Choices and Preferences for Living and Moving in a Suburban Car-Free Neighbourhood

A Case Study in De Stationstuinen

Author: C. Van Rijsoort

Date: June 24th 2025

Choices and Preferences for Living and Moving in a Suburban Car-Free Neighbourhood

A Case Study in De Stationstuinen

By

C. Van Rijsoort (5400546)

In partial fulfilment of the requirements for the degree of:

Master of Science

in Transport, Infrastructure and Logistics

at the Delft University of Technology,

to be defended publicly on Tuesday July 8, 2025 at 12:00 AM.

Supervisor:	Dr.ir. M. Kroesen	
Thesis committee:	Dr.ir. M. Kroesen,	TU Delft
	Prof.dr.ir. B. van Arem,	TU Delft
	S. Meijerink,	Gemeente Barendrecht

Preface

This thesis marks the end of my time as a student at TU Delft. After completing my Bachelor's degree in Technische Bestuurskunde at the Faculty of Technology, Policy and Management, I am proud to have also completed the Master's programme in Transport, Infrastructure and Logistics at the Faculty of Civil Engineering and Geosciences. This study is initiated as part of the XCARCITY program funded by NOW in which Barendrecht is represented by the Metropolitan Region Rotterdam Den Haag (MRDH).

I would like to thank everyone who supported me over the past year during the final phase of my studies. First, I would like to thank my graduation committee for their guidance throughout my master’s thesis. Maarten Kroesen, thank you for answering all my questions and for your quick responses to my emails. Bart van Arem, thank you for making me part of the XCARCITY program and for your clear and constructive feedback. Sjaak Meijerink, thank you for the opportunity to carry out my thesis project at the municipality of Barendrecht and for the time and effort you invested in it. Additionally, I would like to thank all the participants who took the time to fill in the survey.

I would also like to thank all the people close to me for their support during this period. My fellow students, Ralf and Sasha, thank you for the productive and enjoyable study sessions we had every week and for the great times throughout the rest of our studies. You made it all a lot more fun. To my parents and sisters, thank you for your support and patience during some stressful moments. And finally, to everyone else who has supported and encouraged me over the past few years, thank you.

Charlotte van Rijsoort

Delft, June 24th 2025

Summary

Cars remain the dominant mode of transport, as they increase accessibility, offer status and comfort. However, the increasing use of private cars also causes issues such as congestion, emissions and excessive land use. As climate goals must be met and space is needed for increasing demand for housing, different strategies are implemented. One of these strategies is the implementation of car-free neighborhoods. In these neighborhoods, urban quality of life is prioritized by encouraging walking, cycling, and the use of sustainable mobility options while repurposing public space for green areas, housing and amenities instead of cars.

This study addresses a gap in the existing literature, as limited research has been done yet on neighborhood preferences of potential residents for a yet to develop car-free neighborhood in a suburban area. In addition, this study addresses the knowledge gap about the influence of socio-demographic characteristics, attitudes and current travel behavior on the neighborhood preferences. Unlike most existing studies, which focus on individuals already living in car-free areas, this study seizes the opportunity to examine whether people are willing to adapt their behavior by reducing car dependency after relocating to a car-free neighborhood. Gaining insights into the preferences of potential residents is essential for the municipality to make informed decisions about the design of the neighborhood and the use of available space. Additionally, it provides valuable information on the demand for transportation alternatives, which can help optimize the local transportation network based on residents' needs. This study tries to answer the following research question:

How do neighborhood characteristics, attitudes, socio-demographic factors, and current mobility preferences influence the willingness of potential residents to live in a car-free neighborhood and adapt their mobility choices?

A Discrete Choice Experiment was conducted to answer the research question. The target population consisted of individuals aged 18 and older living in or around Barendrecht. The survey included questions on socio-demographic characteristics, current travel behavior, attitudinal statements and choice sets belonging to the stated choice experiment. For the stated choice experiment, each respondent was presented with 11 choice sets, each requiring a choice between two car-free neighborhoods. These neighborhoods varied in terms of the level of green and blue, walking distances to mobility hubs and amenities, annual parking costs, train frequencies, and availability of shared mobility services. The survey was created using Qualtrics and distributed via flyers, the municipality's social media channels, and the local newspaper. This resulted in a sample of 265 respondents, of whom 145 completed the survey. Responses to the attitudinal statements were analyzed using an Exploratory Factor Analysis. The choice data was analyzed using a Multinomial Logit Model (MNL) and a Latent Class Choice Model (LCCM). The advantage of an LCCM is that it accounts for heterogeneity within the population, whereas the MNL model estimates average preferences for the entire sample.

This study resulted in the following findings:

- On average, respondents value neighborhoods with higher levels of green and blue spaces. They prefer frequent train connections and low parking costs. Shorter walking distances to mobility hubs are valued more than shorter walking distances to amenities. Shared mobility contributes little to the overall attractiveness of a car-free neighborhood, as shared scooters are perceived negatively and shared cars are viewed only somewhat positively.
- The LCCM results show that there is heterogeneity in neighborhood preferences within the population. This model resulted in three classes: Low Cost Mobility Seekers (38.29%), Sustainable Mobility Enthusiasts (36.45%) and Proximity Oriented Car Lovers (25.25%). Low Cost Mobility Seekers and Proximity Oriented Car Lovers are both a little bit conservative in

terms of mobility preferences, as they prefer to keep their car close by and are not very likely to switch to alternative transport modes. However, while Low Cost Mobility Seekers are positive towards the train, Proximity Oriented Car Lovers do not prefer any type of sustainable transport mode. Sustainable Mobility Enthusiasts are the only ones that are not attached to their private cars. They prefer a green, well-connected neighborhood with public transport as well as shared mobility options.

- Socio-demographic characteristics, current travel behavior, and attitudes help explain the likelihood of individuals belonging to a specific class. Individuals living in single-person households, with higher education levels, familiarity with sustainable transport, and a positive attitude towards car-free living and sustainable mobility, are more likely to be classified as Sustainable Mobility Enthusiasts. Families with children who primarily rely on private cars tend to fall into the Low-Cost Mobility Seekers class. Older individuals with lower levels of education and a negative attitude towards sustainable transport are most likely to belong to the Proximity Oriented Car Lovers class.
- Private cars are the main mode of transport for 52.4% of the residents of Barendrecht. Additionally, active modes are also frequently used, 48.3% of respondents walk four or more days per week, and 31% use (electric) bicycles. Public transport is less popular among residents, and shared mobility services are barely used or even unfamiliar.
- An explanatory factor analysis resulted in four types of prevailing attitudes towards car-free neighborhoods and sustainable transport. Factor 1 represents car-free enthusiasm, these people hold a positive attitude towards car-free living and value a green environment with social interactions and nearby amenities. They are willing to give up their car ownership when moving to a car-free neighborhood. Factor 2 are the conservative public transport critics, these people hold a negative attitude towards sustainable alternatives for the private car. They do not believe in the car-free concept and are not willing to give up their car. Factor 3 represents the Social Green, these people hold a positive attitude towards car-free living and sustainable transportation modes. They value green and social environments and are somewhat skeptical towards private cars. The last factor represents the car lovers, these people are attached to their cars and therefore hold negative attitudes towards alternative modes of transport. The results reveal that 29% of the respondents would change their car use or ownership when moving to a car-free neighborhood. The remaining 71% is not willing to give up their car ownership or travel differently. In addition, the sum scores show that on average residents hold a neutral or slightly negative attitude towards car-free neighborhoods.

Based on the results of this study, two possible approaches are recommended. The first approach involves relaxing the assumption that 75% of the homes should be allocated to current residents of Barendrecht. Given that the majority of respondents are car-oriented, and only one group (Class 2: Sustainable Mobility Enthusiast) is clearly enthusiastic about car-free living, it is unlikely that the envisioned diverse target group can be formed solely from residents of Barendrecht. By treating the 75% local allocation as a flexible guideline rather than a fixed rule, the municipality increases the chances of developing a truly sustainable and diverse community. Alternatively, if the 75% target for Barendrecht residents is maintained, the characteristics of the car-free concept should be relaxed to better accommodate class 1 (*Low Cost Mobility Seeker*) and class 3 (*Proximity Oriented Car Lover*). A gradual, step-by-step transition towards sustainable mobility is recommended, rather than an immediate limitation on car use.

Residents identified as Sustainable Mobility Enthusiasts are likely to be well-suited to a car-free neighborhood. Therefore, this group requires little effort. However, it remains important to keep them informed and engaged to maintain their interest in the development. More attention is needed for the Low-Cost Mobility Seekers and Proximity Oriented Car Lovers, as these groups remain strongly attached to private car use and together represent more than half of the population. To attract these residents, the municipality should recognize that private cars still play a vital role for many households, particularly in a suburban context like Barendrecht, where some destinations may be difficult to reach by other means. To promote sustainable transport while accommodating the continued need for private vehicles, the municipality is advised to invest in user-friendly and high-quality public transport and green infrastructure, as these elements are valued by most of the respondents and therefore are likely to create an attractive neighborhood for most residents. Based on the results of the scenario analysis, it is advised to keep parking costs within a range of 500 to 800 euro per year to maintain affordability for residents, but the number of parking spaces should be limited to encourage the reduction of car-ownership. In addition, it is advised to introduce parking policies in surrounding neighborhoods to prevent illegal parking. Targeted communication strategies can help inform residents about public transport and shared mobility options. To encourage families to use public transport, the introduction of family discounts could be an effective incentive.

A potential direction for future research is to investigate the choice probabilities between car-free and traditional neighborhoods in more detail, by including the optout in the analysis instead of only analyzing the forced choices between two car-free neighborhoods. Additionally, this study could be repeated with a larger sample size to enhance the likelihood of obtaining a representative sample. Another possible extension would be to replicate the study in a different suburban area where a car-free neighborhood is being developed. This would allow for a comparative analysis across municipalities and help identify consistent preference patterns in suburban contexts. Further research could also put more focus on the underlying motivations behind residents' preferences by using qualitative methods, such as interviews. Finally, additional research could be conducted once the first homes in De Stationstuinen are occupied. A revealed preference study among the actual residents could provide valuable insights into real-life mobility and housing choices. This can be used as a complement for this study.

Samenvatting

Auto's blijven de dominante vorm van vervoer, omdat ze de toegankelijkheid vergroten en status en comfort bieden. Het toenemende gebruik van privéauto's veroorzaakt echter ook problemen zoals files, uitstoot en overmatig landgebruik. Omdat klimaatdoelstellingen moeten worden gehaald en er ruimte nodig is voor de toenemende vraag naar woningen, worden verschillende strategieën geïmplementeerd. Een van deze strategieën is de implementatie van autoluwe wijken. In deze wijken wordt prioriteit gegeven aan stedelijke levenskwaliteit door lopen, fietsen en het gebruik van duurzame mobiliteitsopties aan te moedigen, terwijl de openbare ruimte wordt herbestemd voor groene gebieden, woningen en voorzieningen in plaats van auto's.

Deze studie vult een leemte in de bestaande literatuur, aangezien er nog weinig onderzoek is gedaan naar buurtvoorkeuren van potentiële bewoners voor een nog te ontwikkelen autoluwe buurt in een voorstedelijk gebied. Daarnaast richt deze studie zich op de leemte in de kennis over de invloed van sociaal-demografische kenmerken, attitudes en huidig reisgedrag op de buurtvoorkeuren. In tegenstelling tot de meeste bestaande studies, die zich richten op individuen die al in autoluwe gebieden wonen, grijpt deze studie de kans om te onderzoeken of mensen hun gedrag aanpassen door hun autoafhankelijkheid te verminderen als ze naar een autoluwe buurt zouden verhuizen. Inzicht krijgen in de voorkeuren van potentiële bewoners is essentieel voor de gemeente om weloverwogen beslissingen te nemen over het ontwerp van de buurt en het gebruik van de beschikbare ruimte. Daarnaast levert het waardevolle informatie op over de vraag naar vervoersalternatieven, wat kan helpen bij het optimaliseren van het lokale vervoersnetwerk op basis van de behoeften van de bewoners. Deze studie probeert de volgende onderzoeksvraag te beantwoorden:

Hoe beïnvloeden buurtkenmerken, houdingen, sociaal-demografische factoren en huidige mobiliteitsvoorkeuren de bereidheid van potentiële bewoners om in een autoluwe buurt te wonen en hun mobiliteitskeuzes aan te passen?

Om de onderzoeksvraag te beantwoorden is een keuze experiment uitgevoerd. De beoogde doelgroep bestond uit personen van 18 jaar en ouder die in of rond Barendrecht wonen. De enquête bevatte vragen over sociaal-demografische kenmerken, huidig reisgedrag, stellingen over houdingen t.o.v. autoluwe wijken en duurzaam vervoer en keuzesets die deel uitmaakten van het keuze experiment. Voor het keuze experiment kreeg elke respondent 11 keuzesets voorgelegd, die elk een keuze tussen twee autoluwe buurten toonden. Deze buurten varieerden in termen van het niveau van groen en blauw, loopafstanden naar hubs en voorzieningen, jaarlijkse parkeerkosten, treinfrequenties en beschikbaarheid van deelvervoer. De enquête werd opgesteld met Qualtrics en verspreid via flyers, de sociale mediakanalen van de gemeente en de lokale krant. Dit resulteerde in een steekproef van 265 respondenten, waarvan 145 de enquête hebben voltooid. De antwoorden op de stellingen werden geanalyseerd met behulp van exploratieve factoranalyse. De resultaten van het keuze-experiment werden geanalyseerd met behulp van een Multinomial Logit Model (MNL) en een Latent Class Choice Model (LCCM). Het voordeel van een LCCM is dat het rekening houdt met heterogeniteit binnen de populatie, terwijl het MNL-model gemiddelde voorkeuren voor de hele steekproef schat.

Dit onderzoek resulteerde in de volgende bevindingen:

- Gemiddeld waarderen respondenten buurten met meer groene en blauwe ruimtes. Ze geven de voorkeur aan frequente treinverbindingen en lage parkeerkosten. Kortere loopafstanden naar hubs worden meer gewaardeerd dan kortere loopafstanden naar voorzieningen. Gedeelde mobiliteit draagt weinig bij aan de algemene aantrekkelijkheid van een autoluwe buurt, aangezien deelscooters negatief worden beoordeeld en deelauto's slechts enigszins positief.

- De resultaten van het LCCM laten zien dat er heterogeniteit is in buurtvoorkeuren binnen de bevolking. Dit model resulteerde in drie klassen: Low Cost Mobility Seekers (38,29%), Sustainable Mobility Enthusiasts (36,45%) en Proximity Oriented Car Lovers (25,25%). Low Cost Mobility Seekers en Proximity Oriented Car Lovers zijn allebei een beetje conservatief op het gebied van transportkeuzes, omdat ze hun auto het liefst in de buurt houden en niet snel geneigd zijn om alternatief vervoer te kiezen. Maar terwijl Low Cost Mobility Seekers positief staan tegenover de trein, hebben Proximity Oriented Car Lovers geen voorkeur voor een duurzame vervoerswijze. Sustainable Mobility Enthusiasts zijn de enigen die niet gehecht zijn aan hun eigen auto. Zij geven de voorkeur aan een groene, goed verbonden buurt met openbaar vervoer en gedeelde mobiliteitsopties.
- Sociaal-demografische kenmerken, huidig reisgedrag en attitudes helpen verklaren hoe waarschijnlijk het is dat individuen tot een specifieke klasse behoren. Mensen die in een eenpersoonshuishouden wonen, een hoger opleidingsniveau hebben, vertrouwd zijn met duurzaam vervoer en een positieve houding hebben ten opzichte van autoluw leven en duurzame mobiliteit, zullen eerder geclassificeerd worden als Sustainable Mobility Enthusiasts. Gezinnen met kinderen die voornamelijk afhankelijk zijn van een eigen auto vallen eerder in de klasse van de Low Cost Mobility Seekers. Oudere mensen met een lager opleidingsniveau en een negatieve houding ten opzichte van duurzaam vervoer behoren het vaakst tot de klasse van de Proximity Oriented Car Lovers.
- De eigen auto is voor 52,4% van de inwoners van Barendrecht de belangrijkste vervoerswijze. Daarnaast worden actieve vervoerswijzen ook veel gebruikt, 48,3% van de respondenten loopt vier of meer dagen per week en 31% gebruikt de (elektrische) fiets. Het openbaar vervoer is minder populair onder de bewoners en deelvervoer worden niet of nauwelijks gebruikt.
- Een verklarende factoranalyse resulteerde in vier typen houdingen ten opzichte van autoluwe woonwijken en duurzaam vervoer. Factor 1 vertegenwoordigt de autoluwe enthousiastelingen, deze mensen hebben een positieve houding ten opzichte van autoluw wonen en hechten waarde aan een groene omgeving met sociale interacties en nabijgelegen voorzieningen. Ze zijn bereid hun autobezit op te geven wanneer ze verhuizen naar een autoluwe buurt. Factor 2 zijn de conservatieve openbaar vervoer critici, deze mensen hebben een negatieve houding ten opzichte van duurzame alternatieven voor de auto. Ze geloven niet in het autoluwe concept en zijn niet bereid om hun auto op te geven. Factor 3 vertegenwoordigt het sociale groen, deze mensen hebben een positieve houding ten opzichte van autoluw leven en duurzame vervoerswijzen. Ze hechten waarde aan groene en sociale omgevingen en staan enigszins sceptisch tegenover privéauto's. De laatste factor vertegenwoordigt de autoliefhebbers, deze mensen zijn gehecht aan hun auto en hebben daarom een negatieve houding ten opzichte van alternatieve vervoerswijzen. De resultaten laten zien dat 29% van de totale steekproefgroep hun autogebruik of -bezit zou veranderen als ze naar een autoluwe buurt zouden verhuizen. De overige 71% is niet bereid om hun autobezit op te geven of anders te gaan reizen. Daarnaast laten de somscores zien dat de gemiddelde houding ten opzichte van autoluw wonen neutraal is.

Op basis van de resultaten van dit onderzoek worden twee mogelijke benaderingen aanbevolen. De eerste benadering bestaat uit het versoepelen van de aanname dat 75% van de woningen moet worden toegewezen aan de huidige bewoners van Barendrecht. Aangezien de meerderheid van de respondenten gebonden is aan de auto en slechts één groep (Class 2: Sustainable Mobility Enthusiasts) duidelijk enthousiast is over autoluw wonen, is het onwaarschijnlijk dat de beoogde diverse doelgroep alleen uit inwoners van Barendrecht gevormd kan worden. Door de 75% lokale toewijzing te behandelen als een flexibele richtlijn in plaats van een vaste regel, vergroot de gemeente de kans op het ontwikkelen van een echt duurzame en diverse gemeenschap. Als alternatief, als de doelstelling van 75% voor inwoners van Barendrecht wordt gehandhaafd, moeten de kenmerken van het autovrije concept worden versoepeld om beter tegemoet te komen aan Class 1 (Low Cost Mobility Seeker) en

Class 3 (Proximity Oriented Car Lover). Een geleidelijke, stapsgewijze overgang naar duurzame mobiliteit wordt aanbevolen, in plaats van een onmiddellijke beperking van het autogebruik.

Bewoners die zijn geïdentificeerd als Sustainable Mobility Enthusiasts zijn waarschijnlijk goed geschikt voor een autovrije buurt. Daarom vergt deze groep weinig inspanning. Het blijft echter belangrijk om hen op de hoogte te houden en te betrekken om hun interesse in de ontwikkeling te behouden. Er is meer aandacht nodig voor de Low-Cost Mobility Seekers en de Proximity Oriented Car Lovers, omdat deze groepen sterk gehecht blijven aan het gebruik van de eigen auto en samen meer dan de helft van de respondenten vertegenwoordigen. Om deze bewoners aan te trekken moet de gemeente erkennen dat de eigen auto nog steeds een belangrijke rol speelt voor veel huishoudens, vooral in een buiten stedelijke context zoals Barendrecht, waar sommige bestemmingen moeilijk bereikbaar zijn met andere middelen. Om duurzaam vervoer te bevorderen en tegelijkertijd tegemoet te komen aan de blijvende behoefte aan privévoertuigen, wordt de gemeente geadviseerd om te investeren in gebruiksvriendelijk en hoogwaardig openbaar vervoer en groene infrastructuur, aangezien deze elementen door de meeste respondenten worden gewaardeerd en daarom waarschijnlijk een aantrekkelijke buurt zullen creëren voor de meeste bewoners. Op basis van de resultaten van de scenarioanalyse wordt geadviseerd om de parkeerkosten binnen een range van 500 tot 800 euro per jaar te houden om de betaalbaarheid voor bewoners te handhaven, maar het aantal parkeerplaatsen moet worden beperkt om de vermindering van autobezit aan te moedigen. Daarnaast wordt geadviseerd om parkeerbeleid in te voeren in omliggende buurten om illegaal parkeren te voorkomen. Gerichte communicatiestrategieën kunnen helpen om bewoners te informeren over openbaar vervoer en gedeelde mobiliteitsopties. Om gezinnen aan te moedigen het openbaar vervoer te gebruiken, kan de invoering van gezinskortingen een effectieve stimulans zijn.

Een mogelijke richting voor toekomstig onderzoek is om de keuzemogelijkheden tussen autovrije en traditionele buurten in meer detail te onderzoeken, door de optout mee te nemen in de analyse in plaats van alleen de gedwongen keuzes tussen twee autovrije buurten te analyseren. Daarnaast zou deze studie herhaald kunnen worden met een grotere steekproefgrootte om de kans op het verkrijgen van een representatieve steekproef te vergroten. Een andere mogelijke uitbreiding zou zijn om het onderzoek te herhalen in een ander voorstedelijk gebied waar een autoluwe buurt wordt ontwikkeld. Dit zou een vergelijkende analyse tussen gemeenten mogelijk maken en helpen bij het identificeren van consistente voorkeurpatronen in buiten stedelijke contexten. Verder onderzoek zou zich ook meer kunnen richten op de onderliggende motivaties achter de voorkeuren van bewoners door gebruik te maken van kwalitatieve methoden, zoals interviews. Tot slot zou er aanvullend onderzoek kunnen worden gedaan zodra de eerste woningen in De Stationstuinen bewoond zijn. Een revealed preference onderzoek onder de daadwerkelijke bewoners zou waardevolle inzichten kunnen opleveren in de werkelijke mobiliteit en woonkeuzes. Dit kan gebruikt worden als aanvulling op dit onderzoek.

List of Figures

List of Tables

Contents

1. Introduction

1.1 Research Context

Between 1990 and 2019, greenhouse gas emissions increased by 33.5% in Europe. Private cars account for a significant share, contributing 60.6% of the total CO2 emissions from road transport in Europe (European Parliament, 2019). The rise in car use has led to the expansion of car-dependent infrastructure, including roads, parking spaces, and fuel stations. Additionally, increased accessibility and high travel speeds have encouraged urban sprawl, resulting in longer travel distances. These longer distances make alternative modes of transport less attractive, as walking and cycling require greater physical effort, and public transport becomes less cost-effective due to lower user density (Zijlstra et al., 2022). As a result, cars remain the dominant mode of transport, exacerbating issues such as congestion, emissions, and excessive land use. However, to achieve climate goals, increasing attention is being paid towards the sustainability of the mobility sector (CBS, 2023; Ministry of Infrastructure and Water Management, 2024).

One proposed solution to reduce car dependency, promote sustainable transportation alternatives, and adapt the land use purpose, is the development of car-free areas. In these areas, urban quality of life is prioritized by encouraging walking, cycling, and the use of sustainable mobility options while repurposing public space for green areas, housing and amenities instead of cars (Jorritsma, Arendsen, et al., 2023). However, the success of car-free environments depends on the availability of adequate transport alternatives. While large cities often have well-developed public transport networks and mobility services, suburban areas face greater challenges in offering viable alternatives. Consequently, the shift towards car-free policies is primarily occurring in larger cities (Jorritsma, Arendsen, et al., 2023).

Several major cities, such as Utrecht, Hamburg, Helsinki, Madrid, and Oslo, have already implemented car-free initiatives. A car-free city does not eliminate motorized transport entirely, instead, it significantly reduces private car usage (Nieuwenhuijsen et al., 2018). Public transport, taxis, and other shared mobility options remain available, while restrictive measures, such as parking reductions and road access limitations, make private car use less attractive.

The reduction of private cars in cities is expected to yield multiple benefits. First, it is likely to lead to lower greenhouse gas emissions and improved local air quality. According to Nieuwenhuijsen et al. (2018), this potential environmental improvement is one of the primary drivers of the shift towards car-free cities. Furthermore, reducing private car usage and promoting sustainable transport modes can decrease noise disturbances, create opportunities for green spaces, and foster social interactions. Collectively, these effects contribute to better public health (Nieuwenhuijsen & Khreis, 2016). However, limiting private car use without providing adequate alternatives risks reducing accessibility, potentially leaving certain societal groups unable to reach essential destinations.

According to ROM et al. (2025), suburban areas surrounding small train stations offer a lot of potential for developing car-free neighborhoods. The train provides an excellent alternative to private cars, supporting both mobility and housing transitions. Utilizing this potential can help to facilitate the shift towards car-free areas, not only in urban areas but also in suburban environments.

In line with this potential, the municipality of Barendrecht is currently developing a car-free neighborhood called De Stationstuinen, located next to the train station. This development stems from the challenge of accommodating a growing population within a limited available space. High housing density places significant pressure on public areas, prompting the municipality to prioritize green spaces, social hubs, and playgrounds over car infrastructure. Additionally, reducing car ownership is expected to alleviate congestion on the already overburdened regional road network.

De Stationstuinen will largely be car-free, with limited parking facilities located on the outskirts of the neighborhood. These parking spaces will be regulated for residents and subject to fees for visitors. By removing cars from residential streets, the goal is to make alternative transport options more appealing. The neighborhood is strategically positioned within walking distance of a train station and several bus stops, and shared mobility services, such as car-sharing hubs, will be integrated at the neighborhood's edges (Goudappel, 2023).

1.2 Knowledge Gap

The vision for De Stationstuinen is to create a green neighborhood where sustainable transportation is central, providing space for living, working, learning, and recreation. However, for this vision to succeed, it is essential that the preferences of future residents align with the planned development. If these preferences are not met, people may not be attracted to the neighborhood, making it difficult to encourage a shift towards sustainable mobility. This could result in more space being allocated to cars instead of housing and green areas. Additionally, some residents may choose to move to the car-free neighborhood due to housing availability or job opportunities in the agro-food industry, yet remain unwilling to alter their mobility choices. This unwillingness could hinder the achievement of the sustainable goals associated with a car-free neighborhood. Understanding the preferences of potential residents is therefore crucial. Gaining insights into these preferences enables the municipality to tailor its plans accordingly, ensuring that the neighborhood attracts residents who are not only interested in living there but are also willing to embrace a car-free lifestyle.

The concept of car-free neighborhoods is not new, and various studies have explored this topic. Existing research provides a foundation for developing new car-free areas. However, most studies focus on established car-free zones in urban environments, often outside the Netherlands, or on the transformation of existing neighborhoods into car-free areas.

Gundlach et al. (2018) examined the preferences of people for a car-free city center in Berlin. However, only 20% of the respondents in this study owned a car, meaning the results may not be representative for residents of a car-oriented suburban village like Barendrecht. Additionally, Gundlach et al. (2018), Ajdari et al. (2022), and Da Silva Borges and Goldner (2015) all studied the car-free concept in existing urban neighborhoods outside of the Netherlands. Car ownership rates differ between urban and suburban areas (Laviolette et al., 2024), which may affect the applicability of their findings to the context of a yet-to-develop car-free neighborhood in a suburban village. Furthermore, these studies primarily focus on mobility alternatives and green spaces within car-free areas, but there remains a knowledge gap regarding the influence of nearby amenities such as shops and sports facilities on potential residents' choices. Moreover, Baehler and Rérat (2020) investigated the preferences of people already living in a car-free neighborhood. However, their findings may not fully apply to individuals who currently reside in car-oriented areas and are considering relocating to a car-free neighborhood. Lastly, existing studies rarely account for the influence of socio-demographic factors on residential preferences, despite multiple studies demonstrating a relationship between these factors (Van Wee et al., 2002; Van Wee, 2009; Van Acker et al., 2010). Paijmans and Pojani (2021) states that future research is valuable to explore specific demographic clusters among the car-free residents.

In summary, existing research primarily focuses on transforming established urban areas into car-free zones rather than developing entirely new car-free neighborhoods. Additionally, previous studies have examined the preferences of people already living in car-free neighborhoods rather than those considering moving to one. De Stationstuinen presents a different case. It is a newly planned neighborhood in a suburban setting, where the surrounding area of Barendrecht is highly car-oriented. This context may significantly influence the attitudes and preferences of potential residents, highlighting the need for targeted research on their mobility and residential preferences.

1.3 Research Questions

Based on the problem statement in the previous section, the following research question was formulated:

How do neighborhood characteristics, attitudes, socio-demographic factors, and current mobility preferences influence the willingness of potential residents to live in a car-free neighborhood and adapt their mobility choices?

This research question will be answered based on the following sub-questions:

1. What characteristics of car-free neighborhoods are preferred by its residents and what are their motivations to live in a car-free neighborhood?
2. What are current mobility choices of the potential future residents of the car-free neighborhood?
3. What are the attitudes towards car-free neighborhoods, the willingness to give up the car in a car-free neighborhood and the willingness to travel differently among potential future residents?
4. What are the preferences towards neighborhood characteristics in car-free suburban neighborhoods?
5. What is the heterogeneity in neighborhood preferences and how do neighborhood characteristics, attitudes, socio-demographic variables and current mobility choices influence this heterogeneity?

Figure 1 shows the conceptual diagram based on the sub-questions above. Residents will fit in a certain mobility profile based on their socio-demographic characteristics and attitudes towards car-free living. Based on this mobility profile and neighborhood attributes, they will make certain choices that will maximize their utility. This information will be used to analyze neighborhood choices among different residents.

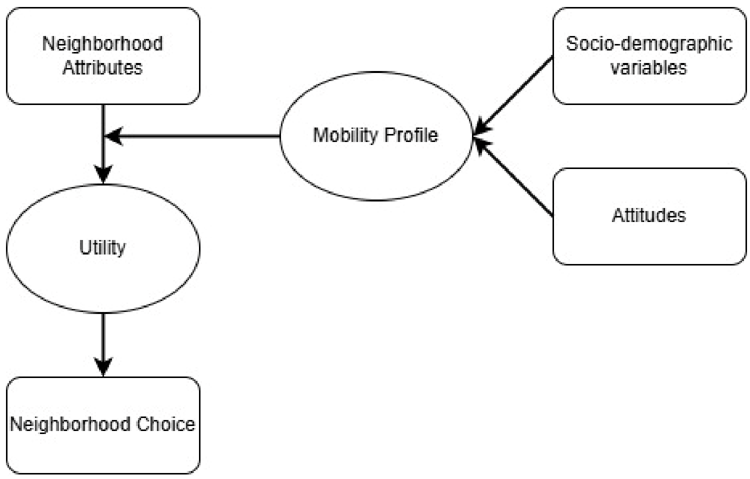


Figure 1. Conceptual Diagram.

1.4 Methodology

The first sub-question is addressed through a literature study on car-free cities, focusing on resident's preferences and motivations. This provides insights into the key aspects that make such neighborhoods attractive and informs the selection of attributes for the Discrete Choice Experiment (DCE). Relevant literature is collected using various academic search engines, including Google Scholar and Scopus.

Sub-questions 2-5 are addressed using data collected by means of a survey. The survey consists of four parts: socio-demographic characteristics, current mobility choices, choice sets and statements. Responses regarding current mobility choices are used to answer sub-question 2. The choice sets are part of the Discrete Choice Experiment and the main part of the survey. The statements are analyzed using Exploratory Factor Analysis to answer sub-question 3.

Exploratory factor analysis is a method to explore the underlying relationships between measured variables. It helps to identify clusters of intercorrelated variables (*Exploratory Factor Analysis*, 2023). In this study, it is used to identify clusters of respondents having a similar attitude towards car-free neighborhoods and alternative transportation modes. To determine these clusters of attitudes, the relationship between the level of agreement on the different statements will be analyzed.

