Applying the concept of car-free neighbourhoods to create a more active living environment in three Dutch neighbourhoods; Multiple case study of Wolfskuil (Nijmegen), Oosterflank (Rotterdam) and Holtenbroek IV (Zwolle).

Source: Peters (2016)

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Word count: 23.076

Bachelor Thesis – December 4, 2023

Abstract

In this thesis, the use of the concept of car-free neighbourhoods to increase the active living behaviour of people living in these neighbourhoods is researched in a multiple case study. This was done by researching the possibilities for the three Dutch neighbourhoods Wolfskuil (Nijmegen), Oosterflank (Rotterdam) and Holtenbroek IV (Zwolle) to become car-free and trying to find out how such a transition to a car-free neighbourhood would influence the active living behaviour of the people living in these neighbourhoods. The first part of the research consisted of desk research, including literature research and a policy document collection. Extensive literature research was done on the subjects of car-free, active living, active living behaviour, active mobility, active living environment, walkability, bikeability, public transport and public space. The Theory of Planned Behaviour was used to find out how a car-free neighbourhood can influence the active living behaviour of its inhabitants. With the help of a government policy document collection, the existing policies regarding spatial planning and mobility were analysed to find out to what extent the existing policies facilitate a transition to a car-free neighbourhood in Wolfskuil, Oosterflank and Holtenbroek IV. The second part of the research consisted of the conduction of three door-to-door surveys in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV. The surveys included 98 respondents, divided over the three researched neighbourhoods. The data collected in the conducted surveys were analysed to find out more about the presence of walkability, bikeability, public transport and public space in Wolfskuil, Oosterflank and Holtenbroek IV. The research in this thesis shows that Wolfskuil, Oosterflank and Holtenbroek IV provide a foundation for a transition to a car-free neighbourhood, through existing policies and the presence of walkability, bikeability, public transport and public space. In this research, there have been found relationships between some of the spatial key factors for a transition to a car-free neighbourhood and active living behaviour. Also, a relationship has been found between the attitude of people regarding active transportation methods and active living behaviour.

Keywords

Car-free neighbourhood, active living, active living behaviour, active mobility, active living environment, walkability, bikeability, public transport, public space

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1. Introduction

In the Western world, people are becoming more and more car-dependent. In our society it is normalized that most people take the car everywhere they go (Erasmus Universiteit, 2011). This is not surprising, because, for people who own a car, car mobility is an easy, comfortable and quick method of transportation. In the Western world, mobility infrastructure is mainly based on the use of cars (Jones, 2016). The use of cars is made attractive because of the high accessibility and comfort that this car-based infrastructure provides. Because of this, people tend to use the car more often than other transport methods. The car-based infrastructure creates a dependency on car-based mobility (Zhang et al., 2017).

Because car-based mobility is a non-active method of transport, it contributes to less active living and even health disadvantages for people who use the car as a method of transport frequently (Sugiyama et al., 2020). The lack of active living is a problem in the Netherlands, where only about half of the people met the basic movement criteria in 2020 (Centraal Bureau voor de Statistiek, 2020a). When people use their car to get from A to B, they miss an opportunity to get from A to B, while doing their daily physical activity at the same time (Sallis et al, 2004).

Active living is an important aspect of a healthy lifestyle. The concept of active living emphasises how physical activity can be integrated into daily life (Swedburg & Izso, 1994). Because people on average are not living active enough they are not healthy enough. The lack of active living has two negative effects. Firstly, a lack of active living leads to too many people being overweight, with consequences such as mortal obesity or heart diseases (Galloway & Jokl, 2000). Secondly, a lack of active living not only physically decreases people's health, but also has an impact on people's mental health (Warburton, Nicol & Bredin, 2006).

The physical consequences of a non-active lifestyle are seen more with people living in cities than with people living in the countryside (Centraal Bureau voor de Statistiek, 2020b). For example, the BMI (Body Mass Index), which gets higher as the fat percentage increases, shows a difference between urban and rural people. Urban men and women have an average BMI of respectively 23.3 and 24.2, while rural men and women have an average BMI of respectively 22.3 and 23.2 (Arambepola et al., 2008).

Active mobility can contribute to an improvement in active living (Swedburg & Izso, 1994). The concept of active mobility focuses on transportation methods that require physical activity, like walking or cycling. Public transport is also considered active mobility because people need to walk or cycle to places where they can enter the public transport system (Sallis et al., 2004). It is important to make active mobility attractive for people to choose active mobility over car-based mobility, and thus contribute to active living. To begin, cities can be designed in a way

to attract people to choose certain types of transport. For example, a city can be more bicycle-friendly, resulting in a safer feeling while cycling through the city.

The attractiveness of active living can be triggered by the creation of a car-free environment. Car-free policies lead to the use of alternative ways of mobility, like walking, cycling or the use of public transport (Nieuwenhuijsen & Khreis, 2016). A partially car-free area creates a lot of opportunities for alternative, more active ways of transport. Nieuwenhuijsen & Kreis (2016) suggested that car-free policies will create an active living environment, which attracts people to choose active methods of transport, as shown in Figure 1 below.

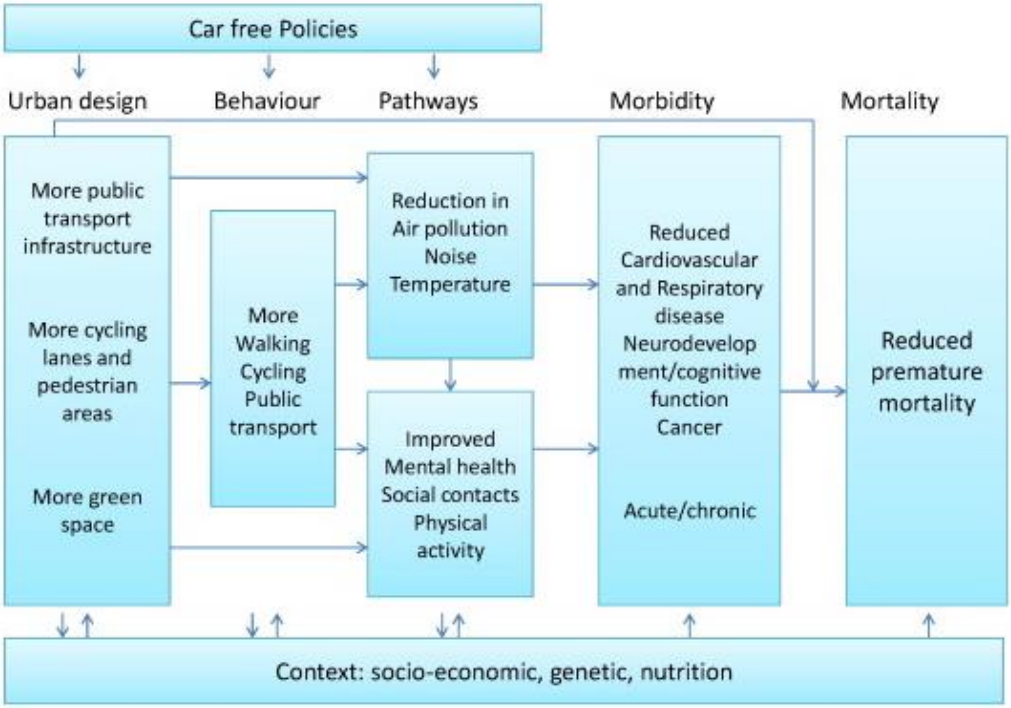

Figure 1: Car-free policies as a pathway to healthy urban living, according to Nieuwenhuijsen and Khreis (2016)

By creating a car-free environment, people will be more attracted to using active methods of transport (Edwards & Tsouros, 2006). In addition to policies, a transition to a car-free environment requires certain spatial factors to be present on a basic level. A car-free environment requires the availability of alternative, more active, transportation methods, such as walking, cycling and public transport. This means that walkability, bikeability and public transport should be pursued on a certain level (Nieuwenhuijsen & Khreis, 2016). A car-free environment also should provide an attractive living environment, which can be achieved through the presence of green space and the absence of grey spaces, making public space a place that is comfortable to be in (Edwards & Tsouros, 2006). In addition to the 'governmental policies', this thesis will therefore look into the spatial key factors 'Walkability', 'Bikeability', 'Public Transport' and 'Public Space' and the extent to which these play a role in a transition to a car-free neighbourhood.

1.1 Problem Statement

The lack of active living is becoming a problem in the Netherlands, as lack of active living is leading to more and more people in the Netherlands experiencing health disadvantages and even diseases (Galloway & Jokl, 2000). Among others, car dependency highly contributes to this lack of active living (Sugiyama et al., 2020). As stated before, car-free cities are seen as a pathway to healthy urban living (Nieuwenhuijsen & Khreis, 2016). The implementation of car-free measures through governmental policies can create an active living environment, that supports people to be physically active and supports active transportation methods, also known as active mobility (Edwards & Tsouros, 2006). While previous research has mainly focused on car-free cities and car-free city centres, this research will focus on car-free neighbourhoods. With the implementation of car-free neighbourhoods, the environment people live in will become (partially) car-free, which could have an influence on active living behaviour in a couple of ways.

Firstly, people living in a car-free environment are more likely to choose alternative methods of transport instead of cars to get to their destination (Edwards & Tsouros, 2006). Active mobility methods, such as walking, cycling or public transport, can provide these alternative methods of transport for people (Panter et al., 2018). By implementing the car-free concept in neighbourhoods, car trips will be replaced by other, more active methods of transport (Maibach et al., 2009). A transition to a car-free neighbourhood could therefore lead to an increase in walkability, bikeability and public transport accessibility (Edwards & Tsouros, 2006).

Secondly, the transition to a car-free neighbourhood will lead to less space occupied by car-based infrastructure and mobility, which will make more public space available for the creation of green spaces, like parks and recreation areas. Green space makes an environment attractive for people to be in and gives people more opportunities for short outside activities, creating an area that encourages people to be active (Van den Berg et al., 2010). Residents of urban neighbourhoods often express strong feelings regarding a lack of green space (Pincetl & Gearin, 2005). In car-free neighbourhoods, there are more opportunities for the development of green space, as there is less space occupied for car-based mobility (Nieuwenhuijsen and Khreis, 2016).

This research will focus on three neighbourhoods in the Netherlands that currently deal with high car usage problematics and are below average when it comes to income and health statistics (Allecijfers, 2023a). The neighbourhoods this research will focus on are Wolfskuil (Nijmegen), Oosterflank (Rotterdam) and Holtenbroek IV (Zwolle). The neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV themselves and the choice for these locations will be clarified further in Chapter 3.

1.2 Research Goal and Research Questions

This research has two main goals. The first goal of this research is to find out to what extent the key factors for a transition to a car-free neighbourhood are present in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV. For this, I will closely examine the current situations of the three Dutch neighbourhoods, including existing policy documents, walkability, bikeability public transport and public space for each of these neighbourhoods. This will be done to find out if the current policies are supporting or hampering a transition to a car-free neighbourhood in Wolfskuil, Oosterflank and Holtenbroek IV and to find out which spatial key factors for a transition to a car-free neighbourhood are currently present in these neighbourhoods. The first goal therefore consists of finding out to what extent the five key factors for a transition to a car-free neighbourhood (governmental policies, walkability, bikeability, pubic transport and public space) are currently present in Wolfskuil, Oosterflank and Holtenbroek IV and if the existing key factors provide a foundation for a transition to a car-free neighbourhood.

The second goal of this research is to find out what influence a transformation to a car-free neighbourhood will have on active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV. With the use of a multiple case study, this thesis will compare the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV to find out to what extent there is an influence of the spatial factors 'Walkability', 'Bikeability', 'Public Transport' and 'Public Space' on the active living behaviour of inhabitants. To find out more about how the active living behaviour of inhabitants will be influenced following a transition to a car-free neighbourhood, people's behavioural intentions regarding the important key factors will be researched. In this thesis, the Theory of Planned Behaviour by Ajzen (1985) will be used to find out how the behavioural intentions of inhabitants influence their active living behaviour.

To be able to reach the goals of this research, the following research question is designed:

To what extent and how can a transition to a 'car-free' neighbourhood influence the active living behaviour in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV?

This research question will be answered with the help of the following sub-questions:

1. *How can 'active living behaviour' be defined and how is active living behaviour achieved?*
2. *What is meant by the 'car-free city' concept and how do we achieve a car-free city?*
3. *Are the existing governmental policies supporting or hampering the transition to a car-free neighbourhood in Wolfskuil, Oosterflank and Holtenbroek IV?*
4. *To what extent are the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space' present in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV?*
5. *How do the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space' influence the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV?*

6. *How do the behavioural intentions of inhabitants regarding different car-free factors influence the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV?*

1.3 Relevance

1.3.1 Societal Relevance

Western countries are challenged by the problem that there are too many people with a non-active lifestyle (Edwards & Tsouros, 2006). In the United States of America, approximately 80% of US adults and adolescents are insufficiently active, according to the research of Piercy et al. (2018). This is also the case in the Netherlands to a lesser extent. In the Netherlands, around 40-55% of the people are not as active as they should be to maintain a healthy lifestyle according to the physical activity guidelines (Schram et al., 2001). The number of people who live a non-active lifestyle is growing and becoming more and more of a problem in the Netherlands (Sugiyama et al., 2020).

On average, people in the Netherlands are not living actively enough, resulting in physical health disadvantages (Galloway & Jokl, 2000; Edwards & Tsouros, 2006). More and more people are becoming overweight and suffer other physical health consequences of a non-active lifestyle like chronic diseases or heart diseases (Galloway & Jokl, 2000; Edwards & Tsouros, 2006). In addition to health problems, a non-active lifestyle leads to several physical disadvantages, like low strength, flexibility, endurance, and bone density (Edwards & Tsouros, 2006). Regular physical activity significantly reduces the chances of heart disease, high blood pressure, diabetes, obesity, colon- and breast cancer and catching the flu, while having the advantage of healthy and strong bones, better weight management, increased energy and better sleep (Marcus & Forsyth, 2008).

A non-active lifestyle can have – among others - consequences on people's mental health. People who live a non-active lifestyle, tend to suffer more often from depression and anxiety (Paluska & Schwenk 2012; Saxena et al., 2005). According to Paluska & Schwenk (2012), regular physical activity significantly reduces the chances of depression or the formation of anxiety and increases self-esteem (Marcus & Forsyth, 2008). Moderate physical activity, like walking or cycling, is enough to obtain this health boost. Improving the amount of physical activity can be used as a prevention strategy for mental illness, like mental disorders, depression and anxiety (Saxena et al., 2005). According to Blakely et al. (2004) people who maintain a stage of moderate activity during a period of at least six months, have an enormous health advantage compared to people who are not currently active, but considering starting to live active within the next six months.

In addition to the health advantages of the transition into a car-free neighbourhood, the transition into a car-free neighbourhood will also be beneficial from an environmental perspective. Restrictions on car use can be applied to decrease greenhouse gas emissions. A shift of 5% of all vehicle kilometres from car to bicycle would reduce emissions by 0,4% (Lindsay et al., 2011). The result of this decrease in greenhouse gas emissions is that the air that people breathe in will be less toxic. Expressed in economic terms, the 5% shift from car to bicycle would result in health cost savings of about 200 million dollars per year according to Lindsay et al. (2011). The implementation of a car-free area would make travelling by car less attractive than travelling by alternative methods of transport, contributing to a decrease in greenhouse gas emissions (Maibach et al., 2009; Lindsay et al., 2011).

Lastly, many Dutch neighbourhoods are experiencing parking problems because of the substantial number of car owners that live in the neighbourhood itself, but also because people from outside the neighbourhood park in the neighbourhood (MobiliteitsPlatform, 2013). Car ownership has increased by 25% over the last 20 years (Planbureau voor de leefomgeving, 2008). This increase in car ownership is partially a result of car dependency due to the car-based infrastructure in the Netherlands (Kennisinstituut voor Mobiliteitsbeleid, 2022a). The transformation to a car-free neighbourhood can contribute to the solution to these car problematics. A transition to a car-free neighbourhood would make car ownership less attractive and would stimulate more people to use alternative methods of transport (Maibach et al., 2009).

1.3.2 Scientific Relevance

There has been a lot of research on car-free cities and also the topic of car-free neighbourhoods has been researched before. However, the previous research on car-free cities was mainly based on an environmental perspective, such as research on the influence of a car-free city on CO^2 emission mitigation (Lindsay et al., 2011). In addition to environmental advantages, the car-free city design also has a positive influence on active living (Maibach et al., 2009; Edwards & Tsouros, 2006: Sugiyama et al., 2020). According to Maibach et al. (2009), a car-free city design increases walkability, bikeability and public transport accessibility, leading to increased use of alternative, active methods of transport. Edwards & Tsouros (2006) found out that car-free areas contribute to the promotion of physical activity and active living in urban environments. According to Sugiyama et al. (2020), the use of alternatives to cars in car-free environments leads to more physical activity.

Researchers have tried to identify the relationship between people's behaviour and a car-free environment. Nieuwenhuijsen et al. (2019) stated that people living in car-free environments

tend to choose other, more active methods of transport than cars (Nieuwenhuijsen, et al., 2019). According to Swedburg & Iszo (1994) walkability, bikeability and public transport accessibility increase when car-based mobility becomes less accessible, for example in car-free environments; this leads to people living in car-free environments choosing walking, cycling or public transportation as a method of transport, which is more physically active than car-based mobility. According to Heath et al. (2006), car-free environments invite people to go outside and be physically active, which also is the case. Research done by Nieuwenhuijsen & Khreis (2016) shows that people living in car-free environments, with a high amount of green space, are attracted more to participate in physically active activities in their neighbourhood and tend to go outside more often for a walk.

Researchers have tried to understand the role played by car-free policies and the extent to which these policies influence physical activities and a healthy lifestyle. Nieuwenhuijsen & Khreis (2016) concluded that car-free city policies could be a pathway to healthy urban living. Car-free policies are the foundation of a transition to a car-free area, where alternative methods of transport to the car, which are more sustainable and require more physical activity, are more attractive than the use of cars (Nieuwenhuijsen & Kreijs, 2016). According to Edwards & Tsouros (2006), people's participation in active living is influenced by the built environment. When an area, in this case, the neighbourhood people live in, is attractive for people to be in, people tend to show more active living behaviour (Calogiuri & Chroni, 2014). Car-free policies, as the foundation for a transition to a car-free neighbourhood, aim to increase the attractiveness of the living environment and can therefore have a positive influence the active living behaviour (Calogiuri & Chroni, 2014).

Research has been done on active living by design (Bors et al., 2009; Topp & Pharoah, 1994; Heath et al., 2006). According to this research, cities should be developed with enough green space for people to make it easily accessible for everyone to go for a walk (Bors et al., 2009). Heath et al. (2006) reviewed studies about interventions to promote active urban living. According to their research, the construction of green spaces and parks is effective in promoting physical activity. Green spaces and parks have a positive influence on the active behaviour of people living nearby (Heath et al., 2006). The infrastructure should be designed in a way that supports walking and cycling at least as well as car-based mobility (Topp & Pharoah, 1994; Maibach et al., 2009). Pedestrians and cyclists deserve better infrastructure, which is currently lacking in most cities around the world. Soni & Soni (2016) talked about the concept of pedestrianization in their research. This concept focuses on the accessibility and comfort of pedestrians. Hagen & Rynning (2021) did research about bicycle-friendly cities, with policies and infrastructure based on bicycle mobility.

This research can contribute to the knowledge about how to increase active living behaviour. Chapter 2 will go deeper into the different theories that are used in this thesis to research the relationship between car-free neighbourhoods and active living behaviour and the characteristics that are used to measure how suitable neighbourhoods are for implementing car-free measures.

1.4 Structure

Including the introduction, this research has seven chapters. Chapter 2 presents the theoretical framework of this research, discussing all relevant theories and concepts for this thesis. Chapter 3 is the methodology of this research, discussing the used research methods and explaining made choices in this thesis. In Chapter 4, the results of this research will be presented. Chapter 5 presents a discussion of the found results in this thesis. Chapter 6 consists of the conclusion of this research, including the answered research questions and the conclusion of the research. Chapter 7 and 8 consist of recommendations for future research and an academic reflection.

2. Theoretical Framework

This chapter will present and discuss the concepts and theories underpinning this thesis. First, the concept of car-free will be introduced, starting with car-free cities and working towards the concept of car-free neighbourhoods. Next, the concept of 'Active Living' will be discussed, consisting of 'Active Mobility' and 'Active Living Behaviour'. In paragraph 2.3 the Theory of Planned Behaviour is presented. The final part of this chapter provides a disquisition of the key factors for a transition to a car-free neighbourhood.

2.1 The Car-free City Concept

2.1.1 Defining car-free cities

A car-free city is a city that has significant restrictions on the use of motor vehicles in their city border (Nieuwenhuijsen, et al., 2019). This could potentially be the ban on cars in the entire city centre, the restriction of cars in certain parts of the city or mobility that shifts from car-based mobility to alternative methods of mobility. A car-free city is designed for the comfort of pedestrians, cyclists and public transport users and aims to decrease the number of cars on the streets (Topp & Pharoah, 1994). A city cannot transition to a car-free city without good transport alternatives (Zhang et al., 2017). Infrastructure needs to be able to provide places and space for people to use other methods of transport, like public transport, pedestrian and bicycle infrastructure (Nieuwenhuijsen & Kreijs, 2016).

According to the existing literature, car-free cities have several benefits, including:

- Reduced car traffic: By restricting car use and encouraging alternative methods of transport, cities with car-free areas have less car traffic and therefore less congestion. This leads to a better traffic flow (Topp & Pharoah, 1994);
- Reduced air pollution: Restricting car use will lead to less air pollution by cars, increasing the quality of the air in the city. The decrease in air pollution positively affects people's health and the environment (Glazener et al, 2022);
- Higher safety: Less car traffic leads to fewer accidents happening on the roads. In addition to this, less car traffic will give more space to pedestrians and cyclists and will make the streets safer for these vulnerable traffic participants (Friedman, 2021);
- Health benefits: Car-free areas encourage people to choose alternative methods of transport (Swedburg & Izso, 1994). These transport alternatives require more physical activity than the use of cars and will therefore result in more physical activity during transport and more active living behaviour. (Nieuwenhuijsen & Kreijs, 2016);

- More possibilities for green space: The infrastructure and amenities previously used for car-based mobility can now be used for other purposes, for example as green recreation space (Nieuwenhuijsen & Kreijs, 2016). More green space has a positive effect on the time people spend outside, including recreational activities (Heath et al., 2006).

Making an entire city car-free is very challenging because of the car dependency and lack of infrastructure for alternatives to completely replace the car. Many cities around the world have implemented car-restricted zones or implemented policies to reduce car usage. These car-restricted areas often are in and around the city centre, to keep the city centre liveable and improve the appearance of the city centre (Glazener et al., 2022). According to Nieuwenhuijsen & Kreijs (2016), car-free policies are the pathway to the realisation of car-free cities In addition to car-free policies, there are four more key factors for a transition to a car-free city. The three main key factors that need to be available and of high quality for a transition to a car-free city and the implementation of restrictions to car use are (Nieuwenhuijsen & Kreijs 2016):

- Walking infrastructure and walkability;
- Cycling infrastructure and bikeability;
- Public transport accessibility.

To create a car-free city, the accessibility for alternatives, like public transport, cycling and walking needs to be there (Edwards & Tsouros, 2006). These spatial factors provide alternative transportation options that people can use instead of motor vehicles. This means that walkability, bikeability and public transport accessibility have to be present to a certain extent. In addition to what is mentioned above, public space is a fourth important spatial key factor for a transition to a car-free city (Nieuwenhuijsen & Kreijs, 2016). According to Nieuwenhuijsen & Kreijs (2016), the public space in a car-free city needs to be able to provide an active living environment. This includes the presence of green space and the absence of too much grey space within a city, making it attractive for people to go outside and enjoy their city.

In conclusion, the five key factors for a transition to a car-free city, which are also the key factors for a transition to a car-free neighbourhood, according to Nieuwenhuijsen & Kreijs (2016) are ‘governmental policies’, ‘walkability’, ‘bikeability’, ‘public transport’ and ‘public space’. These five key factors will be elaborated further in paragraph 2.4.

2.1.2 Car-free Related Concepts

Because achieving a car-free city design can be challenging, many different concepts have been used to better understand what a car-free city is and how a car-free city works. Each

concept has a slightly different approach to car-free cities. Some important car-free city concepts that are relevant to this research are:

- Walkable cities: The concept of walkable cities is a car-free concept in which the aim is to create certain areas and paths that are exclusively accessible for pedestrians to encourage people to walk from and to their destination in the city (Southworth, 2005). Encouraging people to walk from and to their destinations has multiple advantages; walking is the most sustainable and accessible travelling method in cities and in addition to that walking is an active method of transportation, because it requires physical activity (Conticelli et al., 2018). Walkable areas cause also more interaction between people and therefore it is also attractive from a social perspective (Soni, & Soni, 2016). For walkable areas, the following aspects are important (Southworth, 2005):
    - Connectivity of pedestrian network with important destinations;
    - Connectivity of pedestrian network with other transportation methods;
    - Safety of pedestrian area;
    - Path quality;
    - Surroundings of the pedestrian area;
- Bikeable cities: Like walking, cycling is sustainable, accessible and requires physical activity, therefore bikeability contributes to liveability, sustainability and the increase of people's health (Nielsen et al., 2013). Bikeable city planning tries to make cycling as comfortable and accessible as possible. This can be done by improving bicycle infrastructure, giving cyclists designated and broader lanes and promoting biking in the city (Hagen & Rynning, 2021). By laying the focus on bicycle infrastructure, a large part of the city is accessible within a short time by bicycle. This makes the bicycle an interesting transportation car alternative for mobility within cities (McNeil, 2011);
- Transit-Oriented Development: The concept of Transit-Oriented development is based on the creation of hubs, where multiple methods of transport come together, so-called mobility hubs. These mobility hubs are placed in geographical strategic places, which increases the accessibility of these places by public transport (Aydin et al., 2022). Based on these hubs, an entire smart mobility network can be created, which gives everyone living in the city easy access to the mobility network. Because of easy access to these mobility networks, travelling by public transport can become more efficient than travelling by car (Dittmar & Ohland, 2012). Complex mobility systems according to the concept of Transit-Oriented Development are relatively cheap, accessible and sustainable. According to Ibraeva et al. (2020), Transit-Oriented Development is the most successful attempt to create urban and transport sustainability;

- Complete streets: The concept of complete streets is about designing the infrastructure in a way that fulfils the needs of all users and ensures the safety of all users (Smith et al., 2010). The concept of complete streets is based on providing space and safe mobility for all travellers, not just for motor vehicles. This means that every transportation method has its own private space on or next to the main road (Smith et al., 2010). A complete street design needs private space for every method of transport that is used in this area. This includes for example bicycle lanes, bus lanes, walking paths and crosswalks (Litman, 2015). To be able to implement the theory of complete streets in practice, a complete street design needs to be supported by policies and the usage of vehicles in an area needs to allow a change from car-based mobility to complete streets that give more space to everyone (LaPlante & McCann, 2008).

These different car-free concepts do not necessarily stand alone. Often cities choose a combination of more of these concepts to help reach the goals they find important. It is case-dependent on which car-free concepts are possible and which car-free concept fits best. These concepts are often combined with direct measures to restrict car usage in certain areas (Topp & Pharoah, 1994). The concepts mentioned above about car-free cities can also be implemented in car-free neighbourhoods.

