



Greening streetscapes: cultivating active urban lifestyles

A comprehensive study on the nexus between streetscape greening and physical activity in the city of Utrecht

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Acknowledgments

I am pleased to present my master's thesis titled '*Greening streetscapes: cultivating active urban lifestyles*', a qualitative study on how greening streetscapes can stimulate physical activity among residents in the city of Utrecht. This thesis marks the culmination of the master's program in Spatial Planning at Utrecht University.

I am interested in this research topic because I enjoy being in a green environment and am committed to improving human quality of life. The immediate spatial environment has a huge impact on this, and that's why I find it both exciting and important to delve into this subject. It is wonderful to conduct research in my hometown, and I find it amazing to already see how people in my own neighbourhood can transform a dull, concrete space into a vibrant greened environment.

During my thesis period, I also had the opportunity to do an internship at Planterra, a consultancy focused on the management and improvement of public spaces. During this time, I was involved in various interesting projects. Although it was sometimes challenging to switch between my thesis topic and the projects' subjects, I gained a wealth of new knowledge and valuable experience.

I would like to thank my supervisor, Katinka Wijsman, for her excellent and supportive guidance, valuable feedback, and involvement over the past period. Additionally, I wish to express my gratitude to my internship supervisor, Nick van der Klauw, for his guidance during my internship activities. I also want to thank all my colleagues at Planterra for their help, enthusiasm, and interest during my internship, which made me feel warmly welcomed. Finally, I extend my thanks to all the respondents for their time and effort in participating in interviews and for the engaging discussions we had.

I hope you enjoy reading!

Bas Vriezen

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Abstract

An increasing sedentary lifestyle in recent years has resulted in more and more people not meeting the recommended physical activity guidelines. Physical inactivity has various negative physical and mental health effects. Therefore, it is important to promote physical activity and active lifestyles. An inviting green living environment can help in this regard. Thus, it is relevant to investigate how green streetscapes can influence the physical activity of residents. Through a case study in the Northeast and Northwest neighbourhoods of Utrecht, six residents and four municipal employees were interviewed using qualitative research about both residents' experiences, perceptions, and behaviours and municipal visions, ambitions, and objectives related to street greenery and physical activity. The findings indicate that street greening can positively influence residents' physical activity levels by creating an appealing, inviting, enjoyable, and accessible living environment. Furthermore, this research shows that the municipality has an ambition to look at space differently, for example, regarding mobility aspects. The municipality is working on a pedestrian approach that should take shape through the implementation of green walking routes, giving every resident of Utrecht the opportunity to use these green structures close to home. Municipalities can use the insights gained for future greening projects. Further research could focus on the management and maintenance of the greenery, as this is a bottleneck for the implementation of street greenery.

Keywords: Green streetscapes, Urban Green Space, Physical Activity, sedentary behaviour, urban design

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1. Introduction

Findings from the World Health Organization (WHO) show that lives are becoming increasingly sedentary, largely due to the prevalent use of motorized transportation and the increased reliance on screens for work, education, and recreation (WHO, 2022). Research consistently shows that higher amounts of sedentary behaviour are associated with several poor health outcomes, including all-cause mortality, cardiovascular disease mortality, and cancer mortality (Rezende et al., 2014; Dempsey et al., 2020; Taylor et al., 2020). Physical activity (PA) is key to reducing or preventing non-communicable diseases, particularly obesity, overweight, and depressive symptoms (Arbab et al., 2020). Insufficient PA is a global concern, with nearly one third (31%) of the world's adult population, equivalent to 1.8 billion adults, not meeting recommended activity levels (WHO, 2024). If current trends persist, rates of inactivity are expected to increase further to 35% by 2030, and the world is currently not on course to meet the global target of reducing physical inactivity by 2030. Levels of inactivity are twice as high in high-income countries compared to low-income countries, and since 2001, there has been no improvement in global levels of PA (WHO, 2022). Insufficient activity even increased from 31.6% to 36.8% in high-income countries between 2001 and 2016 (Guthold et al., 2018). According to Centraal Bureau voor de Statistiek (CBS) (2023) and Kenniscentrum Sport en Beweging (2022), this is also an increasing problem in the Netherlands, as less than half of Dutch people meet PA guidelines, and this proportion has decreased over the last years.

There is an urgent need to promote and stimulate PA and active lifestyles, which have numerous benefits for both physical and mental health. Urban design plays a pivotal role in shaping human activities and influencing behavioural patterns. Its characteristics can significantly mediate physical activities and active mobility of residents, such as walking and cycling (Arbab et al., 2020). The WHO advocates for comprehensive strategies that address entire populations, emphasizing the design of environments that promote PA for both transportation and recreation as part of every life, or active living (Day, 2018). There is potential for improvement in cities because the built environment significantly impacts PA, especially in urban settings (Zhang et al., 2022). More than two-thirds of the world population is predicted to live in urban areas by 2050 (WHO, 2019).

A compelling facet of urban design, which is of increasing interest, is the availability of urban green space (UGS) (Anguluri & Narayanan, 2017). Urban greenery is becoming increasingly important because it can have a positive effect on PA levels of residents (Cohen et al., 2016). The presence of greenery can for example incentivize individuals to choose active modes of transportation (Vich, 2019). Research indicates that urban green space is important because being physically active in natural environments is linked with multiple physical and mental health benefits, leading to a higher quality of life (Liu et al., 2023). Urban green space is a vital component in maintaining and enhancing

public health as it offers opportunities for outdoor physical activities (Wang et al., 2021). Next to that urban greenery offer many other benefits, such as improving air quality, reducing heat island effects, promoting biodiversity, and enhancing the overall well-being of residents (Paudel & States, 2023). However, this greenery is also under pressure from urban densification processes, where space is scarce and often competes with other needs such as housing, infrastructure, and commercial developments (Balikçi et al., 2021).

There is a growing body of literature on the relationship between urban green space and PA. For example, there is substantial research on UGS such as parks, forests, and gardens and PA (Koohsari et al., 2015; Kaczynski & Henderson, 2007), but there is less research on the relationship between green streetscapes and PA. Current evidence suggests a beneficial relationship between green streetscapes and PA, but it is still limited in scope and depth (Zhang & Tan, 2022). More research is needed on the specific contributions of green streetscapes to PA. Liu et al. (2023) emphasized the necessity of understanding what types of urban green space increase PA. Much of the research on the relationship between urban green space and PA relies on quantitative geographical information systems (GIS) methods, which analyse spatial data to measure environmental attributes and their impact on PA but fail to capture residents' perspectives of the environment on the ground (McCormack et al., 2010; Richardson et al., 2013; Liu et al., 2023). In contrast, there is relatively little research using qualitative interpretative methods, such as interviews and focus groups, which can provide deeper insights into people's perceptions, experiences, and behaviours. Therefore, it is important to bridge the current knowledge gap and provide empirical insights into how greening streetscapes can stimulate PA in cities.

This research aims to on the one hand explore residents' perceptions, experiences, and behaviours related to urban green streetscapes to understand what constitutes 'good' green spaces that can effectively promote PA in the city of Utrecht. Next to that, this research aims to explore what the visions, ambitions and objectives are of the municipality of Utrecht related to this topic. These two are brought into relation with each other to identify areas of overlap and discrepancy among the stakeholders involved in the practice of greening streetscapes. This led to the following research question and sub-questions:

How do residents perceive, experience, and interact with green streetscapes, and how do these insights align with the visions, ambitions, and objectives of the municipality of Utrecht regarding green streetscapes and PA?

1. *How does street greening influence the PA levels of residents?*
2. *What are the residents' experiences and perceptions of green streetscapes in their neighbourhood?*
3. *What are the residents' perspectives on green streetscapes in their neighbourhood?*
4. *What are the visions, ambitions, and objectives of the Municipality of Utrecht regarding fostering PA of residents by means of implementing (street) greenery?*
5. *What are the bottlenecks, barriers, and challenges regarding implementing (street) greenery to foster PA?*

In the next chapter, the concepts of Physical Activity and green streetscapes will be discussed, and a theoretical framework will be developed. The following section will detail how and where this research was conducted. Subsequently, the results from the interviews will be presented, and in the final section, the discussion will outline what is relevant for future research on this topic.

2. Theoretical framework

This chapter explains the theoretical framework within which the research is conducted. Firstly, the concept PA will be explained. Secondly, the relationship between the built environment and PA will be explained. Thirdly, there will be dived into the concepts of Urban Green Space and green streetscapes.

2.1 Physical Activity

PA is defined by the WHO as “any bodily movement produced by skeletal muscles that requires energy expenditure” (WHO, 2022). PA encompasses all types of movement, whether it occurs during leisure activities (such as going for a walk or bike ride, gardening, running), for transportation purposes (such as traveling to and from locations, e.g. grocery stores), or as part of one's occupational duties (such as traveling to school or work) (Van Eck et al., 2021). This definition emphasizes the broad spectrum of movements that contribute to overall physical health and well-being and is considered clear and generally accepted within scientific and medical contexts. According to the WHO (2022) the most popular ways to be active include walking, cycling, wheeling, sports, active recreation, and play. These physical activities can be done at any level of skill. Both moderate- and vigorous-intensity physical activities contribute to improved health as it helps to prevent and manage noncommunicable diseases such as several cancers, diabetes, stroke and heart disease (WHO, 2021). Besides that it also helps prevent high blood pressure, supports maintaining a healthy weight, and can enhance mental health, quality of life, and general well-being (Duda et al., 2014; Mahindru, 2023). The guidelines and recommendations from the WHO and the Health Council of the Netherlands offer guidance tailored to various age groups and specific population groups regarding the amount of PA required for good health. They state that young people aged 4 to 18 years should engage in a minimum of 60 minutes of moderately intense PA on a daily basis, along with participating in vigorous-intensity activities at least three times per week (CBS, 2023). Adults (including older people) should do at least 150 minutes of moderately intense activity, such as walking and cycling, throughout the week and on different days. They should also engage in activities that enhance bone and muscle strength, for elderly combined with balance exercises, at least twice a week on different days. Generally, the most important forms of PA were walking in leisure time, cycling in leisure time and playing sports (RIVM, 2023). However, the results were different for children. For them, the primary sources of PA were playing outside during recess and in their free time, along with participating in sports. For adolescents, the main sources of PA were participating in sports, biking to school (or work), and attending gym class at school. Groups which are globally (and in the Netherlands) generally less physically active are individuals with a lower level of education or a lower household income, people with chronic health conditions and physical disabilities, people with

a non-Western immigrant background, and overweight people (Mahindru et al., 2023; Rosenthal., 2022; RIVM, 2023). According to new data of the WHO (2024) globally women continue to experience higher levels of physical inactivity compared to men, with rates of 34% for women versus 29% for men. Furthermore, individuals over the age of 60 tend to be less physically active compared to younger adults.

Because there is a wide diversity of forms and expressions of PA, Van Eck et al. (2021) have established three overarching categories of PA, under which various forms and expressions of PA can be classified. The first category is *Active Mobility* which refers to modes of transportation that involve PA to move purposely from one place to another, such as walking and cycling (or in combination with transport). The second category is *Recreational PA* which refers to all types of PA in the daily living environment that you can do from home in your free time, such as taking a walk, walking the dog, gardening and playing outside. The third category is *Physical Exercise* which refers to all types of sport activities that you can do from home in your free time, such as running, jogging and cycling. Although it can be challenging to categorize specific forms of PA into specific categories, these three overarching categories provide an overview of the categories under which different forms of PA can fall. To classify activities based on their energy expenditure, the Metabolic Equivalent of Task (MET) is used, which represents the amount of energy an effort costs (Ainsworth et al., 2011). This includes distinctions for low intensity (< 3 METs), moderate intensity (3-6 METs), and high intensity (> 6 METs). Examples of activities and their MET values include walking (3-4 METs), cycling (4-10 METs, depending on speed), running (6-12 METs, depending on speed), and heavy weightlifting (> 6 METs). While this research does not specifically measure these activities, it is useful to understand how different activities could be categorized into these groups with their respective standards.

From the literature, it appears that different types of urban areas can be important for the aforementioned different categories of PA (Mäki-Opas, 2016). For instance, urban parks and forests and nature areas around the city are crucial for promoting sports activities (Cohen et al., 2007). For recreational physical activities Such as walking and cycling, green corridors and paths are important (Deng et al., 2023). Additionally, community gardens are important for recreational physical activities like gardening (Spierings et al., 2016). For active transport, bike routes, pedestrian routes, green corridors, and parks along traffic routes are essential (Liu et al., 2020). According to van Eck et al. (2021), spaces can serve multiple purposes. For example, a fine-grained network of walking and cycling routes can be used for both active transportation and recreational activities. When green routes through parks and forest areas are well connected to main green structures for walkers and cyclists, it enhances not only opportunities for active transportation but also the opportunities for sports and recreational users.

2.2 Built environment and PA

According to the WHO (2024) it is important and necessary to create environments that promote and stimulate PA to combat the worrying trend of the rise of physical inactivity levels. The relationship between PA levels and the urban environment has been the focus of numerous different studies, often concentrating on specific subsections of urban areas or key aspects of the built environment that could influence PA levels (Sallis et al., 2016; Handy et al., 2002; Wendel-Vos et al., 2004). These studies consistently show us that the built environment affect PA levels of the population. Therefore, there is significant potential to utilize urban environments to enhance opportunities for PA. The focus on the physical design of the built environment directs this study towards the infrastructure, or the 'hardware,' that forms the foundation of the city. While acknowledging that there exist many different determinants of PA that are important for promoting PA, this study focuses on the built environment and especially on urban design, narrowed down on Urban Green Space (UGS) (Figure 1). This focus is chosen because UGS has been shown to have a significant impact on PA levels, providing accessible and attractive spaces for exercise, relaxation, and social interaction, which are essential components for enhancing public health and well-being (Yilmaz et al., 2017; Yang et al., 2022). According to Mytton et al (2012) it is hypothesized that individuals with greater access to green spaces in their local environment are likely to achieve higher levels of PA.