The third part of the survey, consisting of the choice sets, are part of the Discrete Choice Experiment (DCE) used for this study. It is an attribute based method that helps to measure utility (Ryan et al., 2007). As stated in Chapter 4.1, a DCE is commonly used for studies on choice behavior and preferences. Additionally, a DCE is appropriate for this study because it allows for the investigation of preferences in hypothetical scenarios that do not yet exist in reality, in this case *De Stationstuinen*. The DCE will help to gain insights into the preferences and trade-offs made by future residents of a car-free neighborhood.

To analyze the DCE results and answer sub-questions 4 and 5 both a Multinomial Logit Model (MNL) and a Latent Class Choice Model (LCCM) are used. A Multinomial Logit Model (MNL) is a classic and simple model to describe a decision making process (Broers et al., 2018). This method helps to gain insights into the influence of independent variables on the dependent variable. A MNL model is particularly suitable for situations where the dependent variable has multiple categories, which makes it an effective tool for analyzing choice behavior among various alternatives. It helps identifying which factors influence the likelihood of a respondent choosing a specific neighborhood. Despite its advantages in modeling complex choice behavior and analyzing multiple alternatives, it has been found that the MNL is too restrictive and often unrealistic due to underlying assumptions (Broers et al., 2018).

One of the extensions of the MNL that accounts for its limitations is the Latent Class Choice Model (LCCM). A Latent Class Choice Model is useful if it is assumed that there are two or more groups of people underlying the data. Respondents will have a probability of belonging to each class, this probability will increase if there is a similarity in preferences that differ from another class. The methods used in this study are presented in Table 1 and discussed in more detail in Chapter 4.

Table 1. Research Questions and Methods.

How do neighborhood characteristics, attitudes, socio-demographic factors, and current mobility preferences influence the willingness of potential residents to live in a car-free neighborhood and adapt their mobility choices?

Sub-question	*Method*
What characteristics of car-free neighborhoods are preferred by its residents and what are their motivations to live in a car-free neighborhood?	Literature study
What are current mobility choices of the potential future residents of the car-free neighborhood?	Survey with mobility choice questions
What are the attitudes towards car-free neighborhoods, the willingness to give up the car in a car-free neighborhood and the willingness to travel differently among potential future residents?	Exploratory Factor analysis
What are the preferences towards neighborhood characteristics in car-free neighborhoods?	Discrete choice experiment & Multinomial Logit Model
What is the heterogeneity in neighborhood preferences and how do neighborhood characteristics, attitudes, socio-demographic variables and current mobility preferences influence this heterogeneity?	Discrete choice experiment & Latent Class Choice Model

1.5 Relevance

1.5.1 Social Relevance

Gaining insights into the preferences of potential residents is essential for the municipality to make informed decisions about the design of the neighborhood and the use of available space. Additionally, it provides valuable information on the demand for transportation alternatives, which can help optimize the local transportation network based on residents' needs. This research is not only relevant for Barendrecht but also for other municipalities considering the development of car-free neighborhoods in suburban areas. In particular, it provides insights into car-free developments around small train stations, as highlighted by ROM et al. (2025). Understanding the preferences for alternative transportation modes, such as public transport and shared mobility services, will help policymakers develop targeted strategies to support sustainable mobility.

1.5.2 Scientific Relevance

There is a knowledge gap regarding the preferences of potential residents for a yet-to-develop car-free suburban neighborhood. Existing literature primarily examines car-free urban environments, focusing on transportation infrastructure, green spaces, and the types of residents willing to move to such areas. However, little is known about how personal characteristics, attitudes and neighborhood characteristics influence neighborhood choices in a suburban context. This study aims to address this knowledge gap by identifying different classes within the population, based on the heterogeneity in neighborhood preferences.

This study contributes to the available literature by exploring the preferences of potential future residents for a newly planned car-free neighborhood, considering not only transport infrastructure and green spaces but also the impact of nearby amenities. Additionally, this research will investigate how moving to a car-free neighborhood influences residents' mobility choices. A key contribution is analyzing the discrepancy between current travel behavior in a car-oriented neighborhood and expected choices in the new car-free setting. Unlike most existing studies, which focus on individuals already living in car-free areas, this study seizes the opportunity to examine whether people are willing to adapt their behavior by reducing car dependency after relocating to a car-free neighborhood.

1.6 Structure

Chapter 2 presents a theoretical framework, based on the review of the existing literature on car-free neighborhoods. Chapter 3 provides further details about De Stationstuinen, including an overview of the target group that is expected to reside there. Chapter 4 outlines the methodologies used in this study, based on a methodological review of previous studies. Chapter 5 contains the data analysis and results. The results are discussed in Chapter 6 and the conclusions and recommendations are made in Chapter 7.

2. Theoretical Framework

This chapter provides the theoretical framework for this study. It discusses the key aspects related to car-free neighborhoods and their residents. The chapter draws on existing research, providing a clear definition of car-free neighborhoods and a point of reference for comparing the results of this study. Additionally, the insights generated from this literature review will be used for the development of the statements and attributes used in this research. This chapter is concluded with a conceptualization. Table 2 provides an overview of the literature with associated keywords and sources used to find the literature.

Table 2. Authors, Keywords and Sources.

Author	Keywords	Source
Ajdari et al. (2022), Da Silva Borges and Goldner (2015), Melia (2014), Selzer (2021).	Car free definition OR Car free neighborhoods OR Car free development, Car free neighborhood implementation	Google Scholar
Baehler (2019), Baehler & Rérat (2020), Nieuwenhuijsen et al. (2018), Paijmans & Pojani (2021).	Car free motivations OR Preferences in carfree cities	Google Scholar
Doheim et al. (2020).	Transformation car-free	Google Scholar
Elldér et al. (2020).	Mobility choice amenities	Google Scholar
Gundlach et al. (2018), Masoumi (2019).	Discrete choice experiment car free cities OR Discrete choice mode choice	Google Scholar
Handy (2017), Li et al. (2015).	Influence environment on travel behavior OR Factors influencing mode choice	Science Direct
Heroy et al. (2022).	Effect of nearby amenities on mode choice	Sage Journals
Jorritsma et al. (2023).	Autoluw beleid	KIM
Klein et al. (2024).	Residential self-selection car-free housing	Science Direct
Rogers et al. (2016).	Parking utilization neighborhoods	Google Scholar
Southworth (2005).	Active modes	Google Scholar
Van der Waerden et al. (2017).	Walking distances parking	Google Scholar
Van Veldhoven et al. (2022).	Intention to use shared mobility	Science Direct
Wahlgren & Schantz (2014), Witchayaphong et al. (2020).	Factors influencing mode choice	Google Scholar

This chapter reviews the target groups identified in previous studies on car-free neighborhoods, providing a basis for comparison with the target group identified in this study. The municipality of Barendrecht aims to attract a diverse group of residents to De Stationstuinen, understanding the population composition in other car-free neighborhoods can help assess whether this goal is realistic. In addition, this chapter discusses alternative modes of transport to the private car, as this study investigates preferences for such alternatives. Insights from previous research help inform the selection of relevant attributes for the choice sets. Furthermore, the chapter explores the advantages and disadvantages of car-free neighborhoods, which serve as a reference for developing attitudinal statements used in the survey as it is likely that residents will take these advantages and disadvantages into account when forming an opinion. Factors influencing travel behavior, motivations for living car-free, and resident preferences in car-free neighborhoods are also reviewed. These elements will be used to create meaningful attributes for the choice sets and provide the opportunity to compare outcomes of this study with findings from previous research. This provides the opportunity to compare urban and suburban car-free environments.

2.1 Definition of a Car-free Neighborhood

According to Melia (2014) a car free neighborhood is characterized by the following three aspects: the immediate environment is (nearly) traffic free, the environment is designed to facilitate movement by other transportation modes (non-car means) and there is no parking offered for residents or limited parking separated from the dwellings. These aspects are combined with parking policy and rely on different forms of parking management.

There exists different types of car-free neighborhoods. First, the Vauban Model, is about neighborhoods where the parking facilities are removed to the outskirts. It is possible to drive through the neighborhood, but parking is not possible. Car owners must pay for the car parks on the periphery, which acts as a disincentive to car ownership (Melia, 2014).

Secondly, the Limited Access Model, physically restrict the access of motor vehicles to the residential area. It is therefore impossible to drive with a car through the neighborhood. The only exceptions are for special deliveries and emergency services. Residents can park their cars on the peripheries (Melia, 2014). However, exceptions are made for disabled inhabitants.

Thirdly, Pedestrianised Centres, are neighborhoods fully designed to the pedestrian. These areas are totally closed for traffic and parking is possible towards the edge of the neighborhood. This strategy leads to a drop in car ownership and car usage compared to neighborhoods less designed for the pedestrian (Melia, 2014).

2.2 Preferences of Residents in Car-free Neighborhoods

Previous research has identified several key factors that influence people’s willingness to live in a car-free neighborhood. These factors relate to mobility, amenities, green spaces, and accessibility.

A well-developed infrastructure for active modes of transport is essential in a car-free neighborhood, as these modes serve as alternatives to car usage (Da Silva Borges & Goldner, 2015; Gundlach et al., 2018; Ajdari et al., 2022). Ajdari et al. (2022) found that residents prefer high-quality cycling infrastructure, including dedicated bike lanes rather than shared bikeways alongside roads. Additionally, well-maintained pedestrian paths that ensure short walking distances to amenities and public transport services are highly valued (Borgers et al., 2008; Da Silva Borges & Goldner, 2015; Ajdari et al., 2022). Beyond active mobility, public transport plays a crucial role in car-free areas. A dense network of bus stops and train stations has been shown to increase acceptance of car-free living (Gundlach et al., 2018). Additionally, lower public transport costs further encourage residents to embrace car-free living (Gundlach et al., 2018).

The availability of essential amenities within the neighborhood is another important factor. Residents favor having shops, commercial centers, and delivery services nearby to minimize the need for a car (Da Silva Borges & Goldner, 2015). Families, in particular, appreciate the presence of schools and playgrounds, aligning with the fact that many families choose to live in car-free neighborhoods (Da Silva Borges & Goldner, 2015).

Many residents are drawn to car-free neighborhoods due to the availability of green spaces and recreational areas. Streets are designed for community interaction rather than car traffic, promoting active mobility and social cohesion. This emphasis on greenery and shared spaces contributes to an improved quality of life (Da Silva Borges & Goldner, 2015; Gundlach et al., 2018; Ajdari et al., 2022).

While car-free areas limit private vehicle use, some flexibility is preferred. Da Silva Borges & Goldner (2015) found that car-sharing options and controlled access for emergencies or goods transportation improve the feasibility of car-free living. Furthermore, these neighborhoods should remain well-connected to surrounding areas, ensuring accessibility for elderly and disabled individuals, emergency services, and goods transport, without permanent physical barriers restricting movement (Da Silva Borges & Goldner, 2015). Moreover, a study by Borgers et al. (2008) found that residents of a car-free neighborhood who own a car prefer secured parking facilities at the periphery of the neighborhood, especially when parking near their residence is not an option.

In summary, the appeal of car-free neighborhoods is strongly influenced by the presence of high-quality cycling and pedestrian infrastructure, accessible public transport, essential amenities, green spaces, short walking distances and secured parking facilities. Understanding these preferences is key to designing car-free neighborhoods that align with residents' needs and expectations.

2.3 Target Group of Car-free Neighborhoods

Previous studies by Da Silva Borges and Goldner (2015) and Baehler & Rérat (2020) indicate that residents attracted to car-free neighborhoods are often younger than 65 years. Among these households, approximately half consist of families, one-third are individuals living alone, and the remaining households include couples without children and flat-shares. Additionally, users of sustainable transport modes (active modes and shared mobility) are more likely to be drawn to car-free neighborhoods, but frequent public transport users are less likely to choose for a car-free city center (Da Silva Borges and Goldner, 2015; Gundlach et al., 2018). The previous group of residents tend to be younger, more inclined to use shared mobility services, and less dependent on private car ownership (Vassallo Magro & Sánchez, 2024).

Car-free neighborhoods particularly attract highly educated individuals. While these residents have the financial means to own a car, they consciously choose to live without one (Da Silva Borges and Goldner, 2015; Baehler, 2019; Baehler & Rérat, 2020; Paijmans and Pojani, 2021). They are often politically aware, hold strong ethical values, and prioritize environmental concerns. These values are also reflected in their political preferences, as residents of car-free neighborhoods are more likely to vote for social and green parties (Baehler, 2019; Baehler & Rérat, 2020).

However, according to Baehler & Rérat (2020), car-free neighborhoods still accommodate a diverse range of residents. The overrepresentation of highly educated individuals in these areas may be explained by their lower attachment to the status symbol of car ownership, making it easier for them to adopt a car-free lifestyle.

2.4 Alternatives for Private Car Ownership

The introduction of car-free neighborhoods increases the demand for alternative transport modes. To have access to other transport modes, an individual need to have the following competences: physical ability to make use of a certain mode (riding a bike, walking a distance), some acquired skills are necessary like a driving license or specific knowledge about transport alternatives and feeling comfortable with these alternatives. Lastly the individual need to have some organizational skills (knowing where to find information about transport alternatives and how to plan a trip) (Baehler & Rérat, 2020).

Examples of alternative transport modes for the private car are the bicycle, walking, public transport and shared mobility. Research from Baehler and Rérat (2020) shows that the bicycle is mostly used for local trips because of its flexibility, independence and velocity. Walking is often used for shorter distances or as part of a multi-mode trip. Public transport is used for longer distances, but in contrast to a bicycle and walking it comes with a cost (Baehler & Rérat, 2020). The same is true for shared mobility, it can be used for larger distances, but it also requires a payment. Additionally, shared mobility is often not feasible for daily usage compared to other transport options.

2.5 Advantages and Disadvantages of a Car-free Neighborhood

Reducing car usage is expected to have a positive effect on the environment. There will be less pollution and emissions and this provides better air quality. Besides, keeping the neighborhood car-free may reduce the noise level and provides more opportunities for green and blue (water) spaces, this is important to digest heavy rainfall and reduce heat stress (Rogers et al., 2016). All these factors are expected to improve the quality of life and will likely lead to health benefits and a more active lifestyle (Melia, 2014; Wahlgren & Schantz, 2014). It will also reduce the social inequity, since people who do not own a car, typically the ones with low incomes and residents of dense urban areas, suffer the most from the consequences of cars driving through their areas (Melia, 2014). This will disappear when the cars are banned from the streets.

Inhabitants of car-free areas tend to be more active, by walking or using the bike instead of the car. It also turns out that people get better relationships with their neighbors in car-free neighborhoods compared to car-oriented neighborhoods (Melia, 2014). Increasing the use of other modes and decreasing the use of cars can also has a positive effect on traffic safety, since it is likely to reduce the number of traffic accidents (M. Nieuwenhuijsen et al., 2018; Doheim et al., 2020).

Besides the positive effects that are likely to arise when reducing or removing cars from the neighborhoods, it will also bring some difficulties. First of all, the car is seen as a comfortable and flexible mode of transportation, and people perceive the ability to travel by car not only as a practical form of freedom but also as an emotionally and socially charged symbol of independence and status (Masoumi, 2019). Removing cars from the neighborhoods can take away this feeling of freedom of car-users. Some people might not be able to use another mode of transport. These people can also decide to keep their car, however this can also lead to dissatisfaction. This is often due to problems with parking and accessibility. Car owners are unsatisfied when they need to park their car somewhere else, away from their house. It is possible that they are not able to walk a longer distance to their car, or they simply do not want to do this. There also can be problems with car owners who try to cheat, by parking their car somewhere else or avoid the payments. The risk of illegal parking will be higher when there is less parking control (Melia, 2014). Lastly, car-free areas are also less accessible for emergency services, deliverers and disabled people. This need to be taken into account when designing a car-free neighborhood (Baehler, 2019).

2.6 Factors Influencing Travel Behavior

Mode choice is influenced by several factors. First of all it is influenced by transport related factors, examples are the service quality of the transit system, travel time and characteristics, costs, complexity and the availability of parking facilities (Masoumi, 2019). The distance from home to a public transport station also influences the usage. It is found that people who live near green transport options are more tend to use them, which shows that a better green-mode environment stimulates the usage of green-modes (Li et al., 2015; Witchayaphong et al., 2020).

Besides these transport related factors, spatial causes and individual factors also play a role. Spatial causes are for example the residential location and the urban form (Masoumi, 2019). People who live in the city are more inclined to use public transport, since the public transport network is often more dense in the city center and it is more difficult to park your car. On the other hand, people who live in rural areas are more likely to use the private car, since it is easy to park your car in front of the house and public transport is less available (Van Veldhoven et al., 2022; Jorritsma et al., 2023). Besides this, it is found that the availability of parking space also have a significant effect on car ownership. Providing less parking spots is likely to cause a shift from car usage to alternative modes (Baehler & Rérat, 2020). Van der Waerden et al. (2017) stated that the walking distance to parking facilities is the most important factor for deciding to walk instead of getting the car.

Individual factors, such as attitudes, perceptions, behavioral norms, beliefs, and habits, influence transport mode choice (Masoumi, 2019). Car owners often prefer using their cars due to the sense of freedom, speed, comfort, and flexibility it provides. Some individuals value their personal space and have developed a habit of driving. Additionally, car users tend to have a negative perception of public transport, which reduces their willingness to switch to alternative modes (Masoumi, 2019). However, in some cases it is not just the willingness to use alternative modes, but the possibility of using these modes. For example, those who work at remote places, like the harbor, or those who work night shifts might not be able to use public transport and are forced to take the car.

Beyond these individual factors, socio-demographic characteristics also play a significant role in transport mode choice. Research has shown that age, income, and vehicle ownership have a notable impact on an individual's choice of transportation mode (Li et al., 2015; Witchayaphong et al., 2020). Heroy et al. (2022) found that wealthier residents base their decision to walk more on the proximity of amenities rather than the cost of using a transport mode.

Several studies have examined the influence of nearby amenities on mode choice. Findings suggest that a higher availability of neighborhood amenities contributes to increased walking and cycling while reducing reliance on motorized transport (Handy, 2017; Elldér et al., 2020; Heroy et al., 2022). In particular, local everyday services, such as grocery stores that also offer pharmacy and postal services, elementary schools, and restaurants, play a crucial role in shifting travel behavior. Furthermore, the presence of a diverse range of amenities within a neighborhood can influence the mode choice of habitual car users. If the neighborhood offers sufficient amenities, active travel modes such as walking and cycling may become more viable alternatives to car use (Elldér et al., 2020).

Besides the availability of amenities in a neighborhood, walking is influenced by the attractiveness of footpaths, social and objective safety of walking routes, availability and pricing of parking facilities, physical abilities of the pedestrian, and the nature and duration of the activity (CROW Kennisbank, 2024).

In line with these factors, Southworth (2005) outlined key criteria for a successful pedestrian network. The first criterion is connectivity, meaning that footpaths should provide direct and convenient access to essential amenities within short distances. Additionally, they should integrate well with other modes of transport, such as public transport. Furthermore, the pedestrian network must be safe and high quality, ensuring well-maintained paths that are comfortable to walk on and prevent dangerous encounters with other modes. Lastly, the path context is important, the pedestrian network need to offer a pleasant, green, and secure walking environment. By incorporating these criteria into pedestrian network design, walking becomes a more attractive alternative to motorized transport, encouraging a shift towards more sustainable mobility choices.

2.6.1 Travel Behavior in a Car-free Neighborhood

Car-free neighborhoods encourage residents to adopt alternative modes of transportation. Selzer (2021) found that residents in these neighborhoods tend to drive less and leave their cars parked for most of the time. Similarly, a survey by Baehler and Rérat (2020) revealed that, on average, 26% of car owners gave up their car after moving to a car-free neighborhood. However, while cars do not completely disappear, alternative transport modes are used more frequently. The extent to which cars are given up largely depends on the number of available parking spaces in the neighborhood (Baehler, 2019).

One of the key factors driving this shift is the improved infrastructure for cyclists and pedestrians in car-free areas, which encourages residents to choose active modes of transport over the car. Public transport availability also plays a crucial role. The presence of sufficient bus stops and well-structured train and bus schedules further supports the use of public transport (Gundlach et al., 2018).

In addition to these infrastructural improvements, a fundamental change in mindset contributes to reduced car use. Many residents no longer see car ownership as necessary, as they find that alternative transport modes sufficiently meet their mobility needs. As a result, cycling has become the dominant mode of transport in car-free neighborhoods, with 50% of all trips, especially shopping trips, made by bicycle. Walking also plays a significant role in shopping-related trips, since amenities are often within the neighborhood. Public transport is the second most important mode of transport, particularly in larger cities where it is more accessible, and in less centrally located neighborhoods where travel distances are greater (Baehler, 2019).

Mode choice is not solely determined by the built environment, it is also influenced by pre-existing travel attitudes and preferences. Therefore, the shift in mode choice observed in car-free neighborhoods, compared to conventional ones, cannot be attributed only to the characteristics of the built environment. It is also influenced by the type of residents who choose to live there. Since car-free living appeals more to some individuals than others, car-free neighborhoods may be subject to residential self-selection. Residential self-selection suggests that individuals select residential areas that align with their existing travel preferences and attitudes, meaning that their mobility choices are shaped by both personal attitudes and the environment (Klein et al., 2024).

2.7 Motivations to Live Car-free

Research on the motivations for choosing to live in a car-free neighborhood reveals several key reasons. First, many residents indicate that they do not need a car to participate in daily activities. This is often attributed to the availability of alternative transport options in the area, such as public transportation. Second, health and age-related factors play a role in the decision to live in a car-free environment (Paijmans & Pojani, 2021). Some residents prefer these neighborhoods due to their car-free environment, with less pollution and noise-hindrance compared to conventional neighborhoods. Others may choose a car-free lifestyle due to health or physical limitations that prevent them from driving (Baehler, 2019; Baehler & Rérat, 2020).

Financial considerations also contribute to this decision. The high costs associated with car ownership encourage some individuals to opt for alternative transport modes, such as public transport, shared mobility options, and active travel modes like walking and cycling. Additionally, some residents are motivated by environmental concerns and choose a car-free lifestyle as a way to reduce their ecological footprint (Baehler, 2019; Baehler & Rérat, 2020; Paijmans & Pojani, 2021).

It is important to note that car-free neighborhoods do not solely consist of individuals who have completely abandoned car ownership. Some residents still own a car but use it only for specific situations. Furthermore, motivations for living in a car-free neighborhood extend beyond mobility-related aspects. Many residents choose these neighborhoods for their child-friendly environment, as the absence of cars on the streets enhances safety and allows for more accessible green spaces and play areas. Social aspects, such as the sense of community and increased social interaction also play a significant role. Additionally, improved cycling and walking infrastructure, ecological considerations, and financial benefits are cited as important factors in the decision to live in a car-free neighborhood (Baehler, 2019; Baehler & Rérat, 2020).

Ultimately, many residents are drawn to car-free living as part of a broader aspiration for a sustainable, social, and healthy lifestyle. The benefits of a car-free neighborhood can even persuade car owners to give up their vehicles and embrace a car-free way of life. While some prioritize environmental sustainability, others focus on health and well-being, while another group values the practical advantages, such as having essential amenities and transportation alternatives nearby (Baehler, 2019; Baehler & Rérat, 2020; Paijmans & Pojani, 2021).

2.8 Conceptualization

The literature review has shown that neighborhood choices are influenced by transport-related factors, individual characteristics, spatial factors and the availability of parking spaces and nearby amenities. These factors will therefore be incorporated into this study as either attributes or covariates. The attributes represent specific neighborhood characteristics based on prior research, while the covariates capture characteristics such as socio-demographics, current travel behavior and attitudes. This paragraph provides a motivation for the selection of both attributes and covariates.

2.8.1 Covariates

Socio-demographics

The goal of a car-free neighborhood is to create more space for housing, green, social interaction and alternative transportation by reducing the space available for private cars. Car usage is made less attractive, while sustainable transport options are promoted. Based on previous research, it is found that car-free neighborhoods tend to attract a specific type of residents, typically families or younger people, who are highly educated, have a high income and are environmentally aware (Da Silva Borges & Goldner, 2015; Baehler, 2019; Baehler & Rérat, 2020; Paijmans & Pojani, 2021).

Moreover, daily activities such as work, study, or other regular commitments are expected to influence residents' travel patterns and mobility choices (Van Wee et al., 2002). This might affect the willingness to reside in a car-free neighborhood. To explore the type of residents who are attracted to car-free living in a suburban area, the survey includes questions on various socio-demographic characteristics.

This study incorporates variables commonly examined in previous research, namely age, household composition, education level, daily activity and income. This allows for comparison with earlier findings and to assess whether differences exist between urban and suburban areas. In addition, this study introduces variables that have received less attention in existing research, including gender, car ownership and current neighborhood. Gender is included based on the hypothesis that women may be less car-oriented than men and therefore more likely to embrace car-free living. Residents are asked to indicate their current neighborhood, as this information allows for an exploration of potential differences in preferences and choices between residents of Barendrecht and those living elsewhere. Including this variable enables the study to test the assumption made by DISCVision (Chapter 3.2), namely that individuals from outside Barendrecht are more likely to align with the profile of potential car-free residents than current Barendrecht inhabitants. Additionally, car ownership is assessed to evaluate residents' willingness to give up their private vehicle when moving to a car-free neighborhood, as well as to evaluate the influence of car-ownership on neighborhood preferences.

Attitudes

Previous studies have found relationships between attitudes and mode choice (Masoumi, 2019), as well as between attitudes and residential self-selection (Klein et al., 2024). To fully realize the potential of a car-free neighborhood, it is essential to understand the preferences and attitudes of its future residents. Therefore, exploring residents' attitudes towards car-free living is valuable for exploring their impact on the neighborhood choices.

Travel Behavior

According to Klein et al. (2024) there is a relationship between mobility choices and the willingness to live in a car-free neighborhood. Residential self-selection plays a role in choosing to live in this type of neighborhood. Individuals who are already less dependent on cars are more likely to choose a car-free neighborhood. Conversely, residents who are strongly attached to their car would need to significantly adjust their habits in a car-free setting.

Understanding the current travel behavior of potential residents of *De Stationstuinen* is therefore critical. This study includes questions on travel behavior to examine whether a relationship exists between current travel behavior and both the willingness to move to a car-free neighborhood and the willingness to give up private car ownership.

2.8.2 Attributes

The attributes included in this study are based on insights from the literature study. As this study aims to understand preferences and choices of prospective residents in suburban car-free neighborhoods, the selected attributes primarily relate to neighborhood characteristics, with a particular focus on mobility.

The attribute *Green and Blue* is included because the presence of natural elements in the neighborhood contributes to physical and mental well-being and fosters opportunities for social interaction (Da Silva Borges & Goldner, 2015; Gundlach et al., 2018; Ajdari et al., 2022).

Walking distances are included in this study because a car-free neighborhood is only effective if residents are willing to replace car use with active and sustainable modes of transport. According to Van der Waerden et al. (2017), walking distance is a key factor influencing the willingness to walk. Understanding this willingness to walk can help design a neighborhood that meets residents' needs, thereby reducing car dependence and encourage walking. It is chosen to include walking distances to amenities as residents favor neighborhoods with nearby amenities and well-developed walking infrastructure for active modes (Da Silva Borges & Goldner, 2015; Gundlach et al., 2018; Ajdari et al., 2022). Walking distance to hubs is included as attribute as it is found that residents of a car-free neighborhood who own a car prefer secured parking facilities at the periphery of the neighborhood (Borgers et al., 2008). It also allows for an assessment of the importance residents attach to having their car nearby, as opposed to accepting a longer walking distance.

The availability of shared mobility options and train frequency are included as attributes, as it is found that residents are attracted to neighborhoods that offer alternatives for private car usage (Paijmans & Pojani, 2021). Additionally, *train frequency* is included as an attribute because the proximity of the train station to the neighborhood is likely to influence both the willingness to reside in that neighborhood and the likelihood of choosing the train over a private car for travel. It is chosen to include the train frequency instead of the bus frequency because trains connect to a wider range of destinations and typically offer faster, more comfortable travel. Since the neighborhood is located near a train station, residents are more likely to base their preferences on train service rather than bus availability. Including bus frequency as an attribute may introduce bias, as residents' preferences are likely to be influenced by the availability of the train. Shared cars and shared scooters are included as attributes because these forms of shared mobility are more likely to be used by residents compared to shared bicycles, as most people already own a bicycle.

Finally, parking costs at the hubs are included as an attribute, as financial considerations are an important element in mobility and neighborhood choices (Baehler, 2019; Baehler & Rérat, 2020; Paijmans & Pojani, 2021). Higher parking costs are likely to discourage private car usage. It is crucial to understand whether people are willing to use alternative transport modes instead of relying on personal cars. The parking cost attribute is included to explore residents' preferences and the trade-offs they make between alternative mobility options and car ownership.

Understanding preferences related to mobility alternatives, parking costs, green-blue spaces, and amenities provides valuable insights into residents' willingness to reduce car ownership and usage. Residents who are unwilling to substitute car use with alternative modes and remain highly dependent on their private cars are unlikely to prefer a neighborhood with long walking distances to parking hubs and high parking costs. In contrast, others may consider these trade-offs acceptable in exchange for a more sustainable and livable environment. Figure 2 presents the extended conceptual diagram, reflecting the attribute categories and covariates used in this study.

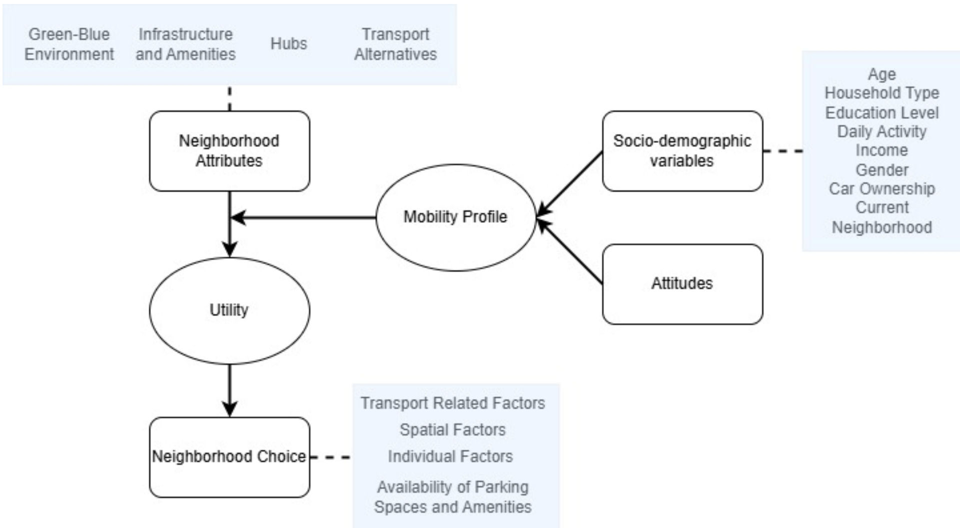


Figure 2. Extended Conceptual Diagram.

3. Case Study: De Stationstuinen

In this chapter, a description of De Stationstuinen is provided together with a description of the intended residents of this new car-free neighborhood.

3.1 What is De Stationstuinen?

De Stationstuinen is an urban development project located next to the train station in the municipality of Barendrecht as presented in Figure 3 (STEC Groep, 2024b). This area, also known as the Fruit Packing District, derives its name partly from the agro-food business park Dutch Fresh Port, for which it is currently well known (Emborion & Gemeente Barendrecht, 2023). The project aims to strengthen Barendrecht's connections with nearby major cities, the agro-food industry, and the recreational landscapes of the Zuidpolder and Waal areas (Emborion & Gemeente Barendrecht, 2023). This section discusses the main aspects that contributes to the sustainable and mixed-use vision of De Stationstuinen.

Figure 3. Visualisation of the layout and transport infrastructure of De Stationstuinen (Gemeente Barendrecht & Kramer, 2025).

