perceptions of public transit refers to the growing discomfort of respondents to travel on the tram or metro in the summer month due to absent AC units. Considering climate change and warmer summers in the future, this is an issue that respondents are very concerned about.

[18] 100% of busses run with AC units

[19] Within the TYFIB respondents, most responses came from individuals with a TIB

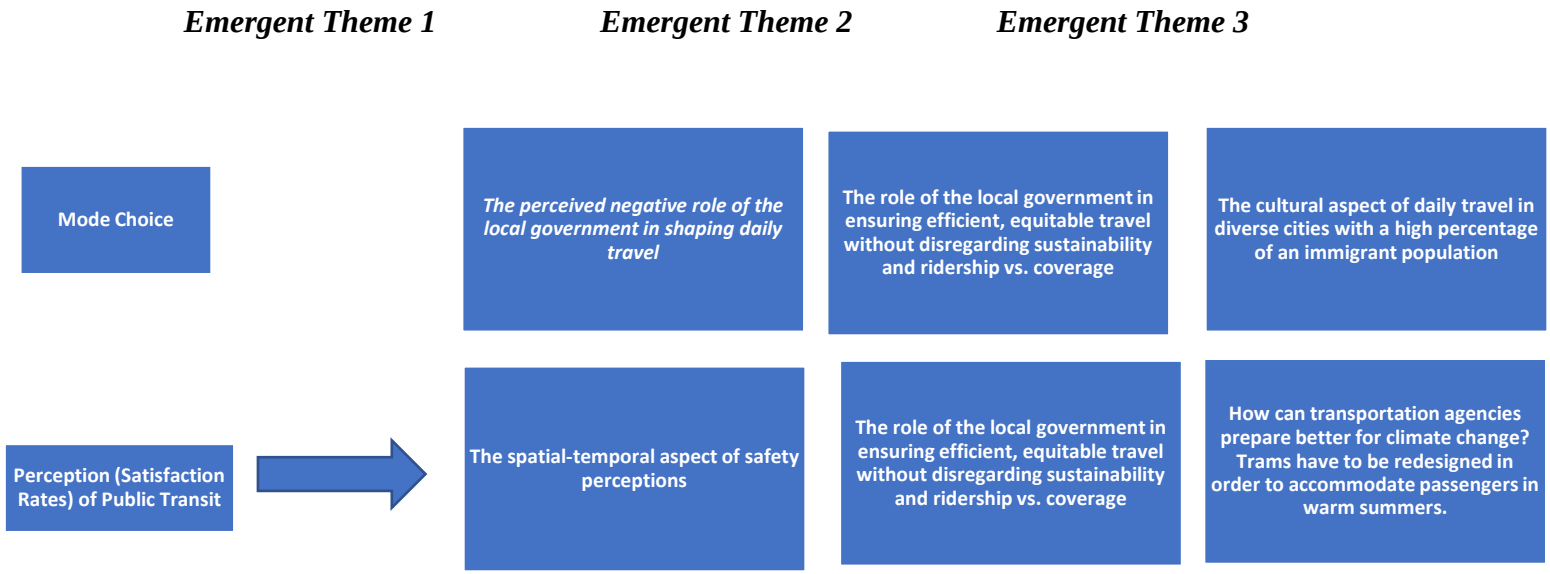

FIGURE 8. 2 EMERGENT THEMES

8.6.5.4.1 Mode Choice

1st Emergent Theme: The perceived negative role of the local government in shaping daily travel.

The emergent themes are themes that represent the larger context in which I situated the experiences and meaning ascriptions of the participants. I identified the first emergent theme which resulted from the formulation of meanings: *The perceived role of the local government in shaping daily travel*. For individuals with a TIB who have high-school or vocational degrees, a certain mistrust of the government related to the restriction of individual freedom became apparent. Public transit and public transit-related policies such as the affordable annual pass are being seen as the effort of the government to restrict individuals in their travel mode choice.

These respondents are therefore not only complaining about the government trying to enforce a certain mode choice but also the frequency of travel mode choice by rising the prices for single or weekly prices and reducing the cost of annual passes, effectively making it much more expensive to ride public transit occasionally. The daily travel experience for these respondents is here an expression of their individualism and the rationale behind using cars stems also from the car being viewed as a high-status symbol. As A5 has mentioned, he feels embarrassed to ride public transit, especially in his neighborhood, due to the fear of being seen in a bus or tram. This pattern is in line with what Barr & Prillwitz (2014) report from focus group interviews, in which they quote an interview participant reporting the importance of the status when driving and the fear of being shamed by their neighbor if they do not own a car.

Insufficient public transit coverage in suburban areas was also mentioned by these respondents. However, they do not expect to switch to public transit (at least for work trips), even if public transit improves, since they see driving as the "adequate" mode to commute to work every day. Again, this observation has also been made in the interviews with focus groups participants, in which Barr & Ptillwitz (2014, pp. 9), quote an interview participant: " *I think society has got so dependent on the convenience and everything else that even if things were improved and other forms of transport were improved I think there still would be a lot of people that who would cling to that car because it means so much to them now*". The importance of the car as a status symbol has been previously mentioned in scholarly research

(Fassmann & Reeger, 2014; Harms, 2007). However, what the interviews with these two young individuals with a TIB have shown, is that the aspect of government skepticism and the relation of individualism and government control might also shape the decision of travelling in a certain fashion daily,

8.6.5.4.2 Perceptions (Satisfaction) of Public Transit

1st emergent theme: The spatial-temporal aspect of safety perception

More than 90% of the respondents who shared their experience regarding safety on public transit were women. This might either stem from a higher probability of women having fear in public transit, or rather from the higher willingness of women to talk about their safety perceptions and experiences and less shy to share their emotions (Yavuz & Welch, 2010). Additionally, women are also more affected by crime on public transit compared to men (Ding et al., 2020). Another relevant factor presented is the ability of women to be able to generalize their experience across time and space and the type of crime or issue encountered (Warr, 1984;

Pain, 1993, 1995; Valentine, 1992; Smith and Torstensson, 1997, as cited in Yavuz & Welch, 2010). The generalizing of experience across time and space become clear in the interviews with the women, as their sense of security changed over space and time. Not only the time of the day plays a role, but also which transportation modes are being used for some respondents, albeit not for all. Ultimately, the wish of any public transit rider is reflected by the statement of A16, a participant with an OIB "For me, safety means that wherever I am, I can walk without looking back or to the sides". This statement from a geographical perspective is an attempt to produce personal conditions in which the feeling of being safe is ubiquitously present independent of time-space constraints.