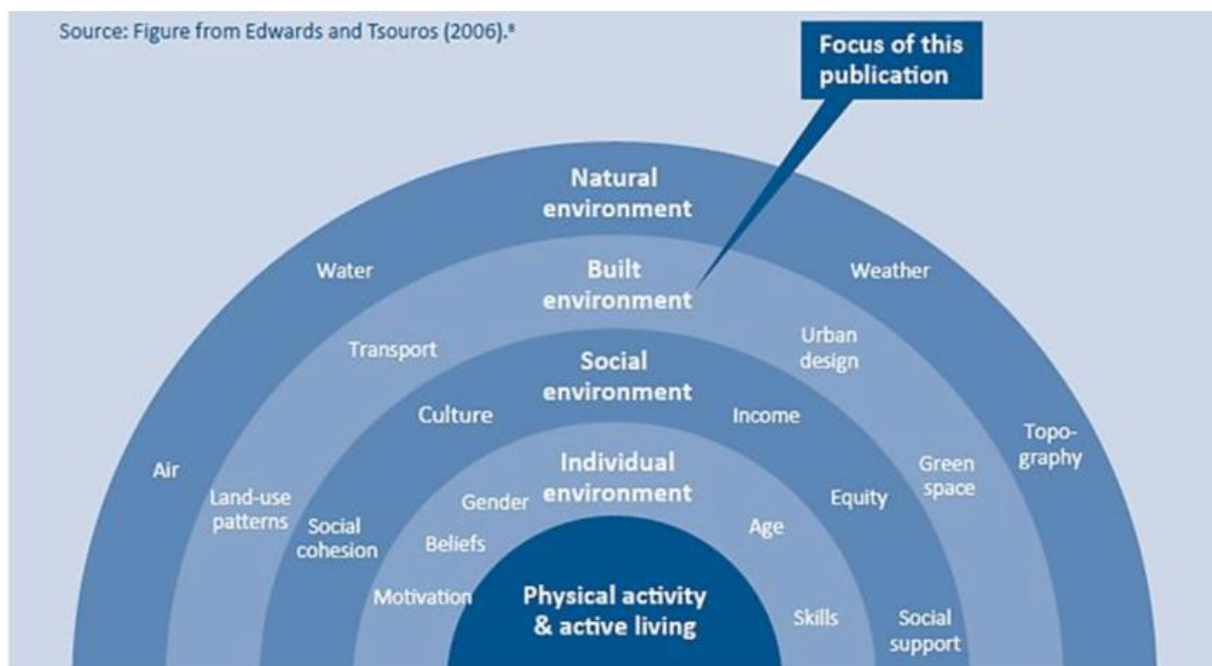


Figure 1 Determinants of Physical Activity (adopted from Edwards and Tsouros., 2006)

2.2.1 Urban greenery and PA

The relationship between UGS and PA and its effect on health is of huge interest in the academic world. Although some studies didn't find an effect between UGS and PA, several studies did demonstrate that the presence of green spaces in urban areas can enhance PA levels of residents (Maas et al., 2006; Cohen et al., 2016; Kaczynski & Henderson (2007)). Next to that there is also accumulating evidence that PA in UGS is more beneficial for health than PA in non-natural environments (Barton and Pretty 2010). PA in an outdoor environment offers greater benefits for human physical and mental health than PA in an indoor environment (Niedermeier et al., 2017). Green spaces are a vital component of the outdoor environment and encompass greenways, parks, gardens, street greenery, and areas covered with grass, shrubs, trees, or other vegetation (Taylor & Hochuli, 2017). According to a model from the RIVM (2022) in which models from Hartig et al. (2014), Markevych et al. (2017) and Marselle et al. (2020) are combined demonstrates that the effects of greenery on health, including PA, are complex. This because several boundary conditions and influencing factors may play a role in the association between urban greenery and PA (RIVM, 2022). The boundary conditions that are described in the model are *the availability of greenery*, such as quantity, quality, accessibility and proximity, and *contact with greenery*, such as exposure and experience. Influencing factors that are described in the model are *the physical and socio-cultural environment*, such as accessibility, perceived safety, facilities, maintenance and cultural practices, and *individual characteristics*, such as age, socioeconomic status, knowledge about green and sense of belonging.

As said in the introduction, much research is focused on green space such as public parks, forests and gardens. However, the presence of nature is not limited to these green spaces. For example street trees and their canopies are natural elements which are found in most urban areas in Europe (Vich et al., 2019). The relationship between green streetscapes and PA is becoming of increasing interest in the academic world. According to de Vries et al. (2013) streetscape greenery contains all sort of vegetation that give the street a green appearance. According to Hahm et al. (2017) and Lu et al. (2018) green streets do enable walking as a means of self-transportation, but these aesthetically pleasant routes could also become optimal places for recreational walking. Empirical studies have demonstrated that green streetscapes has a positive association with PA (Sarkar et al., 2015; Tsai et al., 2019; Vich et al., 2019). A study by de Vries et al. (2013) conducted in four cities in the Netherlands found that PA is more strongly associated with the quality of street greenery than with its quantity. Furthermore recent studies have suggested that PA mediates the effects of street greenery on physical health, however, the evidence remains insufficient (de Vries et al., 2013; Yang et al., 2020). Wang & Yang (2019) show us it is been recognised that a built environment intervention

such as creating green and walkable neighbourhoods is an effective approach for promoting PA and health for older adults. Bai et al. (2022) demonstrated that there is a positive association between street greenery on campuses and AM among university students.. Although there are findings from some studies focusing on specifically green streetscapes, the amount of research is still limited. Therefore this study tries to contribute to this topic.

2.3 Theory of perceived space

To create a more holistic framework for understanding how perceptions, motivations, and behaviours are related to street greenery and PA, a theory can be used that explains how built environments are produced and consumed. The French socialist and philosopher Henri Lefebvre had a significant impact on contemporary understandings of space with his work '*The Production of Space*' (Lefebvre, 1991). Lefebvre argued that space is a product of social interactions. He contended that space should not be seen merely as a collection of physical elements. Instead, the space of a society is shaped by its own spatial practices. According to him, space is a social construct produced through an ongoing process of power dynamics, desires, and negotiations. Space is not merely a reflection of a society, space is that society. During the process of spatial production, the institutions and relationships of that society materialize in an ongoing process where desires and realities, power and powerlessness, dominance and resistance, ideas and matter all converge. Space is a continuous social construction (Lengkeek, 2002). Space, as Lefebvre sees it, is a dynamic entity continually reproduced by the daily routines of its users (Lefebvre, 1991). Social relationships shape space, but space also, in turn, shapes social relationships. The physical aspects and the social practices within a space are always interrelated. Lefebvre emphasized that there is no single, uniform space because each individual perceives and experiences space differently. To illustrate his concept, Lefebvre developed a triad of perceived, lived, and conceived space (Fig. 2). As shown in Figure 2, Lefebvre's theory centres around three main concepts that interact with and intertwine with each other, sometimes in conflicting ways. The interrelations between these three types of space will be discussed in chapter 2.3.4.

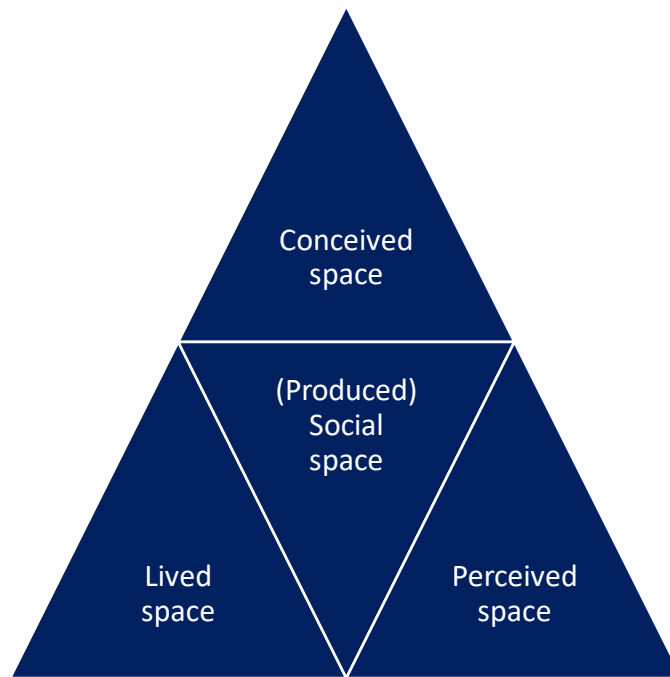


Figure 2 Henri Lefebvre's triad of space production (Lefebvre, 1991)

2.3.1 Perceived space

Perceived space refers to the physical, material world as it is perceived and used in daily life (Lefebvre, 1991). Therefore Lefebvre defined the perceived space as the space of 'spatial practice'. It emphasizes the tangible and sensory experience of space and includes the routine aspects of how people interact with their surroundings. In this dimension of space, physical and material characteristics such as buildings, streets, and objects are central. Daily routines are also key, involving the everyday activities and movements of people, like commuting to work or walking in a park. Sensory experience plays a crucial role in these daily routines, as space is directly perceived through the senses. The focus in perceived space is on how space is used and functions in the everyday context. The perceived space is incorporated into the conceived space. This relationship ensures that plans and designs are realistic, functional, and aligned with the actual experiences of the space users.

2.3.2 Lived space

Lived space builds upon perceived space as it extends beyond the mere physical perception of space (Lefebvre, 1991). Lefebvre described the lived space as the unconscious, non-verbal direct relation of people to space (Wiedmann & Salama, 2012). This type of space is also known as the 'representational space', the space is associated with images and symbols and is therefore directly lived. It encompasses the deeper emotional and symbolic layers of experience and meaning that people attribute to space. It is fundamentally subjective, a passive experience in which the external physical space harmonizes with the inner imagination. Lefebvre (1991) emphasized that lived space is

actively shaped and produced by its users. Through their actions, users infuse the space with meaning. This allows them to impart social, cultural, and political significances to the space. As a result, the space becomes a dynamic and not a passive entity.

2.3.3 Conceived space

The conceived space is created by planners, architects, engineers, and policymakers. It is known as the 'representations of space' and encompasses the abstract, theoretical, and conceptual dimension of space, which is often articulated in designs, plans, and policy documents. It concerns how policymakers and urban planners envision or imagine the use of space. This space is conceived and designed for a specific desired use. Lefebvre (1991) considers this dimension of space to be dominant because it largely determines how space is used. The plans and visions of policymakers regarding spatial structures and functions are implemented, directly influencing how people perceive and experience space. These plans and visions are based on ideas, concepts, and representations that guide and determine the physical layout and use of space. The conceived space is therefore grounded in knowledge and science, intertwined with ideology (Wiedmann & Salama, 2012). This dimension of space can be undermined by tension with the other two dimensions of Lefebvre's triad (Lefebvre, 1991). For instance, this can happen when a space is not used as intended. Lefebvre emphasizes the importance of integrating active public participation in the production of this space to ensure that the desired space is effectively realized. In this research, the conceived space relates to how the implementation of street greenery is aimed at promoting various forms of PA. It is crucial to investigate how plans and designs influence the ways in which people are physically active in urban environments.

2.3.4 Interrelations three dimensions

The three dimensions of Lefebvre's (1991) triad of space production have been described separately above. As previously mentioned, these dimensions cannot exist independently, they are deeply intertwined and continuously influence each other as you can see in Figure 3.

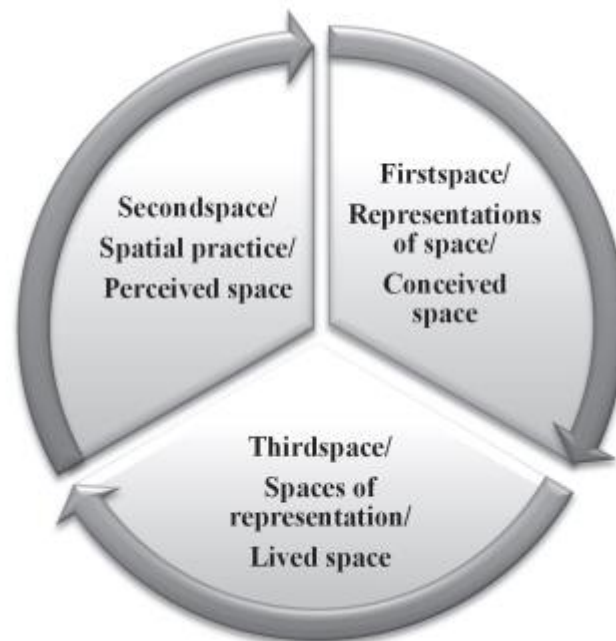


Figure 3: Interrelations between three dimensions of space (adopted from Stojanovic, 2017)

As stated, perceived space is the physical, material world as it is experienced and used in daily life. Lived space encompasses the deeper emotional and symbolic meanings that people attribute to this physical space (Wiedmann & Salama, 2012). The way people experience a space influences how they emotionally and symbolically interpret it. As previously mentioned, conceived space consists of visions based on theoretical and abstract concepts of space created by planners, architects, and policymakers, which are translated into physical environments (perceived space) through designs, plans, and policy documents. The effectiveness of conceived space is determined by how these spaces are realized in the physical world and how they are received and experienced by users. Personal experiences and meanings of space (lived space) may contrast with the visions of planners and policymakers, who often base their ideas on specific ideologies, assumptions, and goals (Schmid, 2008). These visions, for example, do not always take into account the complex reality of how users actually use and experience the space. The interrelation between perceived, lived, and conceived space can lead to both synergy and conflict. When these dimensions are in balance, a space can function optimally while resonating with the emotional and symbolic meanings users attribute to it (Harvey, 2001). However, if there is a dissonance, such as when the physical space does not align with users' expectations or experiences, tensions may arise that limit the effectiveness and use of the space. It is important to apply this to the subject of this research. For instance, a study by Madureira et al. (2011) on the evolution of green structures indicated that plans for green spaces sometimes do not align with how these spaces are used and experienced by local residents. Another study by Wolch

et al. (2014) shows that inequalities can also arise in access to urban green spaces, which sometimes leads to unmet needs and expectations of certain target groups. An earlier study by Koskela et al. (1997) demonstrated how the presence of certain groups in public spaces can influence perceptions of safety and how these perceptions affect the usage patterns of those spaces. In many cities, for example, urban parks are designed as community hubs with features like playgrounds, sports fields, and benches. However, if these parks are frequented by groups of youths who behave intimidatingly, it can create a sense of insecurity among other users, such as families and the elderly (Devlieghere & Roose, 2017). This may lead to decreased use by the broader community and undermine the park's intended role as a safe and inclusive gathering space. According to the GGD Amsterdam (2018), management also plays a role in this. Poorly managed green spaces affect their functionality and attractiveness, which can influence their usage and the experience of those spaces. Furthermore, issues such as odors and noise can create an undesirable experience for users of urban green spaces (Bezemer & Bervaes, 2004).