2.2 Active Living

Active living Is defined as: “A way of life that integrates physical activity into daily routines” (Sallis et al., 2005, p. 93). According to Swedburg & Iszo (1994), active living is an approach that takes all daily physical activity into account, including physical activity that is integrated into daily life. The approach of active living implies all forms of physical activity people do within their daily activities. Most forms of active living activities go relatively unnoticed, like taking short trips on foot or by bike, but sports that are practised on a routine can also be seen as active living (Swedburg & Iszo, 1994).

According to Miles (2007), physical activity can be categorized into three categories: light physical activity, moderate physical activity and vigorous physical activity. Light physical activity consists of activities that require a minimum amount of effort. This includes activities like light household work and walking (Miles, 2007). If practised regularly, these light physical activities will still give people a small health boost (Blakely et al., 2004). Moderate physical activity consists of activities that require some energy but do not tire you out instantly, like recreational walking, recreational cycling or playing golf (Miles, 2007). While this moderate physical activity does not cost too much energy, it will still give a significant boost to health. Increasing moderate physical activity can lead to various advantages, and this increase is

relatively easy to realise (Blakely et al., 2004). Vigorous physical activity consists of activities that require a lot of energy and will tire you out quickly, like running, swimming or playing tennis (Miles, 2007). Vigorous physical activity will help people get or stay fit better than light or moderate physical activity. However, all forms of physical activity will give people health advantages and will make people feel better (Blakely et al., 2004).

Active living has many advantages for people's health (Swedburg & Iszo, 1994). According to Galloway & Jokl (2000), regular physical activity decreases the chance of heart disease and obesity. Regular physical activity also has positive effects on mental health. Physical activity can help clear people's mind, reduces stress and reduces the chance of depression. (Warburton et al., 2006). Vigorous physical activity might not be accessible for everyone, but Light and moderate physical activity is more accessible. These light and moderate physical activities can be life changers for people to live a healthier life (Swedburg & Iszo, 1994). Light and moderate physical activity can be done anytime, anywhere. People can take a walk during their break for example. Light or moderate physical activity can also be combined with transportation, so-called active mobility (See paragraph 2.3.1). Active living offers opportunities for a healthier lifestyle (Swedburg & Iszo, 1994).

2.2.1 Active Mobility

As mentioned above, active mobility is a method to implement active living in mobility. Active mobility is defined as: "A wide variety of human-powered modes, including but not limited to walking and cycling" (Giansoldati et al., 2021, p. 1). The concept of active mobility refers to all methods of transportation that are powered by physical activity (Sallis et al., 2004). Active mobility promotes physical activity and reduces the dependency on motorized transportation methods. Because active mobility is based on physical activity as a drive instead of a motor, active mobility has advantages from a health perspective as well as from an environmental perspective (Conticelli et al., 2018). The most substantial methods of active mobility are being taken into account in this thesis, those being walking, cycling and public transport.

Active mobility can contribute to an improvement in active living behaviour (Swedburg & Iszo, 1994). In the current situation, most of the infrastructure is car-based and as a result, most of the mobility is also car-based. Car-based mobility leads to less active living behaviour and subsequently leads to health disadvantages (Sugiyama et al., 2020). Active mobility transportation methods give people the opportunity to combine travelling to their destination and physical activity and therefore creates easy ways to implement more active living into people's daily life (Sallis et al., 2004).

2.2.2 Active Living Behaviour

An active living design does not directly mean an increase in physical activity. Behaviour regarding physical activity can be defined as the “individual’s decision to be active” (Calogiuri & Chroni, 2014, p. 2). The extent to which each individual chooses to participate in active living can be seen as behavioural (Ludden, 2017). Because the extent to which an individual is active is a choice, it is behaviour and thus influenced by behavioural intentions. The attitude people have regarding physical activity in combination with the perceived control people have regarding physical activity shapes their behaviour regarding active living (Ludden, 2017; Calogiuri & Chroni, 2014). Specific factors can lead to a change of behaviour regarding active living. For example, different behaviour patterns have been found between people living in neighbourhoods with a lot of green space and people living in neighbourhoods with very little green space (Calogiuri & Chroni, 2014).

Active living behaviour can be shaped by behavioural intentions, which are at turn shaped by attitude, subjective norms and perceived behavioural control, as described in the Theory of Planned Behaviour by Ajzen (1985). The Theory of Planned Behaviour will be clarified further in Chapter 2.5. Active living behaviour regarding the car-free environment can be influenced by the presence and quality of infrastructure for public transport, infrastructure for pedestrians, infrastructure for cyclists and green space in the environment (Nieuwenhuijsen and Khreis, 2016). The extent to which each individual decides to participate in active living in their daily lives will be regarded with the term ‘active living behaviour’ in this research.

2.3 Theory of Planned Behaviour

The Theory of Planned Behaviour was developed by Icek Ajzen to find out what determines people’s behaviour (Ajzen, 1985). In his book, Ajzen (1985) describes behaviour as: “Being neither capricious nor frivolous, human social behaviour can best be described as following along lines of more or less well-formulated plans” (p. 11). It is assumed that human behaviour is based on rational thinking influenced by personal beliefs. Human behaviour can therefore be seen as actions that are planned and follow the actions of other people. The Theory of Planned Behaviour assumes that behaviour is motivated by intentions and that these intentions themselves are influenced by certain individual variables (Ajzen, 1985).

Behavioural intentions are the intentions to reach a goal, by the use of certain behaviour. These intentions shape the behaviour people tend to choose to reach that goal. According to the

Theory of Planned Behaviour (Ajzen, 1985), behavioural intentions are dependent on the following three variables:

- Attitude: A certain way of thinking about a subject that is shaped by personal beliefs (Ajzen, 1985). People intend to act or behave in a way that they believe is right. The attitude of people is shaped by emotional, behavioural and cognitive foundations (BetterTraits, 2022). People's attitude creates an opinion that influences how people feel about a subject;
- Subjective Norm: Behaviour that is normalized within a certain group of people about certain behavioural intentions (Ajzen, 1985). People tend to do the same as others because people want to feel like they are part of a group. What is normalized in a social environment will be seen as normal and logical by people within that social environment. This means that the way people intend to act or behave is dependent on the social environment they live in;
- Perceived Behavioural Control: The degree of difficulty that people expect to have about certain behavioural intentions (Ajzen, 1985). How difficult people expect certain behaviours or actions to be, influences the behaviour people intend to perform. The difficulty of certain behaviours or actions influences people's intentions to act a certain way. People normally intend to choose for behaviour that requires the lowest degree of expected difficulty.

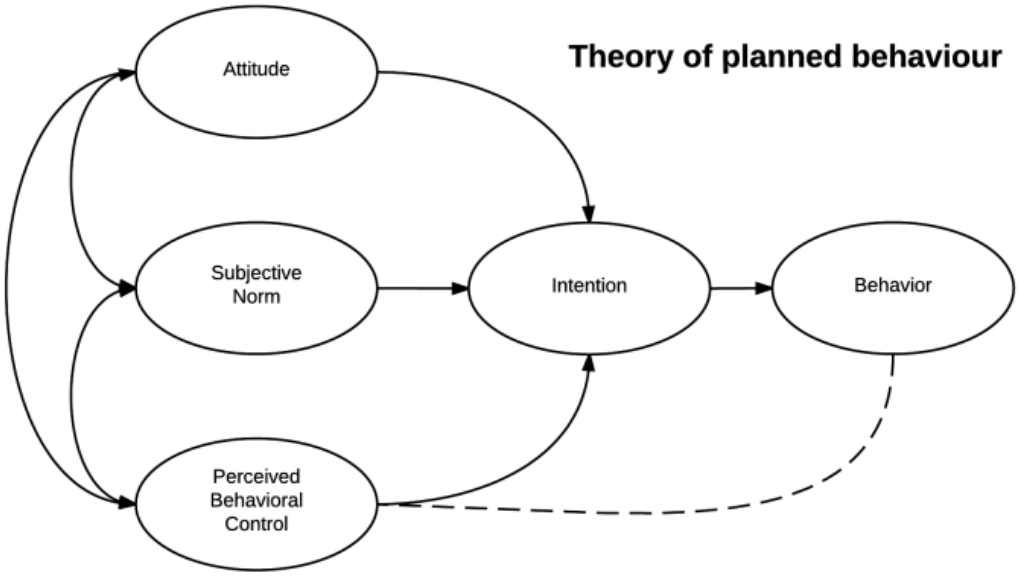

Figure 2: The Theory of Planned Behaviour (Ajzen, 1985)

The Theory of Planned Behaviour (Ajzen, 1985) will be used in this thesis to find out more about the perceived behaviour of people concerning a possible transition to a car-free neighbourhood. The Theory of Planned Behaviour can help with finding out how people's active living behaviour is influenced by a transition to a car-free neighbourhood. The Theory of

Planned Behaviour provides a framework in which the intentions regarding active living behaviour and the choice of transportation method can be explained. This framework helps to understand how the active living behaviour of inhabitants will be positively affected by a possible transition to a car-free neighbourhood.

2.4 Key factors for a transition to a car-free neighbourhood

In this thesis five key factors will be taken into account that are important for a transition to a car-free neighbourhood: 'Governmental Policies', 'Walkability', 'Bikeability', 'Public Transport' and 'Public Space'. Of the key factors, 'Governmental Policies' is a guiding key factor, which lays the foundation of a car-free neighbourhood, and walkability, Bikeability, Public Transport and Public Space are spatial key factors, which can physically influence a possible transition to a car-free neighbourhood. The choice of these five key factors is based on the literature research that is presented earlier in this chapter. In the following paragraphs, these five key factors for a transition to a car-free neighbourhood will be elaborated further.

2.4.1 Governmental Policies

The first key factor for a transition to a car-free neighbourhood is the presence of government policies that support a car-free design (Nieuwenhuijsen & Khreis, 2016). According to Nieuwenhuijsen & Kreis (2016), car-free policies are the start of a transition to healthy urban living. Government policies shape the way public life is organized and are therefore decisive in the development of an area (Colebatch, 2009). Because government policies are the only relevant policies in this thesis, government policies will, for the simplicity of this thesis, be abbreviated to 'policies'.

For a smooth transition to a car-free neighbourhood, existing policies must allow and support such a transition. To support a transition to a car-free neighbourhood, policies should include the following concepts (Nieuwenhuijsen & Kreis, 2016; Zhang et al., 2017):

- Pedestrian infrastructure development;
- Bicycle infrastructure development;
- Public transport development;
- Active living-based public space development.

If these are not supported by policies in any way, developing a car-free neighbourhood under the current policies will not be possible (Nieuwenhuijsen & Kreis, 2016). For a transition to a car-free neighbourhood, it is important to find out more about existing policies and to what

extent these policies can support the development of a car-free neighbourhood (Nieuwenhuijsen & Khreis, 2016).

2.4.2 Walkability

The second key factor for a transition to a car-free neighbourhood is walkability. The term 'walkability' refers to the extent to which a neighbourhood provides accessibility and mobility for pedestrians. In car-free areas, walkability is very important, as walking is a short-distance alternative transportation method that is a form of active mobility (Swedburg & Izso, 1994). When the walkability in a neighbourhood is high, people will be more encouraged to walk from and to their destination, instead of choosing other transportation methods (Southworth, 2005).

For a transition to a car-free neighbourhood, it is therefore important that the walkability in the neighbourhood is on a high level, this includes aspects such as (Southworth, 2005):

- The presence of walkable areas in the neighbourhood;
- The presence and quality of walking paths in the neighbourhood;
- The attractiveness of the neighbourhood for pedestrians;
- The safety of pedestrians in the neighbourhood.

2.4.3 Bikeability

The third key factor for a transition to a car-free neighbourhood is bikeability. Bikeability is a term for the extent to which accessibility and mobility for cyclists are provided in a neighbourhood (Hagen & Rynning, 2021). High bikeability leads to people being encouraged more to use the bicycle as a transportation method of cycling in their free time. In a car-free neighbourhood high bikeability could make cycling a good alternative to the car for short to medium-range mobility (McNeil, 2011).

To realise a transition to a car-free neighbourhood, a certain level of bikeability therefore needs to be present in a neighbourhood, to provide short to medium-range alternatives to the car. Bikeability in a neighbourhood is shaped by the following aspects (Hagen & Rynning, 2021):

- The presence of bikeable areas in the neighbourhood;
- The presence and quality of cycling lanes in the neighbourhood;
- The attractiveness of the neighbourhood for cyclists;
- The safety of cyclists in the neighbourhood.

2.4.4 Public Transport

The fourth key factor for a transition to a car-free neighbourhood is public transport. Public transport is a form of transportation that is publicly accessible and can be used by multiple people at the same time; public transport includes busses, trains and metros. Public transport provides medium to long-range transport options, that can serve as an alternative to the car (Zhang, et al., 2017). In car-free neighbourhoods, public transport accessibility and mobility are therefore very important for the provision of mobility options for inhabitants.

Better public transport accessibility makes it more attractive for people to use public transport for medium to long-range mobility. With high accessibility, the use of public transport can become even more efficient than the use of cars (Dittmar & Ohland, 2012). Car-free neighbourhoods must have a good connection to the public transport network to make it easier for people to get to their destinations without the use of cars, which are not accessible in a car-free neighbourhood (Zhang et al., 2017). The accessibility of public transport can therefore be seen as a key factor for a transition to a car-free neighbourhood Nieuwenhuijsen & Kreijs (2016).

2.4.5 Public Space

The final key factor for a transition to a car-free neighbourhood is public space. This includes the current presence and state of public space and places where people can meet each other. The public space is an important aspect of the car-free design. Within a car-free area, public space plays the important role of providing a network of mobility, social life and active living (Nieuwenhuijsen & Khreis, 2016). This includes the presence of green spaces, like parks and recreational areas, in car-free neighbourhoods. These green spaces can create an active living environment, in which people tend to go outside for activities more (Calogiuri & Chroni, 2014).

In addition to the presence of green space, the absence of grey space is also an important factor that can create an active living environment. Grey spaces in neighbourhoods are seen as unattractive and boring, while green spaces invite people to go outside (Pincetl & Gearin, 2005). To form an attractive living environment, the public space should be a place where people like to be and where people can meet with other people, instead of a place where people are merely passing through (Nieuwenhuijsen & Khreis, 2016).

2.5 Conceptual Model

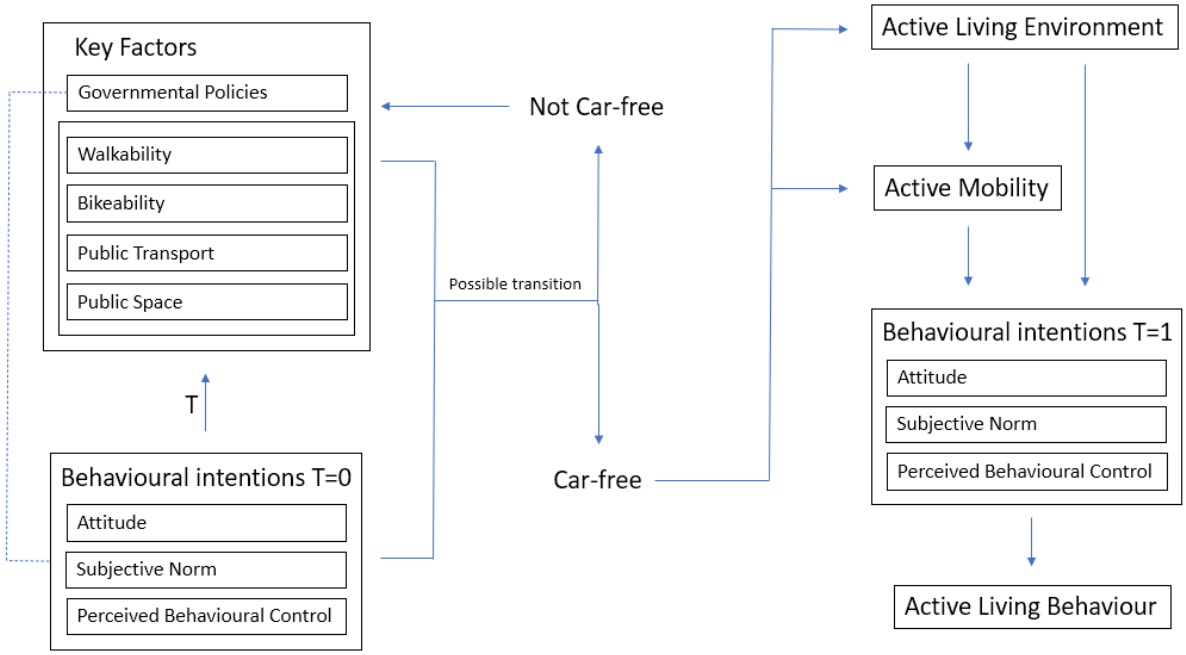

Figure 3: Conceptual Model

Based on the researched theories it is recognised that the key factors for a transition to a car-free neighbourhood, explained in section 2.4, in combination with the behavioural intentions of inhabitants in T=0 (Time component), explained in section 2.3, shape the possibility for a transition to a car-free neighbourhood (Nieuwenhuijsen & Khreis, 2016; Topp & Pharoah, 1994; Ajzen, 1985). The key factors for a transition to a car-free neighbourhood can be shaped over time by the behavioural intentions people in this neighbourhood have in T=0. Also, there could be a relationship between the governmental policies and the behavioural intentions in T=0, these two components somehow shape each other (Ajzen, 1985).

The key factors for a transition to a car-free neighbourhood and behavioural intentions together provide the foundation for a possible transition to a car-free neighbourhood. Key factors and behavioural intentions may favour a transition to a car-free neighbourhood or not. If this transition to a car-free neighbourhood does not occur, this leads back to the key factors. If the neighbourhood would provide the key factors for a possible transition to a car-free neighbourhood in combination with behavioural intentions in favour of a car-free neighbourhood, a transition to a car-free neighbourhood could be realised.

The transition to a car-free neighbourhood plays a role in the shape of the active living environment and active mobility in the neighbourhood. A car-free neighbourhood changes the layout of the neighbourhood and influences the active living environment and active mobility in and around the neighbourhood (Topp & Pharoah, 1994; Nieuwenhuijsen & Kreijs, 2016). Both

the active living environment and active mobility are expected to influence the active living behaviour, through the behavioural intentions in T=1. The active living environment can influence these behavioural intentions in T=1 both directly and indirectly through active mobility (Swedburg & Iszo, 1994; Calogiuri & Chroni, 2014). The behavioural intentions in T=1 can then influence the active living behaviour of the inhabitants (Ajzen, 1985).

3. Methodology

In this chapter, the methodology used in this thesis will be clarified. This chapter contains the methodology and the used data collection methods, including an explanation of why these methods are used. This chapter will end with a discussion of the ethical considerations that are relevant to this research.

3.1 Research Strategy

The research strategy used in this thesis is a case study. According to Baxter & Jack (2008), the explanation of a case study is: “An approach to research that facilitates exploration of a phenomenon within its context using a variety of data sources” (Baxter & Jack, 2008, p. 544). A case study allows one to research a certain case through various lenses (Baxter & Jack, 2008). Yin (2003) states that the case study research strategy should be considered to answer research questions that start with ‘how’ and ‘why’ and when the contextual conditions of the research object are important and need to be covered (Yin, 2003). More specifically, the research strategy used in this thesis is a multiple case study. A multiple case study research strategy allows researching several cases at the same time and allows comparing these cases to find patterns and differences regarding the possible transition to a car-free neighbourhood and active living behaviour (Yin, 2003).

In this thesis both qualitative and quantitative research methods are used. The research methods that are used in this research are literature research, policy document collection and door-to-door surveys. The literature research and policy document collection, which are both desk research, are qualitative research methods. The conducted door-to-door surveys, which are categorized as field research, are a quantitative research method. The advantage of using a mix of qualitative and quantitative research methods is that both detailed contextual data and generalizable externally valid data is collected, giving broad and at the same time generalizable results (Baxter & Jack, 2008). A mix of qualitative and quantitative research also gives more flexibility, as it offers an opportunity to combine different types of research methods with each other (Baxter & Jack, 2008). The qualitative research helps to understand important concepts of car-free neighbourhoods and active living behaviour, while the quantitative research allows detailed research on specific cases (Baxter & Jack, 2008). An overview of the used research strategy of this thesis is shown in Figure 4 below.

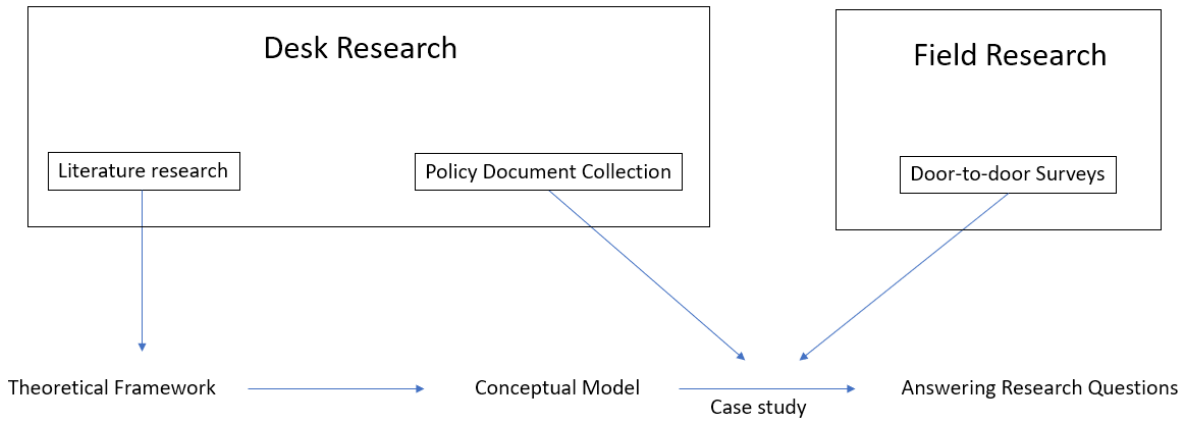

Figure 4 The research strategy overview

3.2 Case-study Selection

The three cases this thesis lays its focus on are the Dutch neighbourhoods Wolfskuil (Nijmegen), Oosterflank (Rotterdam) and Holtenbroek IV (Zwolle). The neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV have been selected for this thesis because they have certain characteristics that make them interesting subjects for the research conducted in this thesis. In this paragraph, the selection of the three cases used in this thesis will be discussed. The neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV are located respectively in the Dutch cities of Nijmegen, Rotterdam and Zwolle.

Firstly, the neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV house many inhabitants with a low social economic status (Centraal Bureau voor de Statistiek, 2022a); Allecijfers.nl, 2023a). This means that a large part of the inhabitants of the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV are low educated, have a low income and have a socially unfavourable position in society (Van Herten, et al., 1997). The 'Centraal Bureau voor Statistiek' (Centraal Bureau voor de Statistiek, 2022a) created the SES-WOA score for neighbourhoods to compare the social economic status of inhabitants with other neighbourhoods in the Netherlands. The SES-WOA score compares the social economic status through wealth, education and labour market participation of people living in a neighbourhood (Centraal Bureau voor de Statistiek, 2022a). The SES-WOA scores for the neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV are respectively -0,303, -0,337 and -0,526. According to Centraal Bureau voor de Statistiek (2022a), a SES-WOA score of -0,2 or lower is classified as very low. This means that the social economic status of inhabitants of Wolfskuil, Oosterflank and Holtenbroek IV is very low compared to other neighbourhoods in the Netherlands. People with a low social economic status often struggle with money problems and different types of inconveniences they have to deal with in their daily lives. This leads to these people with a low social economic status not being able to prioritize health and active living (RIVM, 2010). Lower attention to health and the lack of active living behaviour in the neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV makes these neighbourhoods relevant cases for this research on car-free neighbourhoods to create an active living environment.

Secondly, Wolfskuil, Oosterflank and Holtenbroek IV are neighbourhoods with high car problematics (Allecijfers.nl, 2023a). The number of cars per km² in Wolfskuil, Oosterflank and Holtenbroek IV is high compared to other neighbourhoods in cities. Most of the streets in these neighbourhoods are dominated by cars, there are cars everywhere and a lot of the space in the streets is used for car-based mobility and car parking. This leaves little space for recreation and green in the neighbourhood (Edwards & Tsouros, 2006). The high car density and parking problems in Wolfskuil, Oosterflank and Holtenbroek IV also lead to streets that are crowded

with cars, leaving less space for other methods of transport (Allecijfers.nl, 2023a). The existing car problematics make the neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV interesting cases for this research.

Thirdly, There are many existing policy documents regarding spatial planning and mobility in Wolfskuil, Oosterflank and Holtenbroek IV. On a national level, the relevant existing policy documents 'Nationaal Mobiliteitsbeleid' (PIANOo, 2021), 'Klimaatakkoord Mobiliteit' (Ministerie van Economische Zaken en Klimaat, 2019) and 'Kansrijk Mobiliteitsbeleid' provide a detailed overview of the existing policies in the Netherlands. On a regional and local level, the regions and municipalities Wolfskuil, Oosterflank and Holtenbroek IV are part of, provide many relevant policy documents that include region-specific policies. These regional and local policy documents show how the regions and municipalities aim to deal with the development of spatial planning and mobility. The existing policy documents regarding spatial planning and mobility in Wolfskuil, Oosterflank and Holtenbroek IV will help with conducting the policy document collection.

3.2.1 Wolfskuil

Wolfskuil is a neighbourhood in the city of Nijmegen that dates back to the early 1900s. Around 1910 and 1920 the first part of Wolfskuil was built. Wolfskuil currently houses 6190 inhabitants, of which 2.930 are male and 3.255 are female (Allecijfers.nl, 2023b). 44,3% of the inhabitants of Wolfskuil are highly educated, 29,1% are moderately educated and 26,7% are lowly educated (Allecijfers.nl, 2023b). The average annual income in Wolfskuil is around €24.325, which is fairly low as shown in figure 5. In Wolfskuil 38% of the housing is owner-occupied, 14% is private rental housing and the other 48% is corporate rented housing (Allecijfers.nl, 2023b). 42% of the inhabitants of Wolfskuil are overweight and 13% are severely overweight. 59% of the inhabitants of Wolfskuil follow the physical activity guidelines as published by the government (Ministerie van Volksgezondheid, Welzijn en Sport, 2021; Allecijfers.nl, 2023b). The number of cars per km² in Wolfskuil is 2.907, while the amount of people per km² in Wolfskuil is 8.119. This means that there are about 0,3 cars per inhabitant in Wolfskuil (Allecijfers.nl, 2023b). Four bus lines go through Wolfskuil, stopping in four different locations within the neighbourhood. The neighbourhood of Wolfskuil also lies adjacent to the central train station of Nijmegen (Breng, 2023). As mentioned before, Wolfskuil has a fairly low SES-WOA score of -0,303 (Centraal Bureau voor de Statistiek, 2022a). This means that the social economic status of people living in Wolfskuil is significantly lower than people on average in the Netherlands. In Figure 5 the location of Wolfskuil in Nijmegen is shown.