8.6.5.4.3 Mode Choice and Perceptions (Satisfaction) of public transit combined

2nd Emergent Theme: The role of the local government in ensuring efficient, equitable travel without disregarding sustainability and ridership vs. coverage? [20]

This theme emerged from formulated meanings and subsequently a cluster of themes that originated from statements given by individuals NIB and one individual with a TFYIB, who, unlike the respondents represented in the first emergent themes, holds a graduate degree. Here, the meaning of daily travel and mode choice is closely related to a larger vision of how sustainable cities should be and more specifically how governments should implement sustainable policies.

However, a slight discrepancy in the expectations and visions for sustainable travel and personal daily travel became visible, as most of the respondents stated that their regular travel also includes driving, albeit on a low level and for specific purposes only. These respondents drive to suburban locations, especially on the weekend, to drop off their kids at various events or leisurely activities.

These respondents are very dissatisfied with the interconnectivity of suburban locations regarding public transit. Three concepts emerged from this dissatisfaction: The lack of efficiency, equity, and sustainability. The lack of efficiency of taking public transit on inter-suburban routes is summarized elegantly by A21, a female without IB who holds a graduate degree: "If I drive my children to their swimming practice, it would take me at least twice the time if I took public transit compared to if I drove there". These spatial-temporal imbalances of inter-suburban travel make individuals, who are generally opposed to cars and driving in the city, drive in certain instances against their will.

The equity aspect of this inter-suburban imbalance, which can also be characterized as a transportation mismatch, refers to the reduced mobility of inhabitants of suburban locations,

[20] Here, both emergent themes from the mode-choice and perceptions section were combined due to the similarity of the topic.

who do not drive or have cars available, to reach other suburban locations or their workplace within suburban locations with public transit (Legrain et al., 2016) This problem becomes especially prominent, since increasingly in Vienna, companies have increasingly relocated their offices to suburban locations (Pfaffenbichler & Emberger, 2004). The sustainability aspect refers to the unsustainable aspect of driving between suburban locations, which also is the main cause of concern for these participants.

8.5.5.5.4 Mode Choice

3rd Emergent Theme: The cultural aspect of daily travel in diverse cities with a high percentage of an immigrant population

The third emergent theme, which refers to the cultural and health aspect of daily travel in Vienna shares some similarities in that the respondents associated with each theme situate their daily life into a larger context of meaningful ascriptions. However, the themes differ in that the second theme focused on the environmental aspect of travel, while this third emergent theme focuses on the cultural and health-related aspects of travel. The respondents associated with these themes asserted, that for them, the meaning of regular travel is reflected in the cultural aspect in the sense that every city has a culture of moving around from A to B.

For Vienna, these respondents, who are OIB individuals), living in Vienna means walking, biking, and to a lesser extent riding public transit. Intriguingly, both respondents do state that they have a car available in the household, which they use rarely and mainly on the weekends when going on trips with the family, as it is more convenient to drive with the family than to ride public transit.

This notion is similar to the respondents representing the previous theme, in which there is a slight discrepancy between ideologies/wishes and practical decision-making regarding travel mode choice. Active travel is therefore closely linked to the lifestyle in Vienna. In general, cultural and habitual factors can promote further cycling in cities with high levels of cycling, but also discourage cycling in cities with lower levels of overall cycling (Pucher & Buehler, 2017).

8.5.5.5.1 Perceptions (Satisfaction) of public transit

3rd Emergent Theme: How can transportation agencies prepare better for climate change? Trams have to be redesigned to accommodate passengers in warm summers.

As alluded to earlier, the issue of insufficient AC units in metros and trams was the most pressing issue for many respondents. What emerged from the interviews was not only the anger of having unpleasant metro or trams right now but rather the prospect of riding in hot trams and trains considering climate change´s effect on the city and the resulting higher temperatures, especially in the summer months but not exclusively in the summer. The overarching question here arising is how well transportation agencies in Vienna and around the globe prepare for climate change. According to official Wiener Linien data, the electricity that their trams and metro use is generated exclusively from renewable energies. Another large action implemented (and still being implemented) by the Wiener Linien is the planting of small trees plants, and small lawns around bus stops and even outdoor tram racks, to reduce the heat of the tracks and significantly reduce dust pollution (Wiener Linien, 2023).

8.6.5 Step 6: General Structure (Includes Mode-Choice and Perceptions of Public Transit)

The inconsistency between visions and a clear idea of how a city should function and actual regular travel might stem from what Scheiner & Holz-Rau calls the relationship between life situations and lifestyle. Lifestyle regarding daily travel refers to values, subjective attitudes, preferences, and emotions concerning associated with various mode choices. In contrast, life situation encompasses objective circumstances such as gender, income, household size occupation, and other characteristics that statistical analysis typically classifies as socio-economic variables. Following Bourdieu´s conceptualization, lifestyles always depend on life situations (Bourdieu, 1984). life situation like situation life situation

The role of lifestyles is twofold: They can directly influence travel behavior, or they can indirectly influence travel behavior through life situations. Therefore, even though life situations as alluded to earlier are often conceptualized as independent variables or factors influencing travel behavior, they can be dependent on certain lifestyles (Scheiner & Holz-Rau, 2007). This two-fold effect can be seen with the effect of urban form, as Scheiner & Rau

(2007, pp. 488) postulate: " With urban form, the situation is similar: certain characteristics of urban form at an individual's place of residence might influence his or her travel behavior.

However, the decision for this place of residence might depend on the life situation

and lifestyle of this particular individual (or his/her household). And this life situation and lifestyle might influence travel behavior as well". The interviews have shown, that the urban form played seemed to play a role in travel behavior for the factory workers with a TIB, as they have stated that their car usage is rather location-independent. For the OIB and NIB individuals, who live in less dense, outer district areas, the interviews revealed that for certain types of travel, especially on the weekend, the choice of the place of residence might have been more dictated by life situations such as income rather than lifestyles, as they have stated themselves that their occasional usage of cars on the weekends for certain purposes contradicts their attitudes and preferences regarding mode choice and general transportation in Vienna.