3. Methods

In this chapter, the methodology used in the study will be discussed. This includes the research design, participant recruitment, procedure, ethical considerations, operationalization, data analysis and the case study.

3.1 Research design

To formulate an answer on the research question there is used a qualitative approach. A qualitative approach was suitable for this research because it allowed for inquiries into personal experiences and perceptions (Aspers & Corte, 2019). Additionally, it enabled a deeper exploration of motivations and barriers related to PA patterns. The detailed and context-specific insights provided by this method can offer valuable information for policymakers and urban planners. The research question is descriptive and exploratory in nature, aiming to gain insights into the relationship between green streetscapes and PA of residents in the city of Utrecht. Qualitative methods are employed to gain in-depth insights into the experiences, perceptions, and behaviours of residents regarding green streetscapes and PA. This includes semi-structured and interpretive interviews with residents of recently greened streets of the districts Noordwest (Northwest) and Noordoost (Northeast) Utrecht, aimed at understanding their perception of the impact of streetscape greening on their PA and their views on the role of greenery in a PA-friendly living environment. Additionally, interviews were conducted with relevant employees of the municipality of Utrecht which are involved in streetscape greening projects, to understand their visions, ambitions, and objectives related to greening streetscapes and its effect on PA of residents. This approach provides in-depth insight into the experiences and opinions of stakeholders, aiming for a holistic understanding of the phenomenon under investigation.

3.2 Participant recruitment

The participants in this research were six neighbourhood residents and four relevant employees from the municipality of Utrecht. Four residents live in the district Noordoost Utrecht, and two residents live in the district Noordwest Utrecht. Of the six interviewed neighbourhood residents, five are women and one is a man. Careful consideration was given to ensuring a balanced representation of the various greened streets studied. Two residents live on Egelantierstraat. Two residents live on Laan van Chartroise. Two residents live in the neighbourhood Witte Vrouwen. The four interviewed municipal employees include a policy advisor/project leader, a project assistant, a district councilor, and a pedestrian approach coordinator (see table 1).

Residents		
<i>Number</i>	<i>Gender</i>	<i>District in Utrecht</i>
1	Female	Nothwest (Laan van Chartroise)
2	Female	Northeast (Wittevrouwen)
3	Male	Northwest (Egelantierstraat)
4	Female	Northwest (Laan van Chartroise)
5	Female	Northeast (Wittevrouwen)
6	Female	Northwest (Egelantierstraat)
Municipality		
<i>Number</i>	<i>Gender</i>	<i>Role</i>
7	Female	District councilor Northeast Utrecht
8	Female	Pedestrian Approach Coordinator
9	Female	Project Assistant Northwest
10	Female	Policy Advisor/Project Leader Sustainable Cities

Table 1: Participant demographics

3.3 Procedure

The data collection was conducted in the city of Utrecht from May to June 2024. The data were gathered through ten semi-structured interviews. Participants were approached in various ways. Participants from Noordwest Utrecht were contacted by distributing a flyer (see appendix 4) through the mailboxes of houses on Egelantierstraat and Laan van Chartroise. An advantage of this method is that it reaches a hard-to-reach target group (Sadler et al., 2010). However, a disadvantage is that the response rate can be limited. In addition to distributing the flyer, contact was made with the project assistant for Noordwest Utrecht, who shared the information letter about this research (see appendix 3) in group chats with residents of both streets. Participants from Noordoost Utrecht were approached through the website <https://www.buurtnatuur030.nl/>, where various resident initiatives related to greenery are shared. The questions asked in the interviews were developed based on the theoretical framework but also allowed for possible other relevant input from the participants. To ensure that all relevant aspects were covered in the interviews, topic lists were prepared in advance (see appendix 1 and 2). These topic lists also provided room for relevant input from the participants. The interviews were conducted one-on-one. One interview with a resident was conducted at their home, while the remaining five interviews with residents were conducted online via Teams. The

interviews with the policy advisor/project leader, project assistant, and district councilor were also conducted online via Teams. The interview with the pedestrian approach coordinator took place at the city office.

3.4 Ethical considerations

It was important in this research to ensure the anonymity of the neighborhood residents, so they could speak freely. This meant that no data from the interviews were shared with third parties. It was important that the participants gave informed consent (Mason, 2018). It was important to inform about the purpose of the research; the type of questions that would be asked; that participation in the research was entirely anonymous and voluntary; that the data would be treated confidentially; the researcher's right to analyse and process the data; and the opportunity for participants to ask questions about the research (Mason, 2018; Neuman, 2014). Additionally, permission was requested to record the interviews so they could be transcribed later. Additionally, it was crucial to ask the municipality to be open about the greening projects and her visions, ambitions and objectives. It was also important to ask the participating officials from the municipality of Utrecht about their preferences regarding anonymity, to ensure that statements could not be traced back to the individuals. All four individuals indicated that they have no objections to having their roles mentioned.

3.5 Operationalization

In this thesis, it was decided not to apply strict operationalization of concepts. The reason for this lies in the adopted interpretative research method, which is aimed at obtaining a deep understanding of the phenomena being studied (Miller et al., 2018; Alase, 2017). In an interpretative approach, it is essential to remain open to new insights that emerge during the research process and to maintain the flexibility to let concepts and themes arise from the data itself, rather than strictly defining them in advance (Jansen, 2012). According to him, interpretive research focuses on understanding the meaning of social phenomena from the perspective of those experiencing it, rather than quantifying variables. By following this approach, a balance is struck between theoretical grounding and methodological flexibility, contributing to a robust and contextually anchored analysis of the research results. As mentioned above, concepts were not strictly operationalized. However, the three concepts of Lefebvre's (1991) triad of *space*, *perceived space*, *lived space*, and *conceived space* were used as a guideline in the semi-structured interviews. Using the concepts of perceived space and lived space, it was aimed to gain insights into behaviour, experiences, and perceptions. Through conceived space, it was aimed to uncover the vision, ambitions, and objectives of the municipality of Utrecht.

3.6 Data analysis

After all the interviews were conducted, they were transcribed using the program Word. Subsequently, the interviews were analysed in the program Nvivo to find similarities and patterns. A thematic analysis is, according to research, a valid and effective way to analyse qualitative data (Luo et al., 2021). This analysis in Nvivo was done through coding, starting with open coding, where the transcribed interview was read through and codes were assigned to text fragments. Then, the codes that were related were combined into an overarching code, known as axial coding. The third round of coding involved selective coding, where theory was built based on the main categories found. One codebook was created for the interviews with the residents, and one codebook was created for the interviews with the municipality (see appendix 5).

3.7 Case study

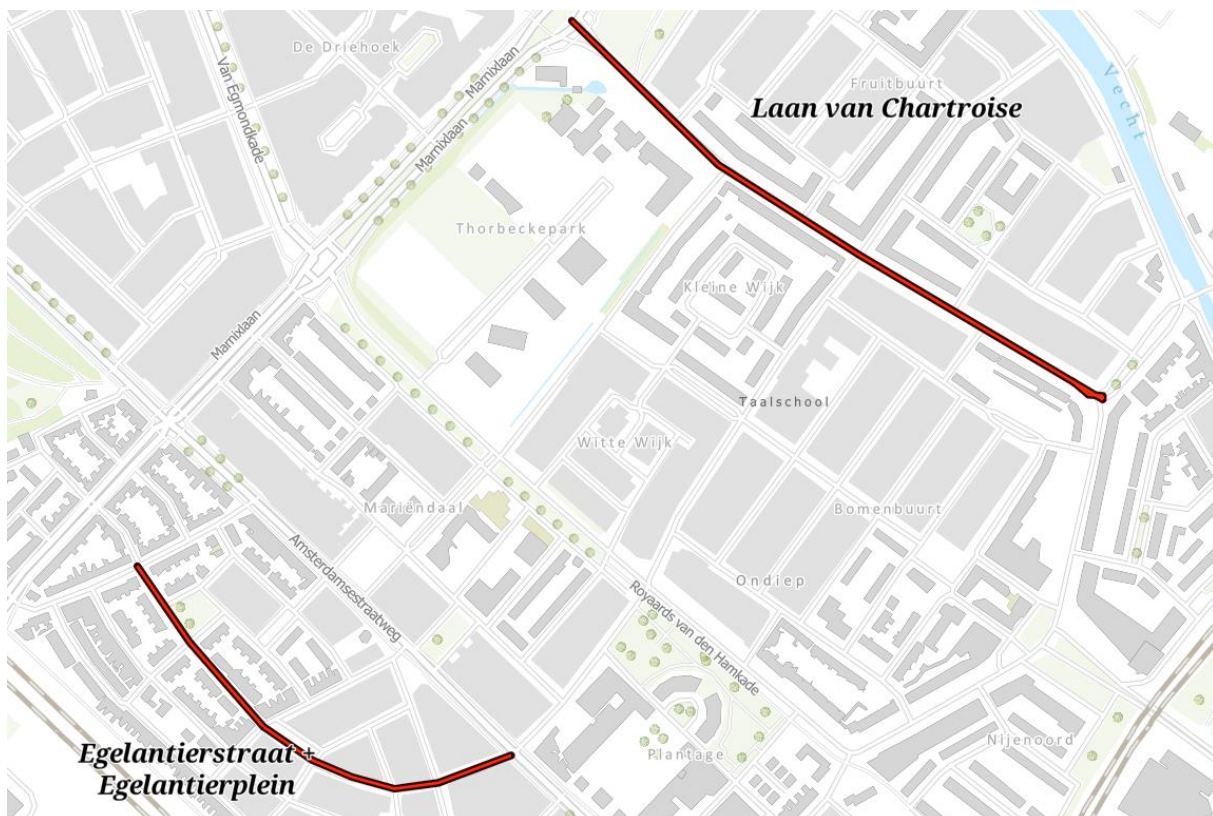
The case study method is an effective and versatile research approach, ideal for thoroughly examining complex phenomena within their real-world context (Hartley, 2004). This approach allows for deep and contextual insights into specific subjects, such as communities or neighbourhoods, by analysing them within their natural environment (Yin, 2018). It is valuable in cases where the boundary between the phenomenon and its context is unclear, and it provides deep, detailed insights that are often not revealed by broader, quantitative research methods (Stake, 1995). Case studies are ideal for exploring new or under-researched areas. They can help in developing hypotheses and provide valuable preliminary insights that can guide future research (Baxter & Jack, 2008).

Case study: city of Utrecht

To gain insights into the relationship between street greening and PA, research was conducted in the neighbourhoods of Noordwest and Noordoost Utrecht. Utrecht was chosen as the case study because it is a rapidly growing city, projected to have over 430,000 inhabitants by 2030, which has its effect on the battle of space (Everhardt, 2019). This population growth within the city limits impacts the health of its residents, presenting both opportunities and challenges for creating a healthy living environment (Giles-Corti, 2016). The presence of green spaces can positively influence people's health (Cohen, 2016). Consequently, the municipality of Utrecht is focusing on designing public spaces to encourage movement, sports, leisure, and social interactions (Gemeente Utrecht, 2018). Given the importance of green spaces in promoting PA, the municipality is working to make streets, squares, courtyards, rooftops, and facades as green as possible. Additionally, they encourage the creation of green areas and protect existing green spaces in development plans. In 2023, an average household in Utrecht had access to 64 square meters of public green space, a decrease from 2022 (66 square meters) (Gemeente Utrecht, 2024). The amount of green space varies significantly across

different neighbourhoods in Utrecht. Based on this, research was conducted in the neighbourhoods of Noordwest and Noordoost Utrecht. Noordwest, with 64% paved areas, is among the districts with a high degree of hard surfaces and is characterized by limited space and narrow streets. This study includes two recently greened streets in Ondiep neighbourhood: Egelantierstraat/plein (street and square) and Laan van Chartroise. Additionally, research was conducted in the Wittevrouwen neighbourhood (Noordoost Utrecht), one of the most paved areas in Utrecht. The study focused on the neighbourhood level, rather than selecting specific streets, because two resident initiatives with greening projects spanning the entire neighbourhood were interviewed. Street greening is a priority in this neighbourhood as well. The Noordwest and Noordoost neighbourhoods are marked by narrow spaces, densification, and limited private garden areas (Gemeente Utrecht, 2024). These characteristics make the challenge of greening more complex in these areas, making them particularly interesting for this research.

Ondiep – focus on specific streets



Figuur 4: Neighbourhood Ondiep: Egelantierstraat/plein and Laan van Chartroise (adopted from Provincie Utrecht, 2024)

The streets in Ondiep (figure 4) which were part of this research have been recently greened, making them relevant for examining the influence of street greenery on the PA levels and patterns of the residents.