Figure 5: The location of Wolfskuil in Nijmegen

3.2.2 Oosterflank

Oosterflank is a neighbourhood in the city of Rotterdam that dates back to the 1980s. The neighbourhood Oosterflank currently houses 10.455 inhabitants, of which 4.985 are male and 5.470 are female (Allecijfers.nl, 2023c). 25,8% of the inhabitants of Oosterflank are highly educated, 42,9% of the inhabitants are moderately educated and 31,2% are lowly educated (Allecijfers.nl, 2023c). The average annual income of inhabitants of Oosterflank is €25.200, which is below average. 34% of the housing in Oosterflank is owner-occupied housing, 6% is private rental housing and 6% is corporate rent housing (Allecijfers.nl, 2023c). 53% of the inhabitants are overweight and 18% are severely overweight. 53% of the inhabitants follow the physical activity guidelines defined by the government (Ministerie van Volksgezondheid, Welzijn en Sport, 2021; Allecijfers.nl, 2023c). Oosterflank has a car density of 2.368 cars per km², while the density of people per km² is 6.483. This means that there are 0,3 cars per inhabitant on average in Oosterflank (Allecijfers.nl, 2023c). The neighbourhood of Oosterflank has five bus lines running through the neighbourhood and has nine bus stops. In addition to this, Oosterflank has three metro stations and a train station within the neighbourhood borders (RET, 2023). As mentioned before, The SES-WOA score of Oosterflank is -0,337 (Centraal Bureau voor de Statistiek, 2022a). This means that the social economic status of people living in Oosterflank is significantly lower than people on average in the Netherlands. The location of Oosterflank in Rotterdam is shown in Figure 6.

Figure 6: The location of Oosterflank in Rotterdam

3.2.3 Holtenbroek IV

Holtenbroek IV is a neighbourhood in the city of Zwolle that dates back to the 1950s. Holtenbroek IV has a population of 3.155 people, of which 1.555 are male and 1.600 are female (Allecijfers.nl, 2023d). 19,5% of the inhabitants of Holtenbroek IV are educated high, 31,9% of the inhabitants are educated moderately and 48,7% of the inhabitants are educated low (Allecijfers.nl, 2023d). The average income per year in Holtenbroek IV is €21.200, which is very low (Allecijfers.nl, 2023d). 23% of the housing in Holtenbroek IV is owner-occupied, 15% is private rented housing and 62% is corporate housing (Allecijfers.nl, 2023d). Of the inhabitants, 51% are overweight and 19% are severely overweight. 48% of the people living in Holtenbroek IV follow the physical activity guidelines of the 'Ministerie van Volksgezondheid, Welzijn en Sport' (2021; Allecijfers.nl, 2023d). The car density in Holtenbroek IV is 1.588 cars per km² and the density of inhabitants in Holtenbroek IV is 4.591 people per km². This means that there are on average around 0,3 cars per person in Holtenbroek IV (Allecijfers.nl, 2023d). The neighbourhood of Holtenbroek has seven bus lines and eight bus stops within the neighbourhood (RRReis, 2023). The SES-WOA score in Holtenbroek IV is -0,526, which is very low (Centraal Bureau voor de Statistiek, 2022a). This indicates that inhabitants of Holtenbroek IV have the lowest social economic status of the neighbourhoods in this thesis. The location of Holtenbroek IV in Zwolle is shown in Figure 7.

Figure 7: The location of Holtenbroek IV in Zwolle

3.2.4 Characteristic Overview

For clarity, Figure 8 below shows a comparison between the characteristics of the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV.

Characteristic	**Wolfskuil**	**Oosterflank**	**Holtenbroek IV**
Population	6.190	10.455	3.155
High education	44,3%	25,5%	19,5%
Low education	26,7%	31,2%	48,7%
Average income	€24.325	€25.200	€21.200
Owner-occupied housing	38%	34%	23%
Overweight people	42%	53%	51%
Following activity guidelines	59%	53%	48%
Cars per m²	2.907	2.368	1.588
Inhabitants per m²	8.119	6.483	4.591
Cars per inhabitant	0,3	0,3	0,3
SES-WOA score	-0,303	-0,337	-0,526

Figure 8: A characteristic overview of Wolfskuil, Oosterflank and Holtenbroek IV

3.3 Data Collection and Research Methods

3.3.1 Desk Research

The data collection in this thesis consists of three different components, divided into two categories, namely desk research and field research. Desk research consists of an academic literature study and the collection of policy documents.

Academic Literature Study

The literature study forms the foundation of this research. With the literature research exploratory research has been conducted on the subjects of car-free design and active living behaviour. Based on this literature study, the theoretical framework and the conceptual model have been designed. Through the literature study, this thesis explored the concepts of 'Car-free cities', 'active living', 'active mobility', 'active living behaviour', the Theory of Planned Behaviour, the key factors for a transition to a car-free neighbourhood and all important underlying concepts of this research.

The literature research was done by searching and reading online articles, books and academic papers. The online literature was accessed by the use of the search engines Google Scholar and Web of Science. The keywords I have used to find relevant literature are among others: 'car-free', 'car-free cities', 'active living', 'active mobility', 'active living behaviour', 'sustainable mobility', 'theory of planned behaviour', 'car-free neighbourhood', 'attractiveness for active living', 'active living environment', 'walkability', 'bikeability', 'public transport' and 'public space'. These keywords are also important aspects of the theoretical framework and conceptual model.

Policy Document Collection

The second part of the desk research is the policy document collection. This policy document collection consists of mobility and spatial planning policy documents from national, regional and local levels of government, starting with national mobility and spatial planning policies in the Netherlands. For the policy document collection, only recent, active and leading relevant policy documents are presented. Within the national policy document collection, three main national policy documents on spatial planning and mobility are presented:

- 'Nationaal Mobiliteitsbeleid' (PIANOo, 2021);
- 'Klimaatakkoord Mobiliteit' (Ministerie van Economische Zaken en Klimaat, 2019);
- 'Kansrijk mobiliteitsbeleid' (Centraal Planbureau voor de Leefomgeving, 2020).

The regional and local policy document collection is combined in this thesis because all of the researched cases are part of a closely cooperating region, with policies on spatial planning and mobility that focus on both regional and local spatial planning and mobility development. The policies on spatial planning and mobility of Wolfskuil, Oosterflank and Holtenbroek IV are closely based on these regional policies and are very similar. Therefore, it is redundant to present the regional and local policies in different chapters.

For the neighbourhood of Wolfskuil, located in the city of Nijmegen, the following three spatial planning and mobility policy documents are collected:

- 'Duurzame Mobiliteit en Bereikbaarheid Regio Arnhem Nijmegen' (Regio Arnhem Nijmegen, 2019);
- 'Groene Metropoolregio' (Regio Arnhem Nijmegen, 2020a);
- 'Regionale agenda' (Regio Arnhem Nijmegen, 2020b).

Regarding the neighbourhood of Oosterflank in Rotterdam, policy document collection is focused on the following two spatial planning and mobility policy documents:

- 'Programma Duurzame Mobiliteit' (Metropoolregio Rotterdam Den Haag, 2020);
- 'Rotterdamse Mobiliteits Aanpak' (Gemeente Rotterdam, 2020).

For the neighbourhood Holtenbroek IV in Zwolle the collected policy documents are:

- 'Bereikbaarheidsambitie Zwolle' (Regio Zwolle, 2020);
- 'Mobiliteitsvisie 2020-2030' (Gemeente Zwolle, 2019).

Through the collection of governmental policy documents, the existing foundation for a possible transition to a car-free neighbourhood can be analysed and discussed, based on the currently active governmental policies on spatial planning and mobility in the neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV.

3.3.2 Field Research

Door-to-door surveys

The field research done in this thesis consists of three conducted door-to-door surveys. The surveys were conducted in the neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV and consist of pre-designed questions, varying between quantitative and qualitative questions. The data collection through door-to-door surveys allows the collection of multiple types of data, regarding important aspects of this thesis, directly from the inhabitants of the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV. Inhabitants of these neighbourhoods were asked

about their active living behaviour and about the key factors walkability, bikeability, public transport and public space in their neighbourhood.

Firstly, these door-to-door surveys are designed to collect data about the current active living behaviour of people living in the neighbourhoods of Wolfskuil, Oosterflank and Holtenbroek IV. People were asked about their average daily physical activities. Secondly, these surveys are designed to collect data about the key factors for a transition to a car-free neighbourhood. The inhabitants were asked about the 'walkability', 'bikeability', 'public transport' and 'public space' in their neighbourhood. This includes questions about the presence and quality of infrastructure for pedestrians, cyclists and public transport, but also questions about the attitude people have regarding the use of these different transportation methods.

The questions about the attitude of respondents, which plays a role in the Theory of Planned Behaviour (Ajzen, 1985), are embedded in the questions on walkability, bikeability and public transport. For the key factor public space, respondents were asked about the presence and state of green space in their neighbourhood, the presence of grey space in their neighbourhood and the presence of enough places to meet other people in their neighbourhood. Regarding the subjective norm and perceived behavioural control, there are no specific questions as these variables are hard to measure through direct questions. On the subjective norm and perceived behavioural control will therefore be concluded based on the existing literature.

The surveys have been conducted on 98 respondents who will remain completely anonymous. In Wolfskuil, there were 35 respondents to the conducted survey, in Oosterflank there were 32 respondents to the survey and in Holtenbroek IV there were 31 respondents to the survey. Because the surveys were conducted as door-to-door surveys, respondents were chosen based on the house they live in. In a group of five students, the survey was conducted door-to-door in a random order. For the selection of respondents, we only surveyed people of at least 16 years of age. On other criteria, like gender or nationality, we did not have any requirements.

The surveys have been conducted as door-to-door surveys on workdays between 10:00 a.m. and 4:0 p.m. Although conducting surveys on a door-to-door basis is a good method to collect data directly from inhabitants, it also has a limitation. Because these door-to-door surveys are conducted at a specific time and day, certain people will be home more often than others. Therefore, specific groups of people will be more represented than others. In this case, mainly parents with young children and elderly people will be at home during workdays between 10:00 am and 4:00 pm, so they will be represented in bigger numbers than people who have full-time jobs.

The survey in Wolfskuil was conducted on Wednesday, May 18th 2022. In Wolfskuil 35 respondents completed the survey, of which 10 are male and 25 are female. Of the 35 respondents in Wolfskuil, 51.4% are lowly educated, 17,2% are moderately educated and 31,4% are highly educated. The age of the respondents in Wolfskuil varies between 19 years old and 81 years old.

The survey in Oosterflank was conducted on Thursday, May 12th 2022. The number of respondents in Oosterflank was 32 in total, of which 12 are male and 20 are female. 31,3% of the respondents in Oosterflank are lowly educated, 25% of the respondents are moderately educated and 43,8% of the respondents are highly educated. The age of the respondents in Oosterflank varies between 22 years old and 87 years old.

The survey in Holtenbroek IV was conducted on Tuesday, May 17th 2022. There were 31 respondents to the survey conducted in Holtenbroek IV. Of the 31 respondents, 12 are male and 19 are female. In Holtenbroek IV, 22,6% of the respondents are lowly educated, 32,3% of the respondents are moderately educated and 38,7% of the respondents are highly educated. The age of the respondents in Holtenbroek IV varies between 16 years old and 84 years old.

The surveys were conducted in a group of five bachelor students to collect data for their bachelor thesis. This means that the surveys include some questions that are not relevant to this thesis. The surveys have been conducted in Dutch. In the results chapter, the data collected with the surveys will be presented in English. The original survey in Dutch can be seen in Appendix 1. The survey used in this thesis will provide answers from inhabitants about their behaviour and their neighbourhood. The data that comes from these surveys will be complemented by data coming from the literature study.

3.4 Data Analysis

3.4.1 Analysis

This section will elaborate on the analysis of the collected data. In addition to the conducted literature research, two data collection methods have been used in this thesis; a policy document collection and door-to-door surveys. The first two sub-questions will be answered using the results of the literature research, presented in the theoretical framework (chapter 2). The analysis of the policy document collection and the door-to-door surveys is used to respond to the third, fourth, fifth and sixth sub-question and will be elaborated in the following paragraphs.

Analysis of Policy Documents

The data collected in the policy document collection will be analysed according to the spatial key factors for a transition to a car-free neighbourhood, as presented in the conceptual model. This means that the collected national, regional and local policies for Wolfskuil, Oosterflank and Holtenbroek IV will be analysed according to the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space'. The analysis of the policy document collection according to the spatial key factors for a transition to a car-free neighbourhood can help to understand and compare the current situation in Wolfskuil, Oosterflank and Holtenbroek IV regarding policies on walkability, bikeability, public transport and public space. This analysis will also provide insight into the development plans for walkability, bikeability, public transport and public space in Wolfskuil, Oosterflank and Holtenbroek IV.

Regarding the analysis of the policy document collection, the spatial key factors from the conceptual model 'walkability', 'bikeability', 'public transport' and 'public space' have been used as a coding scheme. By analysing all collected policy documents according to the spatial key factors, the collected governmental policies for Wolfskuil, Oosterflank and Holtenbroek IV can be compared to each other better. The policy documents have been analysed manually, as the policy document collection is regarded as secondary data in this research. The analysis of the policy document collection will be used to give an answer to the third sub-question.

Analysis of door-to-door surveys

The data retrieved from the door-to-door surveys will be analysed with the help of SPSS. With SPSS, the quantitative data from the surveys is analysed into descriptive data first. Following the descriptive data analysis, multiple regression analyses will be conducted in SPSS.

First, a descriptive analysis of the active living behaviour of respondents in Wolfskuil, Oosterflank and Holtenbroek IV will be conducted. The active living behaviour is divided into light, moderate and vigorous physical activity in this thesis; only light and physical activity are expected to be influenced by a transition to a car-free neighbourhood. Therefore, the descriptive analysis includes data about the light, moderate and vigorous physical activity in days per week and minutes per day.

Following the descriptive data analysis of the active living behaviour, a descriptive data analysis of the key factors 'walkability', 'bikeability', 'public transport' and 'public space' will be conducted. The results of this analysis will be presented in graphs to illustrate to what extent the different key factors for a transition to a car-free neighbourhood are present in Wolfskuil, Oosterflank and Holtenbroek IV. The descriptive data analysis will be used to answer the fourth sub-question.

Following the descriptive analysis of the collected data through the door-to-door surveys multiple regression analyses have been conducted in SPSS. For these multiple regression analyses, first, there will be created new variables for the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space' that consist of the data from the questions that belong to these key factors. This includes the results that are presented for every key factor in Chapter 4.2. Some of the variables used in the regression analyses were negative, which means that new variables had to be created, in which the data was reversed to make the variables positive. In Appendix 2, 3 and 4 this can be seen as some variables include 'REVERSED' in their variable name. Two sorts of multiple regression analyses have been conducted, which will be elaborated in the following paragraphs.

Firstly, multiple regression analyses will be conducted to find out more about the relationship between the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space' and the active living behaviour. The regression analyses are conducted between the spatial key factors in each neighbourhood and the light and moderate physical activity. For these regression analyses, the average valuation of the spatial key factors walkability', 'bikeability', 'public transport' and 'public space' is used to find out more about the influence from these spatial key factors on the active living behaviour. These regression analyses will be used to answer the fifth sub-question.

Secondly, multiple regression analyses will be conducted to find out more about the relationship between the attitude of inhabitants and active living behaviour. The attitude is measured with the questions 'Do you like to walk in your neighbourhood?', 'Do you like to go somewhere on foot?', 'Do you like to cycle in your neighbourhood?', 'Do you like to use the bicycle to get somewhere?' and 'Do you like to use public transport to get somewhere?'. With

these regression analyses, the relationship between the attitude people have toward the alternative transportation methods walking, cycling and public transport and active living behaviour will be researched. Regarding the subjective norm and perceived behavioural control, there are no specific questions about these variables as they are hard to measure through direct questions. The conclusion on a possible relationship between will therefore not be concluded for each neighbourhood itself but will be concluded as one, based on existing literature. These regression analyses will be used to answer the sixth sub-question.

3.4.2 Ethical Considerations

Confidentiality

The confidentiality of this research is only relevant to the conducted door-to-door surveys. Because of the anonymity in the conducted surveys, there is no personal information that people need to share for this research. People were told that they could retreat at any given moment during the survey conduction and was not mandatory to answer any questions within the survey. The results of the survey will only be used for this thesis and the theses of my research colleagues.

Role of researcher

The role of the researcher plays an important part in how the research is conducted. In this research, the role of the researcher is to conduct surveys on a door-to-door basis in neighbourhoods with low socio-economic status, on the subject of car-free neighbourhoods. Important to consider in this researcher role is that I, as the researcher, have a certain view on car-free neighbourhoods as well, which might influence the way that I do the research. Also, the average low socio-economic status of the neighbourhoods where the surveys were conducted might lead to distrust of the respondents regarding scientific research. This distrust might influence the answers of respondents to the questions of the surveys.

Reliability

The reliability of this research consists of the accuracy and consistency of the research methods. Accuracy is about the degree of being precise and exact in collecting data (Van Thiel, 2014). For the literature research and the policy document collection, the accuracy is high, as these qualitative research methods provide contextual and detailed results. The accuracy of

the conducted door-to-door surveys is also high, as the survey questions have been designed in a way that directly asks the respondents about the different aspects of the important concepts and factors in this research. All used research methods in this research therefore include a high accuracy.

Consistency is about whether the results are the same if the entire study is carried out in exactly the same way again (Van Thiel, 2014). Repeating a study will not always lead to the same results. In order to make a research more reliable, it is important that the research strategy and the research methods are applied consistently and that survey for instance take place under the same circumstances. For the literature desk research this means that the same data needs to be collected and the same coding scheme should be used when carrying out the study again. For the conducted doo-to-door surveys this is a little more complicated, as it is a quantitative research method. Firstly, the results of door-to-door surveys are dependent on the respondents. While conducting the surveys a second time, there is a large possibility that there will be other respondents to the survey. These other respondents might answer different to questions on personal experiences, beliefs and lifestyle. Secondly, the survey results are dependent on the date and time that the surveys are conducted. People might have a different opinion based on recent experiences and might therefore answer differently to questions based on the day and time that the surveys are conducted. When the surveys are for example conducted in June, when the weather is nice, people might walk or cycle more, influencing their recent active living behaviour experiences. Also surveying at different times can lead to different respondents because on a workday morning, different people might open the door than on a workday in the afternoon. The consistency of the conducted door-to-door surveys is therefore dependent on many variables. Regarding that the research population is not too large in this research, this might lead to inconsistent results.

Validity

The validity of this research consists of the internal and the external validity. Internal validity refers to the degree results are valid and reflect reality (Van Thiel, 2014). The internal validity of this research is secured with the help of the literature study. Through comprehensive literature research, the different key factors for a transition to a car-free neighbourhood could be established and the policy document collection was conducted. The established key factors were used to design the questions for the surveys in Wolfskuil, Oosterflank and Holtenbroek IV. By designing the questions of the surveys with the help of the literature research and designing clear questions that helped to collect the data I wanted to collect, the internal validity of the survey was secured. The mix of qualitative and quantitative research methods helps to

measure valid results that reflect reality and therefore helps to secure the internal validity of this research.

External validity refers to the extent to which results are generalizable to other situations (Van Thiel, 2014). As the literature research and policy document collection are qualitative research methods, the results of these research methods are generalizable to other situations. The results of quantitative research, such as the door-to-door surveys can also be generalized, but there are some requirements to be met for these results to be generalizable. To secure external validity for the conducted door-to-door surveys, the sample of the survey respondents must be large enough and represent all inhabitant groups of the researched neighbourhoods. As in the conducted door-to-door surveys only about 100 respondents were interviewed in total, this might not be enough to make the door-to-door surveys generalizable. Also because of the time that the surveys were conducted, it is possible that people who do not work during the daytime are more represented. To prevent that only one certain group of inhabitants is included in the conducted surveys, respondents were selected randomly. As the questions of the survey are aimed at collecting the respondents' views on certain aspects of their neighbourhood and important key characteristics for a transition to a car-free neighbourhood and have a relatively low number of respondents, the results of the surveys cannot be generalized to inhabitants of other neighbourhoods. The external validity of the door-to-door surveys therefore is not very high. The mix of qualitative and quantitative research methods however, ensures some external validity of this research, as the results of the literature research and the policy document collection can be generalized to other situations.

4. Results

In this Chapter, the results of the data collection will be presented. The collected data is presented following the variables of the conceptual model. Starting with the key factors for a transition to a car-free neighbourhood 'governmental policies', 'walkability', 'bikeability', 'public transport' and 'public space'. Following the presentation of the key factors for a transition to a car-free neighbourhood, the current active living behaviour is presented. The presentation of the current active living behaviour introduces the presentation of the results regarding the influence of the spatial key factors on active living behaviour and the presentation of the results regarding the influence of the attitude on active living behaviour.

4.1 Governmental Policies

4.1.1 National Level Governmental Policies

In the Netherlands, the frame in which national spatial planning and mobility policy is developed is 'Nationaal Mobiliteitsbeleid', the 'National Mobility Policy' (PIANOo, 2021). This policy framework was created by the Ministry of Infrastructure and Water Management. Of the policy documents in the Netherlands, the 'Klimaatakkoord Mobiliteit' (Ministerie van Economische Zaken en Klimaat, 2019), translated as 'Climate Agreement Mobility', has the most prominent policies regarding sustainable mobility. The 'Klimaatakkoord Mobiliteit' aims for carefree, zero-emission mobility for everyone by 2050. This means that mobility needs to be provided for everyone in a sustainable, affordable and healthy way. Within the 'Klimaatakkoord Mobiliteit' four pillars have been created to reach these goals by 2050. These four pillars are:

- Sustainable energy usage;
- Electrification of (people)transport;
- More sustainable logistics transportation;
- More sustainable people transportation.

Of these four pillars in the 'Klimaatakkoord Mobiliteit', the pillar 'More sustainable people transportation' is directly relevant for car-free neighbourhoods. Within this pillar of sustainable people transportation, the Ministry of Infrastructure and Water Management is aiming to focus on three aspects of people mobility (Ministerie van Economische Zaken en Klimaat, 2019):

- Decreasing work-related mobility and supporting more sustainable mobility methods to travel to work, school or other destinations and supporting flexible working hours;
- Supplying mobility as a service, with the use of sharing concepts, combining transportation methods, smart parking and charging station overviews;
- Stimulation of shared mobility, like car-sharing and scooter-sharing concepts.

According to the ‘Kansrijk Mobiliteitsbeleid’ (Centraal Planbureau voor de Leefomgeving, 2020) sustainable mobility development should include accessibility, viability, affordability and safety for everyone involved. The realisation of safer infrastructure for vulnerable road users, like cyclists and pedestrians, is highly prioritised in the policy document. The ‘Kansrijk Mobiliteitsbeleid’ also aims to decrease the usage of motor vehicles in certain parts of the city, creating zero-emission zones. By increasing the safety for vulnerable road users and making car usage less attractive, the ‘Kansrijk Mobiliteitsbeleid’, aims to support people to diminish their movement by car and to use sustainable methods of transport instead (Centraal Planbureau voor de Leefomgeving, 2020).

4.1.2 Regional and Local Level Governmental Policies

For mobility and spatial planning on a regional and local level, Nijmegen (Wolfskuil), Rotterdam (Oosterflank) and Zwolle (Holtenbroek IV), have regional policy agendas, as the cities of Nijmegen, Rotterdam and Zwolle participate in partnership regions with other cities. These partnership regions are respectively the Arnhem-Nijmegen region, the Rotterdam-Den Haag region and the Zwolle Region. The regional and local policies are based on the national mobility policies, matched with the concerned region and adjusted to the priorities of mobility and infrastructure development in that region. In this paragraph, the relevant regional and local policies of Nijmegen, Rotterdam and Zwolle for car-free neighbourhoods will be discussed.

Policy Agenda Nijmegen

For the neighbourhood Wolfskuil, the policy agenda of Nijmegen is the leading regional policy framework. The city of Nijmegen is part of ‘Regio Arnhem-Nijmegen’, a collaboration between municipalities around the cities of Arnhem and Nijmegen. Within the region Arnhem-Nijmegen, there are multiple policy documents regarding Mobility and infrastructure. The main policy documents that are relevant for this research are ‘Duurzame Mobiliteit en Bereikbaarheid Regio Arnhem Nijmegen’ (Regio Arnhem Nijmegen, 2019), ‘Groene Metropoolregio’ (Regio Arnhem Nijmegen, 2020a) and ‘Regionale agenda’ (Regio Arnhem Nijmegen, 2020b).

The policy document ‘Duurzame Mobiliteit en Bereikbaarheid’ (Regio Arnhem Nijmegen, 2019) is aimed at making public transport accessible for everyone and at creating an attractive bicycle network (Regio Arnhem Nijmegen, 2019). Region Arnhem-Nijmegen intends to develop high-quality public transport and improve bikeability in the region. The main points of attention are the development of (more) mobility hubs throughout the region, the development of bicycle highways, bicycle streets and recreational bicycle paths (Regio Arnhem Nijmegen, 2019).

The policy document ‘Groene Metropoolregio’ (Regio Arnhem Nijmegen, 2020a), region Arnhem-Nijmegen focuses on the development of (more) ‘green spaces’ in neighbourhoods and the reduction of the amount of ‘grey spaces’ in neighbourhoods. The policy document ‘Regionale agenda’ (Regio Arnhem Nijmegen, 2020b) continues ‘Groene Metropoolregio’ (Regio Arnhem Nijmegen, 2020a). ‘Regionale agenda’ takes a sustainable development approach to create a more connected region through the development of the regional public transport network and the regional bicycle network (Regio Arnhem Nijmegen, 2020b).

Policy Agenda Rotterdam

For the neighbourhood Oosterflank, the policy agenda of Rotterdam is the leading regional spatial planning and mobility policy framework. The city of Rotterdam is part of the municipality collaboration ‘Regio Rotterdam-Den Haag’. For this region, the main policy documents that are relevant in this research are ‘Programma Duurzame Mobiliteit’ (Metropoolregio Rotterdam Den Haag, 2020) and ‘Rotterdamse Mobiliteits Aanpak’ (Gemeente Rotterdam, 2020).

The ‘Programma Duurzame Mobiliteit’ (Metropoolregio Rotterdam Den Haag, 2020) aims to achieve a modal shift from car-based mobility to active methods of mobility. To reach this goal, Metropoolregio Rotterdam Den Haag (2020) aims to increase the attractiveness of active mobility methods, such as walking, cycling and public transport and aims to decrease the attractiveness of car-based mobility. In the policy document ‘Rotterdamse Mobiliteits Aanpak’ this is also the case, as the municipality Rotterdam aims to increase space for pedestrians and cyclists, and aims to develop the public transport network in the city of Rotterdam (Gemeente Rotterdam, 2020).

Within the ‘Rotterdamse Mobiliteits Aanpak’ (Gemeente Rotterdam, 2020), an important subject is the balance between cars, bicycles, public transport, parking places and leisure places in the public space (Gemeente Rotterdam, 2020). The aim of the municipality Rotterdam is to create areas in which active methods of transport are prioritised and even to create areas that are exclusively accessible by walking, cycling or public transport, to increase the liveability of areas and the safety of vulnerable road users (Gemeente Rotterdam, 2020). This includes the stimulation of bicycle usage through the development of bicycle paths, bicycle streets and bicycle storages of high quality (Gemeente Rotterdam, 2020). Further, the municipality of Rotterdam aims to develop more public transport-based mobility hubs in and around city neighbourhoods, which offer people more accessibility to the local and regional public transport network (Gemeente Rotterdam, 2020).

Policy Agenda Zwolle

For the neighbourhood Holtenbroek IV, the policy agenda of municipality Zwolle is the leading mobility and spatial planning policy framework. The city of Zwolle is part of the regional collaboration ‘Regio Zwolle’, freely translated as ‘Region Zwolle’. The main relevant policy documents in region Zwolle for this research are ‘Bereikbaarheidsambitie Zwolle’ (Regio Zwolle, 2020) and ‘Mobiliteitsvisie 2020-2030’ (Gemeente Zwolle, 2019).

The policy document ‘Bereikbaarheidsambitie Zwolle’ (Regio Zwolle, 2020) was created with the aim of sustainable mobility development in the region Zwolle. ‘Bereikbaarheidsambitie Zwolle’ has the ambitions to improve public transport accessibility and mobility, to initiate a modal shift from cars to active transportation methods and to increase accessibility and mobility for active transportation methods, such as walking and cycling, in Zwolle (Regio Zwolle, 2020).