3.1.1 Blue-Green Environment

Sustainability plays a key role in De Stationstuinen, with a strong emphasis on spatial planning and sustainable mobility (Emborion & Gemeente Barendrecht, 2023). The neighborhood will have a blue-green character with plenty of space for natural elements. A minimum of 20% of the total area of 40 hectares is made available for green space, with possibilities up to 35% of the space (Van Bloppoel et al., 2025). According to the matrix about nature inclusive development in Barendrecht, the intended amount of green-blue space to be realized in De Stationstuinen is 102.388 m^2, which is approximately 25% of the total area (Gemeente Barendrecht, 2024). The Parksingel and the rooftop park together form the main green structure and main ecological zone of De Stationstuinen. Additional squares function as connections with the rest of the neighborhood (Van Bloppoel et al., 2025). The total green and blue structure provides attractive routes for active modes to all surrounding amenities. Trees, grass, flowers, ponds and nature playgrounds create a healthy and attractive living environment, not only for residents but also for birds and insects (Emborion & Gemeente Barendrecht, 2023; Van Bloppoel et al., 2025). Figure 4 shows a visualization of the green environment in De Stationstuinen.

Figure 4. Visualisation of the green environment (De Schakel, 2023; De Stationstuinen, 2024)

3.1.2 Sustainable Transport Alternatives

In addition to prioritizing green spaces and energy-efficient construction, the neighborhood promotes healthy accessibility by fostering pedestrian- and bicycle-friendly environments and supporting sustainable transport options (Gemeentelijk kernteam De Stationstuinen et al., 2022). The area will largely be car-free, encouraging alternative modes of transport such as shared mobility, cycling, walking, and public transportation. The neighborhood provides direct access to a train station with services in the direction of Dordrecht and Rotterdam, each with a frequency of six times per hour. Additionally, bus services are provided in the directions of Zuidplein, Nieuw Reijerwaard, Rijsoord and Ridderkerk. Bus frequencies in the directions of Zuidplein and Nieuw Reijerwaard will be increased to twice an hour. Active modes are supported by offering an attractive and safe environment for cyclists and pedestrians. Moreover, shared mobility is offered in forms of cars, scooters and bicycles (Goudappel, 2023b).

3.1.3 Parking

In this context, "car-free" means minimizing the number of cars on the streets and relocating them to the outskirts of the neighborhood. The number of cars on the streets will be minimized to optimize public space usage. Collective parking facilities will be established to accommodate vehicles belonging to residents, visitors, and employees. These parking hubs will connect homes and local amenities with pedestrian-friendly routes, ensuring that parking facilities remain within a 200- to 250-meter walking distance (Goudappel, 2023a). Figure 5 shows an impression of a parking hub. Parking facilities will be regulated by means of permits for residents (proposed annual fee: 784 euro) and an hourly payment for visitors (2 euro/hour). By reducing the presence of the car and creating an attractive environment, the goal is to enhance the appeal of other modes of transport, such as walking to the nearby train station or using shared cars stationed in mobility hubs at the neighborhood's edge (Goudappel, 2023). The neighborhood will provide access for essential services by designated routes, and parking near homes will only be allowed in exceptional cases, such as for individuals with mobility impairments (Gemeentelijk kernteam De Stationstuinen et al., 2022).

Figure 5. Impression of a parking hub (Dura Vermeer, 2025).

3.1.4 Community

De Stationstuinen is envisioned as more than just a sustainable neighborhood, it is designed to create a sense of community. The area will feature a mix of functions, including housing, workspaces, public facilities, educational institutions, and opportunities for agro-food industry development and start-ups (Gemeentelijk kernteam De Stationstuinen et al., 2022). A variety of housing types will accommodate diverse target groups, including young professionals, families, and seniors. The plan includes approximately 3,500 homes, with at least 85% consisting of apartments (STEC Groep, 2024b). At least 30% of the homes will be allocated for social housing, another 30% for mid-range rental or for-sale properties, and the remainder for the higher-end market (STEC Groep, 2024b).

3.1.5 Discrepancy Between De Stationstuinen and Barendrecht

The development of De Stationstuinen is distinctive compared to the rest of Barendrecht, particularly in terms of its housing types and car-free concept. Currently, only 27% of homes in Barendrecht are apartments, while the majority (73%) are ground-level houses (STEC Groep, 2024a). Furthermore, Barendrecht is highly car-oriented, featuring an extensive road network, direct access to highways, and abundant parking facilities. In 2023, the average number of passenger cars per household was 1.23, with variations between neighborhoods ranging from 0.9 to 1.6 cars (Goudappel, 2023; Centraal Bureau voor de Statistiek, 2024).

Not only does De Stationstuinen differ from the rest of Barendrecht, but it also stands apart from many existing car-free projects. Unlike most car-free neighborhoods, which are typically transformed from conventional urban areas, De Stationstuinen is designed from scratch with a car-free concept in mind, integrating sustainable mobility solutions into its core planning.

3.2 Target Group

De Stationstuinen is designed to accommodate a diverse group of residents, from young families to urban singles (MOOI, 2024). According to the plans, the future "Fruit Packer" is described as someone who embraces a conscious and sustainable lifestyle, seeks a newly built apartment or home, and relies on shared mobility, public transport, and active modes of transportation such as walking and cycling (Emborion & Gemeente Barendrecht, 2023).

The target group for De Stationstuinen consists of adventure seekers and pleasure seekers. According to the DISC model, this group aligns with an orange lifestyle, complemented by yellow and red elements (MOOI, 2024; Emborion & Gemeente Barendrecht, 2023). These lifestyles are characterized by an extroverted nature, as well as an innovative, cultural, and socially engaged mindset. Social connections, cultural amenities, shopping, and entertainment options are therefore highly valued by this group

(DISCVision, 2024). This aligns well with the vision of De Stationstuinen, which aims to offer a level of facilities comparable to larger cities (MOOI, 2024).

However, adventure seekers and pleasure seekers are not widely present in Barendrecht or similar municipalities in the surrounding area. Research by DISCvision indicates that Barendrecht residents generally have a more reserved and conservative character (Emborion & Gemeente Barendrecht, 2023). In contrast, the envisioned target audience is more commonly found in Rotterdam (MOOI, 2024). Specifically, research shows that residents from neighborhoods such as Rotterdam Charlois, Rotterdam IJsselmonde, and Rotterdam Feijenoord closely match the profile of the intended residents of De Stationstuinen (Emborion & Gemeente Barendrecht, 2023).

Nevertheless, approximately 75% of the housing units are expected to be occupied by local residents, while the remaining 25% will be allocated to households from outside Barendrecht. The sustainable and conscious living environment of De Stationstuinen, combined with the predominant housing type (mainly apartments), is expected to attract a specific type of residents. Currently, older residents in Barendrecht are more inclined to move into newly built apartments, whereas younger people and families tend to prefer existing ground-level homes. By attracting older residents to newly built apartments, ground level family housing will be available for young families. One of De Stationstuinen’s goals is to positively influence the rest of Barendrecht, known for its more reserved and conservative character, by introducing and promoting its progressive vision (Emborion & Gemeente Barendrecht, 2023).

3.3 Conclusion

This chapter discussed the characteristics of De Stationstuinen. The municipality aims to develop a car-free neighborhood next to the train station, with a blue-green environment, different types of alternative transport modes and parking hubs located at the periphery for residents that own a private vehicle. The neighborhood is intended to attract a diverse group of residents, with the goal of fostering an community. However, there is a discrepancy between De Stationstuinen and the rest of Barendrecht and it remains uncertain whether current residents of Barendrecht are open to embracing this different lifestyle.

4. Methodology

4.1 Methodological Review of Previous Studies

This chapter analyzes the methods used in previous studies within a similar context, research on people's preferences and choices in car-free areas. By evaluating the strengths and weaknesses of the previously used methods, a well-informed decision can be made on which approaches are most valuable for this study.

In studies on choice behavior and preferences, researchers often employ either Stated Preference (SP) or Revealed Preference (RP) methods. The key difference between these two is that SP research relies on hypothetical choices, whereas RP research examines actual choices made in real-world situations. The advantage of an SP approach is that it allows for the investigation of preferences in hypothetical scenarios that do not yet exist in reality. However, a potential drawback is that respondents may behave differently in a hypothetical setting compared to real-life decision-making. One way to mitigate this bias is by incorporating RP data, but this is only feasible for existing situations.

When reviewing previous studies on preferences and choices in car-free areas, it becomes evident that most have used a Discrete Choice Experiment (DCE), which is a form of SP research. This preference is understandable, as car-free neighborhoods are relatively new in many locations, making RP methods impractical. Examples of studies using a DCE include Gundlach et al. (2018), Ajdari et al. (2022), and Meester (2021). Gundlach et al. (2018) explored people's preferences regarding a car-free city center in Berlin. Ajdari et al. (2022) conducted a similar study in Tehran, identifying key factors influencing citizens' preferences for a car-free city center. Meester (2021) examined the effects of trip characteristics and socio-demographic factors on neighborhood preferences in the Merwedekanaalzone in Utrecht.

In contrast to the DCE approach, the study of Da Silva Borges and Goldner (2015) has opted for an attitudinal survey. This study used a questionnaire consisting of Likert-scale and open-ended questions to explore the conditions necessary for the success of a car-free neighborhood and the profile of potential residents. The key difference between this research and the previously mentioned studies is that it did not use Discrete Choice Modeling. Instead, the choice for a questionnaire was driven by the lack of prior knowledge about preferences for car-free neighborhoods in Brazil.

A study conducted by Mureau (2025) about the impact of low-car residential neighborhoods on mobility behavior used a revealed preference approach. The study focused on the residents living in the already developed urban car-free neighborhood Cartesius, located in Utrecht. The choice for a revealed preference approach is valuable, but not applicable for this study since De Stationstuinen is not yet developed.

Although a DCE is commonly used for data collection in this field, different methods are applied for data analysis. Gundlach et al. (2018) and Ajdari et al. (2022) both employed a combination of a Conditional Logit Model and a Random Parameter Logit Model, whereas Meester (2021) used a Latent Class Logit Model. In contrast, Da Silva Borges and Goldner (2015) analyzed their questionnaire data using Logistic Regression.

Despite differences in methodology, all three DCE-based studies considered a crucial limitation of the Multinomial Logit (MNL) model when selecting their analytical approach: the Independently and Identically Distributed (i.i.d.) assumption. This assumption implies that the probability distribution is the same for all variables and that all of them are mutually independent. The i.i.d. assumption causes the Independence of Irrelevant Alternatives (IIA) property of the MNL model. This property states that the ratio of the choice probabilities is unaffected by the introduction of other alternatives. However, in reality, alternatives may share characteristics with existing options, which might influence a shift in preferences (Ryan et al., 2007). The Random Parameter Logit Model, used by Gundlach et al. (2018) and Ajdari et al. (2022) allows parameters to vary randomly across individuals and therefore captures variations in preferences. Meester (2021) employed a Latent Class Logit Model, which segments respondents into distinct groups based on their preferences. The Latent Class Logit Model can help to identify clusters within the population and therefore capture heterogeneity.

Both models help account for preference heterogeneity, but they differ in approach. The Random Parameter Logit Model assumes continuous variations in model parameters, whereas the Latent Class Logit Model explicitly categorizes respondents into discrete subgroups. The choice between these models depends on whether the goal is to model individual-level preference variations or to identify meaningful clusters within the population.

There exists many more models to analyze DCE results while accounting for the IIA assumption, yet they have not been widely applied in the context of car-free cities. A distinction can be made between models that partially relax the IIA assumption and models that completely relax the IIA assumption (Ryan et al., 2007). An example of a partial relaxation is the Nested Logit Model, which groups subsets of similar alternatives based on shared characteristics. Alternatives within nests have similarities, while differences exists between nests, making alternatives in different nests more competitive with one another. As a result, the IIA assumption holds within nests but not between them (Ryan et al., 2007). However, a Nested Logit Model is not suitable for this study, as all alternatives will share the same set of attributes, resulting in no substantial differences between them. A model that fully relaxes the IIA assumption is the Mixed Logit Model. A Mixed Logit Model estimates coefficients as distributions (e.g., normal or log-normal), which means that they vary across individuals rather than having a single fixed value. However, this makes the results more difficult to interpret and there may be clusters of individuals that are not immediately identifiable from the data (Lahoz et al., 2023).

Most studies on car-free areas focus on transforming existing cities into car-free environments rather than developing entirely new car-free neighborhoods. Additionally, much of the existing research is conducted outside the Netherlands and primarily emphasizes transportation alternatives rather than the overall neighborhood characteristics, including nearby amenities, in such areas. This study, however, focuses on a yet-to-be-developed car-free neighborhood in a suburban area in the Netherlands. The objective is to gain insights into the preferences of future residents, within this context. Specifically, the study aims to examine how personal characteristics and neighborhood characteristics, such as mobility alternatives, green spaces, and distances to available amenities, influence neighborhood choices.

Given the findings from previous research, a Discrete Choice Experiment is an appropriate method for investigating these preferences. Several methods can be used to analyze the results of the DCE. Based on previous studies within the context of car-free development, it can be seen that a Random Parameter Logit Model or a Latent Class Logit Model are most appropriate in this context. However, Boxall and Adamowicz (2002) stated that the Random Parameter Logit Model is not well-suited for explaining the sources of heterogeneity. The ability of the Latent Class Logit Model to create distinct groups with similar preferences is valuable for municipal planning. Based on the insights generated from previous studies and the advantages of a Latent Class Logit Model, it can be stated that a LCLM is convenient, flexible, and intuitive to account for taste heterogeneity in DCEs (Hurtubia et al., 2014). In this study, the term Latent Class Choice Model is used instead of Latent Class Logit Model, as this better matches with the use of a Discrete Choice Experiment.

4.2 Discrete Choice Experiment

In a DCE, respondents are presented with various choice sets and asked to indicate their preferences. These choice sets consist of two or more alternatives, which vary along several attributes and each attribute vary across different levels (Ryan et al., 2007). In this study, the choice sets will represent neighborhood profiles, each characterized by attributes reflecting the features of a car-free neighborhood. Given the study's focus on mobility, most attributes will pertain to mobility-related aspects. However, since spatial factors influence the mobility choice (Masoumi, 2019), there will also be a focus on spatial attributes, like the level of green in the neighborhood. Figure 6 provides an example of a simple choice set with its definitions.

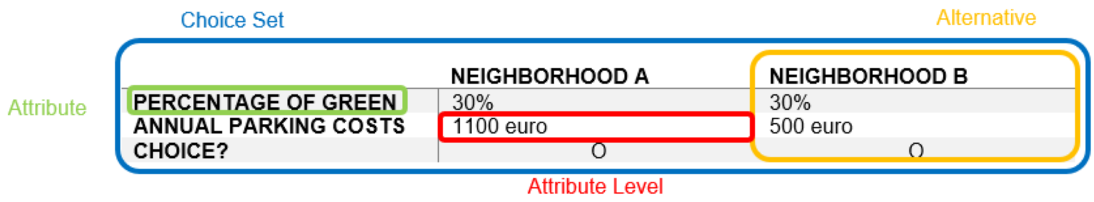


Figure 6. Choice Set and Definitions

The results of the DCE can reveal which attributes are most influential for respondents, based on the assumption that individuals choose the option that maximizes their utility. This assumption aligns with the Utility Maximization Theory (Equation 1). A decision-maker n will only choose alternative i if the utility of alternative i is greater than the utility of alternative j and alternative i and j are not the same.

$$U_{ni} > U_{nj} \ \forall \ i \neq j$$

Equation 1. Utility Maximization Theory (Pudāne & Fazi, 2022).

Utility consists of two parts, the observed part and the unobserved part. The observed part is related to the alternative itself and can be observed by the researcher, while the unobserved part is related to randomness or differences between decision-makers and therefore not observable for the researcher. These two different parts are presented in Equation 2.

$$U_{ni} = V_{ni} + \varepsilon_{ni}$$

Equation 2. Observed and Unobserved Utility (Pudāne & Fazi, 2022).

Additionally, based on Lancaster's economic theory of value, DCEs assume that utility is derived from the attributes rather than the object per se. Moreover, the theory states that individuals' preferences are revealed through their choices (Ryan et al., 2007). To determine the utility derived from a certain alternative, betas will be estimated by the model based on the trade-offs made by the decision-maker. The observed utility of alternative i is calculated by multiplying the coefficient (beta) of each attribute m by its corresponding level (Equation 3).

$$V_{ni} = \sum_{m} \beta_m X_{im}$$

Equation 3. Observed Utility of Alternative i by Decision-maker n (Pudāne & Fazi, 2022).

Several advantages of the DCE approach justify its application in this research. First, performing a DCE is valuable since it provides valuable insights in trade-offs between attributes compared to just directly asking people's preferences. People do not really know what their preferences are and therefore are not able to explicate trade-offs. Additionally, when asking respondents about their preferences by means of an interview, there is a risk of cognitive dissonance or ex-post rationalization (Van Cranenburgh & TU Delft, 2024). The choice sets are variated to ensure there is no correlation between attributes. Second, like stated before, a DCE makes it possible to investigate hypothetical scenarios, such as the planned car-free neighborhood in this study. Third, the method allows for the simultaneous evaluation of multiple attributes, providing insights into the relative importance of each attribute (Molin, 2023).

Despite its advantages, the DCE method has limitations that must be considered. The ecological validity (the extent to which research findings correspond to real life) of DCEs is typically lower than their internal validity, as it is uncertain whether the results fully align with real-world behavior where contextual factors and external influences play a role in decision-making. This is a characteristic of stated choice experiments, which measure individuals' intended behavior rather than their actual behavior, potentially affecting the accuracy of the findings (DeShazo & Fermo, 2002; Kroesen, 2020). Additionally, it is crucial to include the right attributes in the choice sets. If the attributes and corresponding levels do not adequately represent the situation, respondents may rely on assumptions, which could bias the results. Finally, all attributes must be actionable, for example, through policy measures. If an attribute cannot be influenced, it serves no purpose to include varying levels for that attribute (Molin, 2023). The selected attributes are motivated in Chapter 2.8.2, the operationalization can be found in Chapter 4.4.

4.3 Data Analysis

4.3.1 Multinomial Logit Model

A Multinomial Logit Model (MNL) is a classic and simple model to describe a decision making process (Broers et al., 2018). This method helps to gain insights into the influence of independent variables on the dependent variable. A MNL model is particularly suitable for situations where the dependent variable has multiple categories, which makes it an effective tool for analyzing choice behavior among various alternatives. It helps identifying which factors influence the likelihood of a respondent choosing a specific neighborhood.

Despite its advantages in modeling complex choice behavior and analyzing multiple alternatives, it has been found that the MNL is too restrictive and often unrealistic due to underlying assumptions (Broers et al., 2018). One key limitation is the assumption that the error term is independent and identically distributed (i.i.d.) across observations and alternatives. This assumption is often unrealistic, as not all factors influencing choice behavior are captured in the experimental data. This can lead to correlated unobserved utilities, resulting in biased estimates and predictions. The i.i.d. assumption is violated if subsets of alternatives share common factors, if the utility associated with these factors varies across individuals, or if this variation is not fully captured in systematic utility (Van Cranenburgh, 2024).

Another limitation is the Independence of Irrelevant Alternatives (IIA) assumption. This assumption implies that the odds of choosing one option over another are unaffected by the presence or absence of other alternatives. However, this is not always realistic, particularly when alternatives are comparable and one choice-maker has to make several choices (El-Habil, 2012). These limitations highlight the potential need for alternative models that can relax these assumptions and better capture the complexity of choice behavior.

4.3.2 Latent Class Choice Model

One of the extensions of the MNL that accounts for its limitations is the Latent Class Choice Model (LCCM). A Latent Class Choice Model is useful if it is assumed that there are two or more groups of people underlying the data. Respondents will have a probability of belonging to each class, this probability will increase if there is a similarity in preferences that differ from another class. Class membership is based on observed variables Z_n, such as attitudes and socio-demographic characteristics of the individual (Ryan et al., 2007). According to Lahoz et al. (2023), incorporating attitudes helps constructing more realistic classes. Equation 4 shows the class membership equation, which calculates the probability that a decision-maker *n* belongs to class *s*. Class-specific constants δ_s as well as a vector of parameters γ_{sq} are jointly estimated by the model (TU Delft & Faber, 2024).

$$\pi_{ns} = \frac{e^{\delta_s + g(\gamma_{sq}, z_n)}}{\sum_{l=1..S} e^{\delta_l + g(\gamma_{lg}, z_n)}}$$

Equation 4. Class Membership (TU Delft & Faber, 2024).

The LCCM relaxes the IIA assumptions of the MNL model and therefore accounts for heterogeneity within the population. The goal is to maximize homogeneity within classes and heterogeneity between classes. The i.i.d. assumption remains valid within each class, but is relaxed between classes. Since it is likely that the preferences of residents in car-free neighborhoods are heterogeneous and that there exists some groups in society with similar preferences, this method is valuable for this research to create some insights into these groups. It will clarify the preferences of each class and it provides insights into the group of residents who are most attracted to the car-free residential area. The results can be used for the design of tailor-made policies suited to the specific needs and preferences of various classes (Kroesen & TU Delft, 2023).

While the Latent Class Choice Model accounts for capturing heterogeneity and provides insights into the classes within the population, it is difficult to determine the optimal number of classes. A strategy to account for this is to start with two classes and incrementally increase the amount (Ryan et al., 2007). Performing a Latent Class Choice Model with one class is the same as a Multinomial Logit Model.

By splitting the population into classes, the model can estimate the chance of a respondent belonging to a certain class. This is estimated based on their characteristics and preferences. The optimal number of classes can be determined using statistical tests like the Bayesian Information Criterion (BIC) and the Akaike Information Criterion (AIC). The model with the best fit between the data and the number of classes is chosen (Kroesen & TU Delft, 2023).

The results of the Latent Class Choice Model provide insights into the different classes of inhabitants based on mobility preferences, characteristics and attitudes. This can help to understand which groups of residents are most open to a car-free neighborhood and what specific characteristics distinguish them. This analysis will be executed using LatentGold software, as this software offers an appropriate tool for performing a Latent Class Choice Analysis and provides flexible options for output presentation.

4.4 Choice Experiment

4.4.1 Attributes

The literature review in Chapter 2 showed that motivations to live in a car-free neighborhood differ between residents. Some prioritize environmental sustainability, others focus on health and well-being, while another group values the practical advantages, such as having essential amenities and transportation alternatives nearby. The characteristics of De Stationstuinen, described in Chapter 3, are in line with these preferences. As the blue-green environments offer a healthy and quiet environment with possibilities for social interaction, shared mobility and public transport serve as alternatives for the car and hubs offer a place to park the cars out of sight. Since it is valuable to know what residents of Barendrecht prefer most in a car-free neighborhood, the attributes used in the Discrete Choice Experiment are based on insights from the literature review and motivated in Chapter 2.8.2. The researcher used available literature and did a brainstorm session with peers to generate an extensive list with possible attributes to include in this study. This list included attributes related to public transport services, walking- and cycling infrastructure, shared mobility, private cars, the level of child friendliness, green and blue environments, and several attributes related to amenities. It is not possible to include all neighborhood characteristics as attributes in this study, as this would make the choice sets too large, potentially discouraging respondents from completing the survey and affecting the reliability of the results. Therefore, seven attributes were chosen that cover mobility and environmental aspects, as well as the role of private cars within the neighborhood, as these were most in line with the research question. The attributes are presented in Table 3. It is chosen to focus on different types of alternative transport, such as walking, shared mobility and train services as this will help to gain insights about the preferred travel options within a car-free neighborhood. The attribute *Green-Blue areas* is included to account for the environmental aspects, as previous research showed that a quiet and healthy neighborhood is perceived as more attractive and also stimulates the use of active modes. *Parking costs* are included to explore the level of attachment to the private car. The attributes that were not included in the choice sets are still addressed in the survey through other types of questions, such as travel behavior questions and attitude statements.

Table 3. Attributes and Levels

Attribute	**Levels**
Green-Blue areas	20%, 25%, 30%
Walking Distances to Amenities	450 meters, 750 meters, 1050 meters
Walking Distance to Hubs	100 meters, 150 meters, 250 meters
Shared Car	Available, Not Available
Shared Scooter	Available, Not Available
Train Frequency	0 per hour, 3 per hour, 6 per hour
Parking Costs in Hubs	500 euro, 800 euro, 1100 euro

The attributes can be divided into four subcategories, respectively green, walking distances, sustainable modes and private cars. The selection of attributes is motivated in Chapter 2.8.2. The following paragraph contains the operationalization of the attributes, by selecting appropriate levels.

4.4.2 Levels

The shared mobility attributes are binary, while all other attributes have three levels. According to Ryan et al. (2007), the number of levels should not be too high, as an increase in attribute levels also increases the complexity of the experimental design. A higher number of levels results in more choice sets, which could discourage respondents from completing the survey. The attribute levels were determined based on available literature on *De Stationstuinen* as well as relevant research on car-free areas. For all attributes except the attribute *walking distance to hubs*, an equal step-size between the levels was chosen to simplify the interpretation of the results. It is chosen to ignore the equal step-size for the *walking distance to hubs* attribute, since this would have resulted in unrealistic distances.

Green-Blue Areas

This attribute includes all types of public green areas, including parks, playgrounds, vegetable gardens and green streetscapes. The total area of De Stationstuinen is 40 hectares. According to Van Bloppoel et al. (2025) the amount of green-blue spaces is determined based on the housing type. For ground-level housing, 20% of the planning area should consist of green-blue spaces. For non-ground-level housing, an increase in green-blue spaces is required to ensure a healthy living environment for both humans and biodiversity. Therefore, for non-ground-level housing, 35% of the area should be filled with green-blue spaces. In the case of a mix of ground-level and non-ground-level housing, an average between these values is calculated. This is calculated in the matrix of nature inclusive development for the municipality of Barendrecht (Gemeente Barendrecht, 2024). According to this matrix, 25% of the total area in De Stationstuinen should be green-blue space. Consequently, the levels for this attribute will vary around this percentage.

Walking Distance to Amenities and Hubs

The levels of the distance to amenities attribute were derived from CROW-KpVV and Blankers (2021), as no specific data is available for De Stationstuinen. While CROW-KpVV and Blankers (2021) calculated walking distances to different amenities separately, this study combines them into a single attribute. As a result, average values were calculated based on the walking distances to different amenities found by CROW-KpVV and Blankers (2021). The levels for the distance to hubs attribute are derived from walking distance guidelines for De Stationstuinen, as explored by Goudappel (2023a).

Shared Mobility

The shared mobility attributes are included as binary variables (Available/Not Available), as this is easier to interpret compared to a certain amount of scooters or cars within a neighborhood. These attributes are included to assess the importance of the shared car as well as the shared scooter in the neighborhood. These insights will help the municipality determine which shared mobility solutions are most effective for De Stationstuinen, based on the residents' preferences.

Train Frequency

The current train schedule offers a frequency of six trains per hour in the directions of Rotterdam and Dordrecht. By including this attribute with levels of 6 trains per hour, 3 trains per hour and a situation without a train, the impact of train availability on neighborhood preferences can be explored. At the start of the survey, it will be stated that the neighborhood offers a bus line with a frequency of two times per hour. This assumption, together with the varying train frequency levels, is expected to provide insights into the residents' preferences for the train and the bus. Since people who are inclined to use the bus may not be as concerned with train frequency, and vice versa. Including this attribute allows for a better understanding of residents' public transport preferences and needs.

Parking Costs at Mobility Hubs

Another characteristic of the car-free neighborhood is the availability of parking hubs, located on the periphery and designated for residents and visitors of De Stationstuinen. These hubs are not intended to accommodate a car for every household, as the neighborhood maintains a car-free character. Parking costs in the hubs vary for residents, businesses, and visitors. While visitors pay around 2 euros per hour, residents and businesses pay an annual fee. For this study, the focus is on the costs for residents, as the target group for this research consists of potential future residents. The levels for this attribute are based on the proposed annual tariff for residents in De Stationstuinen and the bandwidth for residents' subscriptions in other public parking garages, as found by SPARK. The proposed annual fee for residents of De Stationstuinen is 784 euros, while the range in other cities varies from 588 to 1237 euros, with an hourly fee between 2 and 2.50 euros (Lindenberg-Lemos & Ebbing, 2024). Therefore, the levels for this attribute are varied around the proposed tariff, within this bandwidth.

4.4.3 Experimental Design

To create choice sets an experimental design has to be chosen. A starting point is a full factorial design, this type of design contains all possible combinations of attribute levels. In this way, all effects of the attributes on the choices can be investigated. However, it also causes a very large experimental design that takes too much time for respondents to consider all possible combinations of attribute levels (Ryan et al., 2007). A full factorial design with the attributes and levels stated in Table 3 would have 972 profiles (Equation 5).

$$P = \prod_{i=1}^{k} L_i$$

Equation 5. Number of Profiles Full Factorial Design (k = nr. of attributes, L_i = Levels for attribute i).

To tackle this limitation, an efficient design as well as an orthogonal design can be used. These are both fractional factorial designs. An orthogonal design is mostly used, as the correlations between attributes are zero. This results in low standard errors and therefore reliable parameters. An orthogonal design results in much smaller number of choice sets and allows for estimating all main effects. However, this design is not able to estimate interaction effects (Molin, 2023). An efficient design also minimizes standard errors, additionally it maximizes information about trade-offs. However, an efficient design requires priors and the results are only valuable if the priors are correct. Priors are best guesses on parameter values, they are needed to balance utilities of the choice alternatives. A design is only efficient if the priors are correct. Priors can be obtained based on previous research. Since little research has been done in the context of suburban car-free developments, an orthogonal design is preferred in this study (Molin & TU Delft, 2023).

Choice sets can be constructed using sequential or simultaneous construction. In this study, sequential construction is used since the neighborhood alternatives are unlabeled. Unlabeled means that all alternatives have the same attributes and levels. By using sequential construction, no correlations are present within each alternative, but there are correlations between the alternatives (University of Technology & Molin, 2023). The correlations of the design can be found in Appendix B, Table 21.

The chosen combination of attributes and their levels makes it impossible to use a basic plan, therefore Ngene is used to create the choice sets. Ngene created 36 profiles, which is too much since on average ten choice sets are preferred (Molin & University of Technology, n.d.). A way to reduce the number of choice sets per respondent is to use blocking. Blocking divides the total number of choice sets in smaller blocks, in this study three blocks were chosen to create 12 choice sets per respondent. A block is not orthogonal, but is attribute level balanced, which means that the attribute levels vary between choice sets for every respondent and each level appears an equal number of times. Attribute level balance is an important characteristic, since this guarantees a same number of observations for every attribute level (Molin, 2023).

Appendix A provides the syntax code used in Ngene. Ngene generated 36 choice sets, divided over three blocks, which is equal to 12 choice sets per respondent. However, some of the generated choice sets showed some dominant alternatives, which means that one neighborhood is equal or better on all attributes. It was challenging to remove these dominant alternatives within the orthogonal design because all attributes have a direction. Nonetheless, the number of dominant alternatives was reduced from seven to three by using an asterisk (*) in the Ngene syntax.

Presenting dominant alternatives does not provide any insights into the trade-offs respondents make, therefore, an approach is needed to address these dominant alternatives. Three options are considered: first it is possible to keep the choice sets with dominant alternatives in the questions. This can function as a control question, checking if respondents answer the questions seriously. However, there is a risk that respondents might feel they are not taken seriously when faced with an obvious choice. A second option is to maintain the orthogonal design, but remove the dominant alternatives. This would result in correlations, causing the design to lose its orthogonality. Additionally, attribute level balance would be compromised, meaning not all levels would have an equal number of observations. This will increase the standard error, making the results less reliable. The third option is to switch to an efficient design. Efficient designs require priors. As there is a lack of knowledge about the appropriate priors in this context, the researcher would need to make an educated guess. However, this is likely to lead to incorrect priors and therefore higher standard errors. For this study, the decision was made to maintain the orthogonal design and remove the three dominant alternatives. This causes the design to lose its orthogonality, the correlations can be found in Appendix B, Table 22. While this may result in higher standard errors, collecting a sufficient number of respondents is expected to minimize this effect.