Egelantierstraat is a side street off Amsterdamsestraatweg and serves as a significant link in the neighbourhood, connecting the surrounding areas. At the entrance of Egelantierstraat, six trees have been added, and the planting beds have been expanded. Additionally, 100 square meters of pavement have been replaced with greenery. Below are photos of the entrance of Egelantierstraat.



Figure 5: Entrance Egelantierstraat (after greening project) (photos by participant 9)

Further along Egelantierstraat lies Egelantierplein (square), which has also been greened. An additional 400 square meters of greenery have been added to this square. Three parking spaces have been removed, 15 extra bicycle parking spots have been added, and a walking path has been constructed. Below are photos of Egelantierplein before and after the greening took place.



Figure 6: Egelantierplein (before greening project) (photo by participant 9)



Figure 7: Egelantierplein (after greening project) (photo by participant 9)



Figure 8: Egelantierplein (after greening project) (photo by participant 9)

Laan van Chartroise is a major traffic artery in Ondiep neighbourhood. The residents of the street participated in the national competition 'NK Tegelwippen' (an event where the municipality works with residents to replace as many paving stones as possible with green (facade) gardens.) and made the street greener as a result. Large planting beds have been created on the sidewalks, and trees have been planted. In total, 2,500 tiles were removed. Below are photos showing the transformation.



Figure 9: Laan van Chartroise (before greening project) (photo by participant 9)



Figure 10: Laan van Chartroise (after greening project) (photo by participant 9)

Wittevrouwen – focus on community initiatives

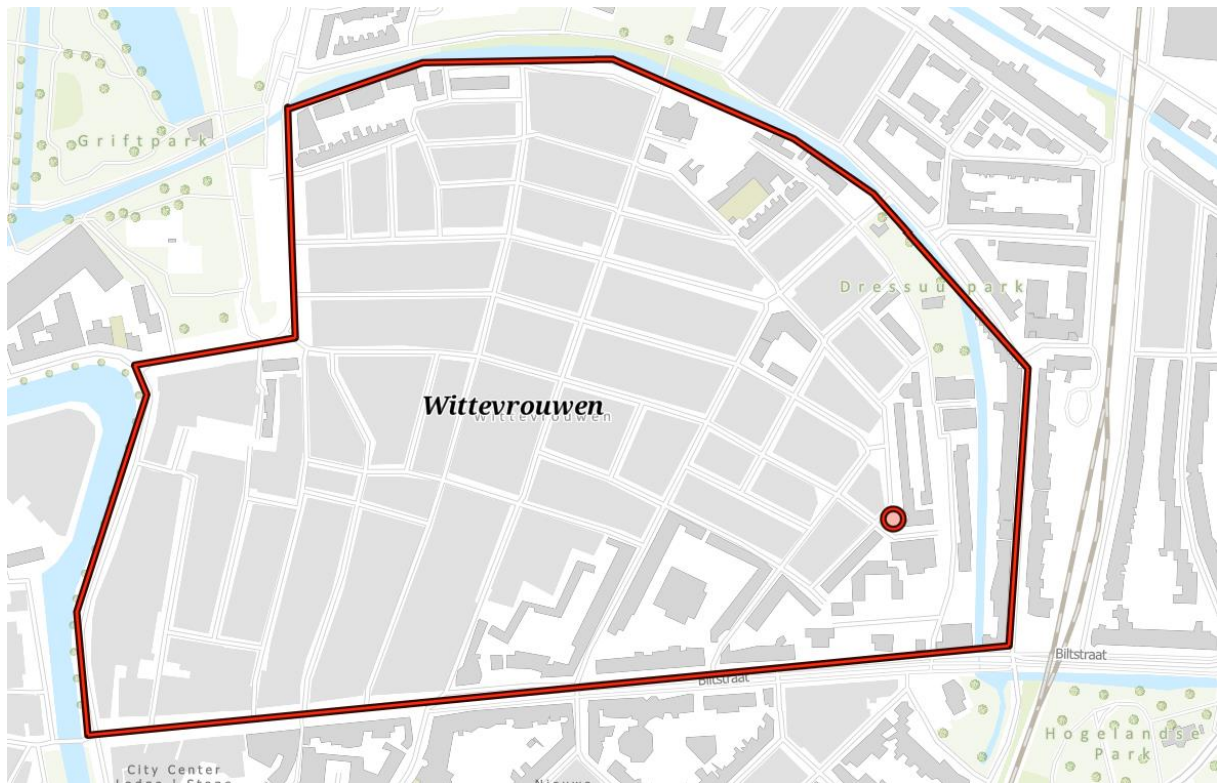


Figure 11: Neighbourhood Wittevrouwen (adopted from Provincie Utrecht, 2024)

In Wittevrouwen neighbourhood, a broader approach was chosen by examining community initiatives that promote greening at a neighbourhood level. Conversations were held with two community initiatives about how these projects influence the PA of residents. One community initiative is named 'de Plantenbak commissie' and the other is named 'Groene Vrouwen'. An example of a recently greening project is where the red dot in figure 11 is placed. This project involved the transformation of a paved square into a green square/park.

De Plantenbak commissie

The neighbourhood of Wittevrouwen has few front gardens and limited municipal green spaces. This lack of greenery is supplemented by approximately 200 planters placed throughout the neighbourhood and managed by residents (Groene Buurtinitiatieven in Utrecht, n.d.). The neighbourhood initiative has been active since 1990 and focuses on planters and tree pits. Facade greening is also encouraged but is not funded by the subsidy the committee receives from the municipality.



Figure 12: De Plantenbakcommissie (adopted from Plantenbak Commissie Wittevrouwen, z.d.)

De Groene Vrouwen (The green women)

The community initiative 'De Groene Vrouwen' is dedicated to greening the paved and densely built Wittevrouwen neighbourhood (Groene Buurtinitiatieven in Utrecht, n.d.). Several greening projects have already been implemented, such as the green strip at Gildstraat/Bollenhofsestraat, with more planned for the future. The goal is to make the neighbourhood more green to enhance resilience to climate change and to encourage residents to spend more time outdoors.



Figure 13: De Groene Vrouwen (adopted from Groene Vrouwen, 2023)

4. Results

In this chapter the results of the research are presented. The findings are presented based on the three themes *perceived space*, *lived space* and *conceived space* of Henri Lefebvre's triad of space production (Lefebvre, 1991). Important to state is that the three dimensions are interrelated with each other. The dimensions *perceived space* and *lived space* are not separated from each other, because the two are to a great extent overlapping and complement each other. These two dimensions are based on the interviews with the residents. The *conceived space* is separated because that dimension is based on the interviews with relevant employees of the municipality. Themes that emerged from the interviews are described under these three dimensions.

4.1 Perceived space and lived space

In this chapter the sub question on how street greenery can influence the PA levels of residents will be answered. Next to that the sub questions on residents' perceptions and experiences related to green streetscapes and PA will be answered. Overall, the interviews revealed that most residents PA levels changed due to the greening projects. The residents perceive the greenery in their street as a positive development and some participants addressed some negative experiences. A variety of factors influencing the experience and perceptions of greenery in relation to PA emerged.

4.1.1 PA levels

Nearly all participants indicated that they walk more since the street has been greened or that the presence of street greenery increases the tendency to walk or cycle. Participant 3 mentioned that more people (including the participant) walk their dogs more often or for longer distances since the street was greened, as there is otherwise little greenery in the neighbourhood. Participant 1 stated that they enjoy walking through the street to observe the greenery. Participant 1 also noted that the greenery in front of their home impacts their PA because now the starting point is green rather than paved. This looks more appealing and could encourage them to go outside and be active. A relevant point mentioned by several participants (2, 4 and 6) is that street greenery is often included in their walking routes, or that people intentionally take a detour to see the greenery. Several participants said they appreciate the greenery and enjoy coming to see it. Participant 2 noted that the greenery is interesting for people because there's more to see than when it was paved. Biodiversity plays a role in this, making the green areas interesting according to the participant, which encourages people to move around.

P2: "I truly believe that the greener a neighbourhood is, the more people are inclined to go outside and walk around. It makes walking more enjoyable because there's something to see. Instead of staying at home, people now take more pleasure in exploring the area. I've heard this from

residents too. There are people here who have lived in the neighbourhood for 40, 50, or 60 years, and they say that it used to be such a dull, concrete area. Now, it's really pleasant to walk around because it has become so beautifully green."

Additionally, participants 5 and 6 mentioned that the greenery in the street has influenced their decision to take short walks, as it is now more appealing to take a walk through green areas than when it was (partially) paved.

P6: "Now I notice that if you have just 15 minutes or so, you can easily take a short walk along this stretch and then head to Wisselspoor, which has also become quite beautiful and green in recent years. And then, well, return from the other side. So, taking a short walk of fifteen to thirty minutes is much easier now than it was before."

Spending time outside

All participants emphasized that the presence of street greenery influences the amount of time people spend outdoors. They mentioned that people are more likely to go outside in a green street because greenery at the doorstep invites them to go out, and because greenery in the street provides a reason to spend more time outside. Additionally, it was noted by participants 3 and 6 that people are more likely to arrange to meet outdoors due to the presence of street greenery. For instance, it was mentioned by participant 3 that having a view of greenery encourages people to go outside. The participant illustrated this with an example, stating that people perceive a difference between looking out onto a paved parking lot and street greenery.

Presence of the square

Several participants (participants 2, 3, 5 and 6) indicated that the presence of a green square in the street is a factor in increasing PA, spending more time outdoors, and meeting neighbours more often. The participants noted that the square generates more activity. Participant 3 mentioned that boxing now takes place on the square, something that never happened before the square was greened. Participants 2,3 and 6 stated that the square is used as a meeting place or for social activities, and that neighbours encounter each other more frequently because of the green square. According to three participants (2,5 and 6), the square also encourages children's PA, as it provides space for them to move freely.

P6: "Previously, we would just stay and play in the backyard. I notice that it's now a bit more appealing, especially for her (pointing to its daughter), to ride her bike in the little park. It's a small park, but she can move around more freely there. Before, it was just a road and a parking lot with cars, which obviously didn't invite us to walk or bike around. But now, it does so much more."

Effect on children

As mentioned above according to participants 2, 5 and 6 the presence of a green square influenced the PA levels of children. The interviews revealed that street greenery particularly influences children's PA and is important for their social development. Participants with children (5 and 6) noted that the street greenery and a green square or playground provide space and opportunities for children to play and meet each other. Participant 6 mentioned that before the greening project, they would often take their child to Julianapark or de Singel to walk. Now that the street is greened, the participant more frequently takes short walks of fifteen to thirty minutes with their child because the public space is now more accessible and inviting for children. Participant 4 also mentioned that greenery has been used to enhance traffic safety by serving as a barrier to prevent children from crossing the road recklessly.

Maintenance and social aspect

Participants 1,2,5 and 6 indicated that greenery, which is partially managed by the community, impacts PA and social cohesion in their neighbourhood. They noted that people spend more time outside tending to the planter boxes or gardens to maintain the greenery. An example from Wittevrouten was mentioned, where there are many community-managed planters. According to participant 5, maintaining these planters serves a social function. Neighbours spend more time outside to care for the greenery and consequently interact with each other more than they would otherwise. Participant 1 expressed enjoyment in working together with neighbours in the small gardens and planting greenery with them.

No difference in PA levels

Some participants (2 and 4) indicated that their PA has not changed or is not noticeably different since the street greening, or that it is too early to say whether the street greening has influenced their PA, as the greenery was recently implemented and still needs to grow. For instance, participant 4 mentioned that their level of PA or the frequency of going outside remains the same, but the overall experience has changed because of the street greenery.

P4: " Yes, no, it's the same... but the experience is different with the children, you know, because it used to be a very busy street with buses and cars driving really fast. I do feel like it now acts as an extra buffer. In terms of traffic safety, I find it quite reassuring. So, it's not so much that the way we use it has changed, but more about the overall atmosphere. That's really the difference."

Participant 6 mentioned that for them, it's important to have more green spaces throughout the neighbourhood to encourage walking. Participant 4 indicated that street greenery has too small of an effect to make them walk more in the neighbourhood because street greenery doesn't feel like nature. Walking through a forest, for example, feels different than walking through a city with street greenery. The same participant also noted that having a street with less traffic would have a greater impact on the amount of walking they do in the neighbourhood.

P4: " Yes, I think it's much more about the traffic. If I lived on a quieter street, I believe that would make a big difference. Yes, yes, we do sometimes think about it. Like, should we move to a quieter street? But you can't have everything, so we're generally quite satisfied. But yes, I think that would really... that would make a much bigger impact."

Presence of blue-green infrastructure

Furthermore, the interviews with the residents revealed that several of them (1 and 4) often engage in longer physical activities in nearby blue or larger green spaces. For example, these participants (1 and 4) from Noordwest Utrecht indicated that the proximity of the river de Vecht is important for taking longer walks or bike rides. Participant 1 also frequently walks between the meadows and values having that option. Participant 5 from Wittevrouwen emphasized the importance of the river de Grift in their neighbourhood, which often forms part of their walks.

4.1.2 Positive experiences

Atmosphere, feeling, relaxation

What stood out the most in the interviews with the residents regarding their perceptions and experience of greenery in their street was that the greening affects the feeling and atmosphere when being outside. For example, participant 4 mentioned that the experience and atmosphere of the walking route have changed since the implementation of street greenery. Three participants (1, 2 and 6) stated that the overall experience has become more pleasant since the greening, making it more enjoyable to walk through the street and along the house. Participant 2 noted that people appreciate the greenery and enjoy walking towards or around it. This same participant also mentioned that people find it pleasant to be in a green environment, and participant 1 shared that this pleasant experience is linked to the presence of plants and greenery, which makes the street view much more pleasant and cozy. This participant also indicated that the expectation is that coming home will be much more pleasant now that the street and the area in front of the house have been greened. They noted that it's nice that, due to the greening in front of the door, the beginning and end parts of the green route are now also greened. Participant 4 stated that having greenery in front of the house does something to your feelings. They mentioned that looking out at the greenery from their home

brings a happy feeling, which would be different if they were looking out at the flat across the street. Also important to mention is that participant 6 reported feeling a sense of relaxation while walking through the green street. Although this feeling is stronger in larger green spaces like a forest, even small-scale greenery in the street has an effect. Especially in a busy city, street greenery is effective for relaxation and calming down. Furthermore, participant 6 mentioned that gatherings and other social interactions with neighbours are more enjoyable and relaxed thanks to the addition of a green square.