Another important mobility policy document in Zwolle is ‘Mobiliteitsvisie 2020-2030’ (Gemeente Zwolle, 2019). Within the ‘Mobiliteitsvisie 2020-2030’, the municipality of Zwolle developed a dynamic mobility agenda. This dynamic mobility agenda is developed at the hand of the STOP principle. The STOP principle exists of the following aspects (Gemeente Zwolle, 2019):

- ‘**S**tappen’, or walking;
- ‘**T**rappen’ or cycling;
- ‘**O**penbaar vervoer’ or public transport;
- ‘**P**rivé-vervoer’ or private transport.

The STOP principle is based on different types of transportation methods, ranked on the amount of priority they get during spatial planning (Gemeente Zwolle, 2019). The municipality first looks at developments from the pedestrian perspective, followed by the cyclist perspective and the public transport perspective. Only in last place, the municipality will look at development from the car user’s perspective (Gemeente Zwolle, 2019).

4.2 Walkability

The first spatial key factor that was researched with the help of the surveys is walkability. Respondents were asked about the presence of walkable areas in their neighbourhood, the presence of walking paths in their neighbourhood, the quality of the walking paths in their neighbourhood, their attitude on walking in their neighbourhood, their attitude on walking as a transportation method and experienced safety when walking in their neighbourhood.

Firstly, respondents were asked the question "*Are there many walkable areas in and around your neighbourhood?*". In Wolfskuil, 73% of the respondents think that there are many walkable areas in and around their neighbourhood, 9% of the respondents do not think that there are many walkable areas in and around their neighbourhood and 18% of the respondents have no strong opinion on this. In Oosterflank, 91% of the respondents think that there are many walkable areas in and around their neighbourhood, while 3% think that there are not many walkable areas in and around their neighbourhood and 6% of the respondents have no strong opinion on this. In Holtenbroek IV, 90% of the respondents think that there are many walkable areas in and around their neighbourhood, 3% of the respondents think that there are not many walkable areas in and around their neighbourhood and 7% of the respondents have no strong meaning about it. In Figure 9 the distribution of the answers to this question is shown.

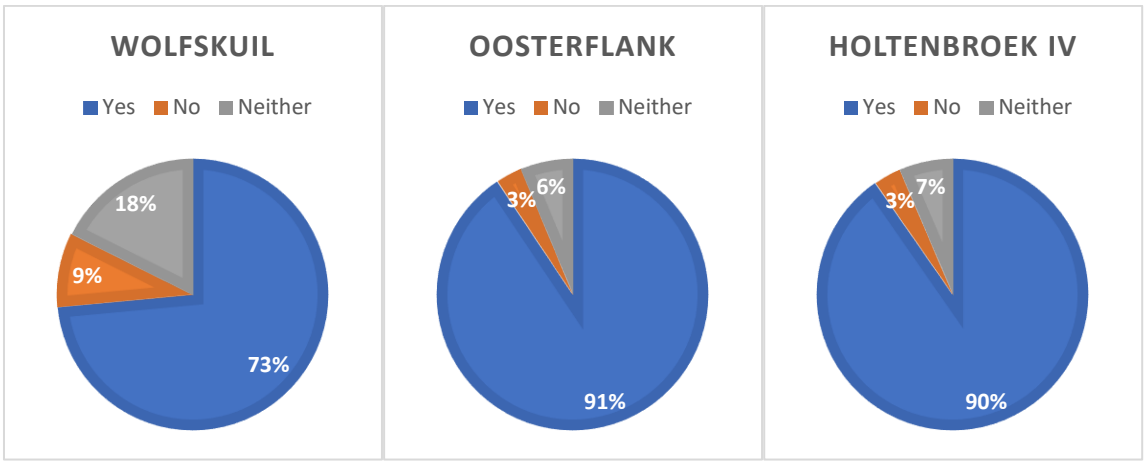

Figure 9 Are there many walkable areas in and around your neighbourhood?

Secondly, respondents were asked, "*Are there enough walking paths in your neighbourhood?*". In Wolfskuil 83% of the respondents think that there are enough walking paths in their neighbourhood, while 8% of the respondents think that there are not enough walking paths in their neighbourhood and 9% of the respondents have no strong opinion about it. In Oosterflank 91% of the respondents think that there are enough walking paths in their neighbourhood, 3% of the respondents think there are not enough walking paths in their neighbourhood and 6% of the respondents do not have a strong opinion on this. In Holtenbroek IV 84% of the respondents think that there are enough walking paths in their neighbourhood, while 3% of the respondents think that there are not enough walking paths in their neighbourhood and 13% of

the respondents have no strong opinion about it. Figure 10 shows the distribution of the answers to this question for all three neighbourhoods.

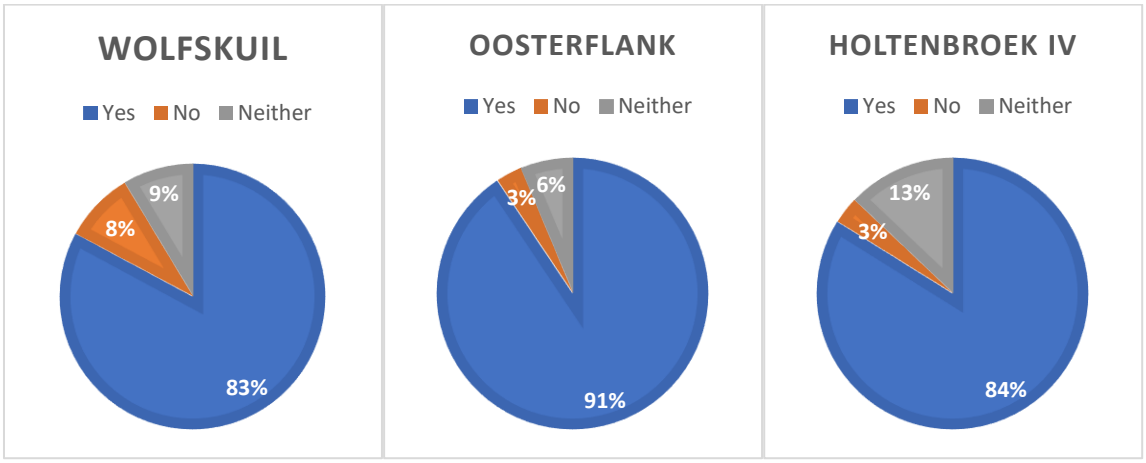

Figure 10: Are there enough walking paths in your neighbourhood?

Next, the respondents were asked, "*Are the walking paths in your neighbourhood of high quality?*"; for high quality was meant that the walking paths were well-maintained and did not have any bumps in them. In Wolfskuil 34% of the respondents think that the walking paths in their neighbourhood are of high quality, 32% of the respondents think that the walking paths in their neighbourhood are not of high quality and 34% of the respondents have no strong opinion about this. In Oosterflank 56% of the respondents think that the walking paths in their neighbourhood are of high quality and 10% of the respondents think that the walking paths in their neighbourhood are not of high quality. An additional 34% of the respondents do not have a strong opinion about the quality of walking paths in Oosterflank. In Holtenbroek IV 52% of the respondents think that the walking paths in their neighbourhood are of high quality, 22% of the respondents do not think that the walking paths in their neighbourhood are of high quality and 26% of the respondents have no strong opinion about it (Figure 11).

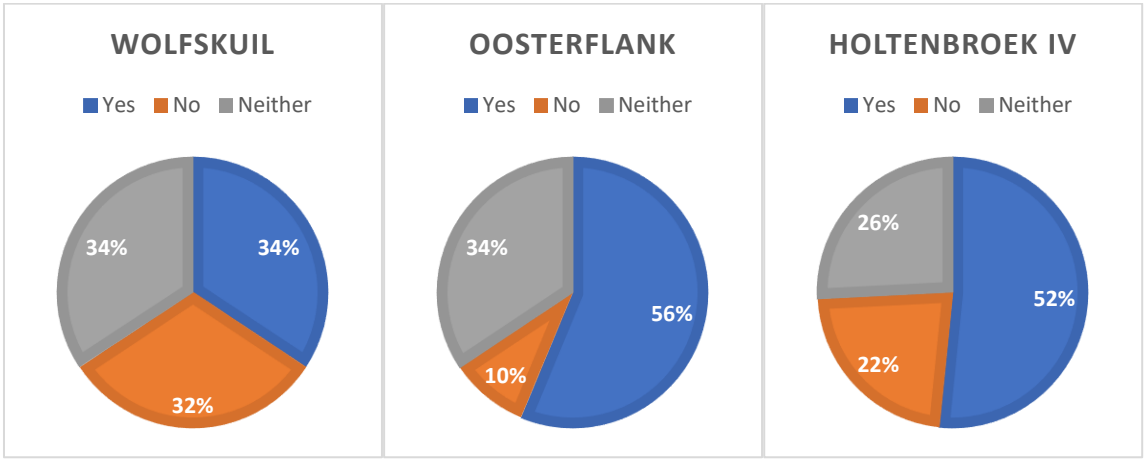

Figure 11: Are the walking paths in your neighbourhood of high quality?

To find out more about the respondents' attitude toward walking in their neighbourhood, the respondents were asked the question *"Do you like to walk in your neighbourhood?"*. In Wolfskuil 83% of the respondents have a positive attitude regarding walking in their neighbourhood, 14% have a negative attitude regarding walking in their neighbourhood and 3% have no strong opinion on the subject. In Oosterflank 75% of the respondents have a positive attitude regarding walking in their neighbourhood, while 9% of the respondents have a negative attitude on this subject and 16% of the respondents do not have a strong meaning on this subject. In Holtenbroek IV 81% of the respondents have a positive attitude regarding walking in their neighbourhood, 13% of the respondents have a negative attitude and 6% have no strong opinion on walking in their neighbourhood (Figure 12).

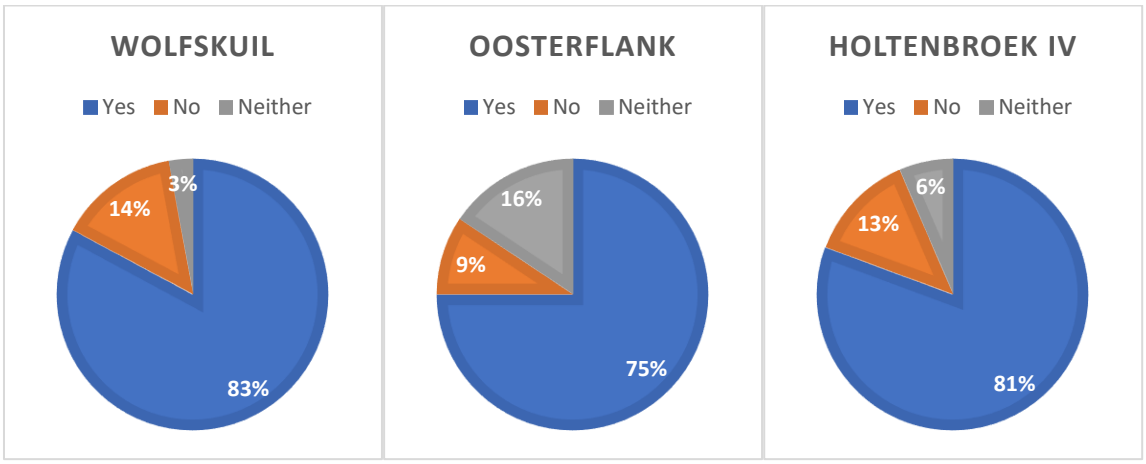

Figure 12: Do you like to walk in your neighbourhood?

To continue, respondents were asked about their attitude regarding walking as a method of transport. For this, the question "*Do you like to go somewhere on foot?*" was asked. In Wolfskuil 77% of the respondents have a positive attitude on going somewhere on foot, 3% of the respondents have a negative attitude on going somewhere on foot and 20% of the respondents do not have a strong opinion about the subject. In Oosterflank 78% of the respondents have a positive attitude regarding going somewhere on foot, 16% of the respondents have a negative attitude regarding going somewhere on foot and 6% of the respondents do not have a strong opinion on this. In Holtenbroek IV 80% of the respondents have a positive attitude on going somewhere on foot, 10% of the respondents have a negative attitude on going somewhere on foot and 10% of the respondents do not have a strong opinion on the subject. The distribution of the answers to this question is shown in Figure 13.

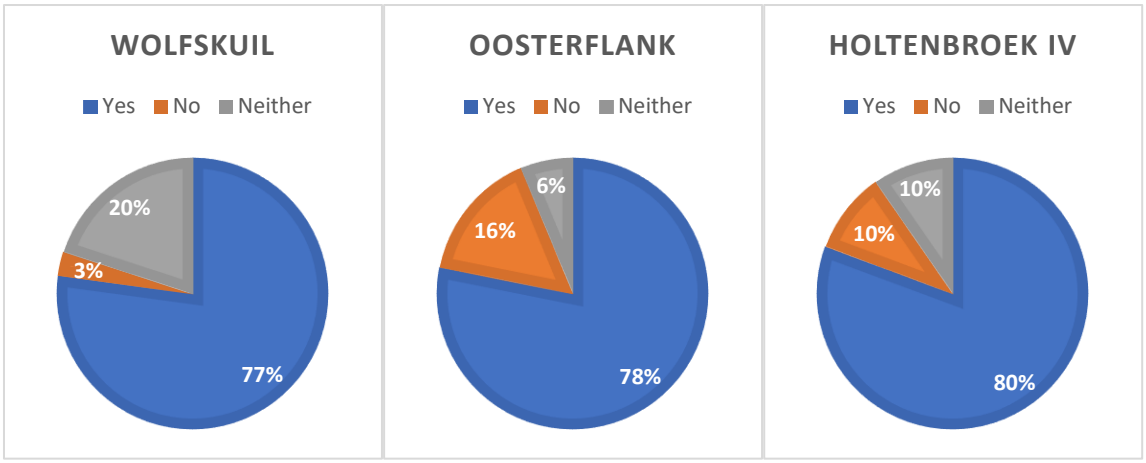

Figure 13: Do you like to go somewhere on foot?

Finally, respondents were asked about their experience of safety when walking through their neighbourhood. The respondents were asked, "*Do you feel safe when walking through your neighbourhood?*". In Wolfskuil 97% of the respondents feel safe when walking through their neighbourhood and 3% of the respondents neither feel safe or unsafe when walking through their neighbourhood. In Oosterflank 81% of the respondents feel safe when walking through their neighbourhood and 19% of the respondents neither feel safe or unsafe when walking through their neighbourhood. In Holtenbroek IV all respondents feel safe when walking through their neighbourhood, None of the respondents to any of the three surveys feels unsafe when walking through their neighbourhood, as is shown in Figure 14.

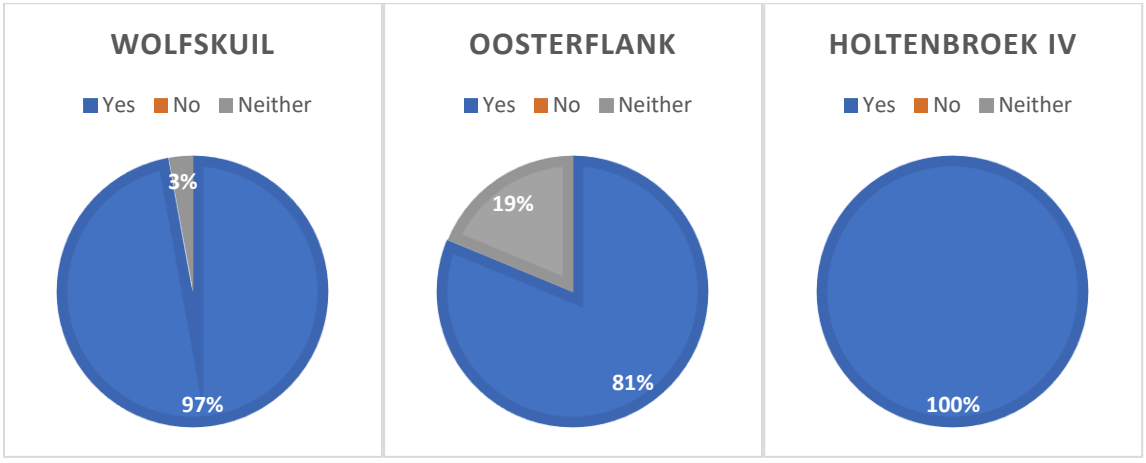

Figure 14: Do you feel safe when walking through your neighbourhood?

4.3 Bikeability

The next subject of the survey is bikeability. Bikeability has been researched by the use of five questions. The respondents were asked about the bikeability in their neighbourhood through questions about the presence of bikeable areas, the presence of cycling lanes in their neighbourhood, the quality of the cycling lanes in their neighbourhood, their attitude towards cycling in their own neighbourhood, their attitude on using the bicycle as a method of transport and experienced safety when cycling in their neighbourhood.

First, the respondents were asked, "*Are there many bikeable areas in and around your neighbourhood?*". In all three neighbourhoods, the majority of the respondents were positive about the presence of bikeable areas in their neighbourhood. In Wolfskuil 73% of the respondents are happy about the number of bikeable areas in and around their neighbourhood, 9% are unhappy and 18% have no strong meaning about it. In Oosterflank 97% of the respondents are happy about the number of bikeable areas in and around their neighbourhood, the remaining 3% have no strong meaning about it. In Holtenbroek IV 90% of the respondents are happy about the number of bikeable areas that are present in and around their neighbourhood, while 3% are unhappy about it and 7% have no strong meaning about it. The results of this question are shown in Figure 15 below.

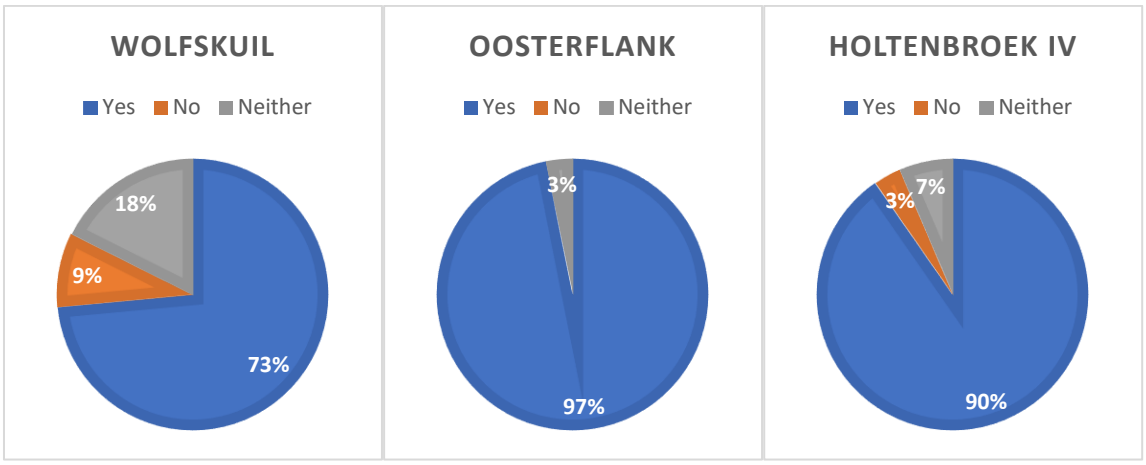

Figure 15: Are there many bikeable areas in and around your neighbourhood?

Secondly, respondents were asked the question "*Are there enough cycling lanes in your neighbourhood?*". The majority of the respondents of all three neighbourhoods are positive about the amount of cycling lanes in their neighbourhood. In Wolfskuil 73% of the respondents are happy about the number of cycling lanes present in their neighbourhood, 18% are unhappy about the amount of cycling lanes and 9% have no strong meaning about it. In Oosterflank 84% of the respondents are happy about the number of cycling lanes present in their neighbourhood, while 16% of the respondents have no strong meaning about it. In Holtenbroek IV 90% of the respondents are happy about the number of cycling lanes in their neighbourhood,

while 10% have no strong meaning about it. Figure 16 shows the distribution of the answers to this question.

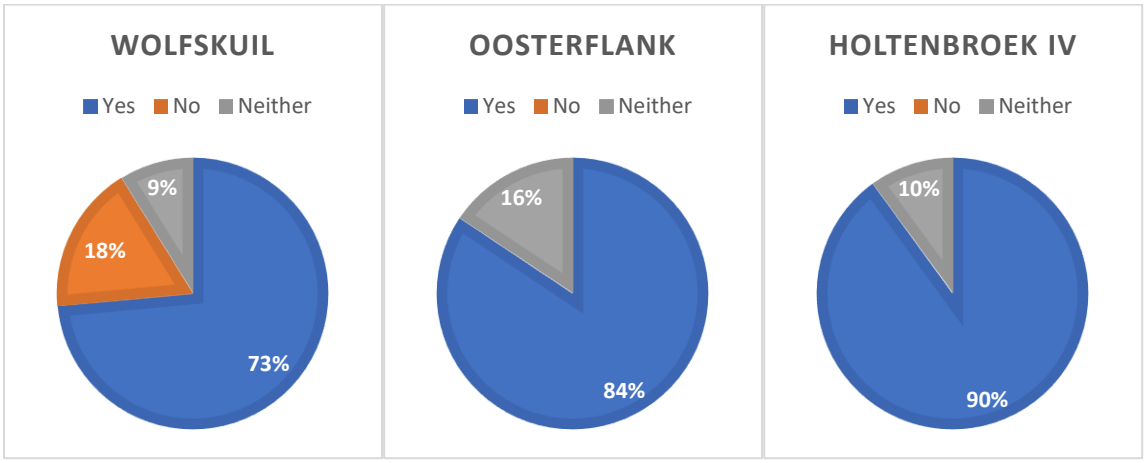

Figure 16: Are there enough cycling lanes in your neighbourhood?

Thirdly on the subject of bikeability, respondents were asked about the quality of the cycling infrastructure in their neighbourhood by asking the question "*Are the cycling lanes in your neighbourhood of high quality?*". In Wolfskuil 61% of the respondents were happy about the quality of the cycling lanes, while 6% were unhappy about the cycling lanes and 33% had no strong opinion on the subject. In Oosterflank 61% of the respondents were happy about the quality of the cycling lanes, while 7% were unhappy about the quality of the cycling lanes and 32% had not strong opinion about it. In Holtenbroek IV 71% of the respondents were happy about the quality of the cycling lanes, 3% were unhappy about the quality of the cycling lanes and 26% had no strong opinion about the subject. The results of this question are shown in Figure 17.

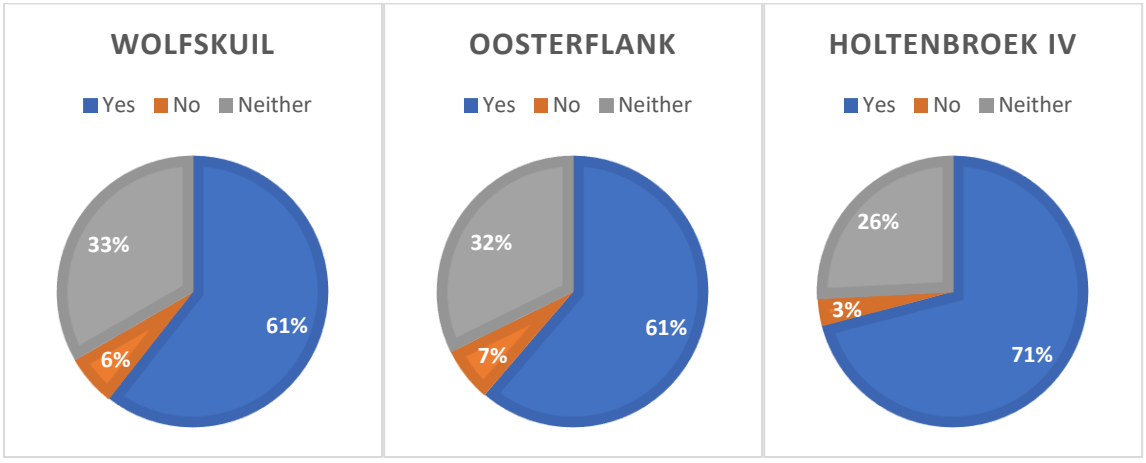

Figure 17: Are the cycling lanes in your neighbourhood of high quality?

Respondents to the survey were asked about their attitude toward cycling in their neighbourhood with the help of the question "Do you like to cycle in your neighbourhood?". In Wolfskuil 62% of the respondents have a positive attitude regarding cycling in their

neighbourhood, 29% have a negative attitude regarding cycling in their neighbourhood and 9% have a neutral attitude regarding cycling in their neighbourhood. In Oosterflank 78% of the respondents have a positive attitude on cycling in their neighbourhood, 6% of the respondents have a negative attitude on cycling in their neighbourhood and 16% of the respondents have no strong meaning on the subject of cycling in their neighbourhood. In Holtenbroek IV 80% of the respondents have a positive attitude on cycling in their neighbourhood, 10% have a negative attitude on cycling in their neighbourhood and another 10% have no strong opinion on the subject. Figure 18 shows the distribution of the answers of respondents in all three neighbourhoods.

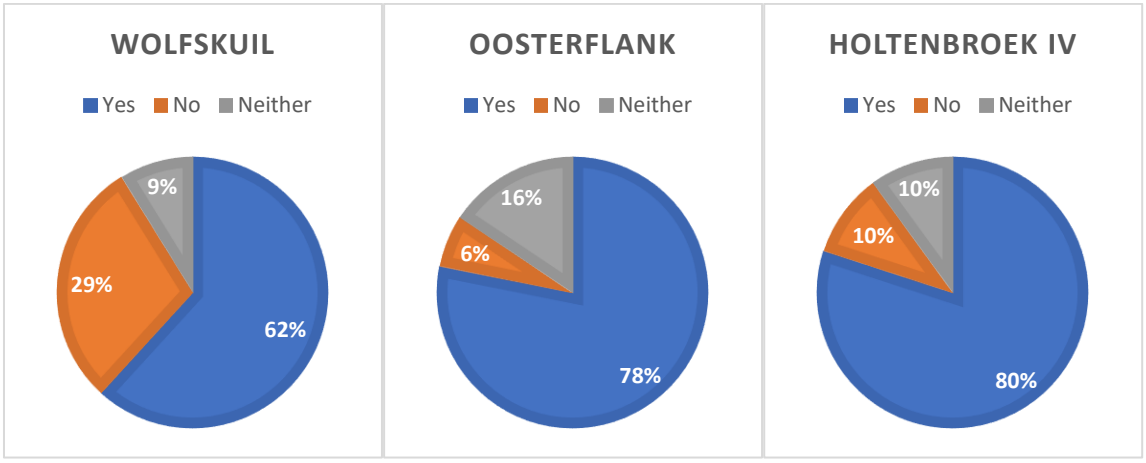

Figure 18: Do you like to cycle in your neighbourhood?

Next, respondents were asked about their attitude on using the bicycle as a method of transport. Respondents were asked, "*Do you like to use the bicycle to get somewhere?*". In Wolfskuil 52% of the respondents have a positive attitude on using the bicycle as a method of transport, 27% of the respondents have a negative attitude on using the bicycle as a method of transport and 21% have no strong opinion on the subject. In Oosterflank 59% of the respondents have a positive attitude on using the bicycle as a method of transport, 28% of the respondents have a negative attitude on using the bicycle as a method of transport and 13% of the respondents have no strong opinion on this. In Holtenbroek IV, 80% of the respondents have a positive attitude regarding the use of the bicycle as a method of transport, 10% of the respondents have a negative attitude regarding the use of the bicycle as a method of transport and 10% has no strong meaning on this subject (Figure 19).