Scheiner & Rau (2007) do state that statistically, life situations have a greater influence on travel behavior than lifestyle, however, lifestyles do influence location choice, locational attitudes, and location decisions and therefore have an influence on travel behavior as well.

This interdependent relationship between life situations and lifestyles shows different characteristics for the different emergent themes. In the first emergent theme, which emerged from the experiences of lower-income individuals with a TIB, the dominant role of the car as a status symbol shapes the lifestyle of these individuals, which in turn influence their life situation. However, in contrast to what Scheiner & Holz-Rau (2007) postulate, the influence of these lifestyles on the life situation, such as the tendency of car owners to live in less dense areas where proximity to density plays a less significant role, cannot be excluded, but neither empirically confirmed. What emerges from the first emergent theme is that the lifestyle and the life situation of these individuals with an IB seem to be more "over-lapping" and less contradictory analytically, as these individuals 'mode choices reflect their lifestyle, at least regarding travel mode choice. The locational choice and lifestyle, therefore, are in greater "harmony" with each other for these individuals than for the individuals that were included in the second emergent theme.

The second emergent theme reflects a more complex relationship between lifestyles and life situations. The lifestyles that most respondents reported were based on an environmentalist

and sustainability ideal of exclusively traveling on green travel modes and excluding the car not only theoretically from their ideal vision of a city but also their practical daily life. However, the life situations, that these respondents find themselves in, are in slight contrast to their lifestyle, which makes these respondents, at least on the weekend, travel by car, even though they are in principle against it. I argue that this conflict stems from two factors, which Scheiner & Holz-Rau (2007) elegantly sum ups as follows: "*The actual location decision can therefore be described by attributes of the location. This means that the influence these attributes of the location have on travel behavior can be interpreted in two distinct ways: as an effect of urban form, or as an effect of a certain location behavior that reflects subjective location attitudes*". However, location choice, as Scheiner & Holz-Rau (2007) name it, is a misleading term, since it cannot be excluded, that these individuals were never given a proper choice in an economic sense to choose a location of their residence which would be aligned with their travel mode choice preferences.

In the third emergent cluster, there is seemingly more cohesion between lifestyles and life situations, as the respondents (OIB) report that how they travel in daily life and how they envision to travel and how they envision the city´s transportation culture to be is identical. These respondents almost exclusively walk or bike to most places, which they can do due to the dense character of the places they live in. In their case, the urban form already facilitates active transportation. Of course, following the logic of Scheiner & Rau (2007), their lifestyle might have played an influence in choosing that location in the first place. The lifestyles and life situations inherently also play a role in the perceptions of public transit, as the interviews have shown.

Hereby again, the low number of individuals with an IB (especially with a high school or vocational school degree) commenting on public transit shows that public transit is not playing a role in their daily travels. The individuals who are very vocal about the issues with the air conditioning units in trams and metros are the same individuals who ride public transit extensively and for whom the environmental aspect of travel is particularly important.

Therefore, the missing AC becomes not only a personal issue but rather reflects the larger context of the harsh realities that climate change in the short and especially medium term will lead to an inner city travels. An aspect that I would have expected to come up with more in the interviews is the aspect of discrimination and racism. Only one individual, a female with an IB other than from Turkey or OIB, has reported, that she sometimes feels uncomfortable due to people staring at her hijab (headscarf).

8.7. Summary of the Research Questions

The previous chapter has used phenomenology in an attempt to answer the research questions laid out at the beginning of the chapter:

In this subsection, I would like to summarize the research questions.

What motivations, attitudes, and socio-cultural factors determine immigrants' (specifically people with a Turkish or former Yugoslavian IB) mode choice in Vienna?

The interview results have shown that it is not possible to understand the intrinsic motivations of the travel behavior of immigrants with a TFYIB without including other socio-economic and demographic factors. What the interviews have shown is that for immigrants with a TIB who have a vocational or high-school degree and who work as factory workers or who work in lower-wage jobs, the car and driving represent socio-economic status and the feeling of being a successful immigrant. The importance of status however cannot be seen in a vacuum, it is deeply embedded in an overall quest to live individual freedom. Interestingly, these individuals have shown the greatest skepticism towards government and government-related policies among the interviewees.

They fear, that the government will restrict their freedom through high fuel prices and generally "hostile" policies through the restriction of cars in the city. One of the factory workers is a 2nd generation immigrant from Turkey, and he has stated that his father used to travel much more by public transit than him, but he felt the responsibility as a 2nd generation immigrant to show economic wealth. Additionally, these factory workers stated, that they can afford a car and that riding public transit would lead to a longer travel time.

The quantitative analysis in the first part of the dissertation has shown that income generally is not a strong predictor for travel behavior. This observation was confirmed, especially

regarding the travel mode choice of workers with a TIB. These factory workers mostly lived in outer districts, but not exclusively. They have also stated that they had lived in inner-city districts before and they also almost exclusively drove around, despite difficulties with parking.

However, this research has also shown, that for participants with a TFYIB, who have university degrees, the travel mode choice reflects a much larger similarity to the travel mode choice of the other two demographic groups. These individuals mostly live in very walkable neighborhoods in the inner districts. But as the previous paragraph has pointed out, locational factors alone do not seem to play a significant role in the travel behavior of individuals with a TIB. Rather, the individuals with a TFYIB who have graduated degrees and who work in higher-paid jobs have a stronger environmental concern and do not see the car as a status symbol, but rather as a burden. One important aspect is also, that this importance of status regarding car usage is seemingly less apparent for factory workers with an IB from FYIB, compared to immigrants with a TIB. Unfortunately, due to the low willingness of these individuals to participate in interviews, further research on the difference between these two groups could not be performed at this point.

What are the differences in the meanings associated with each travel mode?