Inclination to move

All participants noted that their outdoor experience has improved due to the greening of the street. Participant 2 mentioned that a greener neighbourhood makes it more fun to go for a walk, and participant 5 said that the experience of a green street increases the inclination to walk through it and, for example, take a stroll. Participant 3 emphasized their belief that seeing greenery can unconsciously influence people to move in green spaces.

Sense of safety

Some participants (4 and 6) indicated that the greenery in the street affects their sense of safety. Participant 6 noted that the greenery feels like an extra buffer between the busy road and the sidewalk. The participant emphasized that they appreciate how greenery has been used to make the street safer for traffic, especially important when walking with children. Participant 3 highlighted that it is crucial for children to feel safe when moving along a bike path, and that greenery can play a role in this. The participant said that this is important for children's development, as they can, for instance, ride their bikes alone earlier, thus expanding their world sooner.

Aesthetics

Most participants (1,2,4 and 5) indicated that the aesthetics of street greenery are important for encouraging people to go outside and be active. Participant 2 mentioned that a stone neighbourhood is dull compared to a greened one, and participant 5 noted that the street has transformed from bare, stony, and urban to beautifully green. This transformation makes the street look more pleasant and attractive, making people more inclined to go outside and walk. Participant 2 stated that the greenery adds visual appeal, providing more to see, which encourages people to go outside and move. They mentioned that biodiversity contributes to this by offering more to observe. According to the participant, this is particularly interesting for children, as there are many more insects, butterflies, and birds to see, attracting their attention. The participant also noted that the biodiversity of greenery gives people a good feeling and is appreciated by them.

Shade and heat reduction

Another important theme that emerged in most interviews is shade and heat reduction. Nearly all participants (1,2,3,5 and 6) mentioned that the shade and cooling effect resulting from greening improve the experience of being outside and being active. Participant 6 noted that the cooling provided by greenery is more pleasant than stony areas, which feel warmer. This participant mentioned that there is already a noticeable difference between Amsterdamsestraatweg, where little greenery has been implemented, and the greened Egelantierstraat, where the cooling effect is evident. According to the participant, the cooling effect of greenery thus makes a difference in the experience and perception of warmth.

P6: "But on Amsterdamsestraatweg, they have already removed all the greenery and trees. It suddenly became noticeably warmer by a few degrees, and then you cycle into the newly greened Egelantierstraat and especially next to the little park here, you immediately feel that it's a few degrees cooler. So, especially with this hot weather, it really makes a difference in how you experience the heat."

Participant 1 expressed hope and expectation that the greening will reduce the street's heat and make it feel cooler. This could, according to the participant, encourage people to go outside and be active instead of staying inside during (extreme) heat.

4.1.3 Negative experiences

Litter and dog poop

There are also some experiences that participants mentioned which negatively affected their perception of street greenery. For instance, participant 4 noted that litter is more noticeable because it gets blown into the green spaces and often gets stuck there. This creates an unpleasant feeling, according to the participant, as it makes the presence of a lot of litter more evident. Participant 6 pointed out that the presence of dog poop in the greenery also negatively impacts the experience of green spaces in the street. The participant mentioned that they believe the amount of dog poop in an area influences whether or not people choose to walk or play there. Additionally, the participant stated that the experience of green spaces is better when they know there's likely no dog poop around, which affects the use of the green areas.

P6: "I notice that the amount of dog poop in an area really affects the experience. Yes, I think that if there is a lot of dog poop, you are less likely to walk or play there. For example, in Juliana Park, which is dog-free, it makes a big difference. You are much more likely to walk on the grass, play, or make use of the green space because you know there is probably no dog poop there."

Bad maintenance

Participant 5 highlighted that the quality of the greenery is crucial for its enjoyment. They added that poorly maintained greenery can cause irritation among residents, which is the opposite of the desired effect of street greenery. Two other participants (1 and 4) reported instances where the greenery they had planted themselves was removed by the municipality. They described this as a negative and frustrating experience that affected their perception of greenery because it reduced their sense of involvement with the street's greenery.

Limited natural feel of street greenery

Participant 4 mentioned that street greenery has little impact on their sense of nature. They stated that despite the street greening, it remains a busy street with a lot of concrete and traffic. While they appreciate the street greenery, it does not provide a real sense of nature and is too small to encourage walking or strolling. The participant noted that the difference between urban greenery and larger green structures is clearly noticeable in their experience. For example, they would get more of a forest/nature feeling if more trees were planted in the street. As a result, the participant is more inclined to walk near de Vecht or Oud Zuilen, as those larger green areas do not feel 'urban'.

4.1.4 Desired green elements

The interviews with residents revealed a variety of responses regarding what desirable street green elements are for encouraging PA.

Trees and shade

Almost all participants (1, 2, 4, 5 and 6) mentioned that trees are an important element of street greenery. For example, participant 4 said they appreciate that trees have been planted in some parking spaces and would like to see even more trees on the street to create a forest-like feel. Participant 5 noted that the shade provided by trees is important for residents to be able to sit outside. The importance of shade-providing greenery frequently came up in the interviews. Three participants (1, 5 and 6) mentioned that shade is essential during hot weather. Participant 6 pointed out that adults, in particular, prefer taller greenery like trees because it provides shade. Participant 5 suggested that when it's not possible to plant a tree, a pergola could be a good alternative for creating green spaces with shade.

Diverse/varied greenery

According to many participants, it is important to implement diverse and varied street greenery. For instance, three participants (1, 2 and 4) mentioned that this is crucial for biodiversity. Participant 1

noted that biodiversity makes green spaces more interesting to look at or move through, as it attracts animals and insects. Participant 4 added that monotonous greenery looks less appealing and is less beneficial for biodiversity. Participant 6 expressed a preference for having the greenery look tidy, while two other participants (2 and 3) indicated that it's important to allow the greenery to grow wild.

P2: "And then the city workers come by to clean up, and when you return, everything is just bare and neatly trimmed. But yeah, considering what that means for biodiversity... I don't think it's very wise. So, I believe there is definitely room for improvement in this neighbourhood. We need to move away from the idea that everything has to be neat, tidy, and stripped bare. Instead, we should allow things to grow wild and give more space to wild plants."

Several interviews also highlighted that diverse and multifunctional greenery is important because it can meet the needs and preferences of different groups. For example, Participant 6 mentioned that adults have a greater need for tall greenery that provides shade, while it is important to implement lower greenery with play elements for children. Participant 3 stated that having different types of greenery intended for various activities can help avoid conflicts.

P3: "I think it's wise that the green spaces are designed to be used for as many purposes as possible, and then people can decide how they want to use them. It shouldn't be designated for just one purpose because that always leads to conflicts. For example, if there's only a dog walking area, people might wonder why they can't play football there. So, by ensuring that green spaces can be used for multiple activities, it likely reduces the chances of conflicts."

Other desired street greenery

Additionally, two participants (1 and 4) mentioned that they would like to see more flowers in the street because it enhances the aesthetic value and makes them feel happy. Participant 6 also mentioned that greenery that can grow around lamp posts is a good option if there is limited space for greening. Additionally, participant 5 indicated that planter boxes can provide a solution in densely populated neighbourhoods like Wittevrouten.

4.1.5 Vision of residents

(Mobility) vision needs to change

From the interviews with residents, it emerged that several participants believe there should be a vision less focused on cars and more on other forms of transportation/mobility. For instance, participant 3 mentioned that the space in the city could be better utilized than for car parking.

Participant 6 also supported reducing space for cars and parking. Participant 4 indicated that it is a waste that certain parking spots in the street are not used and remain empty. Participant 3 stated that a different vision is needed regarding cars and parking spaces, emphasizing that it is a positive development to reduce parking space and suggested that this space could be better used for implementing greenery. Participant 1 noted that the size of cars should adapt to the size of parking spaces rather than the other way around. According to participant 3, it is important to facilitate other forms of transportation besides the car. The participant highlighted that the spatial arrangement reflects which type of transportation is considered most important and that the way a certain type of transportation is facilitated influences the behaviour of city residents. The participant stated that if the same type of transportation continues to be facilitated, residents will continue to transport themselves in that manner. The participant stressed that how transportation is facilitated also leads to behavioural changes. For instance, changing the facilitation of bicycles can alter residents' perceptions, which is a necessary development. The participant suggested that bike racks should be placed more prominently on Egelantierstraat. Currently, they are somewhat haphazardly placed on the corner of the street, while they should take priority over car parking spaces. The participant also noted that there is no policy for cargo bikes, and this type of transportation has not been included in the plans for Egelantierstraat.

P3: "If you keep looking at these kinds of issues with such a perspective, it will always be that way. I do think that in the street, the bike racks seem to be somewhat haphazardly placed. So, there is space to park bikes. But, for example, if you look at how many people now use cargo bikes, that number is only increasing, and it wasn't even considered in the design of the street, so I think that's just a missed opportunity. They're looking at the way we currently transport ourselves and are facilitating that again. But if you keep facilitating this way of transportation, we will continue to transport ourselves in this manner."

P3: "Yes, in principle, if you buy a cargo bike and exchange your car for it, you think you're doing well. But if you can't park it anywhere, you end up putting it on the sidewalk, and then someone in a wheelchair can't get by. And where else are you supposed to put it, because you can't put it in a parking space since those are only for cars. This doesn't really encourage people to buy a cargo bike."

Additionally, participant 2 indicated that there needs to be a transition in how we think about implementing greenery. According to the participant, the current vision is to pave everything first and then consider where greenery can be added. The participant emphasized that it is necessary to green everything that is uselessly paved. This means, according to the participant, that everything should be

greened except for the routes we move on. This way, neighbourhoods can be turned into more of a park landscape.

P2: "Yes, I really have a vision about that. There's also this kind of parks club, people who believe that we should turn everything into parks and connect all those parks. From that perspective, I also have a vision that we need to think differently. Instead of what we do now, putting up buildings and then paving everything from building to building and then consider where we can maybe create a garden, a plant bed, or plant a tree. I think it should be different. I think we should green everything in principle, except for the places where we need to move around, such as biking, walking, and driving, but everything else should be greened. We are working on a plan to make part of this neighbourhood into a park. Because, I don't know exactly how much, but maybe 60 percent of the paved ground is actually uselessly paved and should be greened."

Advice and improvement points for the municipality

The interviews with residents also revealed advice and improvement points for the municipality. It emerged that it is important for the municipality to actively engage and involve residents in greening projects. According to participant 6, the municipality should actively involve the community in the projects and explain what type of greenery is being planned and how it should be maintained. The participant suggested that the municipality should excite residents beforehand or occasionally provide a kind of refresher workshop on greenery to equip the community with knowledge and keep them actively involved. The participant noted that it would be beneficial if the municipality ensured that someone with knowledge of green maintenance could brainstorm with residents one day a year. According to participant 5, the municipality should not assume that a neighbourhood can maintain the implemented greenery on its own and possesses self-organizing capabilities. The participant emphasized the need for oversight in this regard. Participant 5 proposed the idea that each neighbourhood should have a green concierge who walks through the neighbourhood once or twice a year, monitors all the greenery, and knows whom to contact for each section of greenery. Participant 6 suggested that the municipality could invest more in knowledge transfer than is currently done in practice, also to encourage residents who have no experience with gardening, for instance. Participant 2 noted that an enthusiastic neighbourhood office can play a significant role and is crucial in supporting resident initiatives. Participant 3 stated that it is important for the municipality to seek input from residents regarding their wishes for street greenery. According to the participant, this was well done on Egelantierstraat/plein project by sending out various questionnaires and organizing consultation evenings. Another point that emerged from the interviews was that municipal

services need to coordinate better with each other. Participant 5 mentioned that the landscaping service was unaware of the order to trim certain streets.

P5: "And the tree pits that weren't maintained by residents had hedge shrubs planted in them, but those grow quite tall eventually. So I asked, 'Who trims these hedge shrubs?' They said the landscaping service does that, so I went to the landscaping service and asked them, 'Are you going to trim these hedge shrubs?' They said, 'Well, they can promise you that, but we haven't received any orders or funding for it.' So the coordination between municipal services could be better."

Additionally, the interviews revealed that the municipality sometimes needs to better maintain street greenery. Participant 5 mentioned that poor maintenance of greenery can lead to irritation and detract from the value of greenery in the neighbourhood. Participant 5 also noted that the municipality could do more to protect tree roots. Participant 6 pointed out that the municipality does not actively address dog waste, which, according to the participant, affects the perception of greenery in the neighbourhood.

4.2 Conceived space

This chapter presents how the space in the city of Utrecht is envisioned by the municipality of Utrecht. It outlines the municipality's perspective on implementing (street) greenery to encourage PA among residents. Based on the analysis of four interviews conducted with individuals from the municipality of Utrecht, the vision, ambitions, and objectives regarding (street) greenery and promoting PA among the city's residents are described below. Subsequently, bottlenecks, obstacles, and challenges are presented.

4.2.1 Vision, ambitions, and objectives

From the discussions with individuals from the municipality of Utrecht, it emerged that Utrecht has a significant task and ambition to further green the city, partly with the aim of encouraging residents to spend more time outdoors and to be more active. The interviews revealed that the municipality of Utrecht is working on greening and making further plans to green on various scales. For instance, participants 8 and 10 mentioned that the municipality is working on the 'Groene Schaalsprong' (Green Leap), which considers different levels. This ranges from small-scale greenery, such as greenery at the street and neighbourhood levels, to the greenery surrounding the city.