Respondents will be randomly assigned to one of the three blocks. After removing the dominant alternatives, each block consists of 11 choice sets. Table 4 provides an example choice set and related questions. The complete experimental design can be found in Appendix D, Table 23 and 24.

Table 4. Example Choice Set and Questions (translated).

Neighborhood Characteristics	Neighborhood A	Neighborhood B
Percentage Green and Water	25%	25%
Average walking distance to amenities	750	1050
Average walking distance to hub	150	100
Availability shared cars	0	0
Availability shared scooters	0	0
Train Frequency	3	6
Annual costs parking hub	1100	1100
Choice:		
Question 1: Imagine you had to move, which of the above neighborhoods would you prefer? • Neighborhood A • Neighborhood B Question 2: I expect to reduce the use and/or ownership of my car if I lived in this neighborhood. • Agree • Disagree Question 3: Suppose you could choose between a home in a traditional neighborhood (not car-free) or a home in your chosen car-free neighborhood, which neighborhood would you prefer? • Chosen car-free neighborhood • Traditional neighborhood		

4.5 Survey Design

This chapter elaborates on the structure, testing and distribution of the survey. The survey is set up in Dutch as the target group of the survey is Dutch. The survey can be found in Appendix E.

4.5.1 Survey Structure

A survey is used to distribute the choice sets and additional questions. First, some questions about socio-demographic factors were asked. Secondly, questions related to current mobility preferences were presented. These questions will create insights into the current mobility choices for different kind of activities, like work, school and shopping. The third part of the survey consists of the choice sets with related questions. The answers to these choice set questions will give insights into the preferences towards the attributes. Finally, multiple statements about car-free neighborhoods were presented. The valuation of these statements will create an overview of prevailing attitudes towards car-free neighborhoods and will help to get a better understanding of the motivations of the respondents.

The results are used to further analyze the choices made by the respondents. In particular, latent classes will be identified and predictions will be made about the probabilities of an individual belonging to a subgroup (Vermunt et al., 2006). In this way, relationships between respondents' choices and their characteristics are examined. These insights can be used to determine whether groups in society can be distinguished with similar preferences and choice patterns.

Choice Set Questions

Each respondent was presented with 11 choice sets. For each choice set, the respondent was asked to answer three questions. The respondents were first asked to choose a neighborhood they want to move to (*Imagine you had to move, which of the above neighborhoods would you prefer?*). Question two focusses on car usage if they were to live in the chosen car-free neighborhood and already own a car (*I expect to reduce the use and/or ownership of my car if I lived in this neighborhood.*). This question aims to explore whether people would change their mode of transport if they lived in a car-free neighborhood. Lastly, respondents were asked if they would choose the car-free neighborhood over a conventional neighborhood (*Suppose you could choose between a home in a traditional neighborhood (not car-free) or a home in your chosen car-free neighborhood, which neighborhood would you prefer?*). This serves as a control question to assess whether respondents are genuinely willing to live in a car-free neighborhood or if they are simply choosing based on the availability of housing. It was decided to ask all three questions for each choice set, as the answers are likely to vary depending on the different characteristics of the neighborhoods. However, question two is only asked if respondents have indicated that they own a car.

Attitudes

Attitudes are assessed through multiple statements included in the survey. These statements are based on opinions about car-free neighborhoods, collected through interviews where the researcher asked the interviewee what their views were on car-free residential neighborhoods. Based on these views, the researcher then formulated the statements. While formulating the statements, the important aspects related to car-free neighborhoods were considered, such as environmental concern, views on shared mobility and public transport, dependency on private cars and valuation of social contacts. These aspects were derived from the literature review in Chapter 2, which also highlights the influence of attitudes on neighborhood and mobility preferences (Ryan et al., 2007; Masoumi, 2019; Klein et al., 2024). The statements aim to provide an overall picture of attitudes towards the main features of a car-free neighborhood. Respondents were asked to rate these statements using a five-point Likert scale, ranging from "Totally Disagree" to "Totally Agree." A five-point Likert scale is chosen because it offers a nuanced way to measure attitudes. The five levels allow for more differentiated answers than a three-point scale, but are easier to interpret than a 7 point-scale, where the differences may become harder to distinguish (Janse, 2024). The statements can be found in Appendix C.

The results of these statements were first analyzed using an explorative factor analysis. A factor explains the correlations between different indicators, in this case the statements (Kroesen, 2023). Statements with high correlations are represented by a factor and will represent a specific attitude. These attitudes were then incorporated into the Latent Class Choice Model to assess their impact on neighborhood- and mobility choices. However, since the direction of causality for attitudes is not always clear, this must be considered before drawing conclusions about the relationships between attitudes and choices.

Travel Behavior

To get insights into the current travel behavior, the survey includes questions about mobility choices for everyday activities, such as grocery shopping, commuting to work and school. Since a car-free neighborhood will offer most of these everyday amenities, it is expected that residents who are open to living in a car-free neighborhood would also be willing to adopt sustainable transportation modes. While it is possible that these residents already use sustainable modes of transport, they may also change their behavior upon moving to a car-free neighborhood. To examine potential differences between current and future mobility choices, an additional question about car use is asked after the choice set questions (Table 4, Question 2).

Socio-demographic Characteristics

As stated in Chapter 2, there is a relationship between socio-demographic characteristics and the choice to live in a car-free neighborhood. The survey therefore includes several questions about these characteristics. In addition to variables examined in previous studies, some new variables have also been included to explore potential unexplored relationships. This data will help identify which groups are attracted to De Stationstuinen and whether this aligns with the intended target group. Table 5 provides the operationalization of the socio-demographic variables in the survey.

Table 5. Operationalization socio-demographic variables

Variable	Answer Options
Age	In the question it is asked to give the year of birth. This can be useful to filter the data on groups of age.
Gender	Respondents can choose between man, woman or otherwise if they do not identify as a man or woman.
Household type	Respondents will also be asked to specify their household type. Three possible answers are provided, to cover all types of households. Single-person household applies to anyone who lives alone. Multiple person household with children applies to all kind of families living together. Multiple person household without children applies to all types of couples living together without children (Centraal Bureau voor de Statistiek, 2025).
Education level	Furthermore, respondents will indicate their education level. To cover a wide range of education levels, eight answer options are provided based on Mobility Panel Data (Ministry of Infrastructure and Water Management, n.d.). The options are: no education, primary education, secondary education (VMBO, MAVO, Havo or VWO), and supplementary education (MBO, HBO- or WO-Bachelor and HBO- or WO-Master).
Neighborhood	To explore the geographic background of potential car-free neighborhood residents, respondents will be asked to provide their postal code. Only the numeric part (pc 4) of the postal code is requested, providing sufficient information while ensuring privacy, as an address cannot easily be identified using only these numbers. Moreover, when considering the postal code type 6 it is likely that the areas become too small with too little respondents, which makes it difficult to draw conclusions.
Daily activity	Additionally, respondents will state their daily activity (e.g., work, study, or other). Respondents can choose between studying, working, retired, workless, incapacitated, householder and volunteer (Ministry of Infrastructure and Water Management, n.d.).
Income	Income level will also be surveyed to determine whether there is a relationship between income and neighborhood choice. The answers provided by this question are based on income groups of the housing organization Woonnet Rijnmond. This organization manages rental housing in the Rotterdam Rijnmond region (Woonnet Rijnmond, 2025).
Car Ownership	Lastly, respondents will be asked whether they own a private car. This information will be used to assess their willingness to give up car ownership if they choose to move to a car-free neighborhood. Respondents who own a car are later asked to state if they are willing to give up the car.

Additionally, respondents are asked whether they are already familiar with a car-free neighborhood and whether they ever considered moving to one. This information can be used to categorize respondents based on their prior interest in car-free neighborhoods. It is possible to create two subgroups of respondents, one group of respondents who were already familiar and possibly interested in car-free neighborhoods and one group of respondents who had not considered it before.

4.5.2 Survey Testing

The survey is tested among a group of individuals from the researcher's personal network prior to its final distribution. These people were asked to give feedback on the clarity and length of the questions, as well as the overall survey. Based on the feedback received, some questions were reformulated and the explanatory texts in the survey were shortened for improved readability and shortened completion time. Additionally, navigation features were added, allowing respondents to move between questions and skip them if desired. Moreover, some additional answer options are added to the education and income related questions to better reflect the range of possibilities relevant to the respondents.

4.5.3 Survey Distribution

After processing the feedback, the survey was distributed throughout Barendrecht as 75% of the future residents are expected to come from Barendrecht (STEC Groep, 2024a). Since De Stationstuinen will be a neighborhood for all types of residents, the survey was shared through multiple platforms to reach a diverse audience. Various methods to distribute the survey were used, including social media (Instagram, Facebook, LinkedIn), the local newspaper (on paper and online), a local news website *Barendrechts Dablad*, and the website of the municipality (Figure 7). Additionally, the researcher distributed 535 flyers with a QR code in mailboxes throughout Barendrecht (Figure 13, Appendix F). Due to time limits, not all neighborhoods did receive flyers. However, the researcher selected a diverse set of neighborhoods presented in Figure 8.

Figure 7. Several distribution methods are used: website of the municipality, local newspaper, social media, Barendrechts Dagblad, online newspaper (Barendrechts Dagblad, 2025) (Gemeente Barendrecht, 2025)

By employing multiple distribution methods, the likelihood of obtaining a representative sample of respondents will increase. The decision was made to include all types of residents, as this will provide a more realistic representation of the general population's attitudes and willingness to give up car ownership, rather than overestimating support based on individuals already engaged with the project. Moreover, since the various distribution methods are likely to reach beyond Barendrecht, it was decided to also include respondents from outside the municipality. This allows for an exploration of potential differences between residents of Barendrecht and those living elsewhere.

The survey aimed to accurately capture the attitudes and preferences of the residents to assess their willingness to live in a car-free neighborhood. The survey was conducted online using Qualtrics software provided by the university. The goal was to get 100 respondents. The survey remained open between April 8 and 21, 2025. To engage residents to complete the survey, a Bol.com gift card of 20 euros will be rewarded to one of the respondents. The full survey can be found in Appendix E.

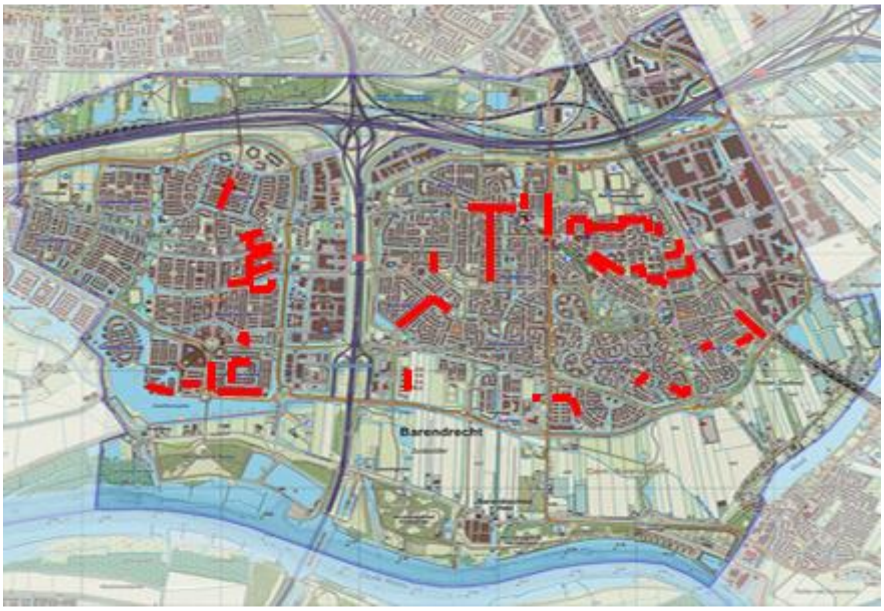


Figure 8. Flyer distribution throughout Barendrecht. Red marked streets received flyers in their mailboxes.

4.6 Model Estimation

4.6.1 Data Cleaning and Preparation

Before the data can be analyzed, it needs to be cleaned and prepared. The data exported from Qualtrics includes all respondents, including those who did not complete the survey. Therefore, 120 incomplete responses were removed from the dataset. The remaining 145 completed responses were prepared for analysis. Of these, 22 respondents do not live in Barendrecht but are connected to the municipality in some way, such as through work. These respondents were kept in the dataset, as they may offer valuable insights into differences between residents of Barendrecht and those living elsewhere.

The data exported from Qualtrics primarily consisted of string values, which are not suitable for analysis. As a result, the dataset is prepared using SPSS software. String variables are converted into numeric values, and for some variables, response categories are merged to reduce the number of categories and increase the number of observations per group. This is done to simplify the analysis and improve the likelihood of identifying statistically significant effects. Missing values are coded as 99. The syntax used for recoding the variables can be found in Appendix H. A complete list of variables and their values, is provided in Appendix G.

Each respondent was assigned to one of three blocks, each containing 11 choice sets. Each choice set included two alternatives. For the analysis, each row in the dataset must represent a single choice, resulting in 22 rows per respondent. Each row is linked to the corresponding attribute levels to explicate the choices.

4.6.2 MNL Model Fit

The analysis of the Discrete Choice Experiment begins with a Multinomial Logit (MNL) model, which can be considered as a Latent Class Choice Model (LCCM) with only one class. This basic model serves as a benchmark to assess the model fit of more complex LCCMs with multiple classes. The MNL model estimates the average preferences for the total sample, without accounting for heterogeneity in preferences or incorporating covariates. It is used to identify which variables are statistically significant and to verify whether the directions of the coefficients are logical. The model fit of the MNL model is presented in Table 6.

Table 6. Model fit 1-class model

Model	LL	BIC(LL)	AIC(LL)	Npar	df	p-value
Model 1: 1-Class Choice	-913.3216	1861.4804	1840.6433	7	138	5.0e-104

4.6.3 LCCM Model Fit

The utility function presented in Equation 6 is used for the Latent Class Choice Models (LCCMs). To determine the optimal number of classes, the model is first estimated with varying numbers of classes, excluding covariates. The selection of the appropriate number of classes is based on both the Bayesian Information Criterion (BIC) and the Akaike Information Criterion (AIC), as defined in Equations 7 and 8. Both BIC and AIC account for model complexity and sample size. However, they differ in how they penalize complexity. AIC applies a constant penalty for the number of parameters, while BIC imposes a stronger penalty that increases with the sample size (Sinha et al., 2020). Lower BIC and AIC values indicate a better model fit. Nonetheless, model interpretability also plays a crucial role in selecting the final number of classes. Therefore, a model with slightly higher BIC or AIC values may still be preferred if it yields more meaningful and interpretable class distinctions.

$$U(neighborhood) = \beta_{GREEN} * GREEN + \beta_{WALKDIST_{AMENITIES}} * WALKDIST_{AMENITIES} + \beta_{WALKDIST_{HUBS}} * WALKDIST_{HUBS} + \beta_{SHAREDCARS} * SHARED_{CARS} + \beta_{SHAREDSCOOTERS} * SHARED_{SCOOTERS} + \beta_{TRAINFREQUENCY} * TRAINFREQUENCY + \beta_{PARKINGCOSTS} * PARKINGCOSTS$$

Equation 6. Utility Function.

$$BIC = -2 \cdot LL + k \cdot \ln(N)$$

Equation 7. Bayesian Information Criterion. LL = log-likelihood of the estimated model, k = number of parameters, N = number of observations.

$$AIC = -2\ln(L) + 2k$$

Equation 8. Akaike Information Criterion. L = maximum value of the Likelihood estimation of the model, k = number of parameters.

The LCCM without covariates was estimated for models with up to seven classes. As shown in Table 7, the BIC value decreases until the 5-class model, after which it begins to increase with the addition of more classes. Although the AIC continues to decline, a model with seven distinct classes is considered impractical and difficult to interpret. Initial attempts to interpret the 5-class model revealed substantial overlap between some of the classes, making it challenging to create meaningful classes. The same issue was observed in the 4-class model. As a result, the 3-class model is selected for further analysis. While this model does not provide the best BIC or AIC values, it offers more intuitive and interpretable class distinctions, which is critical for deriving practical insights.

Table 7. Model fit LCCM model 2-7 without covariates.

Model	LL	BIC(LL)	AIC(LL)	Npar	df	p-value
Model 2: 2-Class Choice	-867.9092	1810.4694	1765.8184	15	130	1.2e-90
Model 3: 3-Class Choice	-838.2885	1791.0419	1722.5770	23	122	4.9e-83
Model 4: 4-Class Choice	-816.2589	1786.7965	1694.5177	31	114	3.7e-78
Model 5: 5-Class Choice	-793.7524	1781.5974	1665.5048	39	106	4.1e-73
Model 6: 6-Class Choice	-782.6533	1799.2130	1659.3066	47	98	3.3e-72
Model 7: 7-Class Choice	-774.4548	1822.6300	1658.9097	55	90	2.1e-72

In the following step, covariates were included in the 3-class model. Initially, all available covariates were added, but this resulted in many non-significant parameters. Consequently, the number of covariates was reduced by recoding the nine individual mode-use variables into three broader categories. Specifically, car, motorbike, and scooter users were grouped under *motorized transport users*; cyclists and pedestrians were combined as *active transport users*; and shared mobility and public transport users were merged into *sustainable transport users*. The decision to combine shared mobility and public transport users was made due to the small sample size of shared mobility users, which limited statistical significance. The covariates included in the final model are:

- Year of Birth
- Postal Code
- Gender
- Car Ownership
- Household Type
- Work-Study
- Income
- Education
- Moving to Car-free Neighborhood
- Factor scores
- Motorized Travelers
- Active Travelers
- Sustainable Travelers

The model fit of the final LCCM is presented in Table 8.

Table 8. Model fit 3-class choice model with covariates.

Model	LL	BIC(LL)	AIC(LL)	Npar	df	p-value
Model 8: 3-Class Choice with covariates	-752.1728	1867.6472	1650.3457	73	72	1.0e-266

5. Data Analysis and Results

5.1 Descriptive Statistics

The total number of respondents who completed the survey is 145. An additional 120 respondents did not finish the survey and were therefore excluded from the dataset. Among the 145 completed surveys, the average completion time was 29 minutes and 22 seconds. However, since some respondents took several days to complete the survey, this average is not fully representative of the actual completion time. To address this, the average completion time for those who completed the survey on the same day was calculated and found to be 18 minutes and 48 seconds. The minimum completion time was 5 minutes and 59 seconds, while the maximum completion time was 18 hours and 6 minutes. As a result, no responses were deleted due to unrealistically short completion times.

Regarding the distribution method, social media generated the highest number of respondents, accounting for 44.1% of the completed surveys. Flyers contributed 17.9%, representing 26 respondents. A total of 535 flyers was distributed, which means a very low response rate of less than 5%. The newspaper accounted for 15.9%, while the municipality's website generated 11% of the responses. The remaining 11.1% of respondents indicated they found the survey through "other means," which may include channels such as friends or family (Table 9).

Table 9. Share of Distribution methods (n=145)

Distribution method	Frequency	Percentage
Social media	64	44.1%
Flyer	26	17.9%
Newspaper	23	15.9%
Municipality website	16	11.0%
Otherwise	16	11.1%
Total	**145**	**100.0%**

5.1.1 Sample Representativeness

Prior to this analysis, the researcher collected socio-demographic data for the residents of Barendrecht from various sources (PostcodeBijAdres, 2023; AlleCijfers, 2024; GGD Rotterdam Rijnmond, 2024; AlleCijfers, 2025; KadastraleKaart, 2025). To assess the representativeness of the survey sample, the survey data were compared with the available demographic data for all residents of Barendrecht. Given that the sample includes 22 respondents (15%) from outside Barendrecht, a separate dataset was created, consisting only of Barendrecht residents, to ensure these respondents adequately represent the target population. A summary of this comparison is provided in Table 10.

Table 10. Socio-demographic variables: Comparison of survey data and population data.

Variable	Sample distribution (n = 145)	Sample distribution (Barendrecht only, n = 123)	Barendrecht distribution
Gender			
Female	46.2%	49.6%	51.0%
Male	53.8%	50.4%	49.0%
Age			
18-24	4.8%	4.1%	13.0%
25-44	27.6%	23.6%	21.0%
45-64	46.9%	49.6%	30.0%
65+	20.7%	22.8%	19.0%
Household composition			
Single-person household	9.0%	6.5%	27.0%
Multi-person household without children	42.8%	51.2%	30.0%
Multi-person household with children	48.3%	42.3%	44.0%
Education level			
Low (No education, primary school, VMBO or MAVO)	4.1%	4.9%	24.3%
Middle (MBO, HAVO or VWO)	25.5%	28.5%	43.3%
High (HBO or WO)	69.7%	65.9%	32.1%
Income			
Less than €28.375 euro	9.7%	10.6%	Less than €31.000* 45.0%
€28.376-€49.699 euro	18.6%	19.5%	€31.000-€40.000 24.0%
€49.670-€67.366 euro	23.4%	18.7%	
	33.1%	33.3%	30.0%

More than €67.367 euro I would rather not say	15.2%	17.9%	More than €40.000
Work/Study			
(Self-) Employed	68.9%	65%	72.2%*
Retired	14.5%	17.1%	-
Housewife/man	3.4%	4.1%	-
Studying	5.5%	5.7%	-
Volunteer	4.1%	4.1%	-
Workless	0.7%	0.8%	2.7%
Incapacitated	2.8%	3.3%	2.8%

*(CBS regionale kerncijfers & it's public analyse, 2021)

Table 10 shows some notable findings. The variable age shows an overrepresentation of middle-aged respondents (45-64 years old) and an underrepresentation of younger respondents (18-24 years old) in the sample. While the relative distribution of age groups in the sample aligns with that of the population, the absolute distribution differs. Middle-aged residents are overrepresented, with a positive difference of 19.6% compared to the population, while younger residents are underrepresented, with a negative difference of 8.9%. A similar pattern is observed in household composition, with single-person households underrepresented and multi-person households without children overrepresented. Both income and education levels are higher in the sample compared to the general population. Additionally, females are somewhat underrepresented in the dataset. These differences suggest that the survey sample is not fully representative of the overall resident population. The work-study variable, however, is distributed as expected, with most respondents indicating that they are employed.

Table 11. Frequencies of car-ownership variable.

Variable		
Car Ownership	Sample Distribution (n=145)	Sample Distribution (Barendrecht only, n=123)
No Car	7.6%	5.7%
1 Car	42.8%	43.1%
2 Cars	38.6%	39.8%
3 or more cars	11.0%	11.4%

The lack of representativeness may be attributed to a selective group following the municipality's social media channels and reading the newspaper, as well as potential participation bias. Residents with a particular interest or strong opinion on the subject may be more inclined to complete the survey than others. A significant portion of respondents were already familiar with car-free neighborhoods (90.3%), and 9% had previously considered moving to such a neighborhood, suggesting that interest in the topic likely influenced participation. Table 11 presents the frequencies for the car ownership variable. Based on these percentages, the average number of cars per respondent in this sample is calculated to be 1.53, which is higher than the average for the general population of Barendrecht (Centraal Bureau voor de Statistiek, 2024). This may indicate participation bias, as it is likely that residents who own cars hold strong opinions about car-free neighborhoods. The results also revealed that most respondents are attached to their cars, with 71% stating they would not be willing to reduce their car usage or ownership if they were to move to a car-free neighborhood (Figure 9). Only 25% of respondents expressed willingness to move to their chosen car-free neighborhood, while 75% preferred a traditional neighborhood over a car-free one (Figure 10).

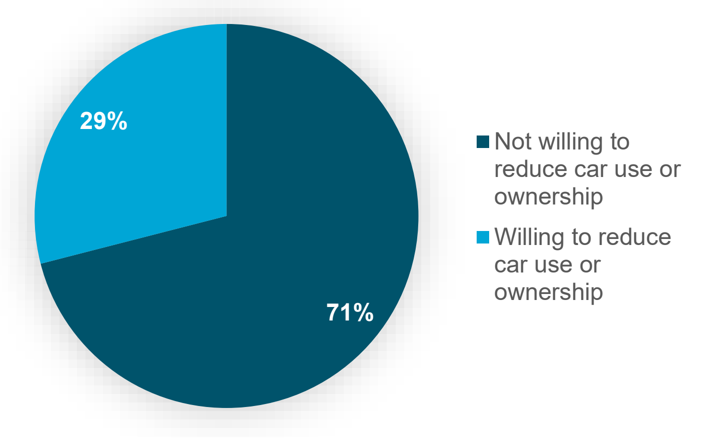


Figure 9. Willingness to reduce car-ownership or usage when moving to a car-free neighborhood (n=145).

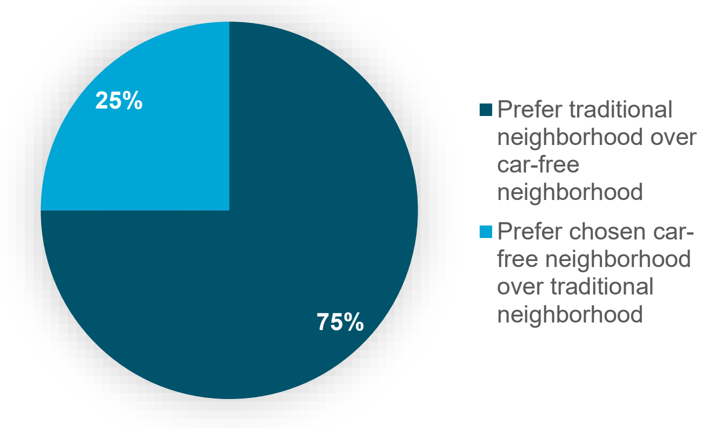


Figure 10. Preferences towards traditional and car-free neighborhoods (n=145).

5.1.2 Travel Behavior

Figure 11 shows the main mode choices made by the respondents. The results align with expectations, as the car emerges as the dominant mode for most respondents. 52.4% of the respondents use their car 4 or more days per week. However, active modes such as walking and cycling are also frequently used. Walking is the main mode of travel for 48.3% of respondents, who use it 4 or more days per week, while 31% rely on the (electric) bicycle. The use of motor vehicles, scooters, and shared mobility is minimal. Public transport, though less frequently used than the car and active modes, still plays a role in the respondents' mobility choices. The train is used by 62.8% of respondents, and bus, tram, or metro services are used by 69.7%. However, most respondents do not use these modes regularly. Only 6.2% use the train 4 or more days per week, and 2.8% use the bus, tram, or metro 4 or more days per week.

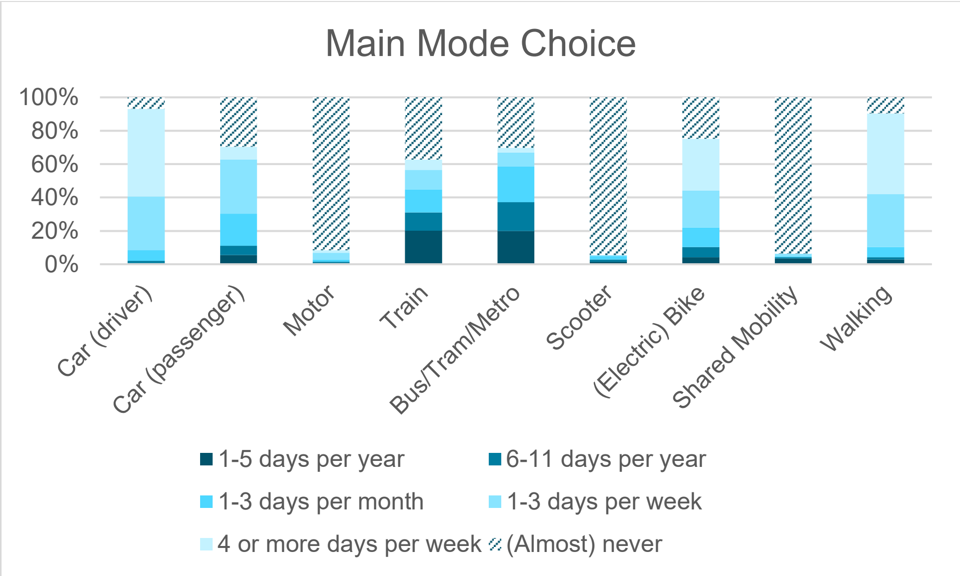


Figure 11. Main mode choice (n=145)

Figure 12 illustrates the mode choices for different activities. The car remains the dominant mode across all types of activities, followed by the (electric) bicycle. The car is primarily used for commuting to work and school (55.9%), while the (electric) bicycle is predominantly used for sports and hobbies (34.5%). The train is mainly used for work and school (8.3%), whereas walking is more commonly used for other types of activities. It is not surprising that the train is almost exclusively used for work and school, given its excellent connection to the cities of Dordrecht and Rotterdam, which offer numerous employment and educational opportunities. Active modes, such as walking and cycling, are mainly used for activities likely to take place within the residential area.

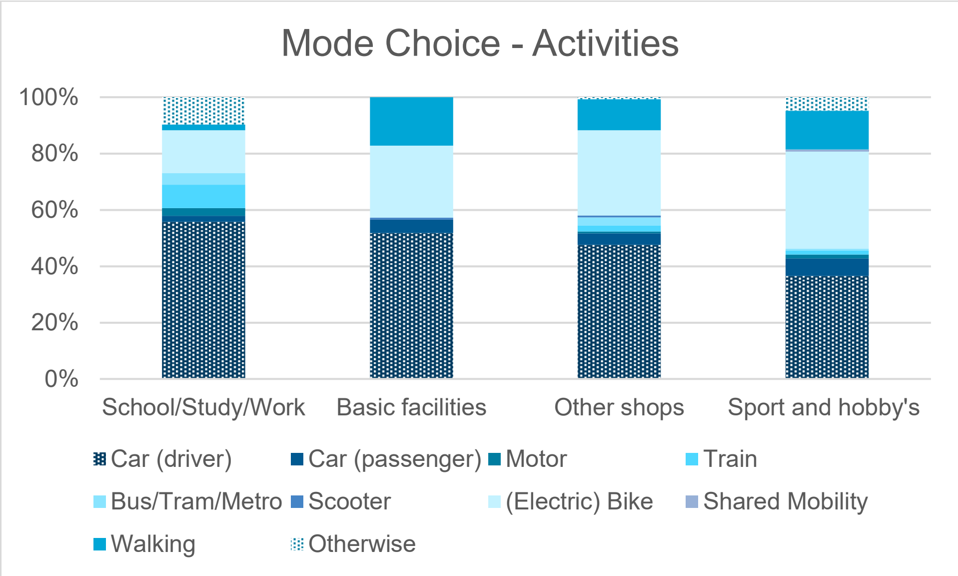


Figure 12. Mode choice for daily activities (n=145)

5.2 Factor Analysis

To analyze attitudes towards car-free neighborhoods and alternative transportation, an exploratory factor analysis was conducted. The attitudinal statements were recoded on a five-point Likert scale ranging from 1 ("Strongly disagree") to 5 ("Strongly agree"). The factor analysis is performed using the Principal Axis Factoring method in SPSS. A Direct Oblimin rotation is applied to achieve a simple structure, which is easier to interpret as opposed to the orthogonal Varimax rotation. Varimax rotation increases the likelihood that a single indicator (statement) loads highly on multiple factors, which can complicate clear interpretation.

Since factor analysis is an iterative process, multiple steps were required. In the first step, all indicators were included. In the second iteration, indicators with a communality below 0.25 were excluded. In this case, statement 15 ("I experience shared mobility as an addition to the car instead of a replacement") was removed due to a communality value of 0.24.

The initial results revealed five factors with eigenvalues greater than 1. However, the fifth factor only slightly exceeded this threshold (eigenvalue = 1.134) and was difficult to interpret. As a result, it was considered neither robust nor meaningful. The analysis was therefore performed with a fixed number of 4 factors.

This resulted in a pattern matrix with a simple structure, where each indicator had a high value (> 0.50) on a single factor and low values (< 0.30) on the others. The resulting structure was intuitive and did not require further adjustments (Molin, 2017). The final pattern matrix is presented in Table 13 and the factor scores are provided in Appendix I. The following paragraphs describe the interpretation of each factor. In addition to the factor scores, sum scores are calculated to analyze the average attitude of residents towards car-free neighborhoods. Based on the results, presented in Table 12, it can be concluded that, on average, residents in Barendrecht hold a neutral to slightly negative attitude (2.68 out of 5) towards car-free living. However, the standard deviation of 0.65 indicates variation in responses, ranging from more negative to somewhat positive attitudes.