The interviews have revealed strong differences in meanings associated with each travel mode. However, as already mentioned in the paragraph above, one cannot assume a certain ascription of meaning for the three demographic groups per se. Rather, different socio-economic factors within immigration groups lead to different ascriptions of meanings. The meaning of traveling for lower-income vocational or high school graduates with an IB from Turkey (and to a much lesser extent former Yugoslavia) is closely related to the idea of freedom and social status, whereas the meaning for individuals with OIBs and individuals with NIB, the meaning of travel is much more guided by health and environmental concerns, albeit not excluding the dimensions of convenience. However, the interviews have also shown that convenience as a measure of easy and stress-free travel has different meanings for different individuals. This is a point in which quantitative analysis reaches its limits and reveals its shortcomings. I argue, that there is no objective measure of convenience. The interviews have displayed a wide range of meanings associated with the term convenience. While NIB individuals interviewed associated carless travel as convenient, TFYIB (especially individuals with a TIB with vocational degrees and lower-wage jobs) convenience was strongly linked to driving and car usage. I argue that convenience cannot be seen as a

value-free concept, therefore, ideologies and ideas about how travel should influence the conceptualization of convenience. One difference between vocational school graduates with a TIB and the other demographic groups was the lower tendency to travel multi-modal for the former group. NIB and OIB in general showed more diversity in the travel modes that they used.

The differences in mode choice between work-related daily travel and leisurely travel were apparent across all three demographic groups. Due to the question design, in which leisurely travel was translated as "Freizeitaktivitäten", the question might have led to a bias in that the respondents associated leisurely activities as activities performed on the weekend, as shopping or other trips on weekdays before going to work (or coming from work) might have still been cognitively associated as work-related travel. While TYFIB immigrants tend to travel with the same modes for work and non-work-related purposes and respectively on weekdays and weekends, NIB individuals reported that on the weekends, they travel differently than on the weekday. [21]

The interviews have shown, that these differences in weekday and weekday travel might stem from a greater tendency for NIB individuals to visit suburban or rural areas outside of Vienna, This greater tendency might stem from the fact, that NIB individuals might take more outings to rural areas and take long walks or hikes there. Additionally, some of the NIB individuals interviewed were not from Vienna, but from rural areas outside of Vienna. Therefore, on the weekends, they often visited their families home.

What are the reasons behind the differences in satisfaction with public transit in Vienna?

The interviews have shown, that public transit as a whole has a worse reputation for immigrants with a TIB (especially for lower-income, vocational school graduates). Even the cheap costs of the annual pass is viewed skeptically and as a form of “government interference”. Further, these individuals do not want to mingle with the “crowds” of the

[21] The differences in weekday-weekend travel for NIB mainly stem from increased car usage on the weekend.

public transit. They do not view public transit as a lifestyle, that some people might enjoy taking, but rather as a travel mode for individuals who have no other choice.

The perceptions of public transit for NIB and OIB however are more nuanced. OIB individuals seem to be less critical overall of public transit, as they compare the overall public transit system in Vienna to the system in their home country or previous residence and conclude that Vienna´s public transit system is overall performing very efficiently. However, this does not mean that these individuals are unsatisfied with certain points of public transit. The missing air conditioning units in trams and metros are a pressing issue for most public transit riders. Safety as a concept is very subjective and therefore also difficult to generalize across groups. However, in my interviews, the vast majority of individuals who did voice concern over safety identified as females. What became apparent in the interviews was also that among all the six aspects of public transit, the sense of safety was the aspect that was the most influenced by previous experiences in other countries lived or in one´s home country. This was particularly apparent for the individuals with an IB from North America. The satisfaction regarding travel time, waiting times, and connectivity must be viewed within a general discussion of one´s socio-spatial arrangement. In general, individuals living in outer districts were more dissatisfied with these three aspects of public transit. This dissatisfaction stems not only due to a practical implication for their daily lives but rather due to their visions and expectations for the city to have wide coverage of public transit and fewer waiting times in outer districts. One common theme which emerged from the interviews with NIB individuals could be translated as: "I know I sound like I am complaining on a very high level, but I think there are still some things that can be improved. I am aware that people from other countries are jealous of our Public Transit system, but I can't help to still complain about a few things". These views reflect a certain discrepancy between the view of NIB who live in Vienna and individuals who live abroad.

8.7.1 Limitations

Sub-chapters 6.1.14 and 6.2.19 have already presented limitations in the quantitative section. In this sub-chapter, a discussion on limitations regarding the qualitative section will be provided.

Several limitations ought to be mentioned regarding the qualitative section in general and the interviews in particular. First, the responses of the participants varied greatly in terms of the

lengths and the topics they chose to focus on. Therefore, the comparability of many topics across participants was difficult, because not every participant commented on every topic to the same extent. My goal was not to have every respondent respond briefly to every topic just to cover them but rather to let them decide on which topics they would like to focus on and go in-depth on. Also, as I interviewed some of the respondents at (or nearby) their workplace, I was careful not to push the interviews in a certain direction, in which they might have felt uncomfortable discussing in front of their colleagues or supervisors. Second, the interviews could have benefited more from participants with a TIB who have high-school or vocational degrees, to get a more complete and nuanced picture of their motivations to ride cars more and public transit. Even though the interviews with individuals with a TIB have provided valuable insights about the importance of social and economic status and attitudes towards governments on travel behavior, a larger pool of individuals with a TIB might have provided for a deeper understanding of how these status ascriptions changer under certain conditions or over life. Third, the interviews would have benefited more from a more balanced age distribution. The vast majority of the interview participants were between the ages of 30-50. Due to consent issues and IRB restrictions, I was not able to interview high-school students or minors below the age of 18. While there were no legal or institutional restrictions regarding interviewing elderly population groups above the age of 70, it was difficult to reach those groups through online channels. As my interview partners emerged from the same sample as my online survey participants, a certain bias towards population groups who are more familiar with the internet was given. Fourth, as I do not speak Serbian/Croatian/Bosnian, interviews with individuals who have an IB from these regions were conducted in German. Even though the German levels of those participants were very good (or native), they might have been more comfortable sharing some thoughts in their native language.

Chapter 9

Bridging The Quantitative And Qualitative Parts

This mixed-methods study does not only aim to bridge the theoretical gap between quantitative and qualitative research, but also a methodological one. This chapter will provide an account of the validity and reliability aspects of the mixed-methods study and how the quantitative and qualitative study complement each other and each parts role in answering the research question. This chapter will conclude with limitations This dissertation employed mixed methods design to understand the travel behavior of individuals with and without NIB in Vienna. The quantitative and qualitative portions of this dissertation were not solely employed as purely methodological tools, but also as ontological and epistemological conceptualizations which aim to further our understanding of how one can understand and view realities, in this case regarding daily travel.