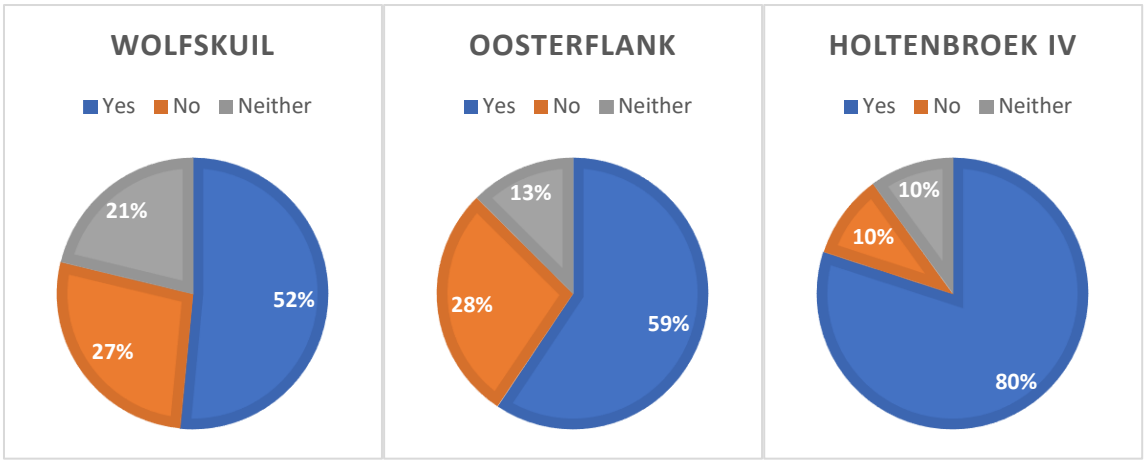

Figure 19: Do you like to use the bicycle to get somewhere?

The final question on the subject of bikeability is related to the experienced safety while using cycling as a method of transport. The respondents were asked, "*Do you feel safe when cycling through your neighbourhood?*". In Wolfskuil 97% of the respondents feel safe when cycling through their neighbourhood and 3% have no strong opinion on safety when cycling. In Oosterflank, 84% of the respondents feel safe when cycling through their neighbourhood and 16% of the respondents have no strong opinion of their safety when cycling through their neighbourhood. In Holtenbroek IV, 94% of the respondents experience a safe feeling when cycling through their neighbourhood, 3% experience an unsafe feeling when cycling through their neighbourhood and 3% experience neither a safe nor unsafe feeling when cycling through their neighbourhood. Figure 20 shows the answer distribution of the answers to this question per neighbourhood.

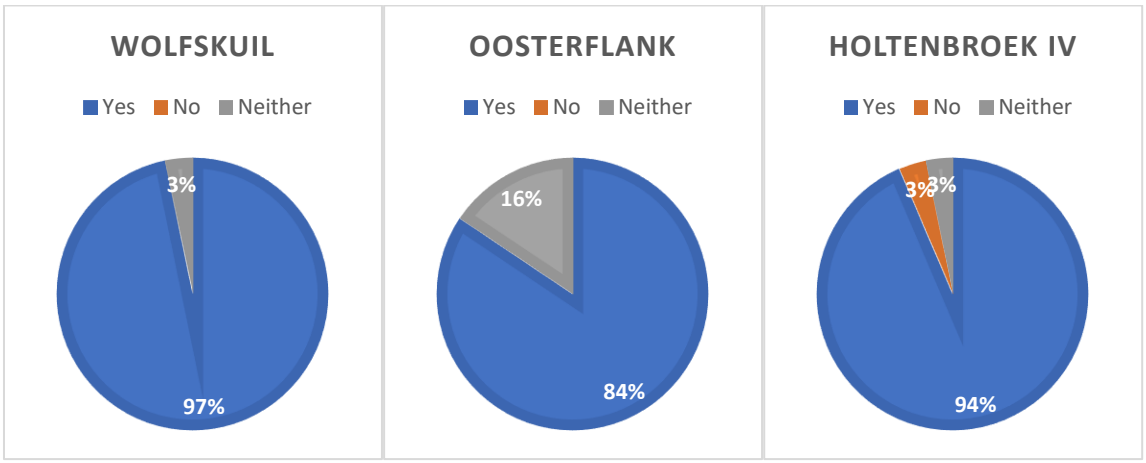

Figure 20: Do you feel safe when cycling through your neighbourhood?

4.4 Public Transport

After asking the respondents about bikeability, the respondents were asked about public transport in their neighbourhood. On the subject of public transport, the first question that was asked the respondents was "*Is public transport easily accessible in your neighbourhood?*". In Wolfskuil 80% of the respondents found public transport easily accessible, only 3% found public transport not easily accessible and 17% had no strong meaning on the accessibility of public transport. In Oosterflank 91% of the respondents find public transport easily accessible, 6% of the respondents find public transport not easily accessible and 3% have no strong meaning on accessibility of public transport. In Holtenbroek IV 87% of the respondents think public transport is easily accessible, 7% think public transport is not easily accessible and 6% have no strong meaning about the accessibility of public transport (Figure 21).

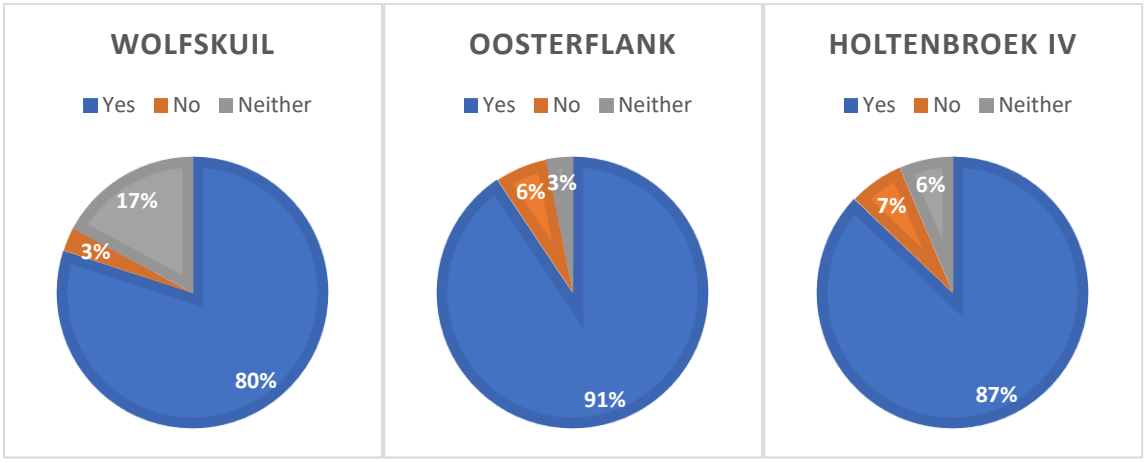

Figure 21: Is public transport easily accessible in your neighbourhood?

The second question for the subject of public transport is about respondents' attitudes on the use of public transport. The second question about public transport is "*Do you like to use public transport to get somewhere?*". In Wolfskuil 40% of the respondents answered that they like to use public transport to get somewhere, 37% answered that they do not like to use public transport to get somewhere and 23% had no strong meaning on this subject. In Oosterflank 44% of the respondents like to use public transport, 34% do not like to use public transport and 22% have no strong opinion on using public transport. In Holtenbroek IV 29% of the respondents like to use public transport, 52% of the respondents do not like to use public transport and 19% of the respondents have no strong opinion on the use of public transport. In Figure 22 the distribution of the answers can be seen.

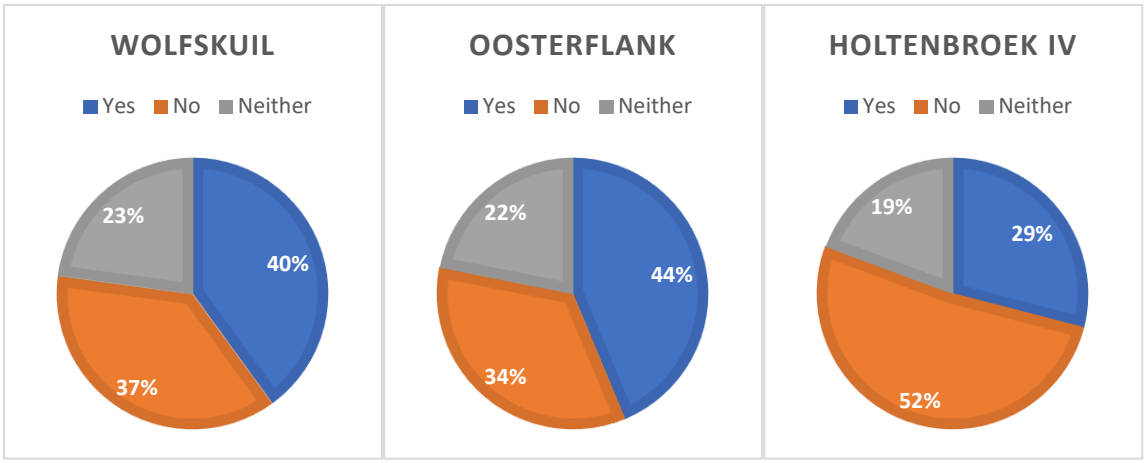

Figure 22: Do you like to use public transport to get somewhere?

4.5 Public Space

Following the questions on Public Transport, questions were asked about the opinion of respondents on the public space in their neighbourhood. Firstly, respondents have been asked about the presence of green space in their neighbourhood. This has been with the help of the questions "*Are there enough trees and plants in your neighbourhood?*", "*Are there enough lawns in your neighbourhood?*" and "*Are there enough playgrounds in your neighbourhood?*". In Wolfskuil 77% of the respondents are happy about the number of trees and plants in their neighbourhood, 63% of the respondents are happy about the number of lawns in their neighbourhood and 71% of the respondents are happy about the number of playgrounds in their neighbourhood. In Oosterflank 88% of the respondents are happy about the number of trees and plants in their neighbourhood, 81% of the respondents are happy about the number of lawns in their neighbourhood and 75% of the respondents are happy about the number of playgrounds in their neighbourhood. In Holtenbroek IV 94% are happy about the number of trees and plants in their neighbourhood, 81% of the respondents are happy about the number of lawns in their neighbourhood and 84% of the respondents are happy about the number of playgrounds in their neighbourhood. Figure 23 shows the results of these questions about green space in Wolfskuil, Oosterflank and Holtenbroek IV.

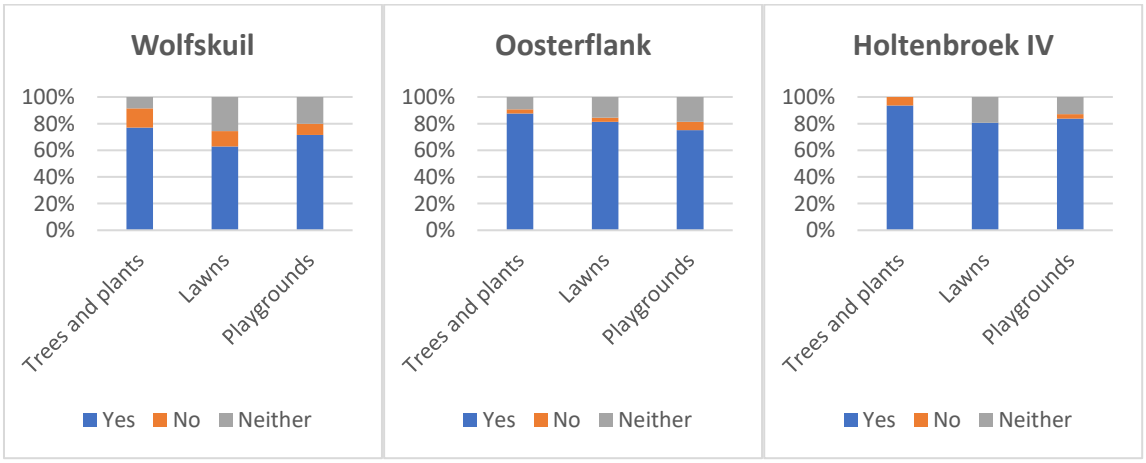

Figure 23: Are you happy about the green space in your neighbourhood?

Additionally, the respondents were asked the question "*Is the green space in your neighbourhood clean and well-maintained?*". Of the respondents in Wolfskuil, 40% were happy about the state of the green space, while 29% of the respondents were unhappy about the state of the green space and 31% of the respondents did not have a strong opinion on the state of the green space in their neighbourhood. In Oosterflank 41% of the respondents were happy about the state of the green space in their neighbourhood, 31% of the respondents were unhappy about the state of the green space in their neighbourhood and 28% of the respondents had no strong meaning on this. In Holtenbroek IV 47% of the respondents were happy about the state of the green space in their neighbourhood, 20% of the respondents were

unhappy about the state of the green space in their neighbourhood and 33% of the respondents did not have a strong meaning on this (Figure 24).

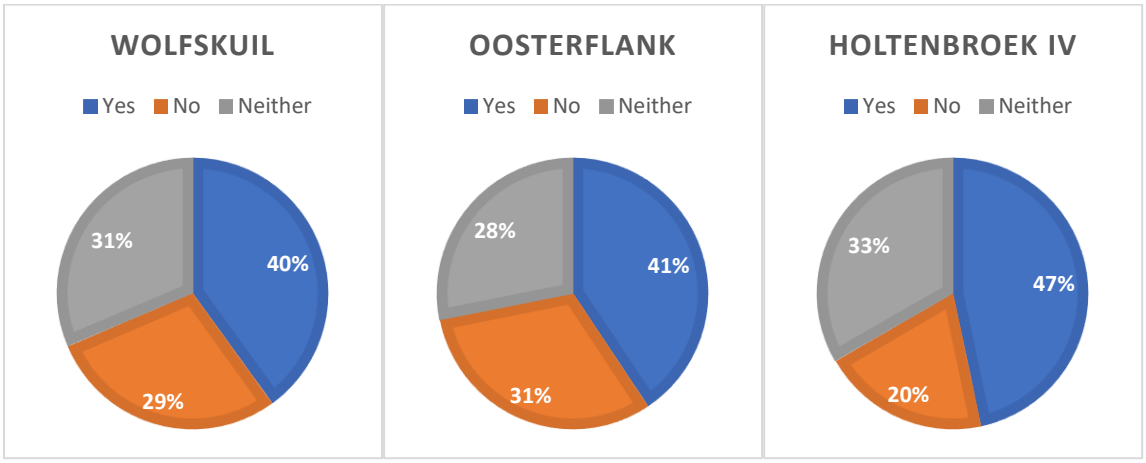

Figure 24: Are you happy about the state of the green space in your neighbourhood?

After asking the respondents about green space in the neighbourhood, they were asked about the 'grey space' in their neighbourhood. As mentioned earlier, grey space consists of all hardened surfaces consisting of for example asphalt, brick and concrete. The respondents were asked the question "*Is there too much 'grey space', like asphalt, in your neighbourhood?*". As can be seen in Figure 25, in Wolfskuil 32% of the respondents indicated they think that there is too much grey space in their neighbourhood, 37% of the respondents indicated that they do not think that there is too much grey space in their neighbourhood and 31% of the respondents did not have a strong meaning on this subject. In Oosterflank 34% of the respondents think that there is too much grey space in their neighbourhood, 28% of the respondents think that there is not too much grey space in their neighbourhood and 38% of the respondents have no strong meaning on this subject. In Holtenbroek IV 50% of the inhabitants think that there is too much grey space in their neighbourhood, 27% of the respondents think that there is not too much grey space in their neighbourhood and 23% of the respondents have no strong meaning on this subject.

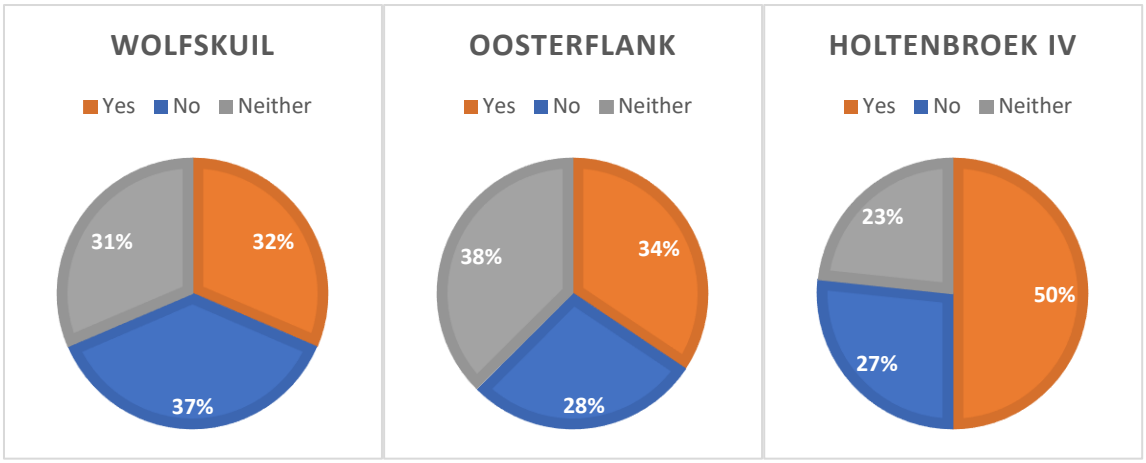

Figure 25: Is there too much 'grey space', like asphalt, in your neighbourhood in your opinion?

Finally, respondents were asked about places to meet people in their neighbourhood. This was done by asking the question "*Are there enough places where people can meet in your neighbourhood?*". More than half of the respondents in Wolfskuil were positive about places for people to meet, as 54% answered yes. Only 20% of the respondents answered no and 26% of the respondents had no strong meaning about places where people can meet in Wolfskuil. In Oosterflank more than half of the respondents were positive about the number of places where people can meet in their neighbourhood. 52% of the respondents answered yes, while 16% of the respondents answered no and 32% of the respondents answered neither. In Holtenbroek IV 90% of the respondents think that there are enough places where people can meet in their neighbourhood, 7% of the respondents think that there are not enough places where people can meet in their neighbourhood and 3% of the respondents have no strong opinion on this subject. The distribution of the respondents regarding this question is shown in Figure 26 below.

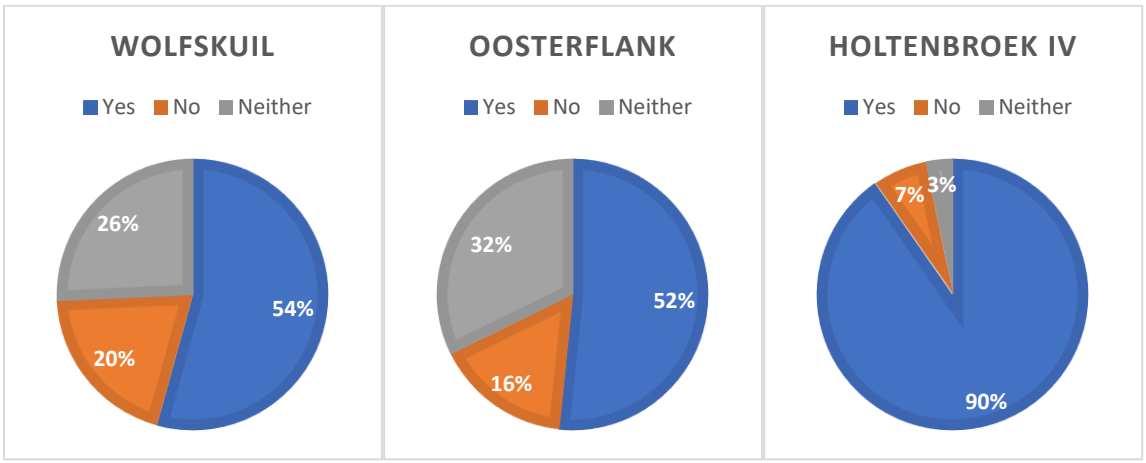

Figure 26: Are there enough places where people can meet in your neighbourhood?

4.6 Current Active Living Behaviour

To find out more about the current active living behaviour of inhabitants of the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV, surveys included questions about the amount of physical activity of inhabitants. Below, the results are presented about the current active living behaviour of the respondents of the surveys in Wolfskuil, Oosterflank and Holtenbroek IV. The current active living behaviour is researched in light of the three categories of physical activity introduced earlier (Miles, 2007), namely light physical activity, moderate physical activity and vigorous physical activity. For all of these categories is asked how often people are physically active and how many minutes a day people spend on these activities on average.

For the category 'light physical activity' the respondents were asked the question "*How many days in the week are you going to school, work or shops by foot or by bike?*" followed by the question "*How many minutes per day are you going to school, work or shops by foot or by bike?*". In Wolfskuil respondents go on average around 3,7 days to school, work or shops by bike and do this on average 24 minutes per day. In Oosterflank respondents go on average 4 days to school, work or shops by foot or by bike for an average of 25 minutes per day. In Holtenbroek IV respondents on average go 4,6 days to school, work or shops by foot or by bike. The respondents of the survey in Holtenbroek IV spent on average 14 minutes per day on this.

For the category 'moderate physical activity' respondents were asked the question "*How many days in the week are you physically active during your leisure time (walking, cycling, gardening, etc.)?*" followed by the question "*How many minutes per day are you physically active during your leisure time (Walking, cycling, gardening, etc.)?*". In Wolfskuil respondents are on average around 4,1 days per week physically active during their leisure time and do this on average 48 minutes per day. In Oosterflank respondents of the survey are on average around 4,4 days per week physically active during their leisure time and spend on average 48 minutes per day on this. Respondents of the survey in Holtenbroek IV spent on average around 3,9 days per week being physically active during their leisure time and are physically active for around 46 minutes per day.

For the category 'Vigorous physical activity the questions "*How many days in the week are you doing heavy housework or jobs at home?*" and "*How many minutes per day are you doing heavy housework or jobs at home?*" were asked. In Wolfskuil respondents on average did heavy housework or jobs at home for 2,2 days per week and did this for an average of 51,1 minutes per day. In Oosterflank respondents did heavy housework or jobs at home on average 1,6 days per week and for around 32 minutes per day. Respondents in Holtenbroek IV did on average heavy housework or jobs at home for 1,2 days per week, spending on average around 20 minutes per day on this.

4.6.1 Spatial Key Factors

With the collected data through the door-to-door surveys, multiple regression analyses have been conducted to find out more about 1) the relationship between the spatial key factors ‘walkability’, ‘bikeability’, ‘public transport’ and ‘public space’ on the active living behaviour of inhabitants and 2) the relationship between the attitude regarding walking, cycling and public transport on the active living behaviour of inhabitants in Wolfskuil, Oosterflank and Holtenbroek IV. The complete regression analyses can be found in Appendix 2, 3 and 4 for Wolfskuil, Oosterflank and Holtenbroek IV respectively.

First, the outcome of the regression analyses regarding the relationship between the spatial key factors ‘walkability’, ‘bikeability’, ‘public transport’ and ‘public space’ and the current active living behaviour of inhabitants in Wolfskuil, Oosterflank and Holtenbroek IV will be presented.

In Wolfskuil, no significant relationships have been found between the spatial key factors for a transition to a car-free neighbourhood and light physical activity. However, a significant relationship has been found between walkability and moderate physical activity ($p=0,019 < 0,05$) in Wolfskuil. The relationship between walkability and moderate physical activity is positive ($B = 4,400$). This means that when the walkability increases, the moderate physical activity of respondents will also increase. For Wolfskuil can therefore be stated that the active living behaviour increases when walkability increases, as walkability has a significant positive influence on moderate physical activity.

In Oosterflank there has not been found a significant relationship between the spatial key factors for a transition to a car-free neighbourhood and light and moderate physical activity. This means that no relationship between the key factors for a transition to a car-free neighbourhood and active living behaviour can be showed in Oosterflank, regarding both light physical activity and moderate physical activity.

In Holtenbroek IV, there has been found a significant relationship between the spatial key factor for a transition to a car-free neighbourhood ‘public transport’ and light physical activity ($p= 0,009 < 0,05$). This relationship between public transport and light physical activity is negative activity ($B = -2,873$), this means that better public transport accessibility would lead to a decrease in light physical activity in Holtenbroek IV. There also has been found a relationship between the spatial key factor for a transition to a car-free neighbourhood ‘bikeability’ and moderate physical activity ($p= 0,042 < 0,05$). This relationship between bikeability and moderate physical activity is positive ($B = 4,640$), meaning that an increase in bikeability would lead to an increase in moderate physical activity in Holtenbroek IV. Overall can be stated that an increase in public transport accessibility would lead to a decrease in the active living

behaviour and that an increase in bikeability would lead to an increase in active living behaviour.

4.6.2 Attitude

Second, the outcome of the regression analyses regarding the relationship between the attitude toward alternative transportation methods of inhabitants and the active living behaviour of inhabitants in Wolfskuil, Oosterflank and Holtenbroek IV will be presented.

In Wolfskuil there have not been found any significant relationships between the attitude regarding alternative active transportation methods and light and moderate physical activity. This means that no relationships have been found between the attitude regarding active alternative transportation methods and the active living behaviour of respondents in Wolfskuil.

In Oosterflank, there have not been found any significant relationships between the attitude toward alternative active transportation methods on light physical activity. Also, there have not been found any significant relationships between the attitude on alternative active transportation methods on moderate physical activity in Oosterflank. This means that no relationships have been found between the attitude regarding active alternative transportation methods and the active living behaviour of respondents in Oosterflank.

In Holtenbroek IV, there have not been found any significant relationships between the attitude toward alternative active transportation methods on light physical activity. However, there has been found a significant relationship between ‘like to use the bicycle as transportation method’ and moderate physical activity ($p= 0,015 < 0,05$) in Holtenbroek IV. This relationship between ‘like to use the bicycle as transportation method’ and moderate physical activity is positive ($B= 1,715$). This means that the attitude of respondents regarding the use of the bicycle as transportation method significantly influences the active living behaviour of the respondents in Holtenbroek IV.

5. Discussion

In this Chapter, the findings of this research will be interpreted and discussed according to the existing literature. First, the presence of key factors for a transition to a car-free neighbourhood in Wolfskuil, Oosterflank and Holtenbroek IV will be discussed, followed by the influence of the spatial key factors and the attitude regarding walking, cycling and public transport on the active living behaviour that is found in Wolfskuil, Oosterflank and Holtenbroek IV.

5.1 Presence of key factors

According to the existing literature presented in Chapter 2, the key factors 'governmental policies', 'walkability', 'bikeability', 'public transport' and 'public space' should be present on a high level to facilitate the possibility for a transition to a car-free neighbourhood (Edwards & Tsouros, 2006; Nieuwenhuijsen & Kreijs, 2016). To provide a foundation for a transition to a car-free neighbourhood, it is therefore expected that somehow the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV have governmental policies that support a transition to a car-free neighbourhood with development plans for alternative, active mobility methods, plans to reduce car-use and public space development plans to create an active living environment. According to the existing literature, to provide a foundation for a transition to a car-free neighbourhood it is also expected that the spatial key factors walkability, bikeability, public transport and public space are of high quality in neighbourhoods (Southworth, 2005; Hagen & Rynning, 2021; Nieuwenhuijsen & Kreijs, 2016).

With plans to develop the bicycle network, create better public transport accessibility, reduce grey spaces and create more green spaces, the governmental policies in Wolfskuil are supportive of a transition to a car-free neighbourhood. Also, the governmental policies in Oosterflank support a transition to a car-free neighbourhood, through development plans for walkability, bikeability, public transport and public space in the neighbourhood, to induce a modal shift from car-based mobility to alternative, more active mobility methods. In Holtenbroek IV, the governmental policies are equally supportive of a transition to a car-free neighbourhood, as the policies aim to prioritize the development of active transportation methods over the development of car-based mobility and aim at creating car-free areas to support the choice for active transportation methods. We can conclude that in Wolfskuil, Oosterflank and Holtenbroek IV, the governmental policies are therefore supporting a transition to a car-free neighbourhood.