Table 12. Descriptive Statistics Sum Scores.

	N	Minimum	Maximum	Mean	Std. Deviation
Sum scores	145	1.33	4.29	2.676	0.654

Table 13. Pattern Matrix.

	Factor			
	1	**2**	**3**	**4**
I am willing to live in a car-free neighborhood.	.834			
I am attracted to a car-free residential neighborhood.	.761			
I am willing to pay to park my car in the residential neighborhood.	.696			
I think living in a neighborhood with no cars is wonderfully peaceful.	.617			
I believe a car-free neighborhood contributes to more togetherness.	.611			
I am willing to get rid of my car if I were to move to a car-free neighborhood.	.571			-.371
I mind not being able to get close to my home by car.	-.525			
I get a trapped feeling from a car-free residential area.	-.498			
Barendrecht is set up for car use and therefore a car-free residential area will not work.	-.483	.346		
I find it important that my neighborhood offers a wide range of amenities.	.443			.337
I would like to live in a greener neighborhood.	.420			
I find public transportation reliable.		-.742		
I find public transportation often too crowded.		.698		
I find public transportation too expensive.		.605		
I find the travel time by public transport too long.		.570		
I only choose public transportation if I don't have to change trains.		.564		
I like to walk or bike to my daily activities.			.625	
I find social contact with residents important in my living environment.			.528	
I am very concerned with the environment and climate.			.469	

I like to use shared transportation.			.311	
Using the car is necessary for me.	-.379			.622
I am attached to the convenience of a car.				.585
I am a car enthusiast.			-.391	.392
Public transportation is practical for me only if the station is close to both my starting point and my destination.		.350		.375

Extraction Method: Principal Axis Factoring.
Rotation Method: Oblimin with Kaiser Normalization.
a Rotation converged in 33 iterations.

5.2.1 Factor 1: Car-free Enthusiasm

Factor 1 represents residents with a positive attitude towards car-free neighborhoods. Respondents who score high on this factor are generally attracted to the idea of car-free living and are willing to relocate to such a neighborhood. These individuals value green spaces, a peaceful environment free from traffic noise, a sense of community, and the presence of nearby amenities. They are not strongly attached to car ownership and are willing to give up their car if they move to a car-free area. If they do own a car while living in such a neighborhood, they are willing to pay an annual parking fee and park their vehicle in a hub. In short, they are supportive towards the car-free concept and believe in its feasibility within the context of Barendrecht.

5.2.2 Factor 2: Conservative Public Transport Criticism

Factor 2 reflects residents with a negative attitude towards alternative, more sustainable, modes of transportation, particularly public transport. Respondents with high scores on this factor are not willing to switch from their private car to public transport, as they perceive public transport as too expensive, overcrowded, and inconvenient. They believe that public transport would result in longer travel times and are reluctant to make transfers or deal with extended access and egress times. This group is skeptical about the feasibility of car-free neighborhoods in Barendrecht, arguing that the municipality is too car-oriented for such a concept to succeed. Overall, they appear resistant to changing their mobility habits and prefer to keep their cars and live in more traditional, car-oriented neighborhoods.

5.2.3 Factor 3: Social Green

Factor 3 represents residents who value a green and socially connected environment. Individuals who score high on this factor enjoy being active and prefer walking or cycling to their destinations rather than using a car. They demonstrate concern for environmental and climate-related issues and show a slight negative attitude towards the private car. Instead, they favor more sustainable transport options, such as shared mobility services. These residents are likely to fit in a car-free neighborhood.

5.2.4 Factor 4: Car Lover

Factor 4 represents car lovers. For these individuals, the car is essential to their daily lives and they are strongly attached to the comfort and convenience it provides. They are not willing to give up their car, even if they were to move to a car-free neighborhood. However, they do value having facilities and public transport options in close proximity to their homes. Their strong preference for car use makes it difficult for them to imagine a neighborhood without cars.

5.2.5 Factor Correlations

Table 14 presents the correlations between the four previously identified factors. While no strong correlations are observed, it is notable that factors 1 and 3, as well as factors 2 and 4, show positive correlations with one another. This pattern is not unexpected: Factors 1 and 3 both reflect positive attitudes towards aspects of car-free neighborhoods and sustainable transportation modes, whereas factors 2 and 4 express more skeptical views towards alternative transport. Consequently, it is expected that respondents scoring high on factor 1 or factor 3 are more inclined to choose a car-free neighborhood and to adjust their private car usage accordingly.

Table 14. Factor Correlation Matrix. Extraction method: Principal Axis Factoring. Rotation Method: Oblimin with Kaiser Normalization.

Factor	1	2	3	4
1	1.000	-0.392	0.303	-0.167
2	-0.392	1.000	-0.208	0.342
3	0.303	-0.208	1.000	-0.152
4	-0.167	0.342	-0.152	1.000

5.3 MNL Model

The results of the MNL model are shown in Table 15. Almost all attributes are statistically significant, with the exception of walking distance to hubs and the availability of shared cars. This lack of significance may be due to the relatively small sample size.

Table 15. LatentGold output: Model for Choices, 1 Class Model.

Attributes	Class 1	P-value
Green	0.0540	1.2e-6
Distance to Amenities	-0.0008	3.7e-6
Distance to Hubs	-0.0011	0.11
Shared Cars	0.0153	0.84
Shared Scooters	-0.4081	4.7e-5
Train Frequency	0.1326	3.5e-11
Parking Costs	-0.0027	3.5e-43

The coefficient for *Green* is positive, indicating that a higher percentage of green space in the neighborhood is valued positively. The same applies to *Shared Cars* and *Train Frequency*, the availability of shared cars and a higher frequency of train service are both perceived positively. However, while the direction of the shared car coefficient aligns with expectations, it is not statistically significant, therefore the influence of this variable on the neighborhood choice cannot be stated with certainty.

The attributes *Distance to Amenities*, *Distance to Hubs*, *Shared Scooters*, and *Parking Costs* all have negative coefficients. This aligns with expectations for walking distances and parking costs, as longer walking distances and higher costs are generally seen as undesirable. However, because the coefficient for walking distance to hubs is not statistically significant, there is no certainty about the effect of this variable on the neighborhood choice.

The negative coefficient for *Shared Scooters* is less intuitive. One would expect the availability of shared scooters to be perceived positively, as they expand alternative transport options and improve accessibility. A possible explanation of this negative perception may be the inconvenience or nuisance caused by the placement of shared scooters within the neighborhood or because of the unfamiliarity with scooters, as only 5.5% of the respondents is familiar with scooters (Figure 11).

Based on the results of the MNL model in Table 15 and the utility function shown in Equation 9, the utility contributions for each attribute level have been calculated. These utility contributions are used to compute the relative importance of each attribute (Table 16). The results indicate that low parking costs are perceived as most important when choosing a car-free neighborhood (40.3%). A high train frequency and level of green, short walking distances to amenities, and the availability of shared scooters do also play a role in the selection of a neighborhood. On average residents do not prefer the availability of shared scooters in their neighborhood and this is valued with a relative importance of 10.1% in the decision for a neighborhood. Based on the results in Table 16, it seems that walking distance to amenities is perceived as more important compared to walking distance to hubs. However, it is important to notice that the percentages are based on the attribute levels. It is therefore not possible to compare these two distances, as the distances to the amenities are greater than the distances to the hubs. To compare the two distances, they both need to have the same unit of for example 1 meter. By doing this, it appears that walking distance to hubs is perceived more negatively than walking distance to amenities, possibly because residents prefer to have easy access to their cars near their homes. The negative values for both attributes suggest that residents value short walking distances to both amenities and mobility hubs within their neighborhood.

Although shared cars are seen as a positive feature, the relative importance is very small (0.4%). Moreover, the positive effect of shared cars is offset by the strongly negative perception and importance of shared scooters. Finally, the positive contribution for train frequency outweighs the negative impact of walking distances, indicating that respondents are willing to accept longer walking distances in exchange for better public transport options.

$$U(neighborhood) = \beta_{GREEN} * GREEN + \beta_{WALKDIST_{AMENITIES}} * WALKDIST_{AMENITIES} + \beta_{WALKDIST_{HUBS}} * WALKDIST_{HUBS} + \beta_{SHAREDCARS} * SHARED_{CARS} + \beta_{SHAREDSCOOTERS} * SHARED_{SCOOTERS} + \beta_{TRAINFREQUENCY} * TRAINFREQUENCY + \beta_{PARKINGCOSTS} * PARKINGCOSTS$$

Equation 9. Utility function with all 7 attributes.

Table 16. Relative Importance of each Attribute.

Attributes	Levels			Relative Importance
Green (%)	20%	25%	30%	13.4%
Walking Distance to Amenities (meter)	450	750	1050	11.9%
Walking Distance to Hubs (meter)	100	150	250	4.1%
Availability of Shared Cars	Not Available (0)		Available (1)	0.4%
Availability of Shared Scooters	Not Available (0)		Available (1)	10.1%
Hourly Train Frequency	0	3	6	19.8%
Annual Parking Costs (euro)	500	800	1100	40.3%

5.3.1 Conclusion

The results of the MNL model show that on average, residents have strong preferences for neighborhoods with low annual parking costs and good accessibility via frequent train connections. Additionally, green environments with nearby amenities are preferred. The availability of shared cars are perceived as somewhat positive, but not really important. Shared scooters on the other hand are valued negative and have a greater relative importance compared to the shared cars. This is probably due to the unfamiliarity with scooters or the nuisance caused by scooters.

5.4 LCCM

Table 17. LCCM 3-class model output.

	Class 1: Low Cost Mobility Seeker	Class 2: Sustainable Mobility Enthusiast	Class 3: Proximity Oriented Car Lover	p-value
Class size	38.29%	36.45%	25.25%	
GREEN	0.0577	0.1527	0.0118	4.4e-12
DISTANCE_AMENITIES	-0.0008	-0.0010	-0.0014	7.8e-7
DISTANCE_HUBS	0.0001	-0.0018	-0.0069	0.00012
SHARED_CARS	-0.0807	0.2960	-0.1306	0.16*
SHARED_SCOOTER	-0.7390	-0.0453	-0.3891	0.015
TRAIN_FREQUENCY	0.1575	0.4478	-0.1033	3.1e-23
PARKING_COSTS	-0.0079	-0.0015	-0.0019	1.7e-33

*not significant at the 95% and 90% significance level

The results of the Latent Class Choice model with 3 classes are presented in Table 17. Respondents can be divided into three classes: Low Cost Mobility Seekers, Sustainable Mobility Enthusiast and Proximity Oriented Car Lovers. Low Cost Mobility Seekers is the largest class, with 38.29% of the respondents belonging to this class. This is followed by the Sustainable Mobility Enthusiasts, with 36.45% and finally the Proximity Oriented Car Lovers, with 25.25%. Each of these classes will be explained in the following paragraphs. Their labels were assigned based on the attributes that loaded most strongly on each factor, especially compared to the other factors. It is worth noting that the attribute shared cars is not statistically significant, which means that the classes do not significantly differ on this attribute and the results of this variable cannot be translated to the population.

5.4.1 Class 1: Low Cost Mobility Seeker

Class 1 represents the Low Cost Mobility Seekers. Prospective residents in this class are particularly sensitive to higher parking costs, which they value most negatively compared to any other class. A higher level of green space, increased train frequency, and even longer walking distances to mobility hubs are all perceived positively by this group.

Compared to the other classes, individuals in Class 1 are less averse to longer walking distances to amenities. While shared cars are viewed somewhat negatively, shared scooters are perceived most negatively across all classes. However, the negative utility associated with shared mobility options and parking costs can be offset by the positive utility from green space and frequent train services.

5.4.2 Class 2: Sustainable Mobility Enthusiast

Class 2 represents the Sustainable Mobility Enthusiasts. Individuals in this class place the highest value on green space, the availability of shared cars, and frequent train services. Although shared scooters are viewed negatively, their impact on the utility function is relatively small compared to the other classes.

Members of Class 2 are more sensitive to walking distances than those in Class 1 (*Low Cost Mobility* Seeker) but less so than those in Class 3 (*Proximity Oriented Car Lover*). Parking costs are perceived least negatively by this group compared to the other classes. Overall, this class shows relatively few strong negative coefficients, making its members more inclined to choose a car-free neighborhood due to the significant positive utility they derive from its characteristics.

5.4.3 Class 3: Proximity Oriented Car Lover

Class 3 represents the Proximity Oriented Car Lovers. Respondents in this class value green space the least positive compared to the other classes. All other attributes are valued negatively, indicating that individuals in this group are unlikely to gain utility from living in a car-free neighborhood.

Walking distance to mobility hubs is perceived very negatively, suggesting a strong preference for having their car parked close to their houses. Similarly, this group values walking distance to amenities most negatively of all classes, indicating a strong desire for immediate access to both cars and amenities. Shared mobility options and train frequency are also valued negatively, meaning these residents do not gain utility from alternative transport modes.

While parking costs are valued more negatively compared to Class 2 (*Sustainable Mobility Enthusiast*), they are perceived less negatively than in Class 1 (*Low Cost Mobility Enthusiast*). Overall, the strong negative coefficients across nearly all attributes suggest that people in Class 3 are the least likely to support or choose a car-free neighborhood.

5.4.4 Class Membership Model

Table 18 shows the class membership estimates of the three classes. These estimates are used to determine how socio-demographic characteristics, attitudes and mobility choices impact the likelihood of belonging to a class. The recoding of each variable can be found in Appendix G.

Table 18. Model for Classes.

	Class 1: Low Cost Mobility Seeker	**Class 2: Sustainable Mobility Enthusiast**	**Class 3: Proximity Oriented Car Lover**	**p-value**
Intercept	-13.8140	-5.8792	19.6932	0.042
Year of Birth	1.9540	-0.1361	-1.8179	0.023
Postal Code	4.0274	-0.3050	-3.7224	0.030
Gender	-6.2648	7.8688	-1.6039	0.0048
Car Ownership	-1.3216	4.5233	-3.2018	0.0029
Household				0.011
Single person household	-1.1047	6.9017	-5.7971	
Multiple person household without children	-3.4687	-1.5679	5.0366	

Multiple person household with children	4.5733	-5.3338	0.7605	
Work/Study				0.29
Studying	5.7887	-8.6649	2.8762	
(Self-)Employed	-0.7854	2.5880	-1.8026	
Retired, workless, incapacitated	-3.4594	5.7216	-2.2622	
Houseman/wife	1.7923	-0.2995	-1.4928	
Volunteer	-3.3362	0.6548	2.6813	
Income				0.056
< 28.375 euro	-5.8464	10.9696	-5.1232	
28.376 till 49.699 euro	3.2120	-5.6793	2.4673	
49.670 till 67.366 euro	2.8915	-2.4897	-0.4018	
> 67.367 euro	-0.3277	-3.0932	3.4209	
I would rather not say	0.0705	0.2926	-0.3632	
Education				0.018
Low	3.9221	-18.1003	14.1782	
Middle	11.8767	-2.0549	-9.8218	
High	1.1978	0.5563	-1.7540	
Otherwise	-16.9966	19.5989	-2.6023	
Moving	6.1452	-0.9143	-5.2309	0.15
Factor 1: Car-free enthusiasm	-8.5010	8.2298	0.2711	0.0011
Factor 2: Conservative PT criticism	-7.7929	2.4774	5.3155	0.00092
Factor 3: Social and Green	-3.2688	2.1286	1.1402	0.019
Factor 4: Car Lover	-0.1661	-0.7689	0.9350	0.32
Current mode: Motorized Transport user	10.5521	-9.4022	-1.1499	0.13
Current mode: Active Transport user	-0.6271	6.2441	-5.6170	0.023
Current mode: Sustainable modes	-8.4581	6.0107	2.4474	0.0057

It is important to note that not all variables included in the model are statistically significant. However, this specific selection of variables was kept in the model because it yielded the highest number of significant results overall. The variables that are not statistically significant do not show meaningful differences between the three classes, which means no definitive conclusions can be drawn from them. Nonetheless, they are still interpreted per class, as it is plausible that they would reach significance with a larger sample size. An overview of the recoded variables is provided in Appendix G.

Class 1: Low Cost Mobility Seeker

Low-Cost Mobility Seekers are more likely to be younger individuals currently living in Barendrecht, and more often men than women. They are typically part of a multi-person household with children and are more likely to be students or houseman/housewives, rather than employed. Respondents in this class are more likely to have a middle-high income and middle-high education level. Residents with an income between 28.376 and 49.699 euro are most likely to fit in this class. People who have considered moving to a car-free neighborhood, but still live in a traditional one, are more likely to belong to this class. Compared to the other classes, motorized transport is most commonly used as the current main mode by individuals in this group.

Class 2: Sustainable Mobility Enthusiast

Sustainable Mobility Enthusiasts are more likely to be women than men. This class does not attract specifically young or old residents and therefore it is stated that middle-aged residents are likely to belong to this class. Individuals who live in single-person households and are either working or retired have a higher probability of belonging to class 2 compared to the other classes. Households with children are least likely to belong to this class. Members of this class are more likely to have a low income and to score high on factor 1 (Car-free Enthusiasm) or factor 3 (Social and Green). Additionally, people who currently use active modes, public transport, or shared mobility as their main form of transportation are more likely to belong to this class. Highly educated people are more likely to belong to this class compared to lower educated people. It is worth noting that residents who own multiple cars are most likely to fit into this class, which does not align with their sustainable attitudes. A possible explanation could be that they own multiple cars, but do not really use them and therefore are prepared to reduce the amount of privately owned cars when moving to a car-free neighborhood.

Class 3: Proximity Oriented Car Lover

Respondents in class 3 are more likely to be older and currently live outside Barendrecht, with fewer cars than those in class 1 (*Low Cost Mobility Seeker*) or class 2 (*Sustainable Mobility Enthusiast*). They often live in multi-person households without children. Additionally, individuals with high incomes and lower education levels are more likely to belong to this class compared to those with middle or low incomes or with higher levels of education. Respondents who have never considered moving to a car-free neighborhood also have a higher likelihood of being in this class. Furthermore, this class has the highest probability of including conservative public transport critics. The likelihood of car lovers belonging to this class is also higher than in the other classes. Residents who own less private cars are more likely to fit into this class. A possible explanation could be that they own one car, but really need that car to reach their daily activities and therefore are not able to get rid of their private car.

5.4.5 Scenarios

Based on the results of the LCCM, choice probabilities are computed to assess how different scenarios are valued both across latent classes and within the overall population. This allows to determine the most promising scenario from a policy perspective. Five different scenarios have been developed, each representing a unique combination of attribute levels (Table 19). These scenarios differ in terms of sustainability, accessibility, availability of shared mobility and parking policies.

Table 19. Scenarios with Attribute Levels.

	GREEN	DISTANCE_AMENITIES	DISTANCE_HUBS	SHARED_CARS	SHARED_SCOOTER	TRAIN_FREQUENCY	PARKING_COSTS
Scenario 1: Private Car Oriented Neighborhood	20	1050	100	0	0	0	500
Scenario 2: Car-free Green Neighborhood	30	450	250	1	1	6	1100
Scenario 3: Closeness and PT without shared mobility	25	450	100	0	0	6	800
Scenario 4: Slow transition to car-free	25	750	150	1	0	3	800
Scenario 5: Closeness and PT without shared mobility and with high costs	30	450	100	0	0	6	1100

Scenario 1 represents the base case, a traditional car-oriented suburban neighborhood with no specific emphasis on sustainability measures. The level of green is quite low (20%), amenities are located at greater distances and shared mobility is not available. Moreover, the neighborhood does not offer a train service and annual parking costs are relatively low (500 euro). This combination of attributes is unlikely to discourage private car ownership or promote sustainable travel behavior. It serves as a reference point for the other scenarios.

Scenario 2 reflects a typical car-free neighborhood, where policies actively discourage private car use and promote sustainable transportation and car-free living. This scenario offers a high level of green (30%), short distances to amenities that encourage the use of slow modes and longer distances to hubs, which may discourage private car use. This scenario offers great alternatives to private cars, including both shared cars and scooters, as well as a frequent train service (6 trains per hour). Annual parking costs are high (1100 euro), further discouraging private car ownership. This scenario illustrates a policy focused on promoting car-free and sustainable living.

Scenario 3 can be considered as a combination of scenario 1 and 2. It includes a frequent train service (6 trains per hour), short distances to amenities (450 meter), a moderate level of green (25%) and medium high annual parking costs (800 euro). However, the private car remains easily accessible at an average distance of 100 meter from the houses and no shared mobility services are provided. As such, while this scenario promotes public and active modes to some extent, it does not fully discourage car use.

Scenario 4 presents a transition towards car-free living compared to scenario 1. It includes a higher level of green space and reduced walking distances to amenities, likely encouraging active modes. Compared to the base case in scenario 1, private car use is further discouraged by increased walking distances to hubs, the availability of shared cars, higher annual parking costs (800 euro) and the presence of a train service with three trains per hour. While scenario 2 represents a full commitment to sustainable transport, scenario 4 offers a more gradual transition.

Scenario 5 is a variant of scenario 2, with modifications to the distance to hubs and availability of shared mobility options. Unlike scenario 2, which offers all sustainable alternatives, this scenario focuses on active modes and public transport. The shorter distances to the hubs may keep the private car a viable option. However, the high parking costs (1100 euro) are likely to limit its use to those who genuinely need it. Additionally, the higher level of green space compared to scenario 2 may enhance the attractiveness of walking and cycling.

To determine the valuation of each scenario, utilities are calculated using the utility function defined in Equation 9, in combination with the attribute levels from Table 19 and the class-specific coefficients estimated by the LCCM (Table 17). After computing the utility (V) for each scenario i in class k, these values are used as input in the logit formula (Equation 10) to calculate the class-specific choice probabilities, as shown in Table 20. These choice probabilities, combined with the class sizes, are then used to compute the aggregated choice probabilities for each scenario (Equation 11). These results are also presented in Table 20.

$$P_{i|k} = \frac{e^{V_{ik}}}{\sum_{j=1}^{J} e^{V_{jk}}}$$

Equation 10. Logit Formula for Choice Probability per scenario within each class.

$$P_i = \sum_{k=1}^{K} \pi_k \cdot P_{i|k}$$

Equation 11. Aggregated Choice Probabilities with $\pi_1 = 38.29\%, \pi_2 = 36.45\%, \pi_3 = 25.25\%$.

Based on the results presented in Table 20, scenario 1 emerges as the most preferred option overall, as it has the highest aggregated choice probability. This indicates that, in general, residents show a stronger preference for a traditional, car-oriented neighborhood. This outcome is not unexpected, given that scenario 1 has the lowest parking costs and lacks shared mobility services, attributes that are generally causing disutility for most respondents.

The aggregated probabilities are weighted by the class sizes, with class 1 (*Low Cost Mobility Seeker*) being the largest (38.29%). This class shows a clear preference for scenario 1, followed by scenario 3. This pattern influences the overall results. It can be seen that the most preferred scenarios at the aggregated level tend to exclude shared mobility options and offer short walking distances to mobility hubs, both of which align with the preferences of class 1.

Class 2 (*Sustainable Mobility Enthusiast*), on the other hand, is the only group that shows a strong preference for the scenario that includes both shared cars and shared scooters (Scenario 2). This suggests that this group is more positive towards sustainable and car-free mobility options, which is in line with previous results.

Class 1 (*Low Cost Mobility Seeker*) is particularly sensitive to high parking costs and therefore not likely to choose scenarios with higher parking costs. Class 3 (*Proximity Oriented Car Lover*) does show relative strong preferences for most scenarios, except for scenario 2, which is less favored. This reflects that residents belonging to this class are not willing to fully switch to sustainable transport and car-free living.

These insights underline the importance of accounting for heterogeneity in residents' preferences when designing mobility policies. While a car-oriented approach may currently align with the preferences of the majority, there are distinct groups, such as class 2 (*Sustainable Mobility Enthusiast*), that are more open to sustainable, shared, and car-free alternatives. Scenario 3 has the second largest aggregated choice probability and reflects the need for some level of green, short walking distances to both amenities and hubs, no shared mobility options, a high train frequency and no maximum parking costs.

Table 20. Class Choice Probabilities and Aggregated based on Class Sizes.

	Class 1	**Class 2**	**Class 3**	**Aggregated**
Scenario 1: Private Car Oriented Neighborhood	54.11%	0.69%	36.94%	30.30%
Scenario 2: Car-free Green Neighborhood	1.57%	33.76%	3.50%	13.79%
Scenario 3: Closeness and PT without shared mobility	28.06%	25.16%	27.62%	26.89%
Scenario 4: Slow transition to car-free	12.76%	5.98%	15.38%	10.95%
Scenario 5: Closeness and PT without shared mobility and with high costs	3.50%	34.42%	16.57%	18.07%
Total:	100.0%	100.0%	100.0%	100.0%

5.4.6 Conclusion

Respondents in class 1 (*Low Cost Mobility Seeker*) are most sensitive to parking costs but are relatively tolerant of longer walking distances to access their car, as they are attached to their car. A higher level of green space and frequent train services are likely to increase their willingness to live in a car-free neighborhood. Multiple-person households with children, who are attached to their car are most likely to fit into this class.

Respondents of class 2 (*Sustainable Mobility Enthusiast*) prefer neighborhoods with abundant green space and multiple alternative transport options, such as shared mobility and public transport. This matches with their current mobility choices. This group is the least sensitive to parking costs, making them the most open to living in a car-free environment. Middle-aged individuals, living in a single-person household, with sustainable transport as main mode are most likely to fit into this class.

Respondents in class 3 (*Proximity Oriented Car Lover*) prefer convenience and proximity, showing a strong aversion to long walking distances. They are also unlikely to use alternative modes of transport, such as public transport or shared mobility. This corresponds with their attitudes towards alternative transport. People who are assigned to this group likely to be older, with a low education level and a high income.

Based on the aggregated results, it can be concluded that scenarios in which private car use is not fully discouraged are, on average, valued most by the residents of Barendrecht. This is largely because most residents remain attached to their private cars and show limited openness to shared mobility options. Residents are more likely to consider living in a car-free neighborhood if they can still conveniently access their private vehicle at a reasonable cost, and if the neighborhood offers nearby amenities, a green environment, and a frequent train service.

6. Discussion of the Results

This chapter reflects on the findings of this study by comparing them with results from previous studies. Some results align with existing knowledge, while others differ or provide new insights.

First of all, the effect of gender on the willingness to live in a car-free neighborhood was not found in previous studies. Therefore, this study included gender as a covariate in the analysis. It is found that women are more likely to live in a car-free neighborhood compared to men. A possible explanation is that men may attach greater value to private car ownership, whereas women may be more inclined towards sustainable transport options and a pleasant living environment.

Research by Da Silva Borges and Goldner (2015) and Baehler & Rérat (2020) showed that multiple person households with children are most likely to live in a car-free neighborhood. This is not in line with the findings of this study, which indicates that single-person households are most likely to belong to the car-free class, while households with children are the least likely. However, the previous studies did identify single-person households as the second most likely group, which provides some support for the findings of this study. A possible explanation for the lower willingness among families to live car-free could be that they may be less willing to give up the comfort and convenience of the private car. The inconvenience of longer walking distances to the car, or using public transport with children may outweigh the benefits of a green and child-friendly environment. On the other hand, single-person households might be more attracted to the social interaction and communities offered by a car-free neighborhood.

Da Silva Borges and Goldner (2015) and Gundlach et al. (2018) also showed that residents who are more likely to live in a car-free neighborhood frequently use active modes and shared mobility, but that frequent public transport users are less likely to opt for a car-free neighborhood. The results of this study partially align with these findings. In Barendrecht, residents who currently use active modes, public transport, or shared mobility as their main transport mode are indeed more likely to choose a car-free neighborhood. This supports previous findings, except for the public transport usage. A possible explanation is that public transport is more commonly used in Barendrecht, compared to shared mobility options. As a result, residents who wish to travel sustainably may rely more on public transport compared to car-free urban areas.

Previous studies also indicated that highly educated individuals are more likely to be attracted to car-free neighborhoods (Da Silva Borges and Goldner, 2015; Baehler, 2019; Baehler & Rérat, 2020; Paijmans and Pojani, 2021). This is confirmed by the current study, which found that highly educated residents are more likely to be attracted to car-free neighborhoods compared to lower educated residents. Additionally, people who care about the climate are more inclined to choose a car-free neighborhood (Baehler, 2019; Baehler & Rérat, 2020; Paijmans & Pojani, 2021). This is supported by the fact that those who score high on factor 3 (Social and Green) are more likely to opt for a car-free neighborhood.

It is worth noting that people with lower incomes appear to be more likely to choose a car-free neighborhood. A possible explanation is that financial considerations play a role. As car ownership involves substantial costs, alternative modes of transport may be more attractive to residents with a lower income. Somewhat contrary to this finding, the results also suggest that residents who own multiple cars are more likely to choose a car-free neighborhood. A possible explanation is that these residents may own multiple cars, but do not really use them regularly and may therefore be open to reduce the number of cars they own. In contrast, residents who own only one car might be more attached to it because they really need it to reach their daily activities. These residents are more likely to belong to class 3 (*Proximity Oriented Car Lover*).

This study also found that 29% of the respondents indicated a willingness to reduce their car usage when moving to a car-free neighborhood. This result is comparable to the 26% reduction found in the survey by Baehler and Rérat (2020).

Research by DISCVision revealed that the typical resident of Barendrecht does not closely match the profile of the envisioned target group for De Stationstuinen (Emborion & Gemeente Barendrecht, 2023). The study also found that older individuals are more likely to consider moving into newly built apartments compared to younger residents. This points to a potential mismatch between the intended diverse target audience for De Stationstuinen and the residents most likely to move there, especially given that 75% of the housing is reserved for current Barendrecht residents. Nevertheless, this study identified that 36.45% of respondents can be classified as Sustainable Mobility Enthusiasts, a group generally composed of middle-aged individuals. This challenges DISCVision's assumption that residents of Barendrecht do not align with the envisioned profile for De Stationstuinen. At the same time, DISCVision reported that residents of Barendrecht tend to have a conservative character. This is confirmed by the current study, as most respondents remain attached to traditional neighborhoods, their private cars and familiar modes of transport. Additionally, the results also suggest that interest in apartment living is not limited to older people. This may be explained by the fact that De Stationstuinen offers more than just newly built apartments, it promotes an entire lifestyle centered around sustainable transport options. In line with previous findings, this study shows that younger residents are more likely to be attracted to such an environment compared to older residents (Da Silva Borges and Goldner, 2015; Baehler & Rérat, 2020; Vassallo Magro & Sánchez, 2024).

Finally, it is important to note that not all covariates in this study were statistically significant. In the MNL model, variables for walking distance to hubs and shared cars did not reach statistical significance. Similarly, in the LCCM, the variable shared scooter was not statistically significant. This could be due to the small sample size or the possibility that there are other variables that better predict neighborhood preferences or class membership. It is possible that other covariates that are not included in this study or more complex, underlying relationships better explain the heterogeneity observed.

7. Conclusion

7.1 Summary of the Main Findings

The results show that 52.4% of respondents use a private car as their main mode of transport, indicating that most residents of Barendrecht are highly car-oriented, which is a result that aligns with expectations. However, active modes of transport are also frequently used, 48.3% of respondents walk four or more days per week, and 31% use (electric) bicycles. Public transport is less popular among residents, and shared mobility services are barely used or even unfamiliar. These mobility choices can be explained by the suburban character of Barendrecht. While many residents are car-oriented, walking and cycling are still commonly used, possibly for shorter, local trips where distances are manageable. Public transport is relatively unpopular, which might be explained by the more limited availability and service levels in suburban areas compared to urban regions.