9.1. Validity and Reliability in Mixed-Methods Research

Validity and reliability are two concepts which have great importance in quantitative analysis and qualitative research, and which have been studied rather extensively, particularly for quantitative analysis. In general, validity in quantitative studies in research deals with the question, how accurately the method used is measuring what it intends to measure. Reliability refers to how consistent the outcomes are over time. However, a comprehensive and systematic account of how to achieve validity and reliability has been rather rare, due to the great complexity of ontological, epistemological and methodological approaches in mixed-methods approaches (Creswell, 2009). Therefore, many mixed-methods studies account for validity appears in the quantitative and qualitative sections separately (Creswell, 2009). However, there have been some attempts to provide a conceptual account of validity and reliability in mixed-methods research (Tashakkori & Teddlie, 2008; Teddlie & Tashakkori, 2003).

However, before delving into the specifics of the issue of validity and reliability in mixed-methods research, the following paragraphs will briefly provide an account of validity and reliability in quantitative and qualitative research. Creswell (2013) differs three types of validity: content validity, predictive validity, and construct validity.

Content validity refers to the question, if items and parameters measure what they are supposed to measure. Predictive measure refers to the question, if the test or measure can predict future outcomes. Construct validity, which Creswell (2013) ascribes the most importance, refers to the question, if the results of the analysis have a useful outcome for practice and if they can be generalized to a larger context in practice. The quantitative analysis in the first part has addressed the content validity by giving the rationale for the regression analysis, which is a common method in travel behavior studies. Construct validity is also achieved through a discussion of the research gap in the first part, in which the added value of this study is being discussed. Intriguingly, the added value of the quantitative analysis cannot be understood without the complementary qualitative analysis, as the qualitative analysis have shown, that they can increase the analytical value of the quantitative analysis regarding the travel behavior of individuals with an IB. Reliability in the quantitative analysis was established through the consistent use of logistic binary regressions, in order to achieve comparability of the regression results.

For qualitative research, the concepts of validity and reliable might seem less straightforward and more complex compared to quantitative research (Creswell, 2013). Creswell (2013) offers eight strategies to ensure validity in qualitative research in an order from the most frequently utilized to those who are only sometimes used. The most common validity strategy in qualitative research is called triangulation, in which multiple data sources and theories are used to answer a research question. Additionally, the “content validity” mentioned in terms of quantitative research can be found in qualitative research as well, albeit in the form of understanding the experiences of participants and accurately present them in the research (Ihantola & Kihn, 2011). Interestingly,Tashakkori and Teddlie (2003, p. 694) in a similar fashion ask the question regarding reliability: “Did we “accurately” capture/represent the phenomenon or attribute under investigation?”. Capturing the experiences therefore can be both seen as a strategy to ensure validity and reliability. Gibbs (2007) offers several strategies to address and secure reliability in qualitative research. Most importantly, Gibbs

(2007) highlights the importance of checking transcripts to make sure that no obvious errors were made during the transcription process. Tashakkori & Teddlie (2008) have developed a conceptual framework of integrating validity and reliability, which they call credibility.

The key concept in their framework is called inferences, which translate to outcomes, explanations and concepts which emerge from the mixed-methods research. Tashakkori and Teddlie (2008, p. 101) describe: "meta inference as an overall conclusion, explanation or understanding developed through and integration of the inferences obtained from the qualitative and quantitative strands of a mixed method study. "In order to account for rigor in mixed-methods research, Tashakkori and Teddlie (2008) developed five factors to consider: "interpretive consistency, theoretical consistency, interpretive agreement, interpretive distinctiveness and integrative efficacy". (Ihantola & Kihn, 2011, pp. 45). Interpretive consistency refers to the logical flow of conclusions from findings in the research. The core question here is: Do the conclusions match the evidence that were presented in the research? In my qualitative part, my conclusions were derived from the emergent themes, which in turn were derived from the cluster of themes, which emerged from formulated meanings, which were formulated through significant statements. Additionally, the conclusions from the quantitative parts are clearly based on the regression analysis conducted in the first part of the survey.

The second factor, theoretical consistency refers to each inference being consistent with commonly used theories and frameworks used in other studies. In my dissertation, I discuss the epistemological and ontological bases of my dissertation in greater detail than usually discussed in travel behavior studies. However, the theories I employed are established theories in the social sciences. Interpretive agreement describes the degree to which scholars agree that the conclusions offered in the research are the most accurate interpretation of the findings. Interpretive distinctness refers to the unique character of the inferences/results derived from the findings of the research, meaning that there are no other probable and logical explanations that could be derived from the findings.

Lastly, "the integrative effect is the degree to which inferences made in each strand of a mixed methods study are effectively integrated into a theoretically consistent Threats to validity and reliability 45 meta-inference.

The four previous criteria related to interpretative rigor were applicable to both qualitative and quantitative parts of research and to the meta-inferences that emerge when the inferences of the two or more parts are integrated. By contrast, integrative efficacy is unique to meta-inferences in mixed methods. It is concerned with the degree to which a mixed methods researcher adequately integrates the findings, conclusions, and policy recommendations gleaned from each of the two strands" (Ihantola & Kihn, 2011, pp.45-46). The integration of the claims and results from the qualitative and quantitative strands into a meta-inference is being performed in chapter 9 below. The meta-inference in this dissertation is reflected through the need to understand both strands 'results in order to get the complete picture of the phenomena studied. Without the qualitative interviews, the results of the regression would have not been able to reveal under which conditions and which underlying motivations certain travel behavior might be explained. Without the quantitative study, I would have not been able to provide for some generalizations and overall picture of some trends of certain travel behavior from my sample. The quantitative analysis also helped me situate the interview respondents within a larger sample.

9.2. Bridging the Contextual Gap

The quantitative analysis has shown us that, TFYIB individuals travel more by car, especially for work-trips, and that NIB and OIB individuals are much more inclined to use green transportation modes for all trip purposes. This analysis therefore allowed us to make general assumptions based on the statistical analysis. However, the quantitative analysis did not and cannot provide us with information, under which conditions these travel patterns occur. The interviews in the qualitative analysis do not and cannot aim to form generalizable statements. In contrast, the interviews shed light on why certain individuals travelled the way they do. Why are individuals with a TIB who are vocational school graduates and workers in a factory almost exclusively driving and not using other modes?