Based on this conclusion, the existing governmental policies in Wolfskuil, Oosterflank and Holtenbroek IV provide opportunities for the development of active mobility methods and the development of an active living environment in these neighbourhoods. As active mobility

methods are prioritised in the policy documents, there are opportunities for further development of walkability, bikeability, and public transport in Wolfskuil, Oosterflank and Holtenbroek IV. With improved active transportation methods, the dependency on cars could decrease, as better transportation alternatives become available (Topp & Pharoah, 1994). In combination with the aim to develop more green spaces in Wolfskuil, Oosterflank and Holtenbroek IV, this could lead to a more attractive living environment, where people are choosing to use active transportation methods more often. This development of active mobility methods and the active living environment in Wolfskuil, Oosterflank and Holtenbroek IV could be accomplished by a transition to a car-free neighbourhood (Nieuwenhuijsen & Khreis, 2016).

According to the conducted surveys, walkability, bikeability, public transport and public space are on average regarded positively in Wolfskuil, Oosterflank and Holtenbroek IV. The positive response regarding walkability, bikeability, public transport and public space can be explained as all three neighbourhoods provide infrastructure and accessibility for pedestrians, cyclists and public transport and the public space in all three neighbourhoods provides multiple green spaces and places where people can meet. In all three neighbourhoods however, some aspects of walkability, bikeability, public transport and public space are regarded as less positive than expected.

As an example, in Wolfskuil, Oosterflank and Holtenbroek IV, the quality of walking paths, the attitude toward public transport as a transportation method and the maintenance of green space in the neighbourhood are regarded as less positive. The lack of quality of walking paths can be explained as most walking paths in Wolfskuil, Oosterflank and Holtenbroek IV are unpaved, which makes these walking paths easily affected by weather and intensive use, leading to uneven walking paths and even holes in walking paths. An explanation for the relatively negative attitude toward public transport as a transportation method could be that people find public transport too expensive compared to other available transportation methods, as public transport is very expensive in the Netherlands (Nieuwenhuijsen & Khreis, 2016). The experienced lack of green space maintenance is mainly caused by trees and plants overgrowing people’s personal properties, according to comments that were made in the survey conducted in Wolfskuil, Oosterflank and Holtenbroek IV.

In Wolfskuil and Oosterflank, the attitude toward cycling as a transportation method is less positive than expected. In Wolfskuil, this could be explained by the small streets that are crowded with cars, which leave less space for cyclists, making cycling through the neighbourhood less attractive. In Oosterflank however, this is different, as the attitude on cycling in their neighbourhood itself is regarded very positively, while using the bicycle as a transportation method is regarded less positively than expected. This can be explained as

people in Oosterflank have more alternative transportation methods available, such as busses, metros, trains and cars. As mentioned before, the public transport in the Netherlands is expensive. However, for certain groups, including students and elderly, public transport is made cheaper. According to comments that were made during the survey conduction, there are people in Oosterflank, mainly from these groups, that prefer public transport over cycling as a transportation method.

5.2 Influence on active living behaviour

According to the existing literature, a transition to a car-free neighbourhood can lead to an increase in the active living behaviour of inhabitants (Nieuwenhuijsen & Khreis, 2016). According to Sallis et al. (2004) and Calogiuri & Chroni (2014), a potential ongoing or future transition to a car-free neighbourhood should result in a positive influence from the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space' on the active living behaviour. Looking at the literature, I assumed that there is a positive influence from the spatial key factors on the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV. By comparing the empirical findings with what stated in the literature, I can conclude that my assumptions regarding the influence from the spatial key factors on the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV are partially confirmed.

The empirical findings concerning a positive relationship between walkability and active living behaviour in Wolfskuil, through a positive influence of walkability on moderate physical activity, confirms what stated in the literature. The positive relationship between walkability and active living behaviour can be explained as increased walkability makes walking more attractive, leading to people being encouraged to walk from and to their destination and therefore increasing their active living behaviour (Southworth, 2005). Also, the found positive relationship between bikeability and active living behaviour in Holtenbroek IV, through a positive influence from bikeability on moderate physical activity, is in line with my assumptions. The positive relationship between bikeability and active living behaviour in Holtenbroek IV can be explained as increased bikeability makes cycling more attractive, leading to more people using the bicycle as a transportation method. As cycling is an active method of transportation, more people using the bicycle as a transportation method will increase the active living behaviour of these people (McNeil, 2011).

The found negative relationship between public transport accessibility and active living behaviour in Holtenbroek IV, through a negative influence from the public transport accessibility on light physical activity, is however not in line with my expectations. An explanation for this negative relationship between public transport accessibility and light

physical activity in Holtenbroek IV could be that the accessibility of public transport is already very high in this neighbourhood. A higher accessibility of public transport could lead to people choosing public transport over other active transportation methods, such as walking and cycling. As walking and cycling require more light physical activity than public transport use, the increase in public transport accessibility could lead to a decrease in light physical activity and therefore to a decrease in active living behaviour (Sallis et al., 2004).

Based on the literature, a transition to a car-free neighbourhood could also increase active living behaviour through a positive change in attitude regarding using active transportation methods, according to the Theory of Planned Behaviour (Ajzen, 1985). Given this theoretical background, I assumed that there is a positive influence from the attitude people have toward walking, cycling and public transport on the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV.

The found positive influence of the attitude toward cycling as a transportation method on the active living behaviour in Holtenbroek IV, through a positive influence from the attitude on cycling as a transportation method on moderate physical activity, is in line with my assumptions. According to the Theory of Planned Behaviour, the behaviour of people is shaped by the attitude of people (Ajzen, 1985). In the case of Holtenbroek IV, the attitude people have towards cycling as a transportation method shapes their behaviour regarding using the bicycle as a transportation method, meaning that a more positive attitude regarding cycling as a transportation method will increase their active living behaviour, as cycling is an active transportation method.

Regarding other spatial key factors and attitudes, no significant results have been found in this research. When looking at the neighbourhood characteristics of Wolfskuil, Oosterflank and Holtenbroek IV, no neighbourhood-specific explanation can be found for not finding significant results. There are however multiple possible explanations for these findings regarding the used door-to-door surveys. Firstly, the way the questions in the survey were formulated and constructed could be an explanation for not finding significant relationships. The questions were conducted on a scale of three answers, which did not give respondents the chance to give a precise indication about the walkability, bikeability, public transport and public space in their neighbourhood. Secondly, the number of respondents to the surveys in Wolfskuil, Oosterflank and Holtenbroek IV could play a role in this. The number of respondents was 35 in Wolfskuil, 32 in Oosterflank and 31 in Holtenbroek IV, which is not as high as I aspired it to be. The relatively low number of respondents in the surveys could have prevented the results from being significant, as a higher number of respondents increases the reliability and therefore leads to more significant results.

6. Conclusion

The research in this thesis aims to answer the main research question "*To what extent and how can a transition to a car-free neighbourhood influence the active living behaviour in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV?"*. The main research question will be answered with the help of the sub-questions and will conclude the entire research. The used sub-questions used in this research are:

1. *How can 'active living behaviour' be defined and how is active living behaviour achieved?*
2. *What is meant by the 'car-free city' concept and how do we achieve a car-free city?*
3. *Are the existing governmental policies supporting or hampering the transition to a car-free neighbourhood in Wolfskuil, Oosterflank and Holtenbroek IV?*
4. *To what extent are the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space' present in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV?*
5. *How do the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space' influence the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV?*
6. *How do behavioural intentions of inhabitants regarding different car-free factors influence the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV?*

6.1 Sub-questions

1. How can 'active living behaviour' be defined and how is active living behaviour achieved?

The literature research presented in the theoretical framework (Chapter 2) provides a clear definition of active living behaviour. Active living behaviour can be defined as the "individual's decision to be active" (Calogiuri & Chroni, 2014, p. 2). Active living behaviour is used in this thesis to describe the extent to which each individual decides to participate in active living in their daily lives (Ludden, 2017). This includes the amount of physical activity of individuals through doing housework, physical activity when moving from A to B and all other forms of physical activity regularly.

According to the literature research, active living behaviour is shaped by several factors, including behavioural intentions. According to the Theory of Planned Behaviour, the attitude, subjective norm and perceived behaviour of people in active living shape their behavioural intentions regarding active living, which leads to a certain active living behaviour (Ajzen, 1985). Further, walkability, bikeability, public transport accessibility, the presence of an active living environment and the inclusion of green space in the living environment could positively influence the active living behaviour of the inhabitants (Calogiuri & Chroni, 2014).

The first factor that could influence the attractiveness of active living behaviour is the presence of active mobility infrastructure and services. This includes infrastructure for pedestrians and cyclists, as well as public transport infrastructure and services. The presence of active mobility infrastructure and services provides people with more opportunities to participate in active methods of transport (Sallis et al., 2004).

The second factor that could influence the attractiveness of active living behaviour is the presence of green space in the neighbourhood. This includes spaces like parks, plants, trees and playgrounds in the neighbourhood, where people can go to enjoy nature, take a walk and meet other people for example. In neighbourhoods with more green spaces, it has been shown that people are more likely to be more active in their daily lives (Calogiuri & Chroni, 2014).

The third factor that could influence the attractiveness of active living behaviour is behavioural intentions people have regarding active living behaviour. According to the Theory of Planned Behaviour, discussed in Chapter 2.5, the behaviour people exhibit is dependent on their behavioural intentions. These behavioural intentions of people, influenced by attitude, subjective norms and perceived behavioural control, also are relevant to the active living behaviour of people (Ajzen, 1985).

2. What is meant by the 'car-free city' concept and how do we achieve a car-free city?

According to the literature discussed in Chapter 2, the term 'car-free city' entails the implementation of significant restrictions on the use of motor vehicles in a city. This means that motor vehicles, including cars, are restricted in their movements, within a designated area (Nieuwenhuijsen & Khreis, 2016). The idea behind the car-free city concept is to make the use of alternative transportation methods more attractive than the use of the car as a transportation method, resulting in more people choosing alternative methods of transport. According to the literature research, this shift in choice of transportation method from car-based mobility to alternative methods of transport can lead to the following positive effects:

- Reduced car traffic;
- Reduced air pollution;
- Higher safety;
- Health benefits;
- More possibilities for green space.

According to Nieuwenhuijsen & Kreijs (2016), there are five key factors for a transition to a car-free city. The first key factor for a transition to a car-free city is the presence of governmental policies that support a car-free city transition. This includes policies that support restrictions on

car use, but also policies supporting the development and use of alternative transportation methods. The other key factors for a transition to a car-free city are walkability, bikeability, public transport and public space. For a transition to a car-free city, the existing walkability, bikeability and public transport must provide transportation options that can compete with car-based mobility. To support a transition to a car-free neighbourhood, the public space should provide an active living environment that makes the use of active transportation methods more attractive. All in all, the five main key factors that need to be present for a transition to a car-free city are ‘governmental policies’, ‘walkability’, ‘bikeability’, ‘public transport’ and ‘public space’. The extent to which these five key factors are present in an area defines the opportunities for a transition to a car-free city.

3. Are the existing governmental policies supporting or hampering the transition to a car-free neighbourhood in Wolfskuil, Oosterflank and Holtenbroek IV?

As presented in Chapter 4 and discussed in Chapter 5, the governmental policy documents regarding spatial planning and mobility on all levels of government in Wolfskuil, Oosterflank and Holtenbroek IV include plans for the development of pedestrian infrastructure, bicycle infrastructure and public transport infrastructure to increase the use of active transportation methods by inhabitants. With this aim to increase the use of active transportation methods, the governmental policies in Wolfskuil, Oosterflank and Holtenbroek IV aim to decrease the use of cars by inhabitants, to create a more sustainable and active transport network. The governmental policy documents in Wolfskuil, Oosterflank and Holtenbroek IV also plan to develop public spaces from an active mobility perspective, which includes the development of green spaces, shared spaces and public transport accessibility in the public space. All in all, this means that the existing governmental policies in Wolfskuil, Oosterflank and Holtenbroek IV are supportive of a transition to a car-free neighbourhood.

4. To what extent are the spatial key factors ‘walkability’, ‘bikeability’, ‘public transport’ and ‘public space’ present in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV?

The four spatial key factors ‘walkability’, ‘bikeability’, ‘public transport’ and ‘public space’ are present to an acceptable extent to provide a foundation for a transition to a car-free neighbourhood in Wolfskuil, Oosterflank and Holtenbroek IV. The presence of walkability and bikeability is regarded very positively in Holtenbroek IV, mainly because all parts of walkability and bikeability are present to a large extent in Holtenbroek IV. In Wolfskuil and Oosterflank the presence of walkability and bikeability is also regarded fairly positively, however in these

neighbourhoods some aspects of walkability and bikeability are lacking behind compared to Holtenbroek IV. For Wolfskuil this includes the quality of walking paths, the presence of bikeable areas, the presence of cycling lanes, the attitude toward cycling in the neighbourhood and the attitude toward cycling as a transportation method. For Oosterflank this includes the experienced safety when walking through the neighbourhood and the attitude on cycling in the neighbourhood. Public transport accessibility is regarded very positively in all three neighbourhoods, mainly because of the large number of available public transport services in Wolfskuil, Oosterflank and Holtenbroek IV. The attitude regarding using public transport as a transportation method is however not very positive in Wolfskuil, Oosterflank and Holtenbroek IV, but the existing policy documents in these neighbourhoods aim to improve the attractiveness of using public transport. The public space is regarded positively in Oosterflank and Holtenbroek IV, as all aspects of public space are present to a large extent in these neighbourhoods. The public space in Wolfskuil is regarded less positive, mainly due to less available green space in the neighbourhood compared to Oosterflank and Holtenbroek IV.

All in all, the spatial key factors for a transition to a car-free neighbourhood are all present in Wolfskuil, Oosterflank and Holtenbroek IV. As the spatial key factors walkability, bikeability, public transport and public space are present to the largest extent in Holtenbroek IV, the foundation for a transition to a car-free neighbourhood is the best in Holtenbroek IV. However, for all three neighbourhoods can be said that there is a foundation for a transition to a car-free neighbourhood, according to the current presence of walkability, bikeability, public transport and public space.

5. How do the spatial key factors 'walkability', 'bikeability', 'public transport' and 'public space' influence the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV?

In Wolfskuil, the spatial key factor walkability has a positive influence on active living behaviour, through a positive influence of walkability on moderate physical activity. This influence can be explained as increased walkability increases encouraging people to walk to their destination, instead of using another method of transport. As walking is a method of transport that requires moderate physical activity, an increase in walking will increase the moderate physical activity. In Wolfskuil, walkability therefore positively increases active living behaviour, through moderate physical activity. Regarding the other spatial key factors in Wolfskuil, no relationships have been found through the analysis of the data in this research.

In Oosterflank, according to the literature a positive influence is expected from the key factors walkability, bikeability, public transport and public space on active living behaviour. However,

no influence from any spatial key factor on active living behaviour has been found through the analysis of the data in this research. This means that nothing can be concluded about a relationship between the spatial key factors and the active living behaviour in Oosterflank.

In Holtenbroek IV, the spatial key factors public transport and bikeability influence active living behaviour. Firstly, the spatial key factor public transport negatively influences active living behaviour, through a negative influence from public transport on light physical activity in Holtenbroek IV. This can be explained as improved public transport accessibility leads public transport becoming more attractive as a transportation method. This leads to people choosing public transport over other transportation methods, including walking and cycling, which require more light physical activity than the use of public transport. An increase in public transport accessibility can therefore decrease the active living behaviour in Holtenbroek IV. The spatial key factor bikeability has a positive influence on active living behaviour, though a positive influence from bikeability on moderate physical activity in Holtenbroek IV. This can be explained as the increased bikeability makes cycling more attractive, leading to people choosing the bicycle as a transportation method earlier. As cycling requires moderate physical activity, the increase in bikeability will increase the active living behaviour in Holtenbroek IV. For the other spatial key factors in Holtenbroek IV, no relationships have been found through the analysis of the data in this research.

6. How do behavioural intentions of inhabitants regarding different car-free factors influence the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV?

As elaborated in the theoretical framework (Chapter 4), behavioural intentions are shaped by attitude, subjective norm and perceived behavioural control (Ajzen, 1985). In this research only the attitude is researched with the help of collected data; the subjective norm and perceived behavioural control are too complex for this research, as elaborated in Chapter 3. The relationship between attitude and active living behaviour will be concluded according to the data collected through the surveys, while the subjective norm and the perceived behavioural control will be concluded based on the literature research.

In Wolfskuil and Oosterflank, no influence has been found from the attitude people have regarding walking, cycling and public transport on active living behaviour. This means that nothing can be concluded about the possible relationship between the attitude regarding walking, cycling and public transport and the active living behaviour in Wolfskuil and Oosterflank. In Holtenbroek IV, however, there is a positive influence from the attitude people have regarding using the bicycle as a transportation method on active living behaviour. This relationship can be explained, as a more positive attitude toward using the bicycle will result in

people choosing the bicycle more often as transportation method, leading to an increase in usage of the bicycle. As cycling falls in the category of moderate physical activity, an increase in cycling will lead to an increase in moderate physical activity. In Holtenbroek IV, a more positive attitude regarding using cycling as a transportation method will therefore lead to an increase in active living behaviour, through an increase in moderate physical activity.

According to the Theory of Planned Behaviour (Ajzen, 1985), the subjective norm and the perceived behavioural control are shaped by the environment people live in. A transition to a car-free neighbourhood in Wolfskuil, Oosterflank and Holtenbroek IV will lead to an active living environment, which makes the use of active transportation methods more attractive and encourages people to use these active transportation methods. As a result, the subjective norm and the perceived behavioural control regarding the use of active transportation methods will increase in Wolfskuil, Oosterflank and Holtenbroek IV, resulting in a positive influence from the subjective norm and the perceived behavioural control on the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV. The subjective norm and the perceived behavioural control therefore play a role in the influence of a transition to a car-free neighbourhood on active living behaviour, however in the case of Wolfskuil, Oosterflank and Holtenbroek IV the exact influence of the subjective norm and the perceived behavioural control can not be concluded.

6.2 Main Research Question

In the following paragraph, the entire research will be concluded by answering the main research question of this thesis. The answer to the main research question will be formulated with the help of the answered sub-questions. As presented before, the main research question in this thesis is:

"To what extent and how can a transition to a car-free neighbourhood influence the active living behaviour in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV?".

The results of this research have shown that the key factors for a transition to a car-free neighbourhood 'governmental policies', 'walkability', 'bikeability', 'public transport' and 'public space' are present to a good extent in Wolfskuil, Oosterflank and Holtenbroek IV. Firstly, the existing governmental policy documents in Wolfskuil, Oosterflank and Holtenbroek IV are all supportive of a transition to a car-free neighbourhood. The collected policy documents aim to prioritize active methods of transport over car-based mobility, aim to develop the infrastructure and accessibility of these active methods of transport further, aim to develop the public space from an active mobility perspective and are in favour of a reduction of car-based mobility. According to the conducted door-to-door surveys, walkability, bikeability, public transport and public space are present to a large extent in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV. In Holtenbroek IV these four spatial key factors are present to the largest extent, followed by Oosterflank and Wolfskuil respectively. This means that, regarding the presence of spatial key factors, Holtenbroek IV provides the best foundation for a transition to a car-free neighbourhood. However, according to the results of this research it can be concluded that Wolfskuil, Oosterflank and Holtenbroek IV all provide good premises for a transition to a car-free neighbourhood.

According to the literature research, a possible transition to a car-free neighbourhood would positively influence the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV. The results of this research partially confirm this, as the results show that walkability influences active living behaviour positively in Wolfskuil and that bikeability influences active living behaviour positively in Holtenbroek IV. However, the results also show that there is a negative influence of public transport on active living behaviour in Holtenbroek IV because of the already high accessibility of public transport in Holtenbroek IV. For the other spatial key factors in Wolfskuil, Oosterflank and Holtenbroek IV, no significant relationships have been found. In Holtenbroek IV, the attitude toward using the bicycle as a transportation method positively influences active living behaviour. For the attitude regarding other active transportation methods in all three neighbourhoods, nothing can be stated about a potential influence, although according to the Theory of Planned Behaviour (Ajzen, 1985) it is expected that a more positive attitude toward active transportation methods will lead to more active living

behaviour. According to the Theory of Planned Behaviour (Ajzen, 1985) it is also expected that the subjective norm and perceived behavioural control regarding walking, cycling and public transport have a positive influence on active living behaviour, however, this is not confirmed for Wolfskuil, Oosterflank and Holtenbroek IV in this research. For Wolfskuil, Oosterflank and Holtenbroek IV, the positive influence of the spatial key factors and the attitudes regarding active transportation methods on active living behaviour is only partially confirmed in this research. If the local governments of Wolfskuil, Oosterflank and Holtenbroek IV want to increase the active living behaviour in these neighbourhoods, a transition to a car-free neighbourhood would be an option to consider.

7. Reflection

This section consists of the reflection of the done research in this thesis. Including the reflection on the existing literature, the used research strategy, the used research methods and the results of this thesis.

Concerning the literature, mainly the research by Nieuwenhuijsen & Khreis (2016) provided a useful framework for me. The important aspects of a transition to a car-free city according to Nieuwenhuijsen & Khreis (2016), can also be considered important aspects for my research on car-free neighbourhoods and provided the base for further literature research in this thesis. Regarding the relationship between a car-free neighbourhood and active living behaviour, mainly the research by Edwards & Tsouros (2006) provided interesting concepts, such as active mobility and active living environment. To research the relationship between a transition to a car-free city and active living behaviour, I used the Theory of Planned Behaviour (Ajzen, 1985) to find out more about the influence of the attitude, subjective norm and perceived behavioural control regarding active transportation methods on the active living behaviour. Although it was hard to implement the subjective norm and the perceived behavioural control, the implementation of the attitude from the Theory of Planned Behaviour (Ajzen, 1985) worked well in my opinion.

When looking at the research strategy, the multiple case study helped to compare the active living behaviour and the possibilities for a transition to a car-free neighbourhood in three similar neighbourhoods. However, researching three cases at a time, limited the depth of the research for each single researched case. If this thesis would have focused on just one case, I could have research this case more in-depth, for example by looking at more detailed aspects of a transition to a car-free neighbourhood or by increasing the number of respondents for my survey.

The used research methods in this thesis are divided into desk research, consisting of literature research and policy document collection, and field research, consisting of door-to-door surveys. Regarding the desk research, the literature research helped me to create a theoretical framework and to create the conceptual model, on which the entire research was based. Mainly the research by Nieuwenhuijsen & Khreis (2016) helped me determine the key factors for a transition to a car-free neighbourhood, while the Theory of Planned Behaviour by Ajzen (1985) helped me to find out more about the influence of the attitude of people on their active living behaviour. The use of a policy document collection provided insight into the existing governmental policies on a national, regional and local level in Wolfskuil, Oosterflank and Holtenbroek IV. The governmental policies for Wolfskuil, Oosterflank and Holtenbroek IV were easily accessible and provided the information needed for this research. On a national level,

the available policy documents did not go into very much detail, as the national policies for spatial planning and mobility are mainly created to provide a framework for regional and local policies. The policy documents on a regional and local level provided more detailed information about the existing policies and directions for future development regarding spatial planning and mobility. Although I would have preferred to go into more detail regarding the governmental policies, which was not achievable due to the length of this thesis, I think the policy document collection worked very well to create more insight into the existing policies of Wolfskuil, Oosterflank and Holtenbroek IV.

Regarding the field research, the door-to-door surveys worked really well in my opinion. With the help of the surveys, I was able to obtain information about the current active living behaviour of inhabitants of Wolfskuil, Oosterflank and Holtenbroek IV and on the opinion of inhabitants of these neighbourhoods on the spatial key factors for a transition to a car-free neighbourhood. The results of the door-to-door surveys gave me insight into how the inhabitants of Wolfskuil, Oosterflank and Holtenbroek IV regard the different aspects of walkability, bikeability, public transport and public space in their neighbourhood. In addition to this, the results of the door-to-door surveys helped me to find out if the expected relationship between the spatial key factors for a transition to a car-free neighbourhood and the active living behaviour that was stated by Nieuwenhuijsen & Khreis (2016) is applicable in Wolfskuil, Oosterflank and Holtenbroek IV. The door-to-door surveys also helped to find out more about the relationship between the attitude of inhabitants on active transportation methods and the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV. Regarding the subjective norm and the perceived behavioural control, the door-to-door surveys did not work so well, as I did not collect data to include these aspects of the Theory of Planned Behaviour (Ajzen, 1985) to find out the exact influence of subjective norm and perceived behavioural control on the active living behaviour in Wolfskuil, Oosterflank and Holtenbroek IV.

Looking back at the results, I did not obtain as many significant relationships out of the survey data as I had hoped to. If I did the research again, I would try to address this problem by formulating some of the survey questions differently, by increasing the number of respondents to the surveys and by using larger scales in the survey questions. Addressing some of the questions differently would prevent confusion among respondents, leading to more valid responses. Increasing the number of respondents to around 100 per neighbourhood would also increase the reliability of the results, as there would be more answers given to each question. In the surveys, most questions had a scale width of three, while a scale width of five or even seven might have fitted better. I think if some questions were formulated differently, if there were more respondents to the conducted surveys and if the scales of the questions were larger, there would have been more significant results to the regression analyses in this thesis.

8. Recommendations for future research

This thesis researched the use of the concept of car-free cities to create a more active living environment in the neighbourhoods Wolfskuil, Oosterflank and Holtenbroek IV. However, some interesting interfaces of this subject remain untouched and are interesting for further research. In this section, recommendations for further research will be discussed.

The costs that a transition to a car-free neighbourhood would bring with it are not considered in this thesis. A transition to a car-free neighbourhood can bring many different types of costs with it. For example, a car-free neighbourhood transition will cost money to realise, but it also might cost inhabitants money, as they might have to adapt to the car-free environment. It would be interesting for future research to focus on the costs that can come with such a transition to a car-free neighbourhood.

A second interesting topic that touches on the research done in this thesis but has not been included in this thesis is research on how fitting specific car-free measures are and how effective different specific car-free measures are. In this research, specific car-free measures have only been named. To find out specifically what car-free measures can be implemented in each neighbourhood, it would be interesting to research what car-free measures would be the most fitting and effective for each neighbourhood.

In this research, three cases with similar characteristics were researched, to derive common patterns. In future research, it could be interesting to do comparative research between multiple cases with different characteristics. This way, the results of a similar study to this thesis could show what foundation various types of neighbourhoods have for a transition to a car-free neighbourhood and if there is a difference in the relation between a transition to a car-free neighbourhood and active living behaviour.

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10. Appendix

Appendix 1: Survey

Appendix 2: Output Wolfskuil

Appendix 3: Output Oosterflank

Appendix 4: Output Holtenbroek IV

10.1 Appendix 1: Survey

Introductie

Jouw omgeving heeft invloed op je gezondheid. Dat kan op veel verschillende manieren, door lopen of fietsen, geluid of groen. Soms zijn die dingen goed en soms minder goed. Dat wordt duidelijk door deze Leefplekmeter. Als je weet wat goed is en wat beter kan, kun je dingen veranderen. Daarom horen we graag jouw mening. Zo kunnen we samen zorgen voor een fijne omgeving. Deze vragen gaan over de omgeving waar je woont. Dit zijn je straat, de buurt en andere plekken dichtbij huis. Door antwoord op de vragen te geven, zeg je wat je goed en minder goed vindt in jouw buurt. Zo kun je samen met je buurt, en de gemeente keuzes maken voor volgende stappen.