An explanatory factor analysis resulted in four types of prevailing attitudes towards car-free neighborhoods and sustainable transport. Factor 1 represents car-free enthusiasm, these people hold a positive attitude towards car-free living and value a green environment with social interactions and nearby amenities. They are willing to give up their car ownership when moving to a car-free neighborhood. Factor 2 are the conservative public transport critics, these people hold a negative attitude towards sustainable alternatives for the private car. They do not believe in the car-free concept and are not willing to give up their car. Factor 3 represents the Social Green, these people hold a positive attitude towards car-free living and sustainable transportation modes. They value green and social environments and are somewhat skeptical towards private cars. The last factor represents the car lovers, these people are attached to their cars and therefore hold negative attitudes towards alternative modes of transport. Factor 1 and 3 represents the people that are likely to choose a car-free neighborhood and those who are willing to change their mobility choices. In contrast, people belonging to factor 2 and 4 are not likely to fit in a car-free neighborhood or change their mobility choices. 29% of the total sample size stated that they would change their car use or ownership when moving to a car-free neighborhood. The remaining 71% is not willing to give up their car ownership or travel differently. The sum scores showed that on average, residents hold a slightly negative or neutral attitude towards car-free living.

The results of the MNL model provide insights into the preferences towards a suburban car-free neighborhood in Barendrecht. On average, residents prefer a green neighborhood with frequent train connections. High parking costs and long walking distances cause the neighborhood to be less attractive. Respondents prefer shorter walking distances to the hubs over shorter walking distances to amenities, which shows the car-oriented mindset of most residents. Shared mobility options are not widely preferred by the residents, as the availability of shared cars is only perceived as somewhat positive and shared scooters are perceived as negative. An explanation for the valuation of shared mobility might be the unfamiliarity with this concept and the nuisance caused by shared scooters.

The LCCM results show that there is heterogeneity in neighborhood preferences within the population. This model resulted in three classes: Low Cost Mobility Seekers (38.29%), Sustainable Mobility Enthusiasts (36.45%) and Proximity Oriented Car Lovers (25.25%). Low Cost Mobility Seekers and Proximity Oriented Car Lovers are both a little bit conservative, as they prefer to keep their car close by. However, while Low Cost Mobility Seekers are positive towards the train, Proximity Oriented Car Lovers do not prefer any type of sustainable transportation mode. Based on the utility function of the Low-Cost Mobility Seekers, this class appears to represent a typical resident of Barendrecht: someone who values the convenience of a private car and is therefore unwilling to pay annual parking costs, yet is not opposed to walking or using public transport, and who shows some skepticism towards shared mobility, likely due to unfamiliarity with the concept.

Proximity Oriented Car Lovers, in contrast, show minimal valuation for the characteristics of a car-free neighborhood. Aside from a slight preference for green space, they strongly prefer keeping their private car close to their houses. They are unwilling to shift towards alternative transport modes. People belonging to this class are therefore very unlikely to choose a car-free neighborhood. Sustainable Mobility Enthusiasts are the only ones that are not attached to their private cars. They prefer a green, well-connected neighborhood with public transport as well as shared mobility options. Residents belonging to this class are therefore very likely to fit in a car-free neighborhood.

Based on the Class Membership Model, middle-aged residents with a high level of education and a single-person household are most likely to belong to the class of Sustainable Mobility Enthusiasts. These people already have a positive attitude towards car-free living and sustainable transport options, as reflected by their high scores on factor 1 (Car-free Enthusiasm) or factor 3 (Social and Green). In addition, they are currently using sustainable modes of transport as their main mode of transport. The Low Cost Mobility Seekers are mostly families that are attached to their private cars. Although they appreciate some aspects of a car-free neighborhood, their preference for car use remains dominant. A possible explanation could be the convenience and comfort a car offers when traveling with children. Lastly, the Proximity Oriented Car Lovers are the most resistant to car-free living and alternative sustainable transport modes. This group mainly consists of older couples with lower education levels and higher incomes. They tend to hold negative attitudes towards public transport and are strongly attached to their private cars. One possible explanation for their aversion to car-free neighborhoods and alternative modes of transport is a lack of familiarity with these concepts. Based on the results it can be concluded that current mobility choices influence the attitudes towards car-free living and the willingness to change private car-ownership and usage. The results of the scenario analysis show that, on average, residents prefer a neighborhood where the private car remains to have a dominant role.

7.2 Policy Recommendations

The results show that class 2 (Sustainable Mobility Enthusiasm) consists of residents who are already positive towards car-free living and prefer a green environment with sustainable transport options. In contrast, class 1 (Low Cost Mobility Seekers) and class 3 (Proximity Oriented Car Lovers) are more attached to their private cars and therefore less likely to fit in a car-free neighborhood. For De Stationstuinen to be successful, it is essential to tailor approaches that align with the preferences of the intended target group.

Based on the results of this study, two possible approaches are recommended. The first approach involves relaxing the assumption that 75% of the homes should be allocated to current residents of Barendrecht. Given that the majority of respondents are car-oriented, and only one group (Class 2: Sustainable Mobility Enthusiast) is clearly enthusiastic about car-free living, it is unlikely that the envisioned diverse target group can be formed solely from residents of Barendrecht. To successfully create a car-free neighborhood that discourages car use and promotes sustainable modes of transport, it is important to also attract residents from outside Barendrecht who align with the intended profile for De Stationstuinen. By treating the 75% local allocation as a flexible guideline rather than a fixed rule, the municipality increases the chances of developing a truly sustainable and diverse community.

Alternatively, if the 75% target for Barendrecht residents is maintained, the characteristics of the car-free concept should be relaxed to better accommodate class 1 (*Low Cost Mobility Seeker*) and class 3 (*Proximity Oriented Car Lover*). A gradual, step-by-step transition towards sustainable mobility is recommended, rather than an immediate limitation on car use. For example, class 1 is open to parking their cars at a distance from their homes, provided the annual parking costs remain affordable. Scenario analysis indicates that parking fees between 500 euro and 800 euro are generally acceptable. The proposed 784 euro fee may be on the higher end, so lowering it slightly could make the neighborhood more attractive to car-dependent residents. However, to discourage excessive car ownership, the number of parking spaces should remain limited.

Class 1 (*Low Cost Mobility Seeker*) residents also place a high value on train frequency. Investing in high-quality, reliable and user-friendly public transport will help encourage a shift towards more sustainable travel. Since families with children are more likely to belong to this class, locating family-oriented housing closer to train stations could make public transport a more viable alternative to private cars. In addition, family discounts for train services can encourage families to take the train instead of the private car and increase the familiarity with public transport.

As most residents are still attached to their private cars and not willing to pay high parking costs, it is likely that residents are going to search for parking alternatives. It is possible that surrounding neighborhoods will experience an increase in parking demand if the parking policy in these neighborhoods is not changed. It is therefore advised to introduce some form of parking policy in the surrounding neighborhoods to prevent inconvenience for other residents of Barendrecht. This parking policy could also be to introduce an annual parking fee, but it is also possible to introduce parking permits for residents.

Across all classes, shared scooters are perceived negatively. An explanation is that they are perceived as messy or as a nuisance. Based on the results of this study, it is expected that these scooters will not frequently be used. Therefore, it is recommended to exclude shared scooters from De Stationstuinen. The neighborhood offers amenities within walking or cycling distance, while more distant activities can be accessed via shared cars or public transport. As shared scooters cause disutility for most residents and are unlikely to be used frequently, based on the results of this study, including them would only cause the neighborhood to be less attractive and the residents to be less satisfied.

In contrast, shared cars are on average perceived as positive. Including shared cars is therefore recommended, together with targeted communication strategies to familiarize residents with the concept. This could help improve perceptions and encourage their use as an alternative to private car ownership.

Green space is viewed positively by all classes. However, results from the MNL model indicate that green space is not the most influential factor in neighborhood choice. Attributes such as parking costs and train frequency have a greater impact. Green space should thus be used to enhance the overall appeal of the neighborhood, rather than serve as the main form of attraction. The proposed 25% green space is therefore likely to be sufficient to meet residents' preferences.

Since class 2 (*Sustainable Mobility Enthusiast*) is already open to car-free living, communication efforts for this group can focus on keeping them informed. However, more efforts are needed for class 1 (*Low Cost Mobility Seeker*), as these residents can use some incentives and support to switch from the private car to sustainable mobility. Although class 3 (*Proximity Oriented Car Lover*) is currently the least positive towards car-free living and sustainable transport, targeted education and communication could help reduce resistance and improve the average attitude towards car-free living.

This study shows that a one-size-fits-all approach is unlikely to succeed in De Stationstuinen. While class 2 (*Sustainable Mobility Enthusiast*) is already open to car-free living, most residents (especially in class 1 (*Low Cost Mobility* Seeker) and class 3 (*Proximity Oriented Car Lover*)) still rely on private cars. A successful approach will require either opening the neighborhood to more like-minded residents from outside Barendrecht or adjusting the concept to accommodate local preferences of the larger population. Investments in public transport, affordable parking policies, green space, and targeted communication are essential to ensure both general attractiveness and a gradual shift towards sustainable mobility.

7.3 Limitations

This research has some limitations. First of all the small sample size and limited representativeness of the sample. Due to the small sample size and the possible participation bias, the sample cannot be considered fully representative. As a result, the findings cannot be generalized to the population with certainty. Most respondents were over the age of 45. Since older individuals tend to have a less positive attitude towards car-free living, the sample may have introduced a bias, potentially leading to a more negative perception of car-free living than would be the case in the general population. In addition, only a small number of respondents live outside Barendrecht, which makes it difficult to reliably draw conclusions about differences between residents of Barendrecht and those living elsewhere.

Second, there are limitations related to the methodological approach. A stated choice experiment was used instead of a revealed choice experiment (see Chapter 4.1). Because stated choice experiments are based on hypothetical scenarios instead of real-world situations, there is a risk that respondents provide different answers in the survey compared to what they would do in real life. Additionally, some respondents may not have answered rationally (with utility maximization in mind), which could have led to inconsistent answers and affected the reliability of the results.

Third, the selection of attributes in the choice experiment may have influenced the outcomes. The researcher has made a selection of attributes for the choice experiment, as not all neighborhood characteristics could be included. Including too much attributes would have made the choice set too complex, potentially discouraging respondents from completing the survey and affecting the reliability of the results. Although the attributes were selected carefully and based on prior research, it is possible that non-included attributes could have better explained the heterogeneity between respondents. This could also explain why not all covariates turned out to be statistically significant. Attributes that could have been relevant but were not included in this study are bus frequency and walking distance to the nearest bus stop, as well as the level of child-friendliness, which could be measured by walking distance to schools or the number of playgrounds in the neighborhood. In this study, one attribute was included to represent walking distance to amenities. However, it might be valuable to disaggregate this into multiple attributes that reflect access to different types of amenities. In addition, the selection of attributes and levels introduced correlations within the experimental design. Using a different set of attributes and levels that can be combined with a basic plan would eliminate these correlations and potentially lead to more reliable results.

Lastly, it is important to note that the results of the LCCM are based on forced choices between two car-free neighborhood alternatives. Only after the choice was made, the respondents were asked to state whether they would actually prefer the chosen car-free neighborhood or a traditional neighborhood with cars. In total, 25% of the respondents indicated at the second question that they would prefer the chosen car-free neighborhood over a traditional one. Since the optout option was deliberately excluded from the neighborhood choice tasks and instead a separate question was used to explore the willingness to live car-free or in a traditional neighborhood, the classes identified by the LCCM reflect preferences based on forced choices between car-free alternatives. As a result, no actual choice probabilities with respect to traditional and car-free neighborhoods are derived from the model because there was a lack of time for extra data preparation and analysis. However, the decision to exclude the optout option in the survey was made deliberately since the researcher wanted to avoid a large share of respondents consistently choosing the optout. This would have limited the ability of the analysis to uncover meaningful insights into preferences between different characteristics of a car-free neighborhood.

7.4 Further Research Directions

A possible direction for future research is to explore the choice probabilities between car-free and traditional neighborhoods, by including an optout option in the choice task. This would allow for a more realistic representation of residents' preferences and provide deeper insights into the actual willingness to live in a car-free neighborhood. In addition, estimating class-specific choice probabilities based on individual characteristics, can help to better predict the likelihood that a person with certain characteristics belongs to a certain class. These insights could be valuable for developing targeted policies.

Besides changing the survey itself, future research would also benefit from a larger sample size. A larger sample size increases the probability of obtaining a representative sample, making the results more applicable to the broader population. It would also be valuable to include more residents from outside Barendrecht in the sample. This allows for a better prediction of the impact of current residential areas on the willingness to live car-free.

Another possible extension of this study would be to replicate it in another suburban area where a car-free neighborhood is planned. This would enable a comparative analysis across municipalities and help identify preference patterns in suburban areas. Gaining more knowledge about car-free living in suburban areas would be valuable, as suburban areas offer a lot of potential for developing car-free neighborhoods. Utilizing this potential can help to facilitate the shift towards car-free areas, not only in urban areas but also in suburban environments. It is also possible to repeat this study with another set of attributes. The attributes discussed in Chapter 7.3 can be used, but it might also be interesting to create a list of attributes based on expert interviews.

Further research could also put more focus on the underlying motivations behind residents' preferences. Understanding why certain groups are more inclined towards car-free living, whether due to health considerations, lifestyle, or other reasons, can help during the development of car-free neighborhoods. Adapting neighborhood features based on these underlying motivations could help to attract a broader range of residents to car-free neighborhoods. This could help to increase societal support for car-free developments.

To better explore the underlying motivations behind residents' preferences, also beyond mobility-related aspects, it could be valuable to apply more qualitative methods, such as interviews or co-creation. Interviews allow for a deeper understanding of residents' preferences and motivations compared to surveys with fixed questions and answer options. Residents can be interviewed individually or in a group. Co-creation refers to a process in which multiple actors are involved in the design, decision-making and implementation phases of a project. This enables municipalities, residents and other parties to collectively create values, ideas and plans. Both interviews and co-creation can stimulate meaningful dialogue and generate valuable insights that contribute to the development of widely supported car-free initiatives.

Finally, additional research could be conducted after the first houses in De Stationstuinen are built. A revealed choice experiment among residents of De Stationstuinen can be performed to further explore their preferences based on real life choices instead of stated choices for hypothetical scenarios. This information can be used as a complement for this study. Alternatively, a new stated choice experiment could be conducted in combination with a revealed choice experiment for residents that are not yet moved to the car-free neighborhood. When De Stationstuinen is partly built, this might affect the preferences of residents, as they are now able to see it in real life.

Acknowledgements

During this study, the researcher has used CHATGPT for the following purposes:

- Coming up with creative names for the factors and classes.
- Assisting with translations.

References

Ajdari, A., Taiebnia, A., & Mehrara, M. (2022). Estimation of Effective Components on the Preferences of Tehran Citizens to Choose “Car-Free City Center” Using a Random-Parameter Logit Model. In *https://aes.basu.ac.ir/*. Bu-Ali Sin University. https://doi.org/10.22084/aes.2022.26397.3469

AlleCijfers. (2024, November 15). *Kaart met provincies, gemeenten, woonplaatsen, wijken, buurten en postcodes | AlleCijfers.nl*. AlleCijfers.nl. https://allecijfers.nl/kaart/?lon=4.5390&lat=51.8551&zoom=14

AlleCijfers. (2025, May 1). *Woonplaats Barendrecht in cijfers en grafieken*. AlleCijfers.nl. https://allecijfers.nl/woonplaats/barendrecht/

Baehler, D. (2019). *Living in a car-free housing development. Motivations and mobility practices of residents in nine developments in Switzerland and Germany.* Serval.unil.ch. Retrieved January 1, 2025, from https://serval.unil.ch/resource/serval:BIB_2053C99A97BC.P001/REF.pdf

Baehler, D., & Rérat, P. (2020). Between ecological convictions and practical considerations – profiles and motivations of residents in car-free housing developments in Germany and Switzerland. *Geographica Helvetica*, *75*(2), 169–181. https://doi.org/10.5194/gh-75-169-2020

Barendrechts Dagblad. (2025, April 10). *Vul vragenlijst mobiliteit De Stationstuinen in en maak kans op prijs*. Retrieved April 22, 2025, from https://barendrechtsdagblad.nl/Blik%20op%20Barendrecht/vul-vragenlijst-mobiliteit-de-stationstuinen-in-en-maak-kans-op-prijs

Borgers, A., Snellen, D., Poelman, J., & Timmermans, H. (2008). Preferences for car-restrained residential areas. *Journal of Urban Design*, *13*(2), 257–267. https://doi.org/10.1080/13574800801965734

Boxall, P. C., & Adamowicz, W. L. (2002). Understanding Heterogeneous Preferences in Random Utility Models: A Latent Class Approach. In *Environmental and Resource Economics*. Springer. Retrieved March 3, 2025, from https://link.springer.com/article/10.1023/A:1021351721619

Broers, A., Castelein, A., & Groenen, P. (2018). *A Comparison of Model Selection Procedures for Latent Class Discrete Choice Models*. Erasmus University Rotterdam. Retrieved March 4, 2025, from https://thesis.eur.nl/pub/42983

CBS. (2023, November 28). *Duurzame mobiliteit - Klimaatverandering en energietransitie*. Duurzame Mobiliteit - Klimaatverandering En Energietransitie | CBS. https://longreads.cbs.nl/klimaatverandering-en-energietransitie-2023/duurzame-mobiliteit/

CBS regionale kerncijfers & it’s public analyse. (2021). Basisfeiten over gemeente Barendrecht op een rij. In *BARENDRECHT GEMEENTE IN BEELD* [Report].

Centraal Bureau voor de Statistiek. (2024, February 22). *Autobezit per huishouden, 1 januari 2023*. Centraal Bureau Voor De Statistiek. https://www.cbs.nl/nl-nl/maatwerk/2024/08/autobezit-per-huishouden-1-januari-2023

Centraal Bureau voor de Statistiek. (2025). *Samenstelling huishouden*. Centraal Bureau Voor De Statistiek. Retrieved March 24, 2025, from https://www.cbs.nl/nl-nl/onze-diensten/methoden/begrippen/samenstelling-huishouden

CROW Kennisbank. (2024). *CROW Kennisbank*. kennisbank.crow.nl. Retrieved March 10, 2025, from https://kennisbank.crow.nl/public/gastgebruiker/PARK/Parkeerkencijfers_2024/Acceptabele_loopafstanden/63701

CROW-KpVV, & Blankers, S. (2021). Inzicht in acceptabele loopafstanden. In *CROW*. CROW. Retrieved March 6, 2025, from https://www.fietsberaad.nl/getmedia/baf3eff0-c37a-4257-8d55-7ecfaceb2c4b/CROW-publicatie-Inzicht-in-acceptabele-loopafstanden_1.pdf.aspx?ext=.pdf

Da Silva Borges, B. F., & Goldner, L. G. (2015). Implementation of car-free neighbourhoods in medium-sized cities in Brazil, a case study in Florianópolis, Santa Catarina. *International Journal of Urban Sustainable Development*, *7*(2), 183–195. https://doi.org/10.1080/19463138.2015.1036758

De Schakel. (2023, December 20). Groen licht voor start bouw De Stationstuinen. *Al Het Nieuws Uit Barendrecht*. https://www.deschakelbarendrecht.nl/nieuws/algemeen/70371/groen-licht-voor-start-bouw-de-stationstuinen

De Stationstuinen. (2024). *Nieuws - Stationstuinen Barendrecht*. Stationstuinen Barendrecht. Retrieved May 6, 2025, from https://www.stationstuinenbarendrecht.nl/nieuws/

DeShazo, J., & Fermo, G. (2002). Designing choice sets for stated preference methods: The effects of complexity on choice consistency. *Journal of Environmental Economics and Management*, *44*(1), 123–143. https://doi.org/10.1006/jeem.2001.1199

DISCVision. (2024, May 14). *De 8 DISC leefstijlen - DISCvision*. DISCvision. Retrieved February 20, 2025, from https://www.discvision.nl/over-ons/de-8-disc-leefstijlen/#:~:text=Het%20DISC%20leefstijlen%20model%20legt,gemaakt%20van%208%20leefstijl%20profielen

Doheim, R. M., Farag, A. A., & Badawi, S. (2020). Success measures for transforming into Car-Free Cities. In *Advances in mechatronics and mechanical engineering (AMME) book series* (pp. 231–267). https://doi.org/10.4018/978-1-7998-3507-3.ch010

Dura Vermeer. (2025). *Smart dock*. elementshaarlem.nl. https://elementshaarlem.nl/het-plan/smart-dock/

El-Habil, A. M. (2012). An application on multinomial logistic regression model. *Pakistan Journal of Statistics and Operation Research*, *8*(2), 271. https://doi.org/10.18187/pjsor.v8i2.234

Elldér, E., Haugen, K., & Vilhelmson, B. (2020). When local access matters: A detailed analysis of place, neighbourhood amenities and travel choice. *Urban Studies*, *59*(1), 120–139. https://doi.org/10.1177/0042098020951001

Emborion & Gemeente Barendrecht. (2023). *Fruit Packing District: Structuurplan Oktober 2023*. Gemeente Barendrecht. Retrieved January 1, 2025, from https://planviewer.nl/imro/files/NL.IMRO.0489.BPBTO20230003-ON01/b_NL.IMRO.0489.BPBTO20230003-ON01_tb2.pdf

Exploratory factor analysis. (2023, March 13). Columbia University Mailman School of Public Health. Retrieved May 9, 2025, from https://www.publichealth.columbia.edu/research/population-health-methods/exploratory-factor-analysis

Gemeente Barendrecht. (2024). *Matrix Natuurinclusief Ontwikkelen Barendrecht* [Dataset; Excel].

Gemeente Barendrecht. (2025, April 10). *Vul vragenlijst mobiliteit De Stationstuinen in en maak kans op een prijs*. Retrieved April 22, 2025, from https://www.barendrecht.nl/actueel/vul-vragenlijst-mobiliteit-de-stationstuinen-in-en-maak-kans-op-een-prijs/

Gemeente Barendrecht, & Kramer, P. (2025, April 17). *Presentatie ST*. Presentatie Stationstuinen.

Gemeentelijk kernteam De Stationstuinen, Wissing Ruimtelijke Denkers, & Barendrecht. (2022). Ontwikkelkader De Stationstuinen. In *Stationstuinen Barendrecht*. Retrieved January 1, 2025, from https://www.stationstuinenbarendrecht.nl/wp-content/uploads/2023/11/Definitief-Ontwikkelkader-De-Stationstuinen.pdf

GGD Rotterdam Rijnmond. (2024). *Dashboard - Bevolking - Albrandswaard*. Gezondheid in Kaart. https://gezondheidinkaart.nl/dashboard/dashboard/bevolking

Goudappel. (2023a). De Stationstuinen Barendrecht: Deelrapport parkeren. In *Goudappel* (014356.20230606.R1.03).

Goudappel. (2023b). *De Stationstuinen Barendrecht: Deelrapport Verkeersgeneratie* (014356.20231020.R2.02). Retrieved March 6, 2025, from https://barendrecht.raadsinformatie.nl/document/13593027/1/Stationstuinen+Barendrecht_Eindrapportage+%28014356_20231020_R2_02%29?connection_type=1&connection_id=8073502

Gundlach, A., Ehrlinspiel, M., Kirsch, S., Koschker, A., & Sagebiel, J. (2018). Investigating people's preferences for car-free city centers: A discrete choice experiment. *Transportation Research Part D Transport and Environment*, *63*, 677–688. https://doi.org/10.1016/j.trd.2018.07.004

Handy, S. (2017). Thoughts on the meaning of Mark Stevens's Meta-Analysis. *Journal of the American Planning Association*, *83*(1), 26–28. https://doi.org/10.1080/01944363.2016.1246379

Heroy, S., Loaiza, I., Pentland, A., & O'Clery, N. (2022). Are neighbourhood amenities associated with more walking and less driving? Yes, but predominantly for the wealthy. *Environment and Planning B Urban Analytics and City Science*, *50*(4), 958–982. https://doi.org/10.1177/23998083221141439

Hurtubia, R., Nguyen, M. H., Glerum, A., & Bierlaire, M. (2014). Integrating psychometric indicators in latent class choice models. *Transportation Research Part a Policy and Practice*, *64*, 135–146. https://doi.org/10.1016/j.tra.2014.03.010

Janse, B. (2024, May 22). *Likertschaal: de uitleg - Toolshero*. Toolshero. https://www.toolshero.nl/onderzoek/likertschaal/

Jorritsma, P., Arendsen, K., & Faber, R. (2023). Autoluw beleid gemeenten: Doelen, effecten en rollen. In *Kennisinstituut Voor Mobiliteitsbeleid* (No. 978-90-8902-298–1). Kennisinstituut voor Mobiliteitsbeleid. Retrieved February 19, 2025, from https://www.kimnet.nl/publicaties/publicaties/2023/09/26/autoluw-beleid-gemeenten-doelen-effecten-en-rollen

Jorritsma, P., Jonkeren, O., & Krabbenborg, L. (2023). Mobiliteit en bereikbaarheid in stedelijk en ruraal Nederland: Ontwikkelingen, kansen, bedreigingen en oplossingsrichtingen. In *Ministerie Van Infrastructuur En Waterstaat*. Kennisinstituut voor Mobiliteitsbeleid. Retrieved January 1, 2025, from https://www.kimnet.nl/binaries/kimnet/documenten/publicaties/2023/04/03/de-ontwikkeling-van-de-mobiliteit-en-bereikbaarheid-in-stedelijk-en-ruraal-nederland/KiM+achtergrondrapport+Mobiliteit+en+bereikbaarheid+in+stedelijk+en+ruraal+Nederland_def.pdf

KadastraleKaart. (2025). *KadastraleKaart.com - De gratis online kadasterkaart*. https://kadastralekaart.com/gemeenten/barendrecht-GM0489

Klein, M., Klinger, T., & Lanzendorf, M. (2024). Residential self-selection and the relative importance of travel considerations in the residential choice of a car-reduced neighbourhood. *Transportation Research Part a Policy and Practice*, *190*, 104266. https://doi.org/10.1016/j.tra.2024.104266

Kroesen, M. (2020). *Onderzoek en Data Analyse* [Slide show; Brightspace]. College Slides. Brightspace. https://brightspace.tudelft.nl/d2l/le/content/401781/Home

Kroesen, M. (2023). *Lecture 6 Latent class cluster models I 2023-2024* [Slide show; Powerpoint]. Brightspace. https://brightspace.tudelft.nl/d2l/le/content/597412/viewContent/3624261/View

Kroesen, M. & TU Delft. (2023). *Lecture 7 Latent class cluster models II 2023-2024* [Slide show; Brightspace]. Brightspace. https://brightspace.tudelft.nl/d2l/le/content/597412/viewContent/3624260/View

Lahoz, L. T., Pereira, F. C., Sfeir, G., Arkoudi, I., Monteiro, M. M., & Azevedo, C. L. (2023). Attitudes and Latent Class Choice Models using Machine Learning. *Journal of Choice Modelling*, *49*, 100452. https://doi.org/10.1016/j.jocm.2023.100452

Laviolette, J., Morency, C., & Waygood, E. (2024). Car ownership, carsharing, neighbourhood types and travel attitudes: A latent-cluster analysis. *Case Studies on Transport Policy*, 101292. https://doi.org/10.1016/j.cstp.2024.101292

Li, M., Song, G., Cheng, Y., & Yu, L. (2015). Identification of prior factors influencing the mode choice of short distance travel. *Discrete Dynamics in Nature and Society*, *2015*, 1–9. https://doi.org/10.1155/2015/795176

Lindenberg-Lemos, L., & Ebbing, R. (2024). *Benchmark parkeertarieven, gemeente Barendrecht*.

Masoumi, H. E. (2019). A discrete choice analysis of transport mode choice causality and perceived barriers of sustainable mobility in the MENA region. *Transport Policy*, *79*, 37–53. https://doi.org/10.1016/j.tranpol.2019.04.005

Meester, R., s1707892. (2021). Evaluation of trip characteristics and accessibility in car-free development: A case study in the Merwedekanaalzone in Utrecht. In prof.dr.ing. K.T (Karst) Geurs, dr.ir M.B. (Baran) Ulak, ir. J. (Joost) Bolck, & ir. J.M. (Jan) Engels, *University of Twente*. https://essay.utwente.nl/85821/1/Meester_openbaar_MA_ET.pdf

Melia, S. (2014). Carfree and Low-Car development. In *Transport and sustainability* (pp. 213–233). https://doi.org/10.1108/s2044-994120140000005012

Ministry of Infrastructure and Water Management. (n.d.). *MPN data*. Mobility Panel Data. Retrieved April 3, 2025, from https://www.mpndata.nl/data-variables/view/18612

Molin, E. (2017). *Stappenplan exploratieve factoranalyse*.

Molin, E. (2023). *Introduction to experimental designs* [Slide show]. Brightspace TU Delft. https://brightspace.tudelft.nl/d2l/le/content/597386/viewContent/3392341/View

Molin, E. & TU Delft. (2023, December 18). *Efficient Designs* [Slide show; Powerpoint]. Brightspace. https://brightspace.tudelft.nl/d2l/le/content/597386/viewContent/3579576/View

Molin, E. & University of Technology. (n.d.). *Constructing choice sets: Orthogonal designs*.

MOOI. (2024). Niet-wonen Fruitpacking District. In *MOOI Lost Op*.

Mureau, F. (2025). The impact of low-car residential neighbourhoods on mobility behaviour: A case study of Cartesius in Utrecht from residents' perspectives [Masterscriptie, TU Delft]. In L. Bingen, *Delft University of Technology*. https://repository.tudelft.nl/file/File_b5e178bc-ac1e-4266-a0ae-2c38cadb04d5?preview=1

Nieuwenhuijsen, M., Bastiaanssen, J., Sersli, S., Waygood, E. O. D., & Khreis, H. (2018). Implementing Car-Free Cities: Rationale, requirements, barriers and facilitators. In *Springer eBooks* (pp. 199–219). https://doi.org/10.1007/978-3-319-74983-9_11

Nieuwenhuijsen, M. J., & Khreis, H. (2016). Car free cities: Pathway to healthy urban living. *Environment International*, *94*, 251–262. https://doi.org/10.1016/j.envint.2016.05.032

Paijmans, H., & Pojani, D. (2021). Living car-free by choice in a sprawling city: Desirable and . . . possible? *Case Studies on Transport Policy*, *9*(2), 823–829. https://doi.org/10.1016/j.cstp.2021.04.001

PostcodeBijAdres. (2023). *Postcode Wijk 50 Bedrijventerreinen in Barendrecht - Postcode bij adres*. Postcodebyaddress. https://postcodebijadres.nl/gemeente/barendrecht/wijk/wijk-50-bedrijventerreinen

Pudāne, B., & Fazi, S. (2022). *L1-first introduction to discrete choice* [Slide show; Brightspace]. Brightspace. https://brightspace.tudelft.nl/d2l/le/content/501203/viewContent/3100778/View

Rogers, J., Emerine, D., Haas, P., Jackson, D., Kauffmann, P., Rybeck, R., & Westrom, R. (2016). Estimating parking utilization in multifamily residential buildings in Washington, D.C. *Transportation Research Record Journal of the Transportation Research Board*, *2568*(1), 72–82. https://doi.org/10.3141/2568-11

ROM, Stadszaken, Kuiper Compagnons, & Elbarec. (2025, March 18). Ontwikkelpotentieel rond kleine- en middelgrote stations. In *Ontwikkelpotentieel rond kleine- en middelgrote stations*. Live Stream "Ontwikkelpotentieel Rond Kleine- En Middelgrote Stations," Netherlands. https://vimeo.com/event/4983630

Ryan, M., Gerard, K., & Amaya-Amaya, M. (2007). Discrete choice experiments in a nutshell. In *The Economics of non-market goods and resources* (pp. 13–46). https://doi.org/10.1007/978-1-4020-5753-3_1

Selzer, S. (2021). Car-reduced neighborhoods as blueprints for the transition toward an environmentally friendly urban transport system? A comparison of narratives and mobility-related practices in two case studies. *Journal of Transport Geography*, *96*, 103126. https://doi.org/10.1016/j.jtrangeo.2021.103126

Sinha, P., Calfee, C. S., & Delucchi, K. L. (2020). Practitioner's Guide to Latent class Analysis: Methodological considerations and common pitfalls. *Critical Care Medicine*, *49*(1), e63–e79. https://doi.org/10.1097/ccm.0000000000004710

Southworth, M. (2005). Designing the Walkable City. In *https://ascelibrary.org/*. ASCE Library. https://doi.org/10.1061/(ASCE)0733-9488(2005)131:4(246)

STEC Groep. (2024a, November 15). *Power BI Report*. Retrieved January 1, 2025, from https://app.powerbi.com/view?r=eyJrIjoiYWNlMDQwYTktZjRiOC00Y2Y1LWJhZTMtYzZjN2RhMTRkYzUyIiwidCI6IjE1Mjg5YzBiLTgzMGUtNDdmYi1iMjEyLTQwZDU4OGRjMjgwYyIsImMiOjl9

STEC Groep. (2024b). Woningbehoefte Barendrecht: Woningbehoefte op gemeente- en wijkniveau. In *STEC Groep*.