As already mentioned, the interviews have revealed that political attitudes and strong opinions about/on individualism plays a role in their travel mode choice. A counter argument could be made that one could include a variable like individualism or political attitudes in the quantitative study. However, this would have the shortcoming that many of these political

categories are subject to interpretation and therefore would be insufficient to generalize. Regarding the perceptions of public transit, the importance of the interviews becomes even more important, as the six aspects[22] can have inherently different meanings to different individuals. For example, the interviews have revealed that safety perceptions are closely linked to previous experiences. However, these previous experiences can shape safety perceptions in both positive or negative ways. Quantitative analysis would not or only insufficiently be able to capture the effect of previous experiences on travel behavior.

From a content perspective, the quantitative and qualitative part of this dissertation reflect the life situation – lifestyle dualism presented by Scheiner & Rau (2007) that has already been discussed in the previous chapter. The quantitative part presents the effect of the life-situation on the travel behavior (mode choice) of the respondents. Their life-situation consists of all the factors that are presented as independent variables. A sole quantitative analysis would inherently assume, that these life-situations are only predictors of travel behavior, but not subject to external influences to a great extent. For example, the quantitative analysis in the first part have shown, that there is a prevalent immigration effect regarding TFYIB individuals for regular car usage. The quantitative analysis finds, that having a pre-defined or self-reported TFYIB IB is a significant predictor for regular car usage.

The pre-defined IB in the *Mikrozensus* represents a life-situation, whereas the self-reported IB in the self-conducted survey represents a lifestyle, because the self-reported IB is subjective and a self-identification. Self-identification represents what Scheiner & Rau (2007) call the cognitive dimension of lifestyles. As Spellerberg (1996, pp.53) notes, lifestyles "mediate between social situation and individual action, objective conditions of life and cultural life''. These objective conditions of life are provided in the quantitative analysis through the analysis of various independent variables. Here again, the strength of the self-reported IB becomes visible. Due to the fact, that the self-reported IB can be classified as a

[22] Costs, Travel Time, Equipment, Connectivity, Waiting Times and Safety

subjective lifestyle, the interviews can more easily understand the meanings of this self-ascription. If the interviews had the pre-defined IB as a starting point, the qualitative analysis would have not been impossible, but more challenging, because I would have had to first try to understand how the individuals see themselves and if the pre-defined IB matches the self-reported IB.

Since the self-reported IB is considered a lifestyle in this analysis, the interviews give a nuanced understanding of how the life-situation is interdependently connected with the lifestyles. Of course. The self- reported immigration is not the only lifestyle in this analysis, as perceptions of public transit are also factors that can be classified as lifestyles.

Table 6.10 in chapter 6 has shown, that individuals with a self-reported IB have much higher odds of driving on work-related trips compared to individuals without a self-reported IB. However, the interviews have shown, that self-reported TFIYB and OIB drive (to work) for very different reasons. As already alluded, individuals with a self-reported TFYIB, especially younger factory workers, drive to work due to the car being a status symbol representing economic success, wealth and "successful" immigration. For OIB individuals, driving to work is more a necessity and dictated by urban form. Regarding all trip purposes combined, this immigration effect disappears for self-reported OIB individuals and changes direction for self-reported TFYIB individuals. The interviews have revealed, that many NIB individuals drive on weekends for leisurely activities, whereas many self-reported TFYIB rather stayed at home and did not travel much. The interviews have shown, that I should have distinguished between weekend non-work trips and weekday non-work trips. The interviews have showed, that during the week, the meaning of work trips might be different for different group. . For example, some NIB respondents, who ran errands immediately before or after a work-trip, did not associate those purposes as non-work related, but rather work-related purposes. However, these respondents classified all of their weekend trips as non-work related. In contrast, some of the factory workers did not see their weekend trips only as non-work related, since some of them worked on the weekends as well. This rather diffuse character and different meanings of non-work related trips might also explain the results regarding non-work related public transit, which show that for non-work trips, individuals with a self-reported IB are much less likely to public transit. If only the quantitative analysis had been analyzed, one would have been confused why having a self-reported IB shows a

negative association with riding public transit on non-work-related trips, whereas the results from the analysis regarding regular car usage has hinted that for non-work purposes, car usage is also lower for self-reported TFYIB individuals. This is where the strength of the qualitative analysis becomes apparent, as it revealed the various meanings and diffuse character of non-work trips. Table 6.12 has displayed, that individuals with a TFIYB are statistically significant less satisfied with the costs and connectivity aspect compared to individuals without a self-reported IB. However, there was no statistical difference in the perceptions of individuals with self-reported OIB compared to NIB individuals (self-reported). The perceptions of cost and connectivity were not only constructed as dependent variables, but also as predictors for regular car and public transit usage in the self-conducted survey. A positive perception of travel time and connectivity is associated with lower car usage. Of course, the regression analysis cannot display causality per-se. The interviews results can provide the larger theoretical and context for the quantitative results. In this specific case, the interviews have indeed confirmed, that the connectivity and travel time are factors which have direct influences on the travel behavior. In simpler terms, a better connectivity and less travel time would make respondents switch to public transit for their daily trips.

The interviews have revealed that the dissatisfaction regarding costs for self-reported TFIYB individuals is restricted to the single, weekly and monthly tickets. As already mentioned in detail, these individuals are not opposed to occasionally public transit, but they view the single or weekly fares as much too expensive. These individuals see the cheap annual pass in general positively, but they also see these cheap annual passes and especially the expensive single and weekly passes as a mechanism of the government to push individuals towards exclusively using public transit. The qualitative analysis has therefore shown that the dissatisfaction with costs of public transit is restricted to certain passes and is related to political attitudes towards governments. The regression analysis has also shown that individuals who are born in Austria are generally less satisfied with the connectivity aspect compared to individuals who are not born in Austria. The interviews have shown that there are primarily two factors which can possibly explain this phenomenon. First, many NIB are vocal about the connectivity issues between outer districts. They complained that while the

network focuses on outer districts-inner districts routes, outer district are not extensively connected with each other.

These individuals admit that while they do complain about the connectivity of Vienna´s public transit system, they do acknowledge that the system works very well compared to other systems that they have experienced. However, the self-conducted survey have also showed that TFYIB individuals are also less satisfied with the connectivity aspect compared to individuals with NIB. The interviews have revealed, that this unsatisfaction with the connectivity stems from public transit being constantly compared to the car in terms of the speed and time that it takes to reach destinations. The *Mikrozensus* survey has additionally shown, that individuals who are born in Austria have lower odds of being satisfied with the safety aspect of public transit compared to individuals who are not being born in Austria. The interviews have overall revealed, that safety perceptions are greatly influenced by previous living experiences. Therefore, for many individuals, who were not born in Austria, Vienna´s public transit system appears to be very safe. However individuals who were born in Austria might not have many points of comparison and therefore be more aware of any negative incident related to safety.