Privacy

Dit onderzoek wordt uitgevoerd door studenten van de Radboud Universiteit om te onderzoeken hoe u het wonen in uw buurt ervaart en welke verbeterpunten er volgens u zijn. Zo kan de gemeente uw buurt gericht verbeteren. Wanneer u meedoet aan dit onderzoek, verwerken we de persoonsgegevens die u invult. Wij houden ons hierbij aan de regels uit de Algemene verordening gegevensbescherming (AVG). Uw gegevens worden alleen gebruikt voor dit onderzoek en blijven bewaard om te kunnen toetsen of woonervaringen in de loop der jaren veranderen. Nadat deze analyses zijn gedaan, worden de gegevens verwijderd. De uitkomsten van het onderzoek zijn volledig anoniem en dus niet naar u te herleiden. U bepaalt tijdens het onderzoek zelf welke vragen u wel of niet beantwoordt. Heeft u vragen over uw privacy bij deelname aan dit onderzoek? Stel ze gerust aan onze interviewer, hij/zij vertelt u graag meer.

Wil u meer weten over hoe de Radboud Universiteit de privacy van deelnemers beschermd? Ga naar https://www.ru.nl/vaste-onderdelen/privacyverklaring-radboud-universiteit/ voor meer informatie.

Vragen

V0 Ik ben akkoord met de privacy verklaring en doe graag mee aan dit onderzoek:

- ○ Ja

- Nee

V1. U heeft de deur geopend, dus waarschijnlijk woont u ook hier. Maar voor het onderzoek is het van belang om zeker te weten dat we een gesprek hebben met iemand die op dit adres woont. Daarom is mijn eerste vraag dan ook, woont u hier?

- Ja
- Nee

V2. Wat is uw postcode?

…

De volgende vragen gaan over lichamelijke beweging

V3. Hoeveel dagen in de week gaat u…

A. Fietsen of lopen naar school, werk of winkel?

…

B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)?

…

C. Zwaar huishoudelijk werk doen of klussen?

…

V4. Hoeveel minuten per dag gaat u...

A. Fietsen of lopen naar school, werk of winkel?

…

B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)?

…

C. Zwaar huishoudelijk werk doen of klussen?

…

V5. Doet u deze dingen vooral in de buurt?

A. Fietsen of lopen naar school, werk of winkel?
   - o Vooral in mijn eigen buurt
   - o Evenveel in mijn eigen buurt als buiten mijn eigen buurt
   - o Vooral buiten mijn eigen buurt
B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)?
   - o Vooral in mijn eigen buurt
   - o Evenveel in mijn eigen buurt als buiten mijn eigen buurt
   - o Vooral buiten mijn eigen buurt
C. Zwaar huishoudelijk werk doen of klussen?
   - o Vooral in mijn eigen buurt
   - o Evenveel in mijn eigen buurt als buiten mijn eigen buurt
   - o Vooral buiten mijn eigen buurt

V6. Nu gaan we het hebben over sporten. Heeft u de afgelopen maand (april) aan sport gedaan?

- o Ja
- o Nee

V7. Welke sport(en) doet u? Als u meer dan drie sporten doet, kies dan de drie belangrijkste.

…

V8. Hoe vaak sportte u afgelopen maand?

- o Iedere dag
- o 3 tot 6 keer per week
- o 1 tot 2 keer per week
- o 1 tot 3 keer per maand

V9. Waar sport u?

- o Vooral in mijn eigen buurt

- Evenveel in mijn eigen buurt als buiten mijn eigen buurt
- Vooral buiten mijn eigen buurt

We willen het nu met u gaan hebben over uw buurt.

V10. Kunt u de grenzen van uw buurt aangeven? (straten, winkels of andere opvallende punten die de grenzen van uw buurt aangeven)

…

V11. Hoe lang woont u in deze buurt?

- Minder dan 1 jaar
- 1 tot 2 jaar
- 2 tot 5 jaar
- Meer dan 5 jaar

V.12 Nu gaan we het hebben over wat u van uw buurt vindt. U mag over de volgende onderwerpen met een smiley aangeven hoe blij u daarmee bent. In mijn buurt..

1. Woont u hier graag?

2. Voelt u zich hier veilig

3. Bent u hier overdags graag buiten?

4. Bent u hier in het donker graag buiten?

5. Kunt u hier in het donker veilig alleen over straat?

6. Zijn er bomen en struiken dichtbij?

7. Zijn er grasveldjes dichtbij?

8. Zijn er speeltuinen dichtbij?

9. Zijn er dichtbij plekken om te wandelen?

10. Zijn er dichtbij plekken om te fietsen?

11. Zijn er winkels dichtbij?

12. Is de snackbar dichtbij?

13. Zijn er dichtbij plekken om mensen te ontmoeten?

14. Zijn er sportverenigingen dichtbij?

15. Zijn er dichtbij plekken om te sporten?

16. Wandelt u graag in de buurt?

17. Fietst u graag in de buurt?

18. Sport u graag in de buurt?

19. Ontmoet u vaak mensen in de buurt?

20. Gaat u vaak naar de speeltuin met uw kinderen?

21. Gaat u vaak naar de winkel in de buurt?

22. Gaat u vaak naar de snackbar in de buurt?

23. Laat u vaak eten bezorgen?

24. Vindt u dat er teveel stenen en/of asfalt zijn in de buurt?

25. Is de groene ruimte in de buurt schoon en netjes?

We willen het nu met u hebben over de groene ruimtes in uw buurt. Dit zijn bijvoorbeeld grasveldjes en parkjes waar u kunt zitten en sporten.

V13. Wat doet u in de groene ruimtes in uw buurt?

…

V14. Wat mist er nog in de groene ruimtes in uw buurt?

…

De volgende vragen gaan over vervoer

V15. U mag over de volgende onderwerpen met een smiley aangeven hoe blij u daarmee bent. In uw buurt:

1. Kunt u veilig ergens naartoe wandelen

2. Kunt u veilig op de fiets ergens naartoe?

3. Kunt u veilig sporten als u dat zou willen?

4. Vindt u dat de auto hier alle ruimte heeft?

5. Vindt u dat er voldoende autoparkeerplaatsen zijn?

6. Vindt u dat een deel van de autoparkeerplaatsen anders gebruikt kunnen worden (bijv. meer groen)?

7. Gaat u graag met de auto ergens naar toe?

8. Kunt u makkelijk met de bus/tram/trein?

9. Gaat u graag met het openbaar vervoer?

10. Vindt u dat er genoeg fietspaden zijn?

11. Vindt u de fietspaden hier fijn? (geen gaten en hobbels).

12. Zijn de fietspaden hier gescheiden van de rijbaan?

13. Zou u vaker de fiets pakken als u altijd op een gescheiden fietspad kan fietsen?

14. Gaat u voor de lol graag op de fiets ergens naartoe?

15. Gaat u graag op de fiets naar werk of school?

16. Gaat u graag wandelend ergens heen?

17. Vindt u dat er genoeg stoepen zijn?

18. Vindt u de stoepen hier fijn? (geen gaten en hobbels).

V16. Heeft u een auto (of kunt u er een lenen)?

- Ja
- Nee, maar ik kan er een lenen
- Nee

V17. Als u niet voor de deur zou kunnen parkeren, hoeveel minuten bent u bereid te lopen naar uw auto?

… minuten

V18. Bent u afhankelijk van uw auto voor uw school of werk?

- Ja
- Nee

Tot slot willen we u nog een aantal algemene vragen stellen

V19. In welk jaar bent u geboren?

…

V20. Bent u een man, een vrouw, of wilt u dat niet zeggen?

- Man
- Vrouw
- Anders/Wil ik niet zeggen

V21. Hoe is over het algemeen uw gezondheid?

- (Zeer) slecht
- Matig
- (Zeer) goed

V22. Heeft uw gezondheid u in de afgelopen maand belemmerd in uw alledaagse bezigheden?

- (Bijna) nooit
- Soms
- Vaak

V23. Was uw gezondheid in de afgelopen maand een reden om minder te lopen of te fietsen?

- (Bijna) nooit
- Soms
- Vaak

V24. De gemeente wil bewegen makkelijker maken voor de burgers, bijvoorbeeld door voor meer fiets- en wandelpaden te zorgen. Is u opgevallen dat de gemeente hiermee bezig is?

- Ja
- Nee

V25. Nodigt de gemeente u wel eens uit om mee te denken met hun plannen? Bijvoorbeeld voor een bijeenkomst van de wijkraad of voor een bijeenkomst met de gemeente?

- Ja, daar ben ik tevreden over
- Ja, maar dat kan vaker
- Nee, daar heb ik geen behoefte aan
- Nee, maar dat zou ik wel willen

- Overig

V26. Wat doet u tijdens een gemiddelde week?

- Full-time betaald werk (inclusief zelfstandige / zzp)
- Part-time betaald werk (inclusief zelfstandige / zzp)
- Voltijds student(e)
- Werkloos
- Arbeidsongeschikt of niet in staat om te werken
- Gepensioneerd
- Huisvrouw / -man
- Anders, namelijk: …

V27. Wat is uw hoogst voltooide opleiding? Dit is een opleiding waar u een diploma van heeft. Bent u student? Vul dan de opleiding in die je momenteel volgt.

- Geen onderwijs / basisonderwijs / cursus inburgering / cursus Nederlandse taal
- LBO / VBO / VMBO (kader- of beroepsgerichte leerweg) / MBO 1 (assistentenopleiding)
- MAVO / HAVO of VWO (eerste drie jaar) / ULO / MULO / VMBO (theoretische of gemengde leerweg) / voortgezet speciaal onderwijs
- MBO 2, 3, 4 (basisberoeps-, vak-, middenkader- of specialistenopleiding) of MBO oude structuur (vóór 1998)
- HAVO of VWO (overgegaan naar de 4e klas) / HBS / MMS / HBO-propedeuse of WO-propedeuse
- HBO (behalve HBO-master) / WO-kandidaats- of WO-bachelor
- WO-doctoraal of WO-master of HBO-master / postdoctoraal onderwijs
- Weet niet / wil niet zeggen

10.2 Appendix 2: Output Wolfskuil

The output for the relevant questions in the survey conducted in Wolfskuil

Frequencies

V3. Hoeveel dagen in de week gaat u…

A. Fietsen of lopen naar school, werk of winkel?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	5	14,3	14,7	14,7
	1,00	1	2,9	2,9	17,6
	2,00	4	11,4	11,8	29,4
	3,00	7	20,0	20,6	50,0
	4,00	3	8,6	8,8	58,8
	5,00	6	17,1	17,6	76,5
	6,00	1	2,9	2,9	79,4
	7,00	7	20,0	20,6	100,0
	Total	34	97,1	100,0	
Missing	System	1	2,9		
Total		35	100,0		

B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	5	14,3	14,3	14,3
	1,00	3	8,6	8,6	22,9
	2,00	3	8,6	8,6	31,4
	3,00	3	8,6	8,6	40,0
	4,00	3	8,6	8,6	48,6
	5,00	3	8,6	8,6	57,1
	6,00	5	14,3	14,3	71,4
	7,00	10	28,6	28,6	100,0
	Total	35	100,0	100,0	

C. Zwaar huishoudelijk werk doen of klussen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	15	42,9	42,9	42,9
	1,00	5	14,3	14,3	57,1
	2,00	4	11,4	11,4	68,6
	3,00	1	2,9	2,9	71,4
	4,00	3	8,6	8,6	80,0
	7,00	7	20,0	20,0	100,0
	Total	35	100,0	100,0	

V4. Hoeveel minuten per dag gaat u…

A. Fietsen of lopen naar school, werk of winkel?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	7	20,0	20,0	20,0
	5,00	2	5,7	5,7	25,7
	7,00	1	2,9	2,9	28,6
	10,00	3	8,6	8,6	37,1
	15,00	1	2,9	2,9	40,0
	20,00	6	17,1	17,1	57,1
	30,00	5	14,3	14,3	71,4
	40,00	3	8,6	8,6	80,0
	45,00	3	8,6	8,6	88,6
	50,00	1	2,9	2,9	91,4
	60,00	2	5,7	5,7	97,1
	90,00	1	2,9	2,9	100,0
	Total	35	100,0	100,0	

B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	6	17,1	17,1	17,1
	10,00	2	5,7	5,7	22,9
	15,00	1	2,9	2,9	25,7

	20,00	1	2,9	2,9	28,6
	30,00	12	34,3	34,3	62,9
	40,00	1	2,9	2,9	65,7
	45,00	1	2,9	2,9	68,6
	60,00	5	14,3	14,3	82,9
	90,00	3	8,6	8,6	91,4
	120,00	2	5,7	5,7	97,1
	360,00	1	2,9	2,9	100,0
	Total	35	100,0	100,0	

C. Zwaar huishoudelijk werk doen of klussen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	16	45,7	45,7	45,7
	15,00	2	5,7	5,7	51,4
	30,00	5	14,3	14,3	65,7
	60,00	3	8,6	8,6	74,3
	90,00	3	8,6	8,6	82,9
	120,00	1	2,9	2,9	85,7
	140,00	1	2,9	2,9	88,6
	180,00	2	5,7	5,7	94,3
	240,00	1	2,9	2,9	97,1
	300,00	1	2,9	2,9	100,0
	Total	35	100,0	100,0	

V12. Nu gaan we het hebben over wat u van uw buurt vindt. U mag over de volgende onderwerpen met een smiley aangeven hoe blij u daarmee bent.

1. Zijn er bomen en struiken dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	27	77,1	77,1	77,1
	Geel	3	8,6	8,6	85,7
	Rood	5	14,3	14,3	100,0
	Total	35	100,0	100,0	

2. Zijn er grasveldjes dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	22	62,9	62,9	62,9
	Geel	9	25,7	25,7	88,6
	Rood	4	11,4	11,4	100,0
	Total	35	100,0	100,0	

3. Zijn er speeltuinen dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	25	71,4	71,4	71,4
	Geel	7	20,0	20,0	91,4
	Rood	3	8,6	8,6	100,0
	Total	35	100,0	100,0	

4. Zijn er dichtbij plekken om te wandelen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	23	65,7	65,7	65,7
	Geel	7	20,0	20,0	85,7
	Rood	5	14,3	14,3	100,0
	Total	35	100,0	100,0	

5. Zijn er dichtbij plekken om te fietsen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	25	71,4	73,5	73,5
	Geel	6	17,1	17,6	91,2
	Rood	3	8,6	8,8	100,0
	Total	34	97,1	100,0	

Missing	System	1	2,9		
Total	35	100,0			

13. Zijn er dichtbij plekken om mensen te ontmoeten?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	19	54,3	54,3	54,3
	Geel	9	25,7	25,7	80,0
	Rood	7	20,0	20,0	100,0
	Total	35	100,0	100,0	

16. Wandelt u graag in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	29	82,9	82,9	82,9
	Geel	1	2,9	2,9	85,7
	Rood	5	14,3	14,3	100,0
	Total	35	100,0	100,0	

17. Fietst u graag in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	21	60,0	61,8	61,8
	Geel	3	8,6	8,8	70,6
	Rood	10	28,6	29,4	100,0
	Total	34	97,1	100,0	
Missing	System	1	2,9		
Total	35	100,0			

24. Vindt u dat er teveel stenen en/of asfalt zijn in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Groen	13	37,1	37,1	37,1
	Geel	11	31,4	31,4	68,6
	Rood	11	31,4	31,4	100,0
	Total	35	100,0	100,0	

25. Is de groene ruimte in de buurt schoon en netjes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	14	40,0	40,0	40,0
	Geel	11	31,4	31,4	71,4
	Rood	10	28,6	28,6	100,0
	Total	35	100,0	100,0	

V15. In uw buurt…

1. Kunt u veilig ergens naartoe wandelen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	34	97,1	97,1	97,1
	Geel	1	2,9	2,9	100,0
	Total	35	100,0	100,0	

2. Kunt u veilig op de fiets ergens naartoe?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	30	85,7	96,8	96,8
	Geel	1	2,9	3,2	100,0
	Total	31	88,6	100,0	
Missing	System	4	11,4		
Total		35	100,0		

8. Kunt u makkelijk met de bus/tram/trein?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	28	80,0	80,0	80,0
	Geel	6	17,1	17,1	97,1
	Rood	1	2,9	2,9	100,0
	Total	35	100,0	100,0	

9. Gaat u graag met het openbaar vervoer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	14	40,0	40,0	40,0
	Geel	8	22,9	22,9	62,9
	Rood	13	37,1	37,1	100,0
	Total	35	100,0	100,0	

10. Vindt u dat er genoeg fietspaden zijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	25	71,4	73,5	73,5
	Geel	3	8,6	8,8	82,4
	Rood	6	17,1	17,6	100,0
	Total	34	97,1	100,0	
Missing	System	1	2,9		
Total		35	100,0		

11. Vindt u de fietspaden hier fijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	20	57,1	60,6	60,6
	Geel	11	31,4	33,3	93,9
	Rood	2	5,7	6,1	100,0
	Total	33	94,3	100,0	
Missing	System	2	5,7		

Total		35	100,0		

14. Gaat u voor de lol graag op de fiets ergens naartoe?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	17	48,6	51,5	51,5
	Geel	7	20,0	21,2	72,7
	Rood	9	25,7	27,3	100,0
	Total	33	94,3	100,0	
Missing	System	2	5,7		
Total		35	100,0		

16. Gaat u graag wandelend ergens heen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	27	77,1	77,1	77,1
	Geel	7	20,0	20,0	97,1
	Rood	1	2,9	2,9	100,0
	Total	35	100,0	100,0	

17. Vindt u dat er genoeg stoepen zijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	29	82,9	82,9	82,9
	Geel	3	8,6	8,6	91,4
	Rood	3	8,6	8,6	100,0
	Total	35	100,0	100,0	

18. Vindt u de stoepen hier fijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	12	34,3	34,3	34,3

	Geel	12	34,3	34,3	68,6
	Rood	11	31,4	31,4	100,0
	Total	35	100,0	100,0	

V19. In welk jaar bent u geboren?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1941	1	2,9	2,9	2,9
	1943	1	2,9	2,9	5,7
	1946	1	2,9	2,9	8,6
	1947	1	2,9	2,9	11,4
	1950	1	2,9	2,9	14,3
	1951	1	2,9	2,9	17,1
	1952	2	5,7	5,7	22,9
	1955	2	5,7	5,7	28,6
	1959	1	2,9	2,9	31,4
	1962	1	2,9	2,9	34,3
	1963	1	2,9	2,9	37,1
	1965	1	2,9	2,9	40,0
	1966	1	2,9	2,9	42,9
	1968	1	2,9	2,9	45,7
	1969	1	2,9	2,9	48,6
	1970	2	5,7	5,7	54,3
	1972	1	2,9	2,9	57,1
	1974	2	5,7	5,7	62,9
	1977	1	2,9	2,9	65,7
	1981	1	2,9	2,9	68,6
	1982	2	5,7	5,7	74,3
	1983	1	2,9	2,9	77,1
	1984	2	5,7	5,7	82,9
	1985	1	2,9	2,9	85,7
	1989	1	2,9	2,9	88,6
	1991	2	5,7	5,7	94,3
	2002	1	2,9	2,9	97,1
	2003	1	2,9	2,9	100,0

	Total	35	100,0	100,0	

V20. Bent u een man, een vrouw of wilt u dat niet zeggen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	man	10	28,6	28,6	28,6
	vrouw	25	71,4	71,4	100,0
	Total	35	100,0	100,0	

V21. Hoe is over het algemeen uw gezondheid?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(zeer) slecht	2	5,7	5,7	5,7
	matig	9	25,7	25,7	31,4
	(zeer) goed	24	68,6	68,6	100,0
	Total	35	100,0	100,0	

V27. Wat is uw hoogst voltooide opleiding?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Geen onderwijs / basisonderwijs / cursus inburgering / cursus Nederlandse taal	5	14,3	14,3	14,3
	LBO / VBO / VMBO (kader- of beroepsgerichte leerweg) / MBO 1 (assistentenopleiding)	8	22,9	22,9	37,1
	MAVO / HAVO of VWO (eerste drie	5	14,3	14,3	51,4

	jaar) / ULO / MULO / VMBO (theoretische of gemengde leerweg) / voortgezet speciaal onderwijs				
	MBO 2, 3, 4 (basisberoeps-, vak-, middenkader- of specialistenopleiding) of MBO oude structuur (vóór 1998)	5	14,3	14,3	65,7
	HAVO of VWO (overgegaan naar de 4e klas) / HBS / MMS / HBO-propedeuse of WO-propedeuse	1	2,9	2,9	68,6
	HBO (behalve HBO-master) / WO-kandidaats- of WO-bachelor	6	17,1	17,1	85,7
	WO-doctoraal of WO-master of HBO-master / postdoctoraal onderwijs	5	14,3	14,3	100,0
	Total	35	100,0	100,0	

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
V3. Hoeveel dagen in de week gaat u.. - A. Fietsen of lopen naar school, werk of winkel	34	,00	7,00	3,7353	2,35242
V3. Hoeveel dagen in de week gaat u.. - B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)	35	,00	7,00	4,1429	2,62503
V3. Hoeveel dagen in de week gaat u.. - C. Zwaar huishoudelijk werk doen of klussen	35	,00	7,00	2,2000	2,72029
V4. Hoeveel minuten per dag gaat u... - A. Fietsen of lopen naar school, werk of winkel	35	,00	90,00	24,2000	21,48981
V4. Hoeveel minuten per dag gaat u... - B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)	35	,00	360,00	47,7143	63,30764
V4. Hoeveel minuten per dag gaat u... - C. Inspannend huishoudelijk werk doen of klussen in huis	35	,00	300,00	51,1429	75,71314
Valid N (listwise)	34				

Regression analysis

Key factors → Physical Activity (Light)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Public Space, Public Transport, Bikeability, Walkability[b]	.	Enter
a. Dependent Variable: light physical activity dagen per week			
b. All requested variables entered.			

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,376[a]	,141	-,002	1,89921
a. Predictors: (Constant), Public Space, Public Transport, Bikeability, Walkability				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14,260	4	3,565	,988	,433[b]
	Residual	86,568	24	3,607		
	Total	100,828	28			
a. Dependent Variable: light physical activity dagen per week						
b. Predictors: (Constant), Public Space, Public Transport, Bikeability, Walkability						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,288	4,226		-,068	,946
	Walkability	-,584	2,024	-,067	-,288	,775
	Bikeability	-,273	,898	-,065	-,304	,764
	Public Transport	1,135	,670	,333	1,695	,103
	Public Space	1,732	1,411	,288	1,227	,232
a. Dependent Variable: light physical activity dagen per week						

Key factors → Physical Activity (Moderate)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Public Space, Public Transport, Walkability, Bikeability[b]	.	Enter
a. Dependent Variable: Moderate physical activity dagen per week			
b. All requested variables entered.			

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,513[a]	,263	,145	1,98890
a. Predictors: (Constant), Public Space, Public Transport, Walkability, Bikeability				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	35,274	4	8,818	2,229	,095[b]
	Residual	98,893	25	3,956		
	Total	134,167	29			
a. Dependent Variable: Moderate physical activity dagen per week						
b. Predictors: (Constant), Public Space, Public Transport, Walkability, Bikeability						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,230	4,322		,053	,958
	Walkability	4,400	1,749	,480	2,515	,019
	Bikeability	,785	,907	,168	,866	,395
	Public Transport	-,279	,625	-,077	-,446	,659
	Public Space	-3,158	1,492	-,423	-2,116	,044
a. Dependent Variable: Moderate physical activity dagen per week						

Attitude → Physical Activity (Light)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Gaat u graag met het openbaar vervoer, Wandelt u graag in de buurt, Gaat u graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel, Fietst u graag in de buurt[b]	.	Enter
a. Dependent Variable: light physical activity dagen per week			
b. All requested variables entered.			

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,464[a]	,216	,029	1,90103

a. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Wandelt u graag in de buurt, Gaat u graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel, Fietst u graag in de buurt

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20,848	5	4,170	1,154	,364[b]
	Residual	75,893	21	3,614		
	Total	96,741	26			

a. Dependent Variable: light physical activity dagen per week

b. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Wandelt u graag in de buurt, Gaat u graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel, Fietst u graag in de buurt

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,806	2,827		-,285	,778
	Wandelt u graag in de buurt	,163	,734	,055	,222	,826
	Gaat u graag wandelend ergens heen	1,492	,809	,407	1,846	,079
	Fietst u graag in de buurt	-,253	,669	-,111	-,378	,709
	Gebruik je graag de fiets als vervoersmiddel	,448	,657	,195	,683	,502
	Gaat u graag met het openbaar vervoer	,149	,493	,066	,303	,765

a. Dependent Variable: light physical activity dagen per week

Attitude → Physical Activity (Moderate)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u graag wandelend ergens heen, Wandelt u graag in de buurt, Fietst u graag in de buurt[b]	.	Enter

a. Dependent Variable: Moderate physical activity dagen per week

b. All requested variables entered.

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,471[a]	,222	,046	2,04113
a. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u graag wandelend ergens heen, Wandelt u graag in de buurt, Fietst u graag in de buurt				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	26,201	5	5,240	1,258	,317[b]
	Residual	91,656	22	4,166		
	Total	117,857	27			
a. Dependent Variable: Moderate physical activity dagen per week						
b. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u graag wandelend ergens heen, Wandelt u graag in de buurt, Fietst u graag in de buurt						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-1,126	2,668		-,422	,677
	Wandelt u graag in de buurt	,639	,744	,198	,859	,400
	Gaat u graag wandelend ergens heen	1,500	,813	,384	1,846	,078
	Fietst u graag in de buurt	,676	,669	,285	1,011	,323
	Gebruik je graag de fiets als vervoersmiddel	-,306	,623	-,130	-,491	,628
	Gaat u graag met het openbaar vervoer	-,369	,505	-,156	-,731	,472
a. Dependent Variable: Moderate physical activity dagen per week						

10.3 Appendix 3: Output Oosterflank

The output for the relevant questions in the survey conducted in Oosterflank

Frequencies

V3. Hoeveel dagen in de week gaat u…

A. Fietsen of lopen naar school, werk of winkel?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	7	21,9	21,9	21,9
	1,00	1	3,1	3,1	25,0
	2,00	6	18,8	18,8	43,8
	4,00	1	3,1	3,1	46,9
	5,00	4	12,5	12,5	59,4
	7,00	13	40,6	40,6	100,0
	Total	32	100,0	100,0	

B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	6	18,8	18,8	18,8
	1,00	3	9,4	9,4	28,1
	2,00	4	12,5	12,5	40,6
	3,00	3	9,4	9,4	50,0
	4,00	2	6,3	6,3	56,3
	5,00	4	12,5	12,5	68,8
	6,00	1	3,1	3,1	71,9
	7,00	8	25,0	25,0	96,9
	30,00	1	3,1	3,1	100,0
	Total	32	100,0	100,0	

C. Zwaar huishoudelijk werk doen of klussen?

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	,00	14	43,8	43,8	43,8
	1,00	8	25,0	25,0	68,8
	2,00	3	9,4	9,4	78,1
	3,00	1	3,1	3,1	81,3
	4,00	2	6,3	6,3	87,5
	6,00	1	3,1	3,1	90,6
	7,00	3	9,4	9,4	100,0
	Total	32	100,0	100,0	

V4. Hoeveel minuten per dag gaat u…

A. Fietsen of lopen naar school, werk of winkel?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	8	25,0	25,8	25,8
	1,00	2	6,3	6,5	32,3
	2,00	1	3,1	3,2	35,5
	5,00	1	3,1	3,2	38,7
	7,00	1	3,1	3,2	41,9
	10,00	3	9,4	9,7	51,6
	15,00	1	3,1	3,2	54,8
	20,00	3	9,4	9,7	64,5
	30,00	2	6,3	6,5	71,0
	40,00	1	3,1	3,2	74,2
	45,00	3	9,4	9,7	83,9
	60,00	1	3,1	3,2	87,1
	75,00	2	6,3	6,5	93,5
	90,00	1	3,1	3,2	96,8
	120,00	1	3,1	3,2	100,0
	Total	31	96,9	100,0	
Missing	System	1	3,1		
Total		32	100,0		

B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	7	21,9	21,9	21,9
	1,00	2	6,3	6,3	28,1
	2,00	2	6,3	6,3	34,4
	7,00	1	3,1	3,1	37,5
	10,00	2	6,3	6,3	43,8
	25,00	1	3,1	3,1	46,9
	30,00	4	12,5	12,5	59,4
	45,00	1	3,1	3,1	62,5
	60,00	6	18,8	18,8	81,3
	75,00	3	9,4	9,4	90,6
	120,00	1	3,1	3,1	93,8
	200,00	1	3,1	3,1	96,9
	420,00	1	3,1	3,1	100,0
	Total	32	100,0	100,0	

C. Zwaar huishoudelijk werk doen of klussen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	,00	16	50,0	50,0	50,0
	1,00	1	3,1	3,1	53,1
	4,00	1	3,1	3,1	56,3
	10,00	1	3,1	3,1	59,4
	15,00	1	3,1	3,1	62,5
	30,00	3	9,4	9,4	71,9
	36,00	1	3,1	3,1	75,0
	50,00	1	3,1	3,1	78,1
	60,00	2	6,3	6,3	84,4
	90,00	1	3,1	3,1	87,5
	120,00	2	6,3	6,3	93,8
	180,00	2	6,3	6,3	100,0
	Total	32	100,0	100,0	

V12. Nu gaan we het hebben over wat u van uw buurt vindt. U mag over de volgende onderwerpen met een smiley aangeven hoe blij u daarmee bent.