TU Delft, & Faber, R. (2024). *Latent class discrete choice models for travel behaviour research* [Slide show; Brightspace]. Brightspace. https://brightspace.tudelft.nl/d2l/le/content/597412/viewContent/3631989/View

University of Technology, & Molin, E. (2023). Regret in traveler decision making. In *Challenge the Future* (p. 2) [Lecture notes].

Van Acker, V., Van Wee, B., & Witlox, F. (2010). When Transport Geography meets Social Psychology: Toward a conceptual model of travel behaviour. *Transport Reviews*, *30*(2), 219–240. https://doi.org/10.1080/01441640902943453

Van Bloppoel, T., Willebrand, S., Veillat, G., Goes, J., & Wissing Ruimtelijke Denkers. (2025). VO inrichtingsplan casco buitenruimte De Stationstuinen Barendrecht. In *Gemeente Barendrecht*. Gemeente Barendrecht.

Van Cranenburgh, S. (2024). *Discrete Choice Models MXL wk2* [Slide show]. Brightspace TU Delft. https://brightspace.tudelft.nl/d2l/le/content/597386/viewContent/3566447/View

Van Cranenburgh, S. & TU Delft. (2024). *Discrete_choice_models_MNL_wk1* [Slide show]. Brightspace. https://brightspace.tudelft.nl/d2l/le/content/597386/viewContent/3559639/View

Van den Broek, J., Kuipers, J., & Antea Group. (2023). MER De Stationstuinen Barendrecht. In *AnteaGroup* (0470766.100). AnteaGroup. Retrieved March 6, 2025, from https://www.stationstuinenbarendrecht.nl/wp-content/uploads/2024/10/De-Stationstuinen-Milieueffectrapport-MER-februari-2023.pdf

Van der Waerden, P., Timmermans, H., & De Bruin-Verhoeven, M. (2017). Car drivers' characteristics and the maximum walking distance between parking facility and final destination. *Journal of Transport and Land Use*, *10*(1), 1–11. https://www.jstor.org/stable/26211718?seq=3

Van Veldhoven, Z., Koninckx, T., Sindayihebura, A., & Vanthienen, J. (2022). Investigating public intention to use shared mobility in Belgium through a survey. *Case Studies on Transport Policy*, *10*(1), 472–484. https://doi.org/10.1016/j.cstp.2022.01.008

Van Wee, B. (2009). Self-Selection: a key to a better understanding of location choices, travel behaviour and transport externalities? *Transport Reviews*, *29*(3), 279–292. https://doi.org/10.1080/01441640902752961

Van Wee, B., Holwerda, H., & Van Baren, R. (2002). Preferences for modes, residential location and travel behaviour. *Deleted Journal*. https://doi.org/10.18757/ejtir.2002.2.4.3729

Vassallo Magro, J. M., & Sánchez, J. G. (2024). Key factors affecting the use of emerging shared mobility services in urban areas. In *Dialnet*. Universidad Politécnica de Madrid. Retrieved January 1, 2025, from https://dialnet.unirioja.es/servlet/tesis?codigo=333261

Vermunt, J. K., Magidson, J., & Statistical Innovations, Inc. (2006). *Latent GOLD Choice 4.0 User's Manual*. https://www.statisticalinnovations.com/wp-content/uploads/LGCusersguide.pdf

Wahlgren, L., & Schantz, P. (2014). Exploring bikeability in a suburban metropolitan area using the Active Commuting Route Environment Scale (ACRES). *International Journal of Environmental Research and Public Health*, *11*(8), 8276–8300. https://doi.org/10.3390/ijerph110808276

Wissing. (2025, February 20). *De Stationstuinen Barendrecht - Wissing*. https://www.wissing.nl/projecten/de-stationstuinen-barendrecht/

Witchayaphong, P., Pravinvongvuth, S., Kanitpong, K., Sano, K., & Horpibulsuk, S. (2020). Influential factors affecting travelers' mode choice behavior on mass transit in Bangkok, Thailand. *Sustainability*, *12*(22), 9522. https://doi.org/10.3390/su12229522

Woonnet Rijnmond. (2025). *Wat is een "inkomensgroep"?* https://www.woonnetrijnmond.nl/. Retrieved March 17, 2025, from https://www.woonnetrijnmond.nl/service-en-contact/regelgeving/wat-is-een-inkomensgroep/

Zijlstra, T., Bakker, S., & Witte, J.-J. (2022). Het wijdverbreide autobezit in Nederland. In *Kennisinstituut Voor Mobiliteitsbeleid* (No. 978-90-8902-263–9). Kennisinstituut voor Mobiliteitsbeleid. Retrieved February 19, 2025, from https://www.kimnet.nl/publicaties/publicaties/2022/02/22/het-wijdverbreide-autobezit-in-nederland

Appendix A: Ngene Syntax

```
? Car-free neighborhood design

design

;alts = wijk1*, wijk2*

;rows = 36

;orth = seq

;block = 3

;model:

U(wijk1) = b1*GREEN[20,25,30] + b2*WAM[450,750,1050] + b3*WHB[100,150,250]
+ b4*SCAR[0,1] + b5*SSCOOTER[0,1] + b6*TRAIN[0,3,6] +
b7*PCOSTS[500,800,1100]/

U(wijk2) = b1*GREEN[20,25,30] + b2*WAM[450,750,1050] + b3*WHB[100,150,250]
+ b4*SCAR[0,1] + b5*SSCOOTER[0,1] + b6*TRAIN[0,3,6] +
b7*PCOSTS[500,800,1100]

$
```

Appendix B: Attribute Correlations

Table 21. Correlations with dominant alternatives included.

	wijk1.green	wijk1.wam	wijk1.whb	wijk1.scar	wijk1.sscooter	wijk1.train	wijk1.pcosts
wijk1.green	1	0	0	0	0	0	0
wijk1.wam	0	1	0	0	0	0	0
wijk1.whb	0	0	1	0	0	0	0
wijk1.scar	0	0	0	1	0	0	0
wijk1.sscooter	0	0	0	0	1	0	0
wijk1.train	0	0	0	0	0	1	0
wijk1.pcosts	0	0	0	0	0	0	1
wijk2.green	0	-0.0833	0	-0.0680	-0.1361	0.0417	0.1667
wijk2.wam	-0.1667	-0.0417	0.2728	0	-0.1361	-0.2083	0.3333
wijk2.whb	0	-0.4092	-0.0714	0.0891	0.0445	0.2728	0.2455
wijk2.scar	-0.0680	0	-0.1782	-0.1111	0	0	-0.2722
wijk2.sscooter	-0.2722	0.1361	-0.1782	0.1111	0.1111	0.1361	0.2722
wijk2.train	0.0833	0.1667	-0.1091	-0.2041	0.2041	0.2083	-0.0417
wijk2.pcosts	-0.2917	0.0417	-0.4909	-0.0680	-0.0680	-0.2083	0.0417
block	0	0	0.0273	-0.0680	0	0	0.0417

Table 21 presents the correlations between the attributes, including the dominant alternatives. The results show that there are no correlations within each alternative. However, correlations do exist between alternatives. This is a characteristic of sequential design construction.

Table 22. Correlations without dominant alternatives included. Correlations within and between alternatives.

	wijk1.green	wijk1.wam	wijk1.whb	wijk1.scar	wijk1.sscooter	wijk1.train	wijk1.pcosts
wijk1.green	1	0,046	0,092	-0,074	-0,074	0	0
wijk1.wam	0,046	1	0,014	-0,002	0,077	0	0
wijk1.whb	0,092	0,014	1	0,118	0,032	0	0
wijk1.scar	-0,074	-0,002	0,118	1	-0,029	0	0
wijk1.sscooter	-0,074	0,077	0,032	-0,029	1	0	0
wijk1.train	0	0	0	0	0	1	0
wijk1.pcosts	0	0	0	0	0	0	1
wijk2.green	0,093	-0,19	-0,04	-0,039	-0,037	0,045	0,178
wijk2.wam	-0,174	-0,044	0,293	0	-0,142	-0,208	0,333
wijk2.whb	-0,092	-.354*	-0,051	0,068	-0,068	0,293	0,264
wijk2.scar	-0,074	0,002	-0,168	-0,151	0,029	0	-0,284
wijk2.sscooter	-0,223	0,072	-0,232	0,151	0,213	0,142	0,284
wijk2.train	0,133	0,131	-0,158	-0,183	0,255	0,213	-0,043
wijk2.pcosts	-.409*	0,091	-.459**	-0,149	-0,149	-0,218	0,044
block	0,045	-0,046	0,031	-0,074	0,074	0	0,044

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 22 presents the correlations between attributes, excluding the dominant alternatives. The results indicate that correlations are present both within and between alternatives.

Appendix C: Survey Statements

(1) Het gebruik van de auto is noodzakelijk voor mij.
(2) Ik zou graag in een groenere wijk willen wonen.
(3) Ik word aangetrokken tot een autoluwe woonwijk.
(4) Ik vind het openbaar vervoer vaak te druk.
(5) Ik maak graag gebruik van deelvervoer.
(6) Ik ga graag wandelend of op de fiets naar mijn dagelijkse activiteiten.
(7) Ik ben een autoliefhebber.
(8) Het lijkt mij heerlijk rustig wonen in een wijk zonder auto's.
(9) Ik vind het belangrijk dat mijn woonwijk een uitgebreid aanbod aan voorzieningen biedt.
(10) Het openbaar vervoer is voor mij alleen praktisch als het station zich zowel dichtbij mijn vertrekpunt als mijn bestemming bevindt.
(11) Barendrecht is ingericht op autogebruik en daardoor zal een autoluwe woonwijk niet werken.
(12) Ik vind het erg als ik niet met de auto dicht bij mijn huis kan komen.
(13) Ik krijg een opgesloten gevoel van een autoluwe woonwijk.
(14) Ik kies alleen voor het openbaar vervoer als ik niet hoef over te stappen.
(15) Ik zie deelvervoer meer als een toevoeging dan als een vervanging voor de auto.
(16) Ik ben bereid om in een autoluwe wijk te wonen.
(17) Ik ben gehecht aan het gemak van een auto.
(18) Ik ben veel bezig met het milieu en het klimaat.
(19) Ik vind het openbaar vervoer te duur.
(20) Ik ben bereid om mijn auto weg te doen als ik zou verhuizen naar een autoluwe wijk.
(21) Ik geloof dat een autoluwe wijk bijdraagt aan meer saamhorigheid.
(22) Ik vind het openbaar vervoer betrouwbaar.
(23) Ik ben bereid om te betalen voor het parkeren van mijn auto in de woonwijk.
(24) Ik vind de reistijd met het openbaar vervoer te lang.
(25) Ik vind sociaal contact met de bewoners belangrijk in mijn woonomgeving.

Appendix D: Choice Sets

Table 23. Experimental Design Ngene Output: Non-Dominant Choice Sets.

	NEIGHBORHOOD A							NEIGHBORHOOD B							
	green	wam	whb	scar	sscooter	train	pcosts	green	wam	whb	scar	sscooter	train	pcosts	Block
1	30	1050	150	0	0	3	1100	30	1050	250	0	0	6	500	3
2	25	750	250	1	1	6	800	20	450	250	0	0	6	500	2
3	30	1050	250	0	1	6	800	25	1050	100	1	0	3	500	2
4	25	750	150	0	0	3	1100	25	1050	100	0	0	6	1100	1
6	20	1050	150	0	1	0	500	20	750	150	1	1	6	1100	3
7	30	450	150	0	0	0	500	30	450	150	1	0	6	800	1
8	20	1050	100	0	1	3	800	30	750	100	0	1	6	1100	1
9	25	450	250	1	1	0	1100	25	1050	250	1	1	0	500	1
10	20	750	100	1	0	6	500	25	750	250	1	1	6	800	1
11	25	450	100	1	0	6	500	30	450	250	1	0	3	1100	3
12	20	750	250	1	0	0	1100	30	1050	150	0	0	3	1100	3
13	20	450	250	0	0	6	500	25	1050	150	1	0	0	800	2
14	30	1050	100	1	1	0	1100	20	1050	150	1	1	6	800	3
15	20	450	100	0	1	0	1100	30	750	150	1	0	0	800	2
16	30	1050	250	0	0	6	500	20	750	100	1	0	6	500	2
17	20	750	150	1	1	6	1100	25	450	250	0	1	3	800	2
20	25	450	150	0	1	6	1100	30	1050	250	0	1	6	800	1
21	30	750	100	1	1	3	500	25	450	100	1	0	6	500	1
22	25	1050	150	1	0	0	800	30	1050	100	1	1	0	1100	1
23	30	750	150	1	0	0	800	25	750	100	0	0	0	800	2
24	25	1050	100	1	0	3	500	20	450	100	0	0	0	800	1
25	25	750	100	0	0	0	800	20	450	100	0	1	0	1100	2
26	20	450	150	1	1	3	500	20	1050	100	0	1	3	800	2
27	25	750	150	0	1	3	500	20	450	150	1	1	3	500	3
28	20	450	100	0	0	0	800	20	1050	250	1	0	3	1100	3
29	25	1050	250	1	1	0	500	25	750	150	0	0	3	1100	1
30	30	750	100	0	1	6	1100	25	450	150	0	1	6	1100	3
31	25	1050	100	0	0	6	1100	25	450	250	1	1	0	1100	1
32	30	750	250	0	1	0	500	30	450	150	0	0	0	500	3
33	20	1050	150	1	1	6	800	30	450	100	1	1	3	800	3
34	30	450	250	1	0	3	1100	25	750	150	0	1	3	500	2
35	20	1050	250	1	0	3	1100	20	1050	150	0	1	0	500	2
36	30	450	150	1	0	6	800	30	750	250	0	1	0	500	3

Table 24. Experimental Design Ngene Output: Dominant Choice Sets.

	NEIGHBORHOOD A							NEIGHBORHOOD B							
	green	wam	whb	scar	sscooter	train	pcosts	green	wam	whb	scar	sscooter	train	pcosts	Block
5	30	450	100	1	1	3	800	20	750	250	1	0	0	1100	2
18	25	450	250	0	1	3	800	20	750	250	0	0	3	800	1
19	20	750	250	0	0	3	800	30	750	100	1	1	3	500	3

Appendix E: Survey

Vragenlijst – De Stationstuinen Barendrecht

Vragenlijst Mobiliteit in De Stationstuinen

Verantwoording en Toestemming

We nodigen u uit voor het onderzoek over de mobiliteitsbehoeften en voorkeuren in de Stationstuinen. Dit is een nog te ontwikkelen autoluwe woonwijk in Barendrecht. Het onderzoek is een samenwerking tussen de TU Delft en de gemeente Barendrecht. Deze vragenlijst duurt gemiddeld 15 minuten om in te vullen en is tot en met 16 april beschikbaar. De vragenlijst bestaat uit 4 onderdelen: vragen over persoonlijke kenmerken, huidige vervoerskeuzes, wijk keuzes en tot slot een aantal stellingen. Met het invullen van deze vragenlijst maakt u kans op een **bol.com cadeaubon ter waarde van 20 euro.**

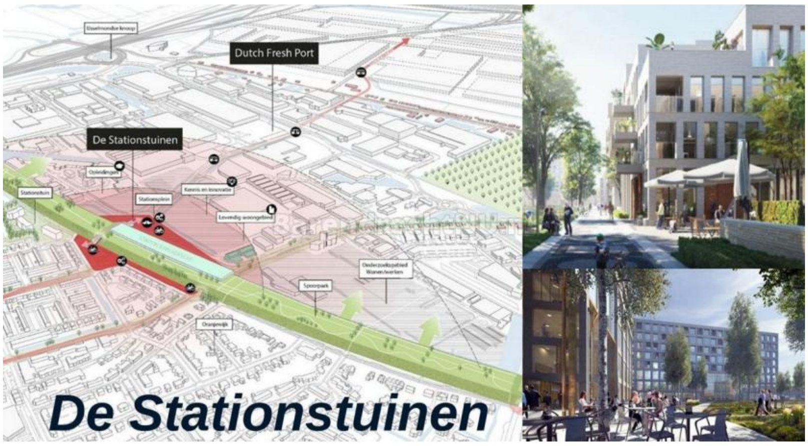
Uw deelname aan dit onderzoek is volledig vrijwillig, en u kunt zich elk moment terugtrekken zonder reden op te geven. U bent vrij om vragen niet te beantwoorden. Als u de vragenlijst start, gaat u akkoord met onderstaande verklaring.

De data worden gebruikt om inzicht te krijgen in de mobiliteitsbehoeften en voorkeuren van bewoners. Deze inzichten zijn van belang voor de ontwikkeling van de Stationstuinen. Door deel te nemen aan dit onderzoek helpt u mee om een woonwijk te creëren die voldoet aan de voorkeuren van de bewoners, hiermee kunt u samen met de gemeente werken aan een fijne leefomgeving. Zoals bij elke online-activiteit is het risico aanwezig dat de data onbedoeld bij een derde partij terechtkomen. Wij doen ons best om dit risico te minimaliseren door alle antwoorden anoniem te verwerken. Daarnaast worden de geanonimiseerde data slechts door de onderzoeker gebruikt om analyses uit te voeren. De data worden niet gedeeld met anderen.

Verantwoordelijke onderzoeker: M. Kroesen

Aanleiding

De gemeente Barendrecht is bezig met de ontwikkeling van een autoluwe woonwijk (een wijk met minder ruimte voor de auto), de Stationstuinen. De wijk biedt ruimte aan veel woningen in een aantrekkelijke openbare ruimte. Om de openbare ruimte aantrekkelijk te maken is er geen ruimte voor de auto in de straten rondom de woningen. Bewoners krijgen de mogelijkheid om hun auto betaald te parkeren aan de rand van de wijk in zogenoemde parkeer hubs (betaalde parkeergarages voor bewoners en bezoekers).



De auto is minder zichtbaar, maar dit betekent niet dat de bereikbaarheid voor de bewoners minder wordt. De wijk bevindt zich namelijk naast het treinstation van Barendrecht en er zullen busverbindingen en vormen van deelvervoer zijn. De wijk krijgt een goed en aantrekkelijk wandel- en fietsnetwerk. Een supermarkt, apotheek, sportfaciliteiten, restaurants en scholen zijn opgenomen in het ontwikkelingsplan. De wijk biedt toegang voor een breed publiek, van starter tot senior, met woningen van sociale huur tot koop. De aanwezigheid van groene voorzieningen zoals parken en moestuinen creëert sociale verbondenheid.

Vragen Sociaal-Demografische Kenmerken

Hieronder volgen enkele vragen met betrekking tot sociaal-demografische kenmerken. Deze informatie zal worden gebruikt om mogelijke verbanden tussen keuzegedrag en persoonlijke kenmerken te onderzoeken. Deze informatie kan de gemeente helpen om een woonwijk te creëren die in lijn is met de voorkeuren van de bewoners.

Vragen:

(1) In welk jaar bent u geboren? (Bijv. 1995)

(2) Wat is uw geslacht?
- o Man
- o Vrouw
- o Anders

(3) Wat zijn de 4 cijfers van uw postcode? (Bijv. 1234)

(4) Hoeveel auto's bezit uw huishouden?
- o Geen
- o 1
- o 2
- o 3 of meer

(5) Wat is de samenstelling van uw huishouden?
- o Eenpersoonshuishouden
- o Meerpersoonshuishouden met kinderen
- o Meerpersoonshuishouden zonder kinderen

(6) Wat is uw hoogst genoten opleiding?
- o Geen opleiding afgerond
- o Basisschool
- o VMBO
- o MAVO
- o MBO
- o Havo of VWO
- o HBO- of WO-Bachelor
- o HBO- of WO-Master

(7) Wat is uw huidige werk- of studie-situatie?
- o Studerend
- o Werkend in loondienst
- o ZZP'er
- o Gepensioneerd
- o Zonder werk
- o Arbeidsongeschikt
- o Huisvrouw/Huisman
- o Vrijwilligerswerk

(8) Tot welke inkomensklasse behoort u (op basis van bruto jaarinkomen exclusief vakantiegeld en eindejaarsuitkering)?
- o t/m 28.375 euro
- o 28.376 t/m 49.669 euro
- o 49.670 t/m 67.366 euro
- o Meer dan 67.367 euro

- Wil ik liever niet zeggen

(9) Was u voordat u deze vragenlijst begon al bekend met de betekenis van een autoluwe woonwijk?
  - Ja
  - Nee

(10) Heeft u eerder overwogen om te verhuizen naar een autoluwe woonwijk?
  - Ja
  - Nee

(11) Hoe bent u bij deze vragenlijst terecht gekomen?
  - Sociale media
  - Gemeente website
  - Krant
  - Nieuwsbrief
  - Flyer
  - Anders

Huidige Mobiliteitskeuzes

De volgende vragen gaan over uw dagelijkse vervoermiddelen. De antwoorden op deze vragen worden gebruikt om inzicht te krijgen in de huidige voorkeuren binnen Barendrecht op het gebied van vervoer.

We vragen naar de hoofdvervoerswijze, dit betekent het vervoermiddel dat u het grootste gedeelte van uw reis gebruikt (Bijv. als u met de fiets naar het station gaat en dan met de trein naar een andere stad, kies dan de trein).

Vragen naar huidige mobiliteitskeuzes:

(12) Geef voor elk vervoermiddel aan hoe vaak u deze gebruikt (ga hierbij uit van het afgelopen jaar).

	4 of meer dagen per week	1 tot 3 dagen per week	1 tot 3 dagen per maand	6 tot 11 dagen per jaar	1 tot 5 dagen per jaar	(Bijna) nooit
Auto (als bestuurder)	○	○	○	○	○	○
Auto (als passagier)	○	○	○	○	○	○
Motor	○	○	○	○	○	○
Trein	○	○	○	○	○	○
Bus/Tram/Metro	○	○	○	○	○	○
Brommer/Scooter	○	○	○	○	○	○
(Elektrische) Fiets	○	○	○	○	○	○
Deelvervoer	○	○	○	○	○	○
Lopen	○	○	○	○	○	○

(13) Kies voor elke activiteit welke vervoerswijze u het meest gebruikt. Kies hierbij de hoofdvervoerswijze, gemiddeld genomen over de zomer- en wintermaanden.

	Auto (als bestuurder)	Auto (als passagier)	Motor	Trein	Bus/Tram/Metro	Brommer/Scooter	(Elektrische) Fiets	Deelvervoer	Lopen	Anders
School/Studie/Werk	○	○	○	○	○	○	○	○	○	○
Basisvoorzieningen (supermarkt, drogist, huisarts, apotheek etc.)	○	○	○	○	○	○	○	○	○	○
Overige winkels	○	○	○	○	○	○	○	○	○	○
Sport en Hobby's	○	○	○	○	○	○	○	○	○	○

Keuze Profielen

Wijk keuzes

Hieronder volgen 11 vragen waarbij u een keuze maakt tussen twee autoluwe woonwijken. Kies bij elke vraag de woonwijk waar u naartoe zou verhuizen. Voor toelichting bij de vragen kunt u terecht in de lijst met definities. Een vaststaand gegeven voor alle wijken is dat er een buslijn aanwezig is die twee keer per uur rijdt in de richtingen van Zuidplein en Nieuw Reijerwaard. Andere buslijnen verbinden de woonwijk met omliggende gebieden zoals Rijsoord en Ridderkerk. Daarnaast is het niet mogelijk om uw auto bij uw huis te parkeren (m.u.v. bijzondere gevallen zoals invaliden). Aan de rand van de wijk worden een aantal hubs geplaatst waar u uw auto tegen betaling kan parkeren. Voor bezoekers is het een uurtarief, voor bewoners en bedrijven een jaarlijks tarief.

Definities:

- Groen en Blauwe omgeving: De Stationstuinen zullen een totaal oppervlakte hebben van circa 40 hectare (400.000 vierkante meter = 57 voetbalvelden). Dit oppervlakte zal plaats bieden aan voorzieningen, woningen, werken en groen. Bij elke keuze is een percentage genoemd, dit is het percentage groen dat aanwezig is in de wijk. Met groen worden parken, speeltuinen, groen in de straten, moestuinen, daktuinen en overig openbaar groen bedoeld. 5% toename/afname in groen kunt u vergelijken met ongeveer 3 voetbalvelden aan groen.
- Gemiddelde Loopafstand naar Voorzieningen en Hubs: De wijk zal voorzieningen zoals winkels, gezondheidszorg, horeca, onderwijs, cultuur, sport en werk bieden. De hubs worden gevestigd aan de rand van de wijk en bieden ruimte voor een beperkte hoeveelheid auto's en deelvervoer. De afstanden weergegeven in de tabel geven de gemiddelde wandelafstand aan van uw woning tot de voorzieningen en de hubs.
- Deelauto, Deelscooter: Deze twee kenmerken hebben betrekking op deelvervoer. Als bij een kenmerk "Aanwezig" staat betekent het dat de wijk toegang biedt tot deze vorm van deelvervoer. In het geval dat er "Niet Aanwezig" staat, is de betreffende vorm van deelvervoer niet beschikbaar.
- Trein Frequentie: De woonwijk is gelegen naast het treinstation van Barendrecht. Momenteel rijdt de trein daar 6 keer per uur in de richting van Rotterdam en Dordrecht. De waarden van dit kenmerk variëren als volgt: Geen trein verbinding, 3 keer per uur, en 6 keer per uur. Houdt in gedachte dat de wijk ook toegang biedt tot meerdere buslijnen.
- Parkeerkosten Hubs: Het parkeren in de hubs is niet gratis. De bedragen bij dit kenmerk geven de kosten aan die bewoners met een auto in bezit jaarlijks maken. Dit bedrag geldt voor de eerste auto, de kosten zullen toenemen bij een toename van het aantal auto's.

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	25%	25%
Gemiddelde loopafstand van woning tot voorzieningen	750 meter	1050 meter
Gemiddelde Loopafstand van woning tot hub	150 meter	100 meter
Beschikbaarheid deelauto's	Niet Aanwezig	Niet Aanwezig
Beschikbaarheid deelscooters	Niet Aanwezig	Niet Aanwezig
Frequentie treinen	3 per uur	6 per uur
Jaarlijkse parkeerkosten voor een auto in de hub	1100 euro	1100 euro
Keuze:		

Vragen Scenario 1:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	30%	30%
Gemiddelde loopafstand van woning tot voorzieningen	450 meter	450 meter
Gemiddelde Loopafstand van woning tot hub	150 meter	150 meter
Beschikbaarheid deelauto's	Niet Aanwezig	Aanwezig
Beschikbaarheid deelscooters	Niet Aanwezig	Niet Aanwezig
Frequentie treinen	Geen	6 per uur
Jaarlijkse parkeerkosten voor een auto in de hub	500 euro	800 euro
Keuze:		

Vragen Scenario 2:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	20%	30%
Gemiddelde loopafstand van woning tot voorzieningen	1050 meter	750 meter
Gemiddelde Loopafstand van woning tot hub	100 meter	100 meter
Beschikbaarheid deelauto's	Niet Aanwezig	Niet Aanwezig
Beschikbaarheid deelscooters	Aanwezig	Aanwezig
Frequentie treinen	3 per uur	6 per uur
Jaarlijkse parkeerkosten voor een auto in de hub	800 euro	1100 euro
Keuze:		

Vragen Scenario 3:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	25%	25%
Gemiddelde loopafstand van woning tot voorzieningen	450 meter	1050 meter
Gemiddelde Loopafstand van woning tot hub	250 meter	250 meter
Beschikbaarheid deelauto's	Aanwezig	Aanwezig
Beschikbaarheid deelscooters	Aanwezig	Aanwezig
Frequentie treinen	Geen	Geen
Jaarlijkse parkeerkosten voor een auto in de hub	1100 euro	500 euro
Keuze:		

Vragen Scenario 4:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- o Wijk A
- o Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- o Eens
- o Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- o Gekozen autoluwe wijk
- o Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	20%	25%
Gemiddelde loopafstand van woning tot voorzieningen	750 meter	750 meter
Gemiddelde Loopafstand van woning tot hub	100 meter	250 meter
Beschikbaarheid deelauto's	Aanwezig	Aanwezig
Beschikbaarheid deelscooters	Niet Aanwezig	Aanwezig
Frequentie treinen	6 per uur	6 per uur
Jaarlijkse parkeerkosten voor een auto in de hub	500 euro	800 euro
Keuze:		

Vragen Scenario 5:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	25%	30%
Gemiddelde loopafstand van woning tot voorzieningen	450 meter	1050 meter
Gemiddelde Loopafstand van woning tot hub	150 meter	250 meter
Beschikbaarheid deelauto's	Niet Aanwezig	Niet Aanwezig
Beschikbaarheid deelscooters	Aanwezig	Aanwezig
Frequentie treinen	6 per uur	6 per uur
Jaarlijkse parkeerkosten voor een auto in de hub	1100 euro	800 euro
Keuze:		

Vragen Scenario 6:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	30%	25%
Gemiddelde loopafstand van woning tot voorzieningen	750 meter	450 meter
Gemiddelde Loopafstand van woning tot hub	100 meter	100 meter
Beschikbaarheid deelauto's	Aanwezig	Aanwezig
Beschikbaarheid deelscooters	Aanwezig	Niet Aanwezig
Frequentie treinen	3 per uur	6 per uur
Jaarlijkse parkeerkosten voor een auto in de hub	500 euro	500 euro
Keuze:		

Vragen Scenario 7:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	25%	30%
Gemiddelde loopafstand van woning tot voorzieningen	1050 meter	1050 meter
Gemiddelde Loopafstand van woning tot hub	150 meter	100 meter
Beschikbaarheid deelauto's	Aanwezig	Aanwezig
Beschikbaarheid deelscooters	Niet Aanwezig	Aanwezig
Frequentie treinen	Geen	Geen
Jaarlijkse parkeerkosten voor een auto in de hub	800 euro	1100 euro
Keuze:		

Vragen Scenario 8:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	25%	20%
Gemiddelde loopafstand van woning tot voorzieningen	1050 meter	450 meter
Gemiddelde Loopafstand van woning tot hub	100 meter	100 meter
Beschikbaarheid deelauto's	Aanwezig	Niet Aanwezig
Beschikbaarheid deelscooters	Niet Aanwezig	Niet Aanwezig
Frequentie treinen	3 per uur	Geen
Jaarlijkse parkeerkosten voor een auto in de hub	500 euro	800 euro
Keuze:		

Vragen Scenario 9:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- o Wijk A
- o Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- o Eens
- o Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- o Gekozen autoluwe wijk
- o Traditionele wijk met auto’s

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	25%	25%
Gemiddelde loopafstand van woning tot voorzieningen	1050 meter	750 meter
Gemiddelde Loopafstand van woning tot hub	250 meter	150 meter
Beschikbaarheid deelauto's	Aanwezig	Niet Aanwezig
Beschikbaarheid deelscooters	Aanwezig	Niet Aanwezig
Frequentie treinen	Geen	3 per uur
Jaarlijkse parkeerkosten voor een auto in de hub	500 euro	1100 euro
Keuze:		

Vragen Scenario 10:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto's

Kenmerken van de Wijk	Wijk A	Wijk B
Percentage Groen en Water	25%	25%
Gemiddelde loopafstand van woning tot voorzieningen	1050 meter	450 meter
Gemiddelde Loopafstand van woning tot hub	100 meter	250 meter
Beschikbaarheid deelauto's	Niet Aanwezig	Aanwezig
Beschikbaarheid deelscooters	Niet Aanwezig	Aanwezig
Frequentie treinen	6 per uur	Geen
Jaarlijkse parkeerkosten voor een auto in de hub	1100 euro	1100 euro
Keuze:		

Vragen Scenario 11:

(1) Stel u moet verhuizen, welke van bovenstaande wijken heeft dan uw voorkeur?
- Wijk A
- Wijk B

(2) Naar verwachting zal ik het gebruik en/of het bezit van mijn auto verminderen als ik in deze wijk zou wonen.
- Eens
- Oneens

(3) Stel u zou kunnen kiezen tussen een woning in een traditionele wijk (niet autoluw) of een woning in uw gekozen autoluwe wijk, welke wijk zou dan uw voorkeur hebben?
- Gekozen autoluwe wijk
- Traditionele wijk met auto’s

Stellingen

Nu volgt een aantal stellingen over autoluwe woonwijken en het gebruik van de auto. De antwoorden op deze stellingen worden gebruikt om te onderzoeken of er een verband zit tussen de houding ten opzichte van autoluwe woonwijken en de keuze om wel of niet in zo'n wijk te gaan wonen. Geef bij elke stelling aan of u het eens of oneens bent met de stelling.