For that reason, especially for TFYIB who live in outer districts area, the car remains a favorite mode choice for TFYIB (also due to other reasons that were mentioned).

The quantitative analysis of the self-conducted dataset has further shown that the effects of the predictor variables (for all population groups) for work and non-work related public transit usage show opposite directions in most cases. For example, living in an inner city neighborhood is strongly associated with higher public transit for non-work purposes compared to living in an outer district. However, for work-related public transit usage, living in the inner city is not statistically significantly associated with a higher public transit usage. The interviews have shown, that for many respondents, non-work related trips were associated with weekend trips, whereas trips taken during the weekend, even if they were not work-related, were often viewed as work-related trips. The interviews have shed some light on this, in that they have shown, that individuals (especially with NIB), who live in outer districts take public transit for work-related purposes, as their workplace is often located in locations within the city which are accessible by public transit. However, these individuals

ride less public transit for non-work purposes, as their preferred destinations on the weekend is predominantly located in outer districts, which are more difficult to reach by public transit. For that reason, it is not surprising that individuals who live in inner- city districts are much more likely to ride public transit for non-work-related purposes compared to residents who live in outer districts. Another effect which emerged in the various regression models was the greater effect of a driver´s license on regular car usage compared to car-availability in the household. This might seem surprising, because having a car available in the household might seem less abstract and more directly affecting car usage compared to just possessing a driver´s license. I have found in the interviews, that one reason behind the smaller effect for car availability might lie in the fact, that the term car availability might convey different meanings to different people. I have noticed in the interviews that the concept of car availability is a relative term and can be divided into what I call "theoretical car-availability" and "practical car-availability". "Theoretical car-availability" refers to a situation in which a car is in theory shared with another person, but that other person is using the car regularly and therefore the car usage by the participant would in some way disrupt the person´s routine who is using the car. In practical terms, some interview participants have told me, that they have initially agreed with their partners to share a common car, but in reality, only the partner uses the car since it is a more feasible transportation alternative for the partner. "Practical-car availability" refers to the phenomenon that the individuals do not only have access to a car in theory, but also in practice. In simpler terms, these individuals do not have to make many compromises to ride the car and their car usage does not lead to any "disruptions" in that it disturbs the daily routine of another family member.

Another variable which requires further qualitative investigation is density. The analysis of the *Mikrozensus* has shown, that living in a lower density is associated with more regular car usage, which seems intuitive. However, living in a dense neighborhood is not related to more regular public transit usage compared to living in a neighborhood which is not neutral. The interviews have shown, that individuals living in dense neighborhood bike and walk much more regularly compared to individuals who don't live in dense neighborhood. Individuals who don't live in dense neighborhoods and who don't drive have not many (or no) other options to travel other than taking public transit. However, as already alluded in this dissertation, the importance of density is only prevalent for individuals with NIB, as both the

quantitative and qualitative parts have confirmed. Gender has shown different effects throughout models. The interviews have confirmed the results of the analysis results of the *Mikrozensus* survey, in which males are much more likely to use the car regularly compared to females. This effect however is the strongest for individuals with a TFYIB, followed by individuals with NIB Background[23]. However, the rationales for males driving more are different for individuals with a TFIYB compared to individuals with NIB, as the interviews have shown. For individuals with a TFYIB, males generally leave the house more and travel more or take the car more due their workplace often being in factories which are located in outer districts, whereas females with NIB often prefer to walk, bike or ride public transit to their workplace or destinations in general due to their preference for green travel modes or these modes being more convenient. The question here becomes, how much of the differences in gender are really related to the gender itself, or rather to socio-economic and socio-spatial patterns of women´s daily life. In simpler terms, one cannot understand the effects of gender without understanding their socio-economic and socio-spatial patterns in daily life. The interviews have also confirmed the findings of the quantitative analysis, that income in general does not significantly predict regular mode choice for the three demographic groups. However, income might effect certain locational and spatial factors of individuals which effect trave behavior. Therefore, income can be seen as a indirect influencing factor of travel behavior.

[23] No effect regarding gender was found for individuals with OIB who use the car regularly.

Chapter 10

Conclusion

10.1. Implications for Planning and Policy

The Austrian government has announced the goal to reduce per capita CO2 emissions from the transport sector by 50% by 2030 and by 100% by 2040 (base year) (BMEIA, 2021). However, the government has to consider the low rates of green transportation ridership by individuals with IB, especially in urban areas, such as Vienna. The government therefore must set clear goals and initiatives of how to make green transportation modes attractive for some population groups. As this research has shown, the lower tendency to use green transportation modes (particularly by individuals with a TFYIB with lower incomes) does not stem from exclusively locational characteristics of their residence or other socio-economic or demographic characteristics, but rather from political and economic attitudes.

Even though the role of location characteristics could not be empirically confirmed or disproved in this research, the city should increase their coverage of trams and busses to outer districts. Weekend schedules should also be adjusted in a way that residents on the weekend can more efficiently reach destinations in the other outer districts. In general, outer districts should be better connected with each other. Currently, all metro lines except one (U6) run through the inner city from one outer district to another. The U6 does not run through the inner city, but rather on the border (Gürtel=Beltway) which cannot be translated as a running through outer districts. There are busses and trams to a that do connect outer districts, but a metro connecting all outer districts might make outer district-residents, who against their will uses car, to switch to public transit. Additionally, public transit authorities in Vienna should try to make public transit more attractive and inclusive for individuals with IB, particularly for lower-income individuals with a TIB. For example, when buying tickets at local ticket machines at Vienna´s metro stops, there are eleven languages to choose from (Figure 9.1).

However, Turkish is not among the languages to chose from. Including Turkish on the screens would make it easier for individuals with a TIB to buy tickets and ride on public transit. The languages displayed on the machines seem to be a service more for tourists then for individuals with an IB that live in Vienna.