P10: "The 'Groene Schaalsprong' employs various scales and essentially goes from outside to inside or from inside to outside, depending on how you look at it. If you start from inside to outside, the first scale is the streets and the neighbourhood. For example, the greening of streets in Noordwest is a result of this. The next level involves the green-blue connections, which are larger lines that cover a broader area. We also have the level of parks, which often serve the function of providing good

spaces for sports and PA. Accessibility in parks is crucial, so paths are wide enough, flat, and smooth for less mobile people and those with physical disabilities. The next level is the 'Scheggen' which is how the surrounding landscape extends into the city, like green fingers reaching from outside to inside. The final scale level is the greenery around the city."

P8: "We are working on the 'Groene Schaalsprong'. Much more green space is needed, and there are many areas, both around the city and green connections through the city, where we believe all these green connections should have good walking facilities."

The municipality of Utrecht is thus working on larger greening projects by creating and connecting green networks and green corridors at various scales. Additionally, the interviews revealed that the municipality also looks at where there is energy in the community for greening. For instance, participant 9 mentioned that they wait for residents to come up with ideas to green their neighbourhood, community, or street. Participant 7 noted that there is an initiatives fund for residents' ideas regarding greening projects. Participant 9 indicated that the greening projects carried out in neighbourhoods so far involve people with an above-average interest in greenery. For example, the participant mentioned that on Egelantierstraat/plein and Laan van Chartroise projects, there were very active residents who were interested in greenery and well-organized. The vision of the municipality of Utrecht regarding greening within and outside neighbourhoods will be further presented later in this chapter, describing the municipality's ambition to create green walking routes ('Groene ommetjes') and how projects arising from residents' initiatives can be utilized in achieving this ambition.

Changing mindsets and creating awareness

All four interviewees from the municipality indicated that a shift in vision is underway regarding the implementation of (street) greenery and its impact on residents' PA, and that this vision needs to be further development. The interviews revealed that this change in vision needs to occur among various stakeholders. For instance, participant 10 mentioned that on one hand, a change in mindset is needed among designers and policymakers, and on the other hand, it is necessary to influence residents' awareness of greenery, for example, by providing information to encourage a different perspective on greenery. Examples provided by participant 10 include the need for a shift in thinking about 'neat' greenery. What was previously considered weeds is now regarded as spontaneous greenery, which requires a change in the methods of managing or maintaining it. The participant also noted that mowing policies have changed compared to a few years ago, with much less frequent mowing now than before. It is essential to involve residents in this process to bridge the gap between changing policies and residents' mindsets.

P10: "The way mowing is done is really different from a few years ago. There is much less mowing, and some areas are only mowed once a season. This generates quite a few phone calls, complaints from residents who have not been informed or have a very different opinion, who believe that grass should be short and that no other flowers or clover should grow in it. This needs to be balanced, so I believe more has been done in communication last year. A newsletter or a poster about, for example, weeds, which were referred to as spontaneous greenery. To include the residents in the information process, so that in this way, yes, the gap is somewhat bridged."

Additionally, participant 10 emphasized that it is important for both officials and residents to view the city as a utility, where greenery is used intensively and does not always need to be neatly maintained.

Participant 9 stated that it is important to transition from viewing greenery as something beautiful and pleasant to viewing it as a necessity. According to the participant, implementing greenery in the city is now a necessity rather than being seen primarily as a 'nice to have' in the past. The municipality, according to the participant, should play a more proactive role in this regard, rather than waiting to see if residents are eager for the implementation of greenery.

P9: "Greening was initially considered a nice-to-have, like if people had the energy, we could green the area. But it's actually becoming a necessity to green the city, and how we've done this in the past was very much in collaboration with residents. What do residents want, and what do they like? But you eventually reach a point where it simply becomes necessary to green the city, and you can't always involve everyone or wait for the energy in a neighbourhood. I think that's also a transition."

Participant 9 emphasized that, in addition to the necessity of implementing greenery, what is implemented must also be attractive to the city's residents, so that the space invites use and movement. Participant 8 also highlighted that existing spaces should encourage people to go outside and be active. Participant 10 noted that being on the street is far more appealing in a green environment than in a paved one. All four municipal participants agreed that the environment influences people's behaviour. For example, participant 7 mentioned that the aesthetics of greenery can draw people outside and that greenery in the street can impact traffic behaviour, potentially slowing down speeding. This participant also indicated that street greenery encourages people to spend more time outdoors. Participant 10 emphasized that people are more likely to take a few extra steps to walk through a green street rather than a paved route. Participant 9 pointed out that people behave according to how the neighbourhood looks and is arranged, suggesting that individuals adjust their activities based on the neighbourhood's layout.

Participant 8 mentioned several successful projects both within and outside Utrecht that can serve as examples for rethinking and redesigning existing spaces to encourage more street life and movement. The participant explained that these projects demonstrate how existing spaces have been transformed into inviting and attractive areas. The first example given by participant 8 was Drakenplein, located on Grevelingstraat in Rivierenbuurt (see Figure 14 & 15). Previously, the square was entirely paved, which made it very hot in the summer and resulted in very few children playing there. The square has now been greened and new play equipment has been installed. The participant noted that now many children of different ages play there, and adults also spend time in the square



Figure 14: Drakenplein (old design) (photo by participant 8)



Figure 15: Drakenplein (new design) (photo by participant 8)

Participant 8 also mentioned two examples in Lombok neighbourhood. One example is a section of Pieter Bothstraat, which was previously paved and had play equipment, and has now been completely greened, effectively providing residents with a sort of front yard. The participant noted that this transformation has led to many more people walking through the area.



Figure 16: Pieter Bothstraat transformation (photos by participant 8)

Additionally, the participant mentioned the new design of Kanaalstraat and Damstraat, where the roadway has been narrowed and the sidewalks widened. More trees have been planted, and various types of planting have been planned in special planting beds. See the design photos in Figure 16.



Figure 17: New design Kanaalstraat and Damstraat (adopted from Gemeente Utrecht, 2024)

Participant 8 also mentioned that the municipality of Utrecht draws inspiration from garden streets in places like Antwerp. According to the participant, attention is given to what small adjustments can be made for pedestrians, often combined with medium to large amounts of greenery. This can include thinking about residential areas and parking spaces that are partially greened, allowing greenery to blend in and be level with the pedestrian walking surfaces. This approach enlarges pedestrian spaces and gives them a much greener appearance. See the photos of garden streets in Antwerp in Figure 17.



Figure 18: 'Tuinstraten' (garden streets) Antwerp (adopted from Infopunt Publieke Ruimte, 2019)

Participant 9 stated that most neighbourhoods are still designed with the car in mind, leading residents to view the car as a 'sacred cow.' Participant 7 also noted that cars take up a lot of space, which results in fewer people being outdoors and engaging in PA.

P7: "If those cars weren't there, you would have all that space. Imagine if half of the cars were gone; it would look very different. The street would be much quieter, with less traffic, and you could have more greenery. This would also encourage more outdoor play and recreation. For example, in a street in the Dichterswijk, paid parking was introduced a year ago, and now only half of the parking spots are used. There has been a lot of greening in the street. You can now see that children play outside on the street more because it's possible, as there are fewer cars and more space."

In line with this shift in mindset regarding greenery and PA, participant 8 emphasized the importance of rethinking existing spaces. The participant stressed the need to focus on how we can approach the design of urban spaces differently and identify which areas can be freed up for more effective use. Participant 8 noted that the municipality of Utrecht is already making considerable progress in transitioning from prioritizing space for vehicles to encouraging people to be more active on the streets.

P8: "I think that in Utrecht we are already quite engaged in shifting from prioritizing space for vehicles to focusing on a human scale. So, looking at what suits the people on the street, encouraging movement on the street, and considering what is needed in the surrounding environment. Yes, I can't quantify it, but we are increasingly incorporating this into our thinking. For example, the Merwedekanaalzone, which we called low-traffic and car-free. But really, these are walkable neighbourhoods, entirely designed for street play and use by people. Also, because it's high-rise, people often have little private outdoor space themselves. But we are truly creating immense quality in the public outdoor space there."

As described above, the discussions revealed that the municipality of Utrecht is undergoing a transition in how urban spaces are designed, moving away from car-centric layouts (Figure 18). Participant 8 noted that Utrecht is experiencing increased density, with more housing being built on smaller plots. This means that more people will be using the city, and there is not enough space for everyone to own a car. Participant 8 also mentioned that the municipality of Utrecht is focusing on facilitating alternative modes of transportation.

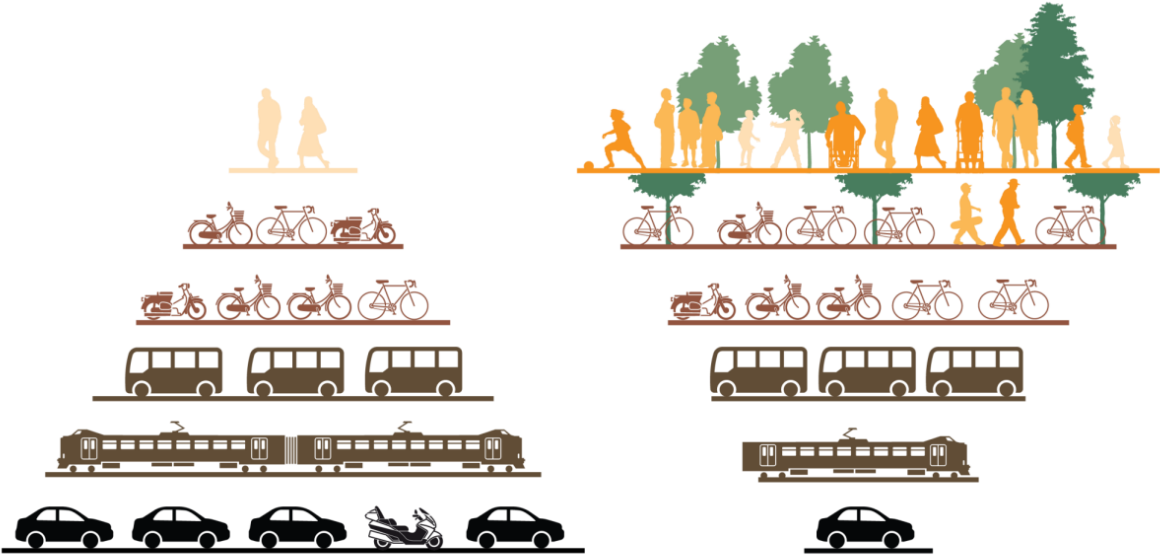


Figure 19: Mobility transition (photo by participant 8)



Figure 10: Example of bicycle oriented parking place (photo by participant 8)

Pedestrian approach

As described above, the approach focuses on alternative modes of transportation other than cars. According to participant 8, it is important to adopt a strategy that views the city from the perspective of pedestrians and all those who use pedestrian spaces. The participant suggested that Utrecht needs to make a leap similar to the one made 10-15 years ago, when the city became a world-renowned cycling city thanks to the ambitious cycling policies introduced by the alderman at the time. This resulted in the development of high-quality cycling routes and continuous bike paths extending from outside the city through to the city centre, as well as the addition of a large number of bicycle parking facilities and improved connections to public transport. Participant 8 pointed out that the municipality of Utrecht now faces a similar challenge with the pedestrian approach. The participant emphasized that it is increasingly recognized that the current planning does not sufficiently consider the needs and patterns of pedestrians.

P8: "And it lies in how the space looks, such as the paving and the greenery, but also in crossing and how traffic lights, for example, are set for pedestrians. Or whether you have the impression that you have to take a detour, or simply have a direct connection. But also whether the pedestrian space doesn't suddenly end, as we also have such situations in the city where there is actually no passage at all or you have to cross but then don't actually end up anywhere. So we are still not really thinking much from the pedestrian's perspective, and we are noticing this more and more."

Participant 8 emphasized, for example, that until recently, Kennisplatform CROW (a knowledge institute for infrastructure, public space, traffic and transport, and work and safety) did not have guidelines specifically for pedestrians. Additionally, within the bicycle-pedestrian team of the municipality of Utrecht, the focus was much more on cyclists, and pedestrians were not explicitly considered.

According to the participant, the pedestrian approach aims to encourage and facilitate walking by focusing on the *ability* and *desire* to walk. Participant 8 emphasized that the *ability to walk* involves whether there is available space and whether that space is socially and traffic-safe. The *desire to walk* pertains to whether the space is attractive and inviting for walking. Utrecht, according to the participant, focuses on walking from the front door. This 'front door' can refer to the door of a train or bus, or an office building, but the participant highlighted that this approach particularly emphasizes the front door of one's home. This makes the approach more neighbourhood-oriented compared to other cities like Amsterdam, which primarily looks at data showing where many pedestrians walk to then expand pedestrian space in those areas. According to the participant, Utrecht aims to also focus on neighbourhoods, not just on places like the station and the pedestrian zone in the city centre.

P8: "You notice that the focus varies everywhere. Amsterdam, for example, has a different approach: where they measure a lot of pedestrians, they actually expand the pedestrian space. Whereas we say, we don't focus on places where it is already good or going well, not just on how you get from the station to the Dom or what the pedestrian area in the city centre looks like. We actually want to focus on aspects such as health, social interactions, loneliness, and also children being on the street, like how do you get to school, things like that. So, from all those social and societal goals, we say we actually focus much more on walking from the front door. And that front door can be the front door of the train or the bus or an office. But that front door is also very often the front door of your home. So let's make sure we have things in order in those neighbourhoods too. And that is really a different approach than many cities have."

Participant 8 indicated that the pedestrian approach to creating pedestrian networks differs from that of creating bicycle networks, which are more focused on rapid flows, whereas pedestrians navigate the environment differently. The participant explained that there doesn't need to be a struggle for space within the main mobility structures where cars and public transport are dominant. Instead, the municipality of Utrecht wants to allow pedestrians to move more quietly and subtly. This means guiding pedestrians more through residential streets and green structures.

P8: "There, a very important access road also runs through the neighbourhood. It is a dominant car and public transport structure. We consciously say, well, we don't need to engage in the battle for space there. You should be able to walk there, but it doesn't necessarily have to be part of a green walking route. You actually want the pedestrian to move much more in the quieter areas, through residential streets, and through green structures. Sure, you can walk anywhere else as well, but the quality we strive for is especially sought outside the main roads for other traffic. And that, I think, also makes a pedestrian network, especially a green pedestrian network, a really different type of network than, for example, a cycling route or the cycling network through the city. That is much more focused on flow and speed, while pedestrians move through the environment in a very different way."

Green walks ('Groene ommetjes')

Participant 8 stated that a key vision and ambition of the pedestrian approach is to create 'Green walks' and to integrate these into a green network in the future. First, Participants 8 and 9 noted that creating these Green walks differs from projects such as those on Egelantierstraat and Laan van Chartroise, where enthusiastic residents wanted to green their neighbourhoods. Participant 9 mentioned that this is currently the approach and that these projects also influence the creation of walks by residents, and that green spaces there also encourage movement. However, this differs from the ambition of Green walks as intended. The creation of Green walks stems from a municipal mission, and these walks are viewed from a strategic map, where the focus is on identifying white spots (places with no or relatively small amount of greenery) on the map where greening can occur. Participant 9 indicated that this approach involves a different perspective on neighbourhoods. This method focuses more on where logical connections can be made, for example towards the Vecht or parks, where currently there is a hardened route that could be greened. Participant 8 emphasized that demographic factors of the neighbourhood are also considered. For instance, they look at where elderly residents live to determine if they can move around the neighbourhood easily. According to Participant 8, the aim of the Green walks ambition is to create loops and connect them so that everyone in the city can access such a green walk within 200 meters of their home. Participant also mentioned that the Green walks do not pass through every street in the neighbourhood but connect to green corridors and follow existing structures. The intention is, according to Participant 8, to create attractive networks throughout the neighbourhood through greening. This network of Green walks is also intended to lead to parks, play areas, shaded spots, places where people can find cooling, or places where people can meet. As previously mentioned, Participant 8 stressed the importance of the space and places as mentioned above being inviting and attractive, in combination with the routes leading to them. Participant 9 also highlighted this and noted that it is important for hardened routes

to be greened to lead to facilities. Participant 7 also emphasized the importance of designing routes to amenities with more trees and sufficient space for cyclists and pedestrians. According to Participant 8, it is crucial that people feel guided by the greenery.

P8: "For example, we now have a different mowing policy than a few years ago, so it's at some places much lusher, partly based on input from residents. This way, you can see that you connect several green spaces, give some an upgrade, but the connecting streets don't need to be grand and dramatic. As long as you feel guided, it's fine. Here, for instance, this is done by placing the same seating elements here and there. So, you recognize: hey, I'm walking a loop."

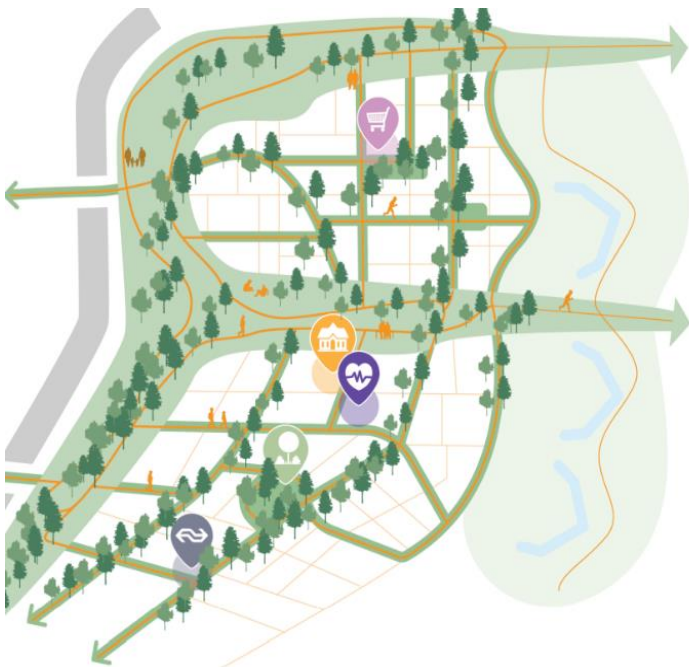


Figure 21: Green walks connected with facilities (photo by participant 8)



Figure 22: Example of a Green walk (photo by participant 8)

The aim is to ensure that such places are no longer standalone entities but are integrated into the network of Green walks (Figure 19). The goal is to connect the Green walks, which are built from loops, with each other and with the urban (green) structures. Participant 8 also mentioned that there is an intention to incorporate standalone projects, like those on Egelantierstraat and Laan van Chartroise, into the network of Green walks.

P8: "Egelantierstraat and Laan van Chartroise are one of those projects where a change in the green spaces was indeed made last year, where we have now really agreed to use such things, for example, to make a walkway out of them and not just a standalone green project."

Integrated approach

From the interviews with Participant 7 and 8, it became clear that the theme of greenery is interconnected with various themes, making an integrated approach necessary. Participant 8 pointed out that it is important to combine different objectives due to the intense competition for space caused by the limited space in the city. Participant 8 emphasized that a shared vision is needed and that less sectoral work is required.

P8: "It is also important to note that I think there should be a shared vision from different sectors. Currently, there is still a lot of sectoral thinking, both in terms of language and collaboration. Seek each other out. An example is the landscape architect and the neighbourhood traffic advisor, which happens too much from their own sectors."

Participant 8 indicated that the municipality of Utrecht is working on this, but that it truly involves a cultural shift. This participant also mentioned that the pedestrian approach is still insufficiently recognized internally and that it should be more integrated into other sectors. An integrated approach is important to effectively and attractively design the space.

P8: "We're not just going to look at greenery and pedestrians, but also at demographics and potential social issues. Yesterday, we spoke with colleagues from the noise department about the acoustic experience in the city. What is pleasant for people in that regard? We are also working with a colleague who designs routes for the elderly, focusing on what the elderly specifically need. From all these themes, we will make a decision in two weeks about where we will start working and where we will further develop plans together with the neighbourhood. But we will actually select an area of about one kilometre. And we are going to do a great job there, so we can truly say that we have a beautiful showcase in Northwest. We would like to implement this approach in many other places as well because it is necessary. Internally, it is still not enough of a theme."

Desired green elements

In the interviews with the municipality, questions were also asked about the vision regarding desired green elements. The municipality emphasized that there is no 'one-size-fits-all' approach for implementing street greenery, and that this is not feasible in a city. For example, Participant 7 noted that sometimes desired greenery is not achievable due to the legally required dimensions of sidewalks, which means that features like façade gardens and sidewalk gardens are not always possible. Participant 8 highlighted that certain types of greenery work well in one location but not in another, and that variation in greenery makes the city more interesting. This participant mentioned that it would be very monotonous if every street had the same green structure, and therefore, variety

should be considered. Participants 7, 8, and 10 also noted that varied greenery is important for promoting biodiversity. According to Participant 10, it is important to combine desirable greenery with efforts to enhance biodiversity.

P10: "I think that that also offers more opportunities for birds to nest, hedgehogs to hide, and perhaps also insects to find a home. So, in that way, it is great to also consider the choice of species. When you plant a shrub hedge or a row of shrubs or a hedge, you might think very aesthetically that they should be neat, trimmed hedges. But if you choose different species that grow a bit mixed together, like hawthorn and flowering plants, you name it, you can better achieve other goals as well."

According to Participant 7, it's important to collaborate with residents to determine which types of greenery are suitable for each location. The participant stressed the need to experiment with green elements at each site to discover which types of greenery work well and are appropriate for that particular spot. For instance, Participant 7 mentioned that the municipality is currently experimenting in Wittevrouten with greenery around bike racks and with vertical greenery. Participant 10 also noted that some streets are poorly oriented, causing sunlight to hit the facades, which can make it difficult for trees to withstand the heat. According to the participant, combining trees with robust facade greenery could provide a solution. In densely populated neighbourhoods like neighbourhoods in Noordwest and Noordoost, Participant 10 suggested providing alternative greenery where space is limited to encourage outdoor activity and movement. Participant 8 gave examples such as implementing facade greenery and greenery around streetlights. Participant 7 indicated that in Wittevrouten, they are experimenting with greenery that grows around rain pipes, such as Climatis, or with very narrow strips of greenery. The participant emphasized that vertical greenery, like climbing plants such as Ivy, Climatis, or Tuscan Jasmine, performs very well in Wittevrouten. Additionally, Participant 8 mentioned that planters at street corners can also be an attractive feature. The participant noted that there can be work with greenery both in the ground and in planters. Furthermore, Participant 8 pointed out that the details of green elements in the Green walks are not yet fully developed but will be in the future. Another important point that emerged from the interviews concerning street greenery and movement is the creation of shade. Participant 9 highlighted the importance of providing shade on walking and cycling routes.

P9: "But I can imagine that in summer too, I notice it in my own behaviour sometimes, if I know that something is right in the sun, on a square for example, and I have to walk past it, I sometimes take different routes if I think, well, that's not necessary right now. So, we hope that if we

can create more of that in the streets, it will become more pleasant for people to take a walk, especially when it is very hot."

According to Participants 8 and 10, the municipality's goal is for pedestrian and bicycle paths to contain 40% shade. This could be achieved, according to Participant 8, by planting (tall) trees and incorporating facade greenery.

4.2.2 Bottlenecks, barriers, and challenges

Cars and resident resistance

Various bottlenecks, barriers, and challenges emerged from the interviews with the municipality of Utrecht. One of these is cars and parking spaces. For example, Participant 9 mentioned that over the last 50 years, people have become very attached to their cars, and many streets are still designed for cars. The challenge for the municipality is to provide alternatives to cars.

P9: "Currently, the street is often just one long row of cars because they are designed for automobiles, which we've collectively done over the past 50 years. Now, we can say we need to green the area, but you can't accomplish that in just a few years. People have gotten used to their cars being almost sacred and parked right outside their doors over the past 50 years. As a municipality, that presents a huge challenge because you have to offer alternatives to parking a car right outside the door. In Amsterdam, people are used to walking five streets away to park their car, but in Utrecht, they are not."

A barrier in this area is the resistance from residents. Participant 7 indicated that eliminating parking spaces for greening purposes is very difficult in practice because residents are so attached to their cars and parking spaces on the street. Participant 9 noted that resistance increases when the municipality plans to remove parking spaces to create green spaces. This participant also mentioned that it is very challenging for initiators (residents) of greening projects to gain support in the neighbourhood.

P9: "We then let the initiators gather support for removing parking spaces. This is very difficult. I experienced it in my own neighbourhood. I wanted to remove a parking space in my neighbourhood for a street garden. I eventually succeeded, but you really need to be very persistent, and you have to gather support from a very broad area in your neighbourhood because someone from three streets away might also want to park in my street."

Participant 7 even provided an example where the plan to remove a parking space led to a dispute between an initiator and local residents. Different views among residents in the same neighbourhood can lead to polarization.

Furthermore, participant 7 noted that today's cars take up more space than those from the past because they are much larger. In a cramped neighbourhood like Wittevrouten, this poses a significant barrier and challenge, according to the participant.

P7: "This is, of course, a very old neighbourhood, and the parking spaces were all measured for the cars people had in the 50s, 60s, and 70s, which were much smaller. Now, cars are bigger and often don't fit in the parking spaces anymore, so they end up partly on the sidewalk, for example with two wheels on the sidewalk."

Additionally, participant 10 mentioned that the municipality generates revenue from paid parking spaces, which are included in the budget. According to the participant, this can make it difficult for the municipality to remove parking spaces in areas where paid parking is in effect.

Green management, maintenance

The interviews with the municipality of Utrecht also revealed that the management and maintenance of greenery are barriers and challenges in implementing street greenery. Participant 7 noted that a barrier is that all the greenery you place must be maintained. Participant 8 indicated that the quality of all the greenery you implement must be preserved. According to the participant, a bottleneck is that when you set up greenery, the maintenance is not automatically arranged. Maintenance represents a significant cost for the municipality, according to Participant 8. Thus, the maintenance of greenery is partly a financial issue. A second barrier in the management and maintenance of greenery mentioned by Participants 7 and 8 is the shortage of personnel. According to Participant 7, there are too few people available who have the knowledge to maintain greenery.

P7: "Besides finances, it's also about manpower. It's very difficult because there are staff shortages everywhere, including here. Anyone can water plants, but you need some knowledge about greenery. We see that many people with this knowledge, like gardeners, are retiring, and there isn't much new blood coming in. Young people find gardening less interesting. You need to know something about greenery to properly maintain all these green areas, like the rose garden in the East. You really need to know about roses; otherwise, you can't maintain that garden. We simply can't find those people. They aren't there. And then it becomes very difficult to maintain all those areas properly."

Collaboration with residents or self-management could offer a solution according to the participants. For instance, according to Participant 7, the municipality often opts for low-maintenance greenery when the municipality itself is responsible for maintenance. However, for variety in greenery, self-management is necessary. But self-management by residents is also a challenge for the municipality.

According to Participants 7, 8, and 9, self-management needs to be supported and guided. Participant 9, for example, noted that while some residents manage self-maintenance well, others require significant guidance and support. Participant 7 emphasized the importance of advising residents on what types of greenery are suitable for specific locations, such as for promoting biodiversity, so residents understand what works and what doesn't for their particular space. Additionally, this participant highlighted the importance of allowing residents to experiment with different types of greenery to gain firsthand experience. It is also crucial, according to Participant 7, to work with groups of residents rather than individuals, as there is always the possibility of someone moving away. To mitigate the risk of losing green knowledge, it is important to collaborate with groups.