6. Zijn er bomen en struiken dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	28	87,5	87,5	87,5
	Geel	3	9,4	9,4	96,9
	Rood	1	3,1	3,1	100,0
	Total	32	100,0	100,0	

7. Zijn er grasveldjes dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	26	81,3	81,3	81,3
	Geel	5	15,6	15,6	96,9
	Rood	1	3,1	3,1	100,0
	Total	32	100,0	100,0	

8. Zijn er speeltuinen dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	24	75,0	75,0	75,0
	Geel	6	18,8	18,8	93,8
	Rood	2	6,3	6,3	100,0
	Total	32	100,0	100,0	

9. Zijn er dichtbij plekken om te wandelen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	29	90,6	90,6	90,6
	Geel	2	6,3	6,3	96,9
	Rood	1	3,1	3,1	100,0

	Total	32	100,0	100,0	

10. Zijn er dichtbij plekken om te fietsen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	31	96,9	96,9	96,9
	Geel	1	3,1	3,1	100,0
	Total	32	100,0	100,0	

13. Zijn er dichtbij plekken om mensen te ontmoeten?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	17	53,1	53,1	53,1
	Geel	10	31,3	31,3	84,4
	Rood	5	15,6	15,6	100,0
	Total	32	100,0	100,0	

16. Wandelt u graag in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	24	75,0	75,0	75,0
	Geel	5	15,6	15,6	90,6
	Rood	3	9,4	9,4	100,0
	Total	32	100,0	100,0	

17. Fietst u graag in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	25	78,1	78,1	78,1
	Geel	5	15,6	15,6	93,8
	Rood	2	6,3	6,3	100,0
	Total	32	100,0	100,0	

24. Vindt u dat er teveel stenen en/of asfalt zijn in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	9	28,1	28,1	28,1
	Geel	12	37,5	37,5	65,6
	Rood	11	34,4	34,4	100,0
	Total	32	100,0	100,0	

25. Is de groene ruimte in de buurt schoon en netjes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	13	40,6	40,6	40,6
	Geel	9	28,1	28,1	68,8
	Rood	10	31,3	31,3	100,0
	Total	32	100,0	100,0	

V15. In uw buurt…

1. Kunt u veilig ergens naartoe wandelen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	26	81,3	81,3	81,3
	Geel	6	18,8	18,8	100,0
	Total	32	100,0	100,0	

2. Kunt u veilig op de fiets ergens naartoe?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	27	84,4	84,4	84,4
	Geel	5	15,6	15,6	100,0
	Total	32	100,0	100,0	

8. Kunt u makkelijk met de bus/tram/trein?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	29	90,6	90,6	90,6
	Geel	1	3,1	3,1	93,8
	Rood	2	6,3	6,3	100,0
	Total	32	100,0	100,0	

9. Gaat u graag met het openbaar vervoer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	14	43,8	43,8	43,8
	Geel	7	21,9	21,9	65,6
	Rood	11	34,4	34,4	100,0
	Total	32	100,0	100,0	

10. Vindt u dat er genoeg fietspaden zijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	27	84,4	84,4	84,4
	Geel	5	15,6	15,6	100,0
	Total	32	100,0	100,0	

11. Vindt u de fietspaden hier fijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	19	59,4	61,3	61,3
	Geel	10	31,3	32,3	93,5
	Rood	2	6,3	6,5	100,0
	Total	31	96,9	100,0	
Missing	System	1	3,1		
Total		32	100,0		

14. Gaat u voor de lol graag op de fiets ergens naartoe?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	19	59,4	59,4	59,4
	Geel	4	12,5	12,5	71,9
	Rood	9	28,1	28,1	100,0
	Total	32	100,0	100,0	

16. Gaat u graag wandelend ergens heen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	25	78,1	78,1	78,1
	Geel	2	6,3	6,3	84,4
	Rood	5	15,6	15,6	100,0
	Total	32	100,0	100,0	

17. Vindt u dat er genoeg stoepen zijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	29	90,6	90,6	90,6
	Geel	2	6,3	6,3	96,9
	Rood	1	3,1	3,1	100,0
	Total	32	100,0	100,0	

18. Vindt u de stoepen hier fijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	18	56,3	56,3	56,3
	Geel	11	34,4	34,4	90,6
	Rood	3	9,4	9,4	100,0
	Total	32	100,0	100,0	

V19. In welk jaar bent u geboren?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1935	1	3,1	3,1	3,1
	1946	1	3,1	3,1	6,3
	1951	3	9,4	9,4	15,6
	1952	2	6,3	6,3	21,9
	1953	2	6,3	6,3	28,1
	1954	1	3,1	3,1	31,3
	1955	2	6,3	6,3	37,5
	1959	1	3,1	3,1	40,6
	1962	1	3,1	3,1	43,8
	1963	1	3,1	3,1	46,9
	1965	1	3,1	3,1	50,0
	1968	1	3,1	3,1	53,1
	1970	1	3,1	3,1	56,3
	1971	1	3,1	3,1	59,4
	1972	1	3,1	3,1	62,5
	1975	2	6,3	6,3	68,8
	1981	1	3,1	3,1	71,9
	1983	1	3,1	3,1	75,0
	1991	1	3,1	3,1	78,1
	1992	1	3,1	3,1	81,3
	1993	1	3,1	3,1	84,4
	1998	2	6,3	6,3	90,6
	1999	1	3,1	3,1	93,8
	2000	1	3,1	3,1	96,9
	69	1	3,1	3,1	100,0
	Total	32	100,0	100,0	

V20. Bent u een man, een vrouw of wilt u dat niet zeggen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	man	12	37,5	37,5	37,5
	vrouw	20	62,5	62,5	100,0
	Total	32	100,0	100,0	

V21. Hoe is over het algemeen uw gezondheid?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	(zeer) slecht	4	12,5	12,9	12,9
	matig	6	18,8	19,4	32,3
	(zeer) goed	21	65,6	67,7	100,0
	Total	31	96,9	100,0	
Missing	System	1	3,1		
Total		32	100,0		

V27. Wat is uw hoogst voltooide opleiding?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	LBO / VBO / VMBO (kader- of beroepsgerichte leerweg) / MBO 1 (assistentenopleiding)	5	15,6	15,6	15,6
	MAVO / HAVO of VWO (eerste drie jaar) / ULO / MULO / VMBO (theoretische of gemengde leerweg) / voortgezet speciaal onderwijs	5	15,6	15,6	31,3
	MBO 2, 3, 4 (basisberoeps-, vak-, middenkader- of specialistenopleiding) of MBO oude structuur (vóór 1998)	7	21,9	21,9	53,1
	HAVO of VWO (overgegaan naar de	1	3,1	3,1	56,3

	4e klas) / HBS / MMS / HBO-propedeuse of WO-propedeuse				
	HBO (behalve HBO-master) / WO-kandidaats- of WO-bachelor	10	31,3	31,3	87,5
	WO-doctoraal of WO-master of HBO-master / postdoctoraal onderwijs	4	12,5	12,5	100,0
	Total	32	100,0	100,0	

Descriptives

	N	Minimum	Maximum	Mean	Std. Deviation
V3. Hoeveel dagen in de week gaat u.. - A. Fietsen of lopen naar school, werk of winkel	32	,00	7,00	4,0000	2,92927
V3. Hoeveel dagen in de week gaat u.. - B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)	32	,00	30,00	4,3750	5,36867
V3. Hoeveel dagen in de week gaat u.. - C. Zwaar huishoudelijk werk doen of klussen	32	,00	7,00	1,6250	2,26829
V4. Hoeveel minuten per dag gaat u... - A. Fietsen of lopen naar school, werk of winkel	31	,00	120,00	25,0323	31,20094
V4. Hoeveel minuten per dag gaat u... - B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)	32	,00	420,00	48,3750	80,50235
V4. Hoeveel minuten per dag gaat u... - C. Inspannend huishoudelijk werk doen of klussen in huis	32	,00	180,00	31,7500	51,89319
Valid N (listwise)	31				

Regression Analysis

Key factors → Physical Activity (Light)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Public Space, Bikeability, Walkability, Public Transport[b]	.	Enter
a. Dependent Variable: light physical activity dagen per week			
b. All requested variables entered.			

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,420[a]	,176	,012	2,24730
a. Predictors: (Constant), Public Space, Bikeability, Walkability, Public Transport				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	21,633	4	5,408	1,071	,397[b]
	Residual	101,007	20	5,050		
	Total	122,640	24			
a. Dependent Variable: light physical activity dagen per week						
b. Predictors: (Constant), Public Space, Bikeability, Walkability, Public Transport						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,258	7,527		,167	,869
	Walkability	,888	2,767	,087	,321	,752
	Bikeability	3,414	2,323	,370	1,470	,157
	Public Transport	-1,208	1,109	-,324	-1,089	,289
	Public Space	-2,039	1,632	-,290	-1,249	,226
a. Dependent Variable: light physical activity dagen per week						

Key factors → Physical Activity (Moderate)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Public Space, Public Transport, Bikeability, Walkability[b]	.	Enter
a. Dependent Variable: Moderate physical activity dagen per week			
b. All requested variables entered.			

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,412[a]	,170	,004	2,25036
a. Predictors: (Constant), Public Space, Public Transport, Bikeability, Walkability				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	20,718	4	5,179	1,023	,420[b]
	Residual	101,282	20	5,064		
	Total	122,000	24			
a. Dependent Variable: Moderate physical activity dagen per week						
b. Predictors: (Constant), Public Space, Public Transport, Bikeability, Walkability						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	,129	6,610		,019	,985
	Walkability	5,737	3,231	,565	1,776	,091
	Bikeability	-2,441	2,211	-,296	-1,104	,283
	Public Transport	-,414	1,074	-,117	-,386	,704
	Public Space	-1,108	1,502	-,190	-,738	,469
a. Dependent Variable: Moderate physical activity dagen per week						

Attitude → Physical Activity (Light)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u graag wandelend ergens heen, Fietst u graag in de buurt, Wandelt u graag in de buurt[b]	.	Enter
a. Dependent Variable: light physical activity dagen per week			
b. All requested variables entered.			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,490[a]	,241	,041	2,21409
a. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u graag wandelend ergens heen, Fietst u graag in de buurt, Wandelt u graag in de buurt				

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	29,498	5	5,900	1,203	,345[b]
	Residual	93,142	19	4,902		
	Total	122,640	24			
a. Dependent Variable: light physical activity dagen per week						
b. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u graag wandelend ergens heen, Fietst u graag in de buurt, Wandelt u graag in de buurt						

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	5,254	3,540		1,484	,154
	Wandelt u graag in de buurt	,216	1,049	,067	,206	,839
	Gaat u graag wandelend ergens heen	-,207	,894	-,055	-,232	,819
	Fietst u graag in de buurt	-,859	1,158	-,227	-,742	,467
	Gebruik je graag de fiets als vervoersmiddel	1,200	,598	,436	2,007	,059
	Gaat u graag met het openbaar vervoer	-,297	,607	-,112	-,488	,631
a. Dependent Variable: light physical activity dagen per week						

Attitude → Physical Activity (Moderate)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u	.	Enter

	graag wandelend ergens heen, Wandelt u graag in de buurt, Fietst u graag in de buurt[b]		
a. Dependent Variable: Moderate physical activity dagen per week			
b. All requested variables entered.			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,431[a]	,185	-,029	2,28706

a. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u graag wandelend ergens heen, Wandelt u graag in de buurt, Fietst u graag in de buurt

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	22,618	5	4,524	,865	,522[b]
	Residual	99,382	19	5,231		
	Total	122,000	24			

a. Dependent Variable: Moderate physical activity dagen per week

b. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Gebruik je graag de fiets als vervoersmiddel, Gaat u graag wandelend ergens heen, Wandelt u graag in de buurt, Fietst u graag in de buurt

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,937	2,885		,671	,510
	Wandelt u graag in de buurt	,155	1,650	,041	,094	,926
	Gaat u graag wandelend ergens heen	1,486	,887	,447	1,675	,110
	Fietst u graag in de buurt	-,216	1,623	-,059	-,133	,896
	Gebruik je graag de fiets als vervoersmiddel	-,518	,633	-,199	-,818	,423
	Gaat u graag met het openbaar vervoer	-,085	,627	-,034	-,136	,893

a. Dependent Variable: Moderate physical activity dagen per week

10.4 Appendix 4: Output Holtenbroek IV

The output for the relevant questions in the survey conducted in Holtenbroek IV

Frequencies

6. Zijn er bomen en struiken dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	29	93,5	93,5	93,5
	Rood	2	6,5	6,5	100,0
	Total	31	100,0	100,0	

7. Zijn er grasveldjes dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	25	80,6	80,6	80,6
	Geel	6	19,4	19,4	100,0
	Total	31	100,0	100,0	

8. Zijn er speeltuinen dichtbij?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	26	83,9	83,9	83,9
	Geel	4	12,9	12,9	96,8
	Rood	1	3,2	3,2	100,0
	Total	31	100,0	100,0	

9. Zijn er dichtbij plekken om te wandelen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	28	90,3	90,3	90,3
	Geel	2	6,5	6,5	96,8
	Rood	1	3,2	3,2	100,0
	Total	31	100,0	100,0	

10. Zijn er dichtbij plekken om te fietsen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	28	90,3	90,3	90,3
	Geel	2	6,5	6,5	96,8
	Rood	1	3,2	3,2	100,0
	Total	31	100,0	100,0	

13. Zijn er dichtbij plekken om mensen te ontmoeten?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	28	90,3	90,3	90,3
	Geel	1	3,2	3,2	93,5
	Rood	2	6,5	6,5	100,0
	Total	31	100,0	100,0	

16. Wandelt u graag in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	25	80,6	80,6	80,6
	Geel	2	6,5	6,5	87,1
	Rood	4	12,9	12,9	100,0
	Total	31	100,0	100,0	

17. Fietst u graag in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	24	77,4	80,0	80,0
	Geel	3	9,7	10,0	90,0
	Rood	3	9,7	10,0	100,0
	Total	30	96,8	100,0	

Missing	System	1	3,2		
Total		31	100,0		

24. Vindt u dat er teveel stenen en/of asfalt zijn in de buurt?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	8	25,8	26,7	26,7
	Geel	7	22,6	23,3	50,0
	Rood	15	48,4	50,0	100,0
	Total	30	96,8	100,0	
Missing	System	1	3,2		
Total		31	100,0		

25. Is de groene ruimte in de buurt schoon en netjes?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	14	45,2	46,7	46,7
	Geel	10	32,3	33,3	80,0
	Rood	6	19,4	20,0	100,0
	Total	30	96,8	100,0	
Missing	System	1	3,2		
Total		31	100,0		

V15. In uw buurt…

1. Kunt u veilig ergens naartoe wandelen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	31	100,0	100,0	100,0

2. Kunt u veilig op de fiets ergens naartoe?

		Frequency	Percent	Valid Percent	Cumulative Percent

Valid	Groen	29	93,5	93,5	93,5
	Geel	1	3,2	3,2	96,8
	Rood	1	3,2	3,2	100,0
	Total	31	100,0	100,0	

8. Kunt u makkelijk met de bus/tram/trein?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	26	83,9	86,7	86,7
	Geel	2	6,5	6,7	93,3
	Rood	2	6,5	6,7	100,0
	Total	30	96,8	100,0	
Missing	System	1	3,2		
Total		31	100,0		

9. Gaat u graag met het openbaar vervoer?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	8	25,8	26,7	26,7
	Geel	6	19,4	20,0	46,7
	Rood	16	51,6	53,3	100,0
	Total	31	96,8	100,0	
Missing	System	1	3,2		
Total		31	100,0		

10. Vindt u dat er genoeg fietspaden zijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	27	87,1	90,0	90,0
	Geel	3	9,7	10,0	100,0
	Total	30	96,8	100,0	
Missing	System	1	3,2		
Total		32	100,0		

11. Vindt u de fietspaden hier fijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	21	67,7	70,0	70,0
	Geel	8	25,8	26,7	96,7
	Rood	1	3,2	3,3	100,0
	Total	30	96,8	100,0	
Missing	System	1	3,2		
Total		31	100,0		

14. Gaat u voor de lol graag op de fiets ergens naartoe?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	22	71,0	71,0	71,0
	Geel	2	6,5	6,5	77,4
	Rood	7	22,6	22,6	100,0
	Total	31	100,0	100,0	

16. Gaat u graag wandelend ergens heen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	25	80,6	80,6	80,6
	Geel	3	9,7	9,7	90,3
	Rood	3	9,7	9,7	100,0
	Total	31	96,9	100,0	

17. Vindt u dat er genoeg stoepen zijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	26	83,9	83,9	83,9
	Geel	4	12,9	12,9	96,8

	Rood	1	3,2	3,2	100,0
	Total	31	100,0	100,0	

18. Vindt u de stoepen hier fijn?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Groen	16	51,6	51,6	51,6
	Geel	8	25,8	25,8	77,4
	Rood	7	22,6	22,6	100,0
	Total	31	100,0	100,0	

V19. In welk jaar bent u geboren?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1938	1	3,2	3,2	3,2
	1940	1	3,2	3,2	6,5
	1947	1	3,2	3,2	9,7
	1948	1	3,2	3,2	12,9
	1949	1	3,2	3,2	16,1
	1950	2	6,5	6,5	22,6
	1952	1	3,2	3,2	25,8
	1953	1	3,2	3,2	29,0
	1956	1	3,2	3,2	32,3
	1959	2	6,5	6,5	38,7
	1960	2	6,5	6,5	45,2
	1961	1	3,2	3,2	48,4
	1963	2	6,5	6,5	54,8
	1965	1	3,2	3,2	58,1
	1966	2	6,5	6,5	64,5
	1967	1	3,2	3,2	67,7
	1968	2	6,5	6,5	74,2
	1978	1	3,2	3,2	77,4
	1979	1	3,2	3,2	80,6
	1981	1	3,2	3,2	83,9

	1986	1	3,2	3,2	87,1
	1988	1	3,2	3,2	90,3
	1993	1	3,2	3,2	93,5
	1999	1	3,2	3,2	96,8
	2006	1	3,2	3,2	100,0
	Total	31	100,0	100,0	

V20. Bent u een man, een vrouw of wilt u dat niet zeggen?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	man	12	38,7	38,7	38,7
	vrouw	19	61,3	61,1	100,0
	Total	31	100,0	100,0	

V21. Hoe is over het algemeen uw gezondheid?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	matig	10	32,3	32,3	32,3
	(zeer) goed	21	67,7	67,7	100,0
	Total	31	100,0	100,0	

V27. Wat is uw hoogst voltooide opleiding?

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Geen onderwijs / basisonderwijs / cursus inburgering / cursus Nederlandse taal	2	6,5	6,5	6,5
	LBO / VBO / VMBO (kader- of beroepsgerichte	3	9,7	9,7	16,1

	leerweg) / MBO 1 (assistentenopleiding)				
	MAVO / HAVO of VWO (eerste drie jaar) / ULO / MULO / VMBO (theoretische of gemengde leerweg) / voortgezet speciaal onderwijs	2	6,5	6,5	22,6
	MBO 2, 3, 4 (basisberoeps-, vak-, middenkader- of specialistenopleiding) of MBO oude structuur (vóór 1998)	7	22,6	22,6	45,2
	HAVO of VWO (overgegaan naar de 4e klas) / HBS / MMS / HBO-propedeuse of WO-propedeuse	3	9,7	9,7	54,8
	HBO (behalve HBO-master) / WO-kandidaats- of WO-bachelor	8	25,8	25,8	80,6
	WO-doctoraal of WO-master of HBO-master / postdoctoraal onderwijs	4	12,9	12,9	93,5
	Weet niet / wil niet zeggen	2	6,5	6,5	100,0
	Total	31	100,0	100,0	

Descriptives

	N	Minimum	Maximum	Mean	Std. Deviation
V3. Hoeveel dagen in de week gaat u.. - A. Fietsen of lopen naar school, werk of winkel	31	,00	7,00	4,6452	2,56318
V3. Hoeveel dagen in de week gaat u.. - B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)	31	,00	7,00	3,9355	2,74391
V3. Hoeveel dagen in de week gaat u.. - C. Zwaar huishoudelijk werk doen of klussen	31	,00	7,00	1,2258	1,82043
V4. Hoeveel minuten per dag gaat u... - A. Fietsen of lopen naar school, werk of winkel	30	,00	60,00	14,5000	15,77591
V4. Hoeveel minuten per dag gaat u... - B. Bewegen in de vrijetijd (wandelen, fietsen, tuinieren)	31	,00	300,00	46,4516	60,05822
V4. Hoeveel minuten per dag gaat u... - C. Inspannend huishoudelijk werk doen of klussen in huis	31	,00	120,00	19,8710	33,18407
Valid N (listwise)	30				

Regression Analysis

Key factors → Physical Activity (Light)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Public Space, Public Transport, Bikeability, Walkability[b]	.	Enter
a. Dependent Variable: light physical activity dagen per week			
b. All requested variables entered.			

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,566[a]	,321	,191	1,75420
a. Predictors: (Constant), Public Space, Public Transport, Bikeability, Walkability				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	30,494	4	7,624	2,477	,075[b]
	Residual	64,621	21	3,077		
	Total	95,115	25			
a. Dependent Variable: light physical activity dagen per week						
b. Predictors: (Constant), Public Space, Public Transport, Bikeability, Walkability						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,361	5,939		1,071	,296
	Walkability	-,366	1,346	-,051	-,272	,788
	Bikeability	2,280	1,875	,222	1,216	,237
	Public Transport	,202	,706	,052	,287	,777
	Public Space	-2,873	1,004	-,530	-2,861	,009
a. Dependent Variable: light physical activity dagen per week						

Key factors → Physical Activity (Moderate)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Public Space, Public Transport, Bikeability, Walkability[b]	.	Enter
a. Dependent Variable: Moderate physical activity dagen per week			
b. All requested variables entered.			

Model Summary				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,501[a]	,251	,108	2,18279
a. Predictors: (Constant), Public Space, Public Transport, Bikeability, Walkability				

ANOVA[a]						
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	33,483	4	8,371	1,757	,175[b]
	Residual	100,056	21	4,765		
	Total	133,538	25			
a. Dependent Variable: Moderate physical activity dagen per week						
b. Predictors: (Constant), Public Space, Public Transport, Bikeability, Walkability						

Coefficients[a]						
Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,792	6,855		-,116	,909
	Walkability	-2,653	1,721	-,304	-1,541	,138
	Bikeability	4,640	2,137	,423	2,171	,042
	Public Transport	-,511	,815	-,121	-,627	,538
	Public Space	,119	1,329	,018	,089	,930
a. Dependent Variable: Moderate physical activity dagen per week						

Attitude → Physical Activity (Light)

Variables Entered/Removed[a]			
Model	Variables Entered	Variables Removed	Method
1	Gaat u graag met het openbaar vervoer, Fietst u graag in de buurt, Gaat u graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel, Wandelt u graag in de buurt[b]	.	Enter
a. Dependent Variable: light physical activity dagen per week			
b. All requested variables entered.			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,462[a]	,213	,006	1,95206

a. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Fietst u graag in de buurt, Gaat u graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel, Wandelt u graag in de buurt

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	19,600	5	3,920	1,029	,429[b]
	Residual	72,400	19	3,811		
	Total	92,000	24			

a. Dependent Variable: light physical activity dagen per week

b. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Fietst u graag in de buurt, Gaat u graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel, Wandelt u graag in de buurt

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	-,345	3,645		-,095	,926
	Wandelt u graag in de buurt	-1,096	,803	-,386	-1,365	,188
	Gaat u graag wandelend ergens heen	1,422	1,080	,363	1,317	,204
	Fietst u graag in de buurt	,987	,891	,252	1,107	,282
	Gebruik je graag de fiets als vervoersmiddel	,503	,607	,211	,829	,418
	Gaat u graag met het openbaar vervoer	,257	,482	,118	,533	,600

a. Dependent Variable: light physical activity dagen per week

Attitude → Physical Activity (Moderate)

Variables Entered/Removed[a]

Model	Variables Entered	Variables Removed	Method
1	Gaat u graag met het openbaar vervoer, Fietst u graag in de buurt, Wandelt u graag in de buurt, Gaat u	.	Enter

	graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel[b]		
a. Dependent Variable: Moderate physical activity dagen per week			
b. All requested variables entered.			

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,656[a]	,430	,280	1,95903

a. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Fietst u graag in de buurt, Wandelt u graag in de buurt, Gaat u graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel

ANOVA[a]

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	55,082	5	11,016	2,870	,043[b]
	Residual	72,918	19	3,838		
	Total	128,000	24			

a. Dependent Variable: Moderate physical activity dagen per week

b. Predictors: (Constant), Gaat u graag met het openbaar vervoer, Fietst u graag in de buurt, Wandelt u graag in de buurt, Gaat u graag wandelend ergens heen, Gebruik je graag de fiets als vervoersmiddel

Coefficients[a]

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	6,790	3,155		2,152	,044
	Wandelt u graag in de buurt	-1,570	,779	-,406	-2,017	,058
	Gaat u graag wandelend ergens heen	-,560	,760	-,145	-,737	,470
	Fietst u graag in de buurt	,081	,777	,021	,104	,918
	Gebruik je graag de fiets als vervoersmiddel	1,715	,643	,567	2,668	,015
	Gaat u graag met het openbaar vervoer	-,540	,470	-,210	-1,148	,265

a. Dependent Variable: Moderate physical activity dagen per week