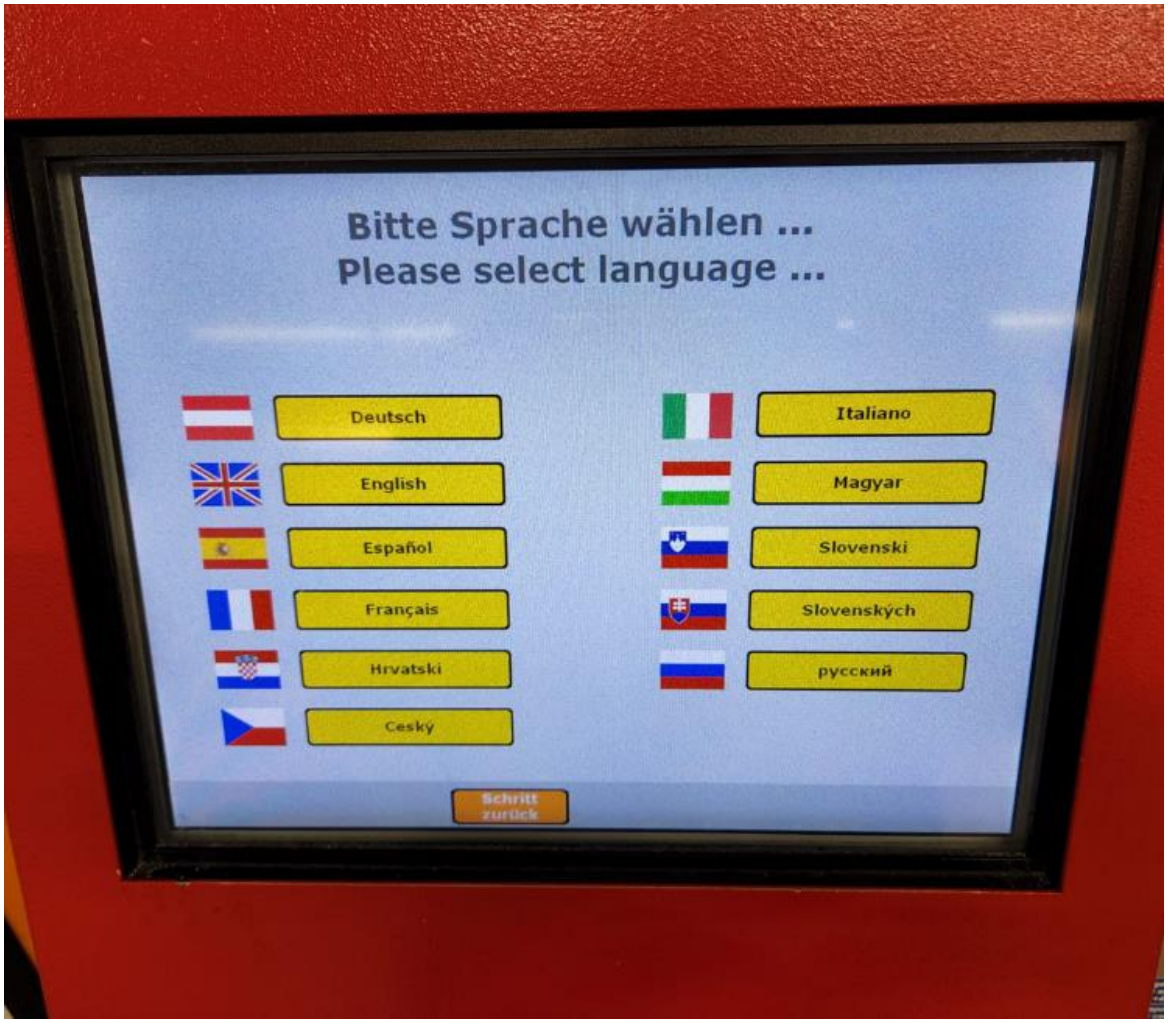

FIGURE 10. 1 LANGUAGE OPTIONS AT A TICKETING MACHINE AT THE METRO STOP SCHWEDENPLATZ IN NOVEMBER, 2022 (OWN-ILLUSTRATION)

The interviews have shown, that travel behavior to a varying extent is also influenced through political attitudes and attitudes towards governments. Therefore, it might be difficult in the short-term for governments to address these issues, as political attitudes might not change for everyone in the short term.

10.2. Implications for Further Research

This dissertation has shown that employing qualitative research in travel behavior analysis can provide valuable insights into the underlying assumptions that shape travel behavior. Concurring with Scheiner & Rau (2007), researchers engaging in quantitative analysis should not only see independent variables, such as gender, age, income, density, occupation etc. as predicting travel behavior as solely being predictors of travel behavior, but rather as factors which are influenced by certain other factors too. However, these underlying factors can only be sufficiently understood through qualitative methods, such as interviews. Using the lifestyle life-situation conceptualizations, quantitative researchers ought not to forget the importance and influence of lifestyle on travel behavior. This more nuanced analysis of travel behavior becomes particularly important in most urban areas in the world today, because most urban areas are not homogenous in terms of their population. Different lifestyles in cities today are not only prevalent due to a greater diversity in terms of ethnic backgrounds or religions, but also among non-immigrants due to varying attitudes towards life and ideologies. Scheiner & Rau (2007) use the dualism of objective and subjective determinants of travel behavior to refer to the influence of lifestyle and life situation.

Here, I am not urging for research to neglect the objective factors of travel behavior, but rather invite researcher to move away from viewing objective factors, commonly expressed as independent variables in a strict positivist, realist perspective and rather understand them in a post-positivist fashion, in which biases and subjective views influences how one sees those factors. Only when researchers start to see predictor variables in travel behavior in a post-positivist way, they will also inevitably see the need to further understand how these independent variables are being influenced by other factors. Additionally, this dissertation research has shown that there can be discrepancies between the self-ascription of immigrants and the statistical definition of immigrants. Therefore, researchers conducting travel behavior

research regarding immigrants should preferably use self-ascriptions of immigrants rather than some statistical definition that might not be accurate.

Concludingly, research incorporating perceptions and attitudes should expand their analysis by not only including perceptions and attitudes towards transportation related themes, but rather overall political attitudes and attitudes towards the governments. This research has shown, that deep-seeded political attitudes, especially for immigrants, plays an important role for their daily travel. Immigrants often grow up in other political systems and have varying political attitudes and attitudes towards governments from individuals who are from the host-country (in this case Austria).

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