Problems with the substrate

Another bottleneck, according to the participants, is that not all desired greenery can be implemented due to the numerous cables and pipelines in the substrate. For example, Participant 9 mentioned that the municipality would like to add trees to streets for a greater green effect and more shade, but this is a huge challenge because of the underground infrastructure. According to Participant 8, in a cramped neighbourhood like Wittevrouwen, there needs to be a focus on smaller-scale greenery.

5 Conclusion and discussion

Below, the answers to the research questions are formulated based on the presented results. Finally, the data collection and result processing are discussed. The limitations of this research are addressed, and recommendations for further research in the areas of streetscape greening and PA are provided.

To answer the main question, *'How do residents perceive, experience, and interact with green streetscapes, and how do these insights align (or not) with the visions, ambitions, and objectives of the municipality of Utrecht regarding green streetscapes and PA?'*, the answers to the sub-questions are outlined below.

The first sub-question of this research is: *How does street greening influence the PA levels of residents?* Overall, the analysis of the results indicated that street greening had an impact on residents' PA levels. Specifically, street greenery influenced the walking and cycling behaviours of residents. People walked more or more frequently since the streets were greened, or they felt a greater inclination to walk, which resonates with the findings from (Sarkar et al., 2015; Tsai et al., 2019; Vich et al., 2019). The street greenery was also incorporated into residents' walking routes. The aesthetics and diversity of the greenery made it attractive and interesting for residents to engage in PA, as the greenery provided more to see and explore, which resonates with the findings from (Yilmaz et al., 2017; Yang et al., 2022). Additionally, street greenery influenced the amount of time spent outdoors, as it encouraged people to go outside and provided a reason to spend more time outdoors. A greened square in the street was a factor that influenced people's outdoor presence and meeting with neighbours. Street greenery had a significant impact on children, as the greening made the neighbourhood more accessible and safe for them to play. The maintenance of street greenery also affected residents' PA levels, as they spent more time outside in the green spaces (together) maintaining them. For some residents, street greenery did not affect their PA levels but did enhance their outdoor and movement experience. The lack of street greenery and traffic congestion played a role in this. Therefore, larger green structures were more attractive locations for PA for some residents.

The second sub-question of this research is: *What are the residents' experiences and perceptions of green streetscapes in their neighbourhood?* The analysis of the results revealed that street greenery was predominantly positively perceived by residents. The greenery contributed to a cozier and more pleasant outdoor experience, making it more enjoyable to walk through the neighbourhood. The experience of walking through green streets also increased the inclination to do so. The presence of street greenery also impacted the sense of traffic safety, especially for people walking with children. The visual appeal of the street greenery led to a positive experience, increasing the tendency to go outside. Residents appreciated the biodiversity brought about by the street greenery, which

contributed to a sense of well-being. Children, in particular, found the biodiversity interesting, as their attention was drawn to the variety of insects and birds. Additionally, the shade and cooling effect of the greenery positively changed the experience of outdoor warmth. However, the visibility of litter and dog waste in the street greenery resulted in a negative experience for residents. Poor maintenance of the greenery and a lack of a natural feel also contributed to a negative perception of the greenery among residents.

The third sub-question of this research is: *What are the residents' perspectives of green streetscapes in their neighbourhood?* The analysis of the results shows that the perspectives of residents on green streetscapes in their neighbourhood emphasize a shift from a car-centric approach to prioritizing green spaces and alternative transportation. Residents advocate for reducing car parking and repurposing these spaces for greenery, integrating bicycles and cargo bikes into street planning, and adopting a 'green first' approach to transform non-essential paved areas into green spaces. It is important that the municipality actively involves the community in greening projects, provides maintenance workshops, and ensures regular oversight and proper maintenance of green areas. Additionally, the need for better coordination among municipal services is necessary to enhance the effectiveness and perception of street greenery.

The fourth sub-question in this research: *What are the visions, ambitions, and objectives of the Municipality of Utrecht regarding fostering PA of residents by means of implementing (street) greenery?* The analysis of the results shows that the municipality of Utrecht has both resident-initiated projects and those implemented by the municipality. A shift in mindset and raising awareness is crucial for policymakers and residents to view greenery differently. There needs to be a vision shift from implementing greenery because it is pleasant and attractive to recognizing it as essential. Additionally, existing spaces should be reimagined to make them attractive and inviting for people to move around. It is also important for Utrecht to make the same progress with pedestrian initiatives as it has with cycling infrastructure. The creation of green walking routes should contribute to encouraging residents to walk through green spaces connected throughout the city. Varied greenery and guiding people through green streets are essential in this regard.

The fifth sub-question in this research is: *What are the bottlenecks, barriers, and challenges regarding implementing (street) greenery to foster PA?* The analysis of the results reveals several bottlenecks, barriers, and challenges in implementing street greenery to foster PA in Utrecht. A significant challenge is the deep-rooted attachment residents have to their cars, making it difficult to repurpose parking spaces for greenery. Resistance from residents further complicates this, as removing parking spaces often leads to disputes and polarization within neighbourhoods, this resonates with findings

from (Harvey, 2001) in which is stated that conflict can arise when visions of policymakers are not adjusted to the experiences and perceptions of the consumers of space. Additionally, today's larger cars exacerbate space issues in older neighbourhoods. Financial constraints and maintenance challenges also pose significant barriers, which resonates with the findings of GGD Amsterdam (2018) in which is stated that bad management and maintenance of greenery can negatively influence the experiences and perceptions and behaviours of the consumers of greenery. The municipality struggles with the cost and manpower required for proper green maintenance, often lacking personnel with the necessary horticultural knowledge. Collaboration with residents for self-management of green spaces is seen as a potential solution, but it requires substantial support and guidance from the municipality. Finally, underground infrastructure, such as cables and pipelines, limits the ability to implement desired greenery, necessitating a focus on smaller-scale green projects in densely built areas.

5.1 Strengths and limitations, and follow-up research

Literature indicated a demand for a more comprehensive view of street greenery in relation to residents' PA. This research contributed to this by focusing not only on PA levels but also on the experience, perception, and perspectives of street greenery and its role in promoting PA. This approach has led to a better understanding of the underlying motivations and explanations of street greenery users. This research also had several limitations. Due to the short timeframe in which this research had to be conducted, the study may not have achieved the comprehensive desired depth. For example, no interviews were conducted with other parties involved in the spatial design of streetscapes, such as architects, engineers, and project developers. Additionally, this research was a case study, meaning the results obtained cannot be generalized to other neighbourhoods in Utrecht or other cities. The small sample size also affects the generalizability of the findings. In this sample, the gender ratio was not balanced, and only residents with an above-average interest in greenery were interviewed. Residents with different views on the implementation of (street) greenery were not interviewed. Lastly, this research focused mostly on recreative PA such as walking and cycling. Findings for active mobility and physical exercise were less prominent. Follow-up research could use a different research method next to qualitative interviews, such as a qualitative survey, to obtain a more structured view of behaviour and experiences regarding implemented street greenery to promote PA. This could allow for a larger and more comprehensive sample. The interviews revealed that the management and maintenance of street greenery is a challenge. Follow-up research could therefore focus on interviewing the managers of the greenery to gain a more in-depth understanding of the issues surrounding management. Additionally, the interviews indicated that street greenery, besides promoting PA, can also influence social contacts and encourage people to spend more time

outdoors. Follow-up research could thus focus on other aspects of health beyond the promotion of PA, such as social cohesion and spending time outdoors. Furthermore, the findings of this research suggested that some target groups experienced higher influence on their PA levels, particularly children. Therefore, it is also interesting for follow-up research to examine which types of greenery influence the PA levels of which target groups, and to identify which target groups are most and least affected by these influences.

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APPENDIX

1. TOPICLIST MUNICIPALITY

1.1 Policy Advisor/Project Leader

Introduction

- Introduction
- Introduction and research objective
- Who are you? Which department do you work in? What is your department responsible for?

Green spaces and Physical Activity

- Can you explain how street greenery influences physical activity? What types of physical activity are affected?
- How is the municipality of Utrecht adapting its policies to address this?
- What are the future plans in this area?
- Which types of physical activity are prioritized?
- What specific green elements support physical activity? Is there a difference in effectiveness depending on the type of activity?
- Do you take inspiration from other cities or countries?
- What are the essential criteria for green spaces, and which ones are prioritized?
- The ambition document states that green spaces will be used more intensively as the population grows. How will green spaces be integrated into neighborhoods with limited public space?

Intended use of space

- What is the municipality of Utrecht's vision regarding this topic?
- How should public spaces (green streets) be used?
- Where is there room for improvement?
- What are the challenges or barriers faced?
- What has not gone as well as expected?
- Which target groups should be encouraged to use green spaces more for physical activity? How is this consideration incorporated into planning?

1.2 Pedestrian Approach Coordinator

Introduction

- Introduction and research objective
- Who are you? Which department do you work in? What is your department responsible for?
- Can you tell us about the pedestrian approach? What needs to change in the future?

Green spaces and Physical Activity

- Can you explain how street greenery influences physical activity? What types of physical activity are affected?
- How is the municipality of Utrecht adapting its policies to address this?
- What are the future plans in this area?
- Which types of physical activity are given priority?
- What specific green elements support physical activity? Is there a difference in effectiveness depending on the type of activity?
- Do you take inspiration from other cities or countries?
- What are the essential criteria for green spaces, and which ones are prioritized?
- The ambition document mentions that green spaces will be used more intensively as the population grows. How will green spaces be integrated into neighborhoods with limited public space?

Intended use of space

- What is the municipality of Utrecht's vision regarding this topic?
- How should public spaces (green streets) be used?
- Where is there room for improvement?
- What are the challenges or barriers faced?
- What has not gone as well as expected?
- Which target groups should be encouraged to use green spaces more for physical activity? How is this consideration incorporated into planning?

1.3 Project Assistant Northwest Utrecht

- Permission for recording
- Introduction and research
- Can you tell us about your role and what your team is currently working on?

Physical Activity

- Is promoting movement/physical activity a priority? How, why, and could you provide some examples?
- What are the ambitions and objectives in this area?
- What types of physical activity are prioritized: recreational, sporting, or active mobility?

Green spaces

- What is the green policy regarding promoting physical activity?
- Can you give examples of current projects?
- Are there any future projects planned?
- Which specific green elements are given priority?

Green and movement

- What role do community initiatives and self-management play?
- What are the challenges or barriers you face? Could you give an example?
- What are the future ambitions in this area?

Intended use of space

- How does the municipality envision the use of public spaces?
- How does physical activity fit into this vision? What kind of physical activity is encouraged?
- What should street greenery look like to meet these goals?
- What are the challenges and priorities in achieving this vision?

Policy

- High-quality green spaces in residential areas are considered essential. In the context of urban densification, innovative and multifunctional use of space is needed. How is greenery integrated into this?
- Street greenery should help make outdoor spaces attractive. How is this implemented?
- Our residents' and health monitor links the availability and quality of green spaces to residents' satisfaction. Higher quality correlates with higher satisfaction. How is this considered in future policies?
- What considerations are taken into account when making policy decisions?
- What considerations are made regarding requirements: accessibility, quantity, quality, proximity, etc.?

1.4 District councilor East-Northeast Utrecht

Introduction and research

- Introduction and research
- Can you tell us about your role, your involvement in this project, and what your department does?

Intended use of space

- What was the goal of this project?
- What type of physical activity was the focus?
- How and by whom should the space be used? How do you accommodate different target groups?
- Do you already see any differences?

Green spaces

- What type of greenery was implemented and why?
- Which green elements contribute to encouraging physical activity?
- Was everything discussed with the residents?
- What input from residents could not be incorporated and why?
- Regarding self-management, how do you ensure residents have the necessary knowledge and skills?

Challenges

- Why were parking spaces retained, and why were bike racks added?
- What were the obstacles and challenges faced?
- What lessons will you carry forward to future projects?
- How do you balance parking spaces versus green spaces?
- How do you manage conflicting interests and sectoral work?
- Are there funds available from the national government?

Future vision

- What is the future vision?
- How should Noordwest look in terms of greenery?
- How should Noordwest be used by residents?

2. TOPICLISTS RESIDENTS

2.1 Topiclist for residents of Northwest Utrecht

Introduction:

- Recording permission: Seek consent for recording the discussion.
- Study + personal background: who am I and what is this study about
- Residence details: Ask the participant about the street they live on and since when they have been residing there.

Lived Space

- Usage of green public spaces: How do you use the (green) public spaces in your street/neighborhood?
 - Activities: What kind of activities do you engage in?
 - Movements: What types of physical movements do you perform?
- Changes since greening: Has this usage changed since the street was greened?
 - Manifestation: If yes, how does this change manifest?
 - Stimulation: How does the greenery in your environment encourage (physical) activities or movements?

Perceived Space

- Experience of street greenery: How do you experience the greenery in your street?
 - Positives and negatives: What aspects do you find positive and negative?
 - Description: Can you describe these experiences?
- Influencing factors: What factors affect your experience?
 - Clarification for participants: If the participant is unsure, mention potential influencing factors from literature such as safety, proximity, accessibility, quality, quantity, etc.
 - Impact of factors: Why do these factors influence your experience?

Conceived Space

- Definition of good greenery: What do you consider good greenery concerning (physical) activity or movement?
- Desired green elements: What specific green elements would you like to see in your street?
 - Impact on activity: How could these green elements affect your (physical) activity or movement?
- Improvements: What could be improved about the greenery in your street?
- Suggestions or ideas: Do you have any wishes or ideas regarding green elements?

Closing

- Additional points: Are there any other points you would like to bring up?
- Thanks: Thank the participant for their time and participation.

2.2 Topiclist of residents of Northeast Utrecht

Introduction:

- Recording