(26) Het gebruik van de auto is noodzakelijk voor mij.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(27) Ik zou graag in een groenere wijk willen wonen.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(28) Ik word aangetrokken tot een autoluwe woonwijk.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(29) Ik vind het openbaar vervoer vaak te druk.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(30) Ik maak graag gebruik van deelvervoer.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(31) Ik ga graag wandelend of op de fiets naar mijn dagelijkse activiteiten.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(32) Ik ben een autoliefhebber.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(33) Het lijkt mij heerlijk rustig wonen in een wijk zonder auto's.
- Zeer eens
- Eens

- Neutraal
- Oneens
- Zeer oneens

(34) Ik vind het belangrijk dat mijn woonwijk een uitgebreid aanbod aan voorzieningen biedt.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(35) Het openbaar vervoer is voor mij alleen praktisch als het station zich zowel dichtbij mijn vertrekpunt als mijn bestemming bevindt.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(36) Barendrecht is ingericht op autogebruik en daardoor zal een autoluwe woonwijk niet werken.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(37) Ik vind het erg als ik niet met de auto dicht bij mijn huis kan komen.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(38) Ik krijg een opgesloten gevoel van een autoluwe woonwijk.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(39) Ik kies alleen voor het openbaar vervoer als ik niet hoef over te stappen.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(40) Ik zie deelvervoer meer als een toevoeging dan als een vervanging voor de auto.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(41) Ik ben bereid om in een autoluwe wijk te wonen.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(42) Ik ben gehecht aan het gemak van een auto.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(43) Ik ben veel bezig met het milieu en het klimaat.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(44) Ik vind het openbaar vervoer te duur.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(45) Ik ben bereid om mijn auto weg te doen als ik zou verhuizen naar een autoluwe wijk.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(46) Ik geloof dat een autoluwe wijk bijdraagt aan meer saamhorigheid.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(47) Ik vind het openbaar vervoer betrouwbaar.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(48) Ik ben bereid om te betalen voor het parkeren van mijn auto in de woonwijk.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(49) Ik vind de reistijd met het openbaar vervoer te lang.
- Zeer eens
- Eens
- Neutraal
- Oneens
- Zeer oneens

(50) Ik vind sociaal contact met de bewoners belangrijk in mijn woonomgeving.
- Zeer eens
- Eens
- Neutraal

- Oneens
- Zeer oneens

Einde Vragenlijst

Bedankt voor het invullen van de vragenlijst!
Mocht u kans willen maken op een Bol.com bon ter waarde van €20, laat dan uw e-mailadres achter. Uw e-mailadres wordt alleen gebruikt als u de waardebon heeft gewonnen, daarna wordt het verwijderd.

Laat uw e-mailadres achter als u kans wil maken op de bol.com cadeaubon t.w.v. 20 euro.

…

Als u nog opmerkingen heeft kunt u deze hier achterlaten.

…

Appendix F: Flyer

Figure 13. Survey Flyer

Appendix G: Variables

Table 25. Variable Geboortejaar (Year of Birth) recoded into 4 categories.

GEBOORTEJAAR	
1940-1965	1
1966-1990	2
1991-2007	3

Table 25 presents the recoding of the variable Geboortejaar (Year of Birth). Given the wide age range in the dataset, the values were grouped into three broader age categories. This recoding simplifies the analysis and increases the likelihood of identifying significant effects, as smaller subgroups are combined into larger, more robust categories.

Table 26. Variable Postcode (Postal Code) recoded into 2 categories.

POSTCODE	
2991-2994 (Barendrecht)	1
Else	0

Table 26 shows the recoding of the variable *Postcode* (Postal Code). The first category includes all postal codes inside Barendrecht and the second category represents all other municipalities. This variable can be used to explore if there are any differences between residents from Barendrecht and other municipalities.

Table 27. Variable Geslacht (Gender) recoded into 2 categories.

GESLACHT	
Man	0
Vrouw	1

Table 28. Variable Auto (Car) recoded into 4 categories.

AUTO	
Geen	0
1 auto	1
2 auto's	2
3 of meer	3

Table 29. Variable Huishouden (Housing) recoded into 3 categories.

HUISHOUDEN	
Eenpersoonshuishouden	0
Meerpersoonshuishouden zonder kinderen	1
Meerpersoonshuishouden met kinderen	2

Table 30. Variable Werk/Studie (Work/Study) recoded into 5 categories.

WERK/STUDIE	
Studerend	1
Werkend in loondienst, ZZP'er	2
Gepensioneerd, zonder werk, arbeidsongeschikt	3
Huisvrouw/Huisman	4
Vrijwilligerswerk	5

Table 31. Variable Inkomen (Income) recoded into 3 categories.

INKOMEN	
t/m 28.375 euro	1
28.376 t/m 49.669 euro	2
49.670 t/m 67.366 euro	3
Meer dan 67.367 euro	4
Wil ik liever niet zeggen	99

Table 32. Variable Bekend (Known with car-free neighborhoods) recoded into 2 categories.

BEKEND	
Nee	0
Ja	1

Table 33. Variable Verhuizen (Ever considered to move to a car-free neighborhood) recoded into 2 categories.

VERHUIZEN	
Nee	0
Ja	1

Table 34. Variable Kanaal (Distribution) recoded into 6 categories.

KANAAL	
Sociale media	1
Gemeente website	2
Krant	3
Nieuwsbrief	4
Flyer	5
Anders	6

Table 35. Variable Gebruik Vervoermiddelen (Use of transportation) recoded into 6 categories.

GEBRUIK VERVOERMIDDELEN	
(Bijna) nooit	1
1 tot 5 dagen per jaar	2
6 tot 11 dagen per jaar	3
1 tot 3 dagen per maand	4
1 tot 3 dagen per week	5
4 of meer dagen per week	6

Table 36. Variable Vervoer (Transportation) recoded into 4 categories.

VERVOER	
Auto als bestuurder, Auto als passagier, Motor, Brommer/scooter	1
Trein, Bus/Tram/Metro, Deelvervoer	2
(Elektrische) fiets, Lopen	3
Anders	4

Table 37. Variable Impact Autobezit (Impact of car-ownership) recoded into 2 categories.

IMPACT AUTOBEZIT	
Oneens	0
Eens	1

Table 38. Variable Traditioneel/Autoluw (Traditional neighborhood/Chosen car-free neighborhood) recoded into 2 categories.

TRADITIONEEL/AUTOLUW	
Traditionele wijk	0
Gekozen autoluwe wijk	1

Table 39. Variable Opleiding (Education) recoded into 4 categories. Low, Middle, High education and missing values.

OPLEIDING	
Geen opleiding afgerond, Basisschool, VMBO, MAVO	1
MBO, HAVO/VWO	2
HBO- of WO-Bachelor, HBO- of WO-Master	3
Anders	99

Appendix H: SPSS Syntax

```
* Encoding: UTF-8.

DATASET ACTIVATE DataSet1.
RECODE geboortejaar (1940 thru 1960=1) (1961 thru 1980=2) (1981 thru 2000=3)
(2001 thru 2007=4)
    INTO LG_GEBOORTEJAAR.
EXECUTE.

RECODE postcode (2991 thru 2994=1) (ELSE=0) INTO LG_POSTCODE.
EXECUTE.

RECODE geslacht ('Man'=0) ('Vrouw'=1) INTO LG_GESLACHT.
EXECUTE.

RECODE auto ('Geen'=0) ('1'=1) ('2'=2) ('3 of meer'=3) INTO LG_AUTO.
EXECUTE.

RECODE   huishouden   ('Eenpersoonshuishouden'=0)   ('Meerpersoonshuishouden
zo'=1)
    ('Meerpersoonshuishouden me'=2) INTO LG_HUISHOUDEN.
EXECUTE.

RECODE werk_studie ('Studerend'=1) ('Werkend in loondienst'=2) ("ZZP'er"=3)
('Gepensioneerd'=4)
    ('Zonder   werk'=5)   ('Arbeidsongeschikt'=6)   ('Huisvrouw/Huisman'=7)
('Vrijwilligerswerk'=8) INTO
    WERKSTUDIE.
EXECUTE.

RECODE  WERKSTUDIE  (1=1)  (7=4)  (8=5)  (2  thru  3=2)  (4  thru  6=3)  INTO
LG_WERKSTUDIE.
EXECUTE.

RECODE inkomen ('t/m 28.375 euro'=1) ('49.670 t/m 67.366 eu'=3) ('28.376 t/m
49.669 eu'=2)
    ('Meer dan 67.367 euro'=4) ('Wil ik liever niet z' = 99)  INTO LG_INKOMEN.
EXECUTE.

RECODE bekend verhuizen ('Ja'=1) ('Nee'=0) INTO LG_VERHUIZEN LG_BEKEND.
EXECUTE.

RECODE   kanaal   ('Sociale   media'=1)   ('Gemeente   website'=2)   ('Krant'=3)
('Nieuwsbrief'=4)
    ('Anders'=6) ('Flyer'=5) INTO LG_KANAAL.
EXECUTE.

RECODE    gebruik_autob    gebruik_autop    gebruik_motor    gebruik_trein
gebruik_bustrammetro gebruik_brommer
```

```
    gebruik_fiets gebruik_deelvervoer gebruik_lopen ('(Bijna) nooit'=1) ('1
tot 5 dagen per ja'=2)
    ('6 tot 11 dagen per j'=3) ('1 tot 3 dagen per ma'=4) ('1 tot 3 dagen
per we'=5) ('4 of '+
    'meer dagen per'=6) INTO LG_GEBRUIKAUTOB LG_GEBRUIKAUTOP LG_GEBRUIKMOTOR
LG_GEBRUIKTREIN
    LG_GEBRUIKBUSTRAMMETRO        LG_GEBRUIKBROMMER        LG_GEBRUIKFIETS
LG_GEBRUIKDEELVERVOER LG_GEBRUIKLOPEN.
EXECUTE.

RECODE  vervoer_schoolstudiewerk  vervoer_basisvoorzieningen  vervoer_overig
vervoer_hobbys ('Auto '+
    '(als bestuurder'=1) ('Auto (als passagier)'=2) ('Motor'=3) ('Trein'=4)
    ('Bus/Tram/Metro'=5)  ('Brommer/Scooter'=6)  ('(Elektrische)  Fiets'=7)
('Deelvervoer'=8)
    ('Lopen'=9)  ('Anders'=10)  INTO  VERVOERSCHOOLSTUDIEWERK  VERVOERBASIS
VERVOEROVERIG VERVOERHOBBYS.
EXECUTE.

RECODE impact_autobezit ('Oneens'=0) ('Eens'=1) INTO LG_IMPACTAUTOBEZIT.
EXECUTE.

RECODE traditioneel_autoluw ('Traditioneel'=0) ('Gekozen autoluwe wijk'=1)
INTO LG_TRADITIONEELAUTOLUW.
EXECUTE.


RECODE  VERVOERSCHOOLSTUDIEWERK  VERVOERBASIS  VERVOEROVERIG  VERVOERHOBBYS
(8=2) (6=1) (7=3) (9=3) (1
    thru  3=1)  (4  thru  5=2)  (10=4)  INTO  LG_VERVOERSCHOOLSTUDIEWERK
LG_VERVOERBASIS LG_VERVOEROVERIG
    LG_VERVOERHOBBYS.
EXECUTE.

RECODE opleiding ('Geen opleiding afgerond'=1) ('Basisschool'=2) ('VMBO'=3)
('MAVO'=4) ('MBO'=5)
    ('HAVO of VWO'=6) ('HBO- of WO-Bachelor'=7) ('HBO- of WO-Master'=8) (''
= 99) INTO OPLEIDING2.
EXECUTE.

RECODE OPLEIDING2 (1 thru 4=1) (5 thru 6=2) (7 thru 8=3) (99 = 99) INTO
LG_OPLEIDING.
EXECUTE.

RECODE verhuizen ('Ja'=1) ('Nee'=0) INTO LG_VERHUIZEN.
EXECUTE.

RECODE geboortejaar (1940 thru 1965=1) (1966 thru 1990=2) (1991 thru 2007=3)
INTO
    DRIELG_GEBOORTEJAAR.
EXECUTE.

COMPUTE Deelvervoer_Fan=LG_GEBRUIKDEELVERVOER >= 5.
```

```
EXECUTE.

COMPUTE gemotoriseerd_transport_gebruiker = (LG_GEBRUIKAUTOB >= 5 OR
LG_GEBRUIKAUTOP >= 5 OR LG_GEBRUIKMOTOR >=5).
EXECUTE.

COMPUTE actieve_gebruiker = (LG_GEBRUIKLOPEN >= 5 OR LG_GEBRUIKFIETSEN >=
5).
EXECUTE.

COMPUTE OV_gebruiker =(LG_GEBRUIKBUSTRAMMETRO >= 5 OR LG_GEBRUIKTREIN >=5).
EXECUTE.

COMPUTE Deelvervoer_OV_Fan = (Deelvervoer_Fan = 1 AND OV_gebruiker = 1) OR
(Deelvervoer_Fan = 1 OR OV_gebruiker = 1).
EXECUTE.

RECODE LG_WERKSTUDIE (1=1) (2=2) (5=2) (3 thru 4=3) INTO cat3_WERKSTUDIE.
EXECUTE.
```

```
* Encoding: UTF-8.

DATASET ACTIVATE DataSet2.
RECODE auto_noodzakelijk groenewijk autoluwewijk ov_druk deelvervoer
wandel_fiets autoliefhebber
    rustig_wonen voorzieningen ov_dichtbij autoluw_barendrecht auto_huis
opgesloten_gevoel overstappen
    deelvervoer_toevoeging bereid_autoluw gehecht_auto milieu_klimaat
ov_duur auto_weg saamhorigheid
    ov_betrouwbaar betalen_parkeren ov_reistijd sociaal_contact ('Zeer
eens'='5') ('Eens'='4')
    ('Neutraal'='3') ('Oneens'='2') ('Zeer oneens'='1').
EXECUTE.

FACTOR
  /VARIABLES auto_noodzakelijk groenewijk autoluwewijk ov_druk deelvervoer
wandel_fiets
    autoliefhebber rustig_wonen voorzieningen ov_dichtbij
autoluw_barendrecht auto_huis
    opgesloten_gevoel overstappen deelvervoer_toevoeging bereid_autoluw
gehecht_auto milieu_klimaat
    ov_duur auto_weg saamhorigheid ov_betrouwbaar betalen_parkeren
ov_reistijd sociaal_contact
  /MISSING LISTWISE
  /ANALYSIS auto_noodzakelijk groenewijk autoluwewijk ov_druk deelvervoer
wandel_fiets
    autoliefhebber rustig_wonen voorzieningen ov_dichtbij
autoluw_barendrecht auto_huis
    opgesloten_gevoel overstappen deelvervoer_toevoeging bereid_autoluw
gehecht_auto milieu_klimaat
    ov_duur auto_weg saamhorigheid ov_betrouwbaar betalen_parkeren
ov_reistijd sociaal_contact
  /PRINT INITIAL KMO EXTRACTION ROTATION
  /FORMAT SORT BLANK(.30)
  /CRITERIA MINEIGEN(1) ITERATE(25)
  /EXTRACTION PAF
  /CRITERIA ITERATE(25) DELTA(0)
  /ROTATION OBLIMIN
  /METHOD=CORRELATION.

COMPUTE rev_autonoodzakelijk=6-auto_noodzakelijk.
EXECUTE.
COMPUTE rev_ovdruk=6-ov_druk.
EXECUTE.
COMPUTE rev_autoliefhebber=6-autoliefhebber.
EXECUTE.
COMPUTE rev_ovdichtbij=6-ov_dichtbij.
EXECUTE.
COMPUTE rev_autoluwBarendrecht=6-autoluw_barendrecht.
EXECUTE.
COMPUTE rev_autohuis=6-auto_huis.
EXECUTE.
COMPUTE rev_opgeslotengevoel=6-opgesloten_gevoel.
```

```
EXECUTE.
COMPUTE rev_overstappen=6-overstappen.
EXECUTE.
COMPUTE rev_deelvervoertoevoeging=6-deelvervoer_toevoeging.
EXECUTE.
COMPUTE rev_gehechtauto=6-gehecht_auto.
EXECUTE.
COMPUTE rev_ovduur=6-ov_duur.
EXECUTE.
COMPUTE rev_ovreistijd=6-ov_reistijd.
EXECUTE.
COMPUTE
somscores_2=MEAN(rev_autonoodzakelijk,rev_ovdruk,rev_autoliefhebber,rev_ovd
ichtbij,rev_autoluwBarendrecht,rev_autohuis,rev_opgeslotengevoel,rev_overst
appen,rev_deelvervoertoevoeging,rev_gehechtauto,rev_ovduur,rev_ovreistijd,g
roenewijk,autoluwewijk,wandel_fiets,rustig_wonen,voorzieningen,bereid_autol
uw,milieu_klimaat,auto_weg,saamhorigheid,ov_betrouwbaar,betalen_parkeren,so
ciaal_contact).
EXECUTE.
```

Appendix I: Factorscores

Respondent_ID	Carfree_enthusiasts	Conservative_PT_critics	Social_Green	Car_lovers
R_8aKXUbZrieFdN8Q	-0,99943	1,01429	0,15012	0,66961
R_2Bu3iXlDx5D1n1C	0,88485	0,39007	0,19183	-0,95137
R_8JKhB0Yv2OXfjAz	0,33852	0,11691	-0,56276	0,02793
R_8j8X8TBprCaaemd	-0,08086	-1,05443	-0,66073	-1,16887
R_2Ja38yprPNdx3Ef	1,01607	-1,6306	-0,93198	-2,91439
R_8vVOCwugSrr48jD	0,85403	-1,65101	1,07274	-2,05807
R_2OvpvWSukN5ordF	1,92311	-0,92273	0,00551	-0,61796
R_2oRdajeYU4pBew1	-0,6578	-0,18275	-1,24497	-0,05761
R_82SiLEzPfnMie8q	1,49938	-1,27469	0,62528	0,08638
R_2czoMXXbHnVJ5y1	0,91135	-0,19249	1,05604	-0,125
R_8LCJMdYCwDZ5IqS	1,06445	0,48981	-0,02923	-0,89972
R_8haklSwPJFTPzTX	0,21818	0,82425	-0,62638	0,41573
R_26h7mqWGoUz3zMW	-0,90598	0,79307	-1,70744	1,19506
R_8rfLN84ErU7rCvv	-0,59183	0,43625	0,20878	-0,29428
R_20uUNFLhdEB45zx	0,8709	-1,01316	1,22102	-0,61309
R_2JAAW8MSmfc9qxj	-0,78098	0,07977	0,24066	0,59043
R_1s7a996RvqQAheF	0,45745	-1,28609	0,10034	1,21697
R_5INxJh7TYIOq769	0,43884	-0,22847	1,30423	0,45348
R_2bVL22iYJAupEGA	0,29139	0,02389	-0,0111	-0,18451
R_2rjvu6HMm1kNjNY	0,62702	-0,82683	0,249	0,13395
R_8wAHUyzB3tCKVKw	1,13465	-0,46852	0,7038	-0,52063
R_7FDSMGWGWS6ZJ8u	-1,33261	0,72489	-1,16752	-0,36743
R_8ZVScsgN2vNT8sC	0,96887	-0,23397	1,01904	0,15281
R_8FJMDrBYoDLnqVW	0,01749	-0,45089	0,39148	0,4532
R_6LdUosoFaIMrhx7	-1,01659	0,12268	-0,57465	0,3001
R_1eHJQXIBr6gSItb	0,26909	-1,13133	0,15156	-0,26933
R_5ppaP5EVwrRdtcJ	1,83485	0,66628	0,58797	0,86143
R_8i1eMXbr8i37vAB	1,33918	0,50905	1,86893	0,23873
R_8p21LLoWoNXFHrj	-1,37285	-0,78686	-1,10266	-0,25634
R_2vjJbaue62MzpG8	-0,0606	0,5392	0,1828	0,55777
R_8KAzQbfLlU2K7AF	-0,9625	-0,0728	-0,47544	0,32367
R_2oFH6S7gmAPzVzw	-1,52451	0,50092	0,35327	-0,22701
R_510nnvy6eDJI07e	-1,05186	1,44663	0,02178	-0,01243
R_1nBqQ0TVIly5pdb	-0,75622	0,99699	-0,25599	0,46508
R_27USEPUuviPa5L3	-1,27122	1,48397	0,21798	0,20064
R_2DULbps6ojKP0s8	-1,34275	0,04254	0,08271	0,1419
R_2xLklmD9dhBu9Pj	-0,92945	1,13677	-0,34201	0,23516
R_26GE0pMOmn7BohH	-0,70032	1,66074	0,68021	0,5635
R_2IFljyewOQXcwbn	0,6723	-0,23302	0,83427	0,7193
R_28CDMzgQQyEjoHv	-0,81203	0,98198	0,6804	-0,07996
R_8rVo6DTrWu2osiB	0,64422	-0,06691	0,2039	-1,015
R_8xQXI4FnDJEtyEx	1,18919	-0,07759	0,49974	-0,30192
R_3jH6Nzixc013SCi	0,59938	1,18152	0,49221	1,11217
R_2OJOG1EtQSI78cd	-0,46411	0,36081	0,49504	-0,27544
R_3JbcxofCbNcRQm5	-1,04249	0,44056	-2,13642	-0,21374
R_2wkPfRHWr76aGwV	-1,15885	0,14448	-2,39238	0,27619
R_81jk0rUVxU5bQJE	-1,27341	0,16052	-2,503	0,42523
R_2CSiROYWF1UxrY5	1,87727	-1,52187	0,77306	-2,53583
R_8dnZhYCP5qcQWGZ	-0,65706	0,06578	1,15433	0,4296
R_3K8WUjUQcxJ6IcY	1,70709	-0,59536	0,3407	-0,96499
R_8dDQxxtVcIuG9Op	-0,62437	0,52135	0,33811	-0,19635
R_61t8dtFwRQdWoOV	-0,31654	0,18773	0,16029	-1,05578
R_3B9ecCXLrK4hylY	-1,33349	0,81254	0,0611	-0,60455
R_7DkcwQJBYnFkNAn	1,43246	-0,81681	1,15208	0,56971
R_1FglpvyNdKz6NiA	1,37025	-0,34201	1,58942	-0,79044
R_2jVsmqwwg4sDrKM	-0,1592	0,61965	0,59191	0,79741
R_511BSnWYkYkZs1b	-0,40579	0,24152	-0,12603	0,07854
R_3dL2YbfrzDdeQwt	-0,47425	0,3409	-0,34732	0,86196
R_3nZmntOm3rsHhtp	-0,42938	0,48183	0,94852	1,35631
R_645hixbgcyQeHOV	-0,97679	1,24832	-0,69218	0,4831
R_380E9kCUXMBBsKl	1,09818	-1,78711	1,23735	-2,88029
R_5InQLP5cwIhgFOG	-0,916	0,90177	-0,32275	0,92933
R_2vzsJRIopHrhDEZ	-0,60912	1,49757	-1,47078	1,42152
R_8kSwBb5b1X2TzW5	-0,03782	1,76584	-0,17228	0,90091
R_8XVIGJ3L6Gyr7Tr	0,90201	0,1713	0,73788	-0,56291
R_2HdkXzem5BnnldU	0,2825	0,19751	0,56268	0,23504
R_8ATiIkgvrRs0RP3	1,24222	-2,41222	-0,44458	1,21911
R_8scATIgkAA6AFPa	-0,96797	-0,86236	-2,21655	0,52214
R_2TtPRsKVwutAdN4	-0,27408	0,21257	0,32724	-0,807
R_2Sxf09mIUgKWyDp	-0,32211	-0,64582	-0,62114	-0,31974
R_24IR0pqCjEuX2n3	0,00856	-0,57789	1,08703	-0,16676
R_2HMIx7vYOPlkIxN	-0,09733	0,28453	0,10103	0,48093
R_5HZKbcznAAuZ6mJ	-0,24657	-0,189	-0,64791	1,47365
R_2fW7FCC0ns6OhZp	-0,20206	0,43509	0,38953	0,69689
R_31eWw5aphHb2o4V	0,61333	-1,45744	0,73329	-1,95454
R_2191g6dEA7bbpQt	-1,29191	0,19034	-0,51522	0,43438
R_5G6z7fv0IYYYV1c	-1,03696	1,4262	-1,17693	0,67552
R_339JgJb18Q5LuOy	-1,17607	1,65665	-2,01284	0,15027
R_3wDfJrtZyNFk4E1	-0,61025	1,14334	0,05911	0,13881
R_71RZFxqt5Pu7BJB	-0,47074	-0,09747	-0,66198	1,64399
R_7diOO5sYCm3KLCx	1,49126	-1,21564	1,19217	0,82835

Figure 14. Factorscores (part 1).

R_3gft2S2MpDe926t	-0,83438	1,00952	-1,22753	0,44138
R_2xEetXhiZrt4RtD	-1,03925	-0,18368	-0,58032	0,50334
R_2mGm9vlGFa84Syt	0,37149	-1,18284	0,59677	0,54786
R_6ErXUt3fCzxWqxe	1,37366	0,53969	0,69943	-0,59426
R_2HZBEr1dxpUQPc8	1,79763	-0,88731	1,23523	-0,72672
R_2A3dHXpFKh90wUh	0,36879	-1,5747	0,19683	-2,49633
R_8QFMRlg1yZtkLBa	1,1859	0,01191	-0,38483	-1,08475
R_2G3AF5hTtNxhx0R	-0,84513	0,10675	0,83095	0,11109
R_3O8PcwScoZeo7Jf	-1,04254	0,55174	-0,86186	-0,00452
R_8sYoHb5N8JPZnYD	0,31159	0,77652	-1,22995	1,01627
R_8j1ixbncdm0qpGc	-0,73539	0,61641	-0,33657	0,57755
R_7jxPpB1Qxzj5n4V	-0,46559	0,03496	0,59351	-0,47315
R_8xtmB6qN2HSM9Rn	-0,90032	1,16173	-0,09837	-0,80446
R_2cBHwL22rNlhOuP	-0,83941	1,26176	-0,80912	0,38671
R_2lQmXhTPwbuz0aZ	0,73367	0,24169	-0,60282	0,45975
R_2g6CgeE5VXsL4Pp	1,03427	-0,3735	0,53385	-0,00104
R_1KPz0VfKqrzgpkD	-1,23404	0,27346	-1,68597	-0,6328
R_8y2ysd3YzZeoC1t	-0,25913	-1,88589	0,49129	-0,67759
R_2Cr160jP2lped1V	-0,89687	0,90855	0,06254	-1,08445
R_72rMwMxNKqW8el7	-0,12623	0,85063	0,57256	0,30222
R_5hZJ6Yxyi8QMrg5	0,47939	0,24641	0,4517	0,55111
R_7fGMi7DIzX7yQsd	0,0994	0,59198	-1,31092	1,02281
R_1YiQYxLvOfSRrON	-0,73949	0,27536	0,4088	0,58755
R_53mHZdImpm2mfmh	0,97056	0,29194	0,26835	-0,7461
R_8t98SGOxyuSR4pK	1,56628	-1,69645	0,9593	-0,62507
R_8k3BMDQy8aMLFHX	-0,31458	0,02496	-0,61103	-0,60335
R_2nKLUiLq0oyuODD	0,74108	-2,13982	0,59342	-2,15227
R_8cNWk3ckIWEA5O1	0,77715	-0,17952	0,20409	-0,04413
R_2iQdMGr72PaaUJ2	-1,23276	1,19464	0,10383	0,01427
R_8anLIjI8QZTNzk3	-0,44594	-0,19492	1,0409	0,06671
R_8lB3gP1megsk8FP	1,18691	0,206	-0,25606	0,3098
R_2vZKZx1jCytPq50	0,9636	-0,10814	-0,26259	0,09168
R_2P7Wt1XR5IrHaAp	1,30621	0,78383	-0,34921	-1,22876
R_2knTv0t1ijO52T8	1,1559	0,67083	1,31225	-0,10738
R_3lbMSah9UTfJG0h	-0,23496	1,1455	-0,67212	1,19895
R_5qxtpL2OE5BttW4	-0,69485	-0,14911	0,18751	0,11671
R_2eV21nbsw6lTn2N	-1,29831	-1,20546	0,25538	-0,00795
R_2ZbBT94oswAM0Ap	-0,39088	-1,23138	0,32489	-0,22723
R_2erEbcwGxLEX5bY	-0,24857	-0,88538	1,11791	0,75498
R_8zl6AgwOriuQULW	-0,85139	0,96243	-0,26774	1,10285
R_2lXl2Ht5QacEPeP	2,13789	-1,67264	-1,14019	0,56313
R_6J2HpnjxkZGToOW	1,07923	-1,10487	-0,99271	-0,08919
R_8PuBC3vUbK8R7al	-0,83512	-0,85616	1,58706	0,16151
R_5y7RJZ2I92DhnM5	-0,59756	1,04157	-0,62095	0,53644
R_2VkxHSkIU4Ggd2l	-0,70074	-0,05609	0,04116	-0,43313
R_3q1KifRNNpgOKZx	-0,06835	-1,56739	-0,1983	-1,05634
R_2lY8CuxwHe14xl7	1,66837	0,34222	-0,11266	2,00735
R_5VUr0WImp0CrVwB	-0,67175	-0,3967	-0,18534	-0,05932
R_2CoU0cra3W9Alyh	-0,50465	0,95743	0,20038	0,81557
R_7rZodKSnP6ppfUf	0,97204	-1,99014	0,34756	-1,97129
R_83KcGomai4MYCEF	1,72822	-1,41365	0,34611	0,63863
R_6Hj9J26QFvA9PfY	-1,05648	0,36687	-0,06172	0,49211
R_2mEj0jEwsPHjdt8	-0,21812	0,99907	-0,99277	0,34452
R_2uq8GZ2K2jnADmK	-0,91053	0,00859	-0,43302	-0,20396
R_2uSR0dTSM2NvWIF	-0,1278	-0,02923	0,61952	0,55333
R_2XS6VSJ9ZCMQRGN	-1,59274	0,2212	-0,30235	-0,90668
R_7r9ybJxRNYNzzcR	-1,23609	-0,87127	0,68971	0,15926
R_8J3TeUBLUdmqPOV	1,14117	0,45607	0,86316	0,21999
R_8rV4ABp0Fkok8wU	0,51989	-0,59454	-1,13428	0,21199
R_8sbvkqluv1Izoty	-0,56946	1,06828	-1,5134	1,02985
R_8JgHNQKA8rfPfGN	-0,86109	0,49365	-0,27753	1,12028
R_23sAlSkH3Hjfiv3	1,30545	0,29141	-0,76748	-0,42392
R_8sAliExtclIOH4c	-0,13958	-0,10352	-0,00737	-0,4135
R_7AFzSlicKNzZQS5	1,41956	-1,8163	1,27488	-1,01849

Figure 15. Factorscores (part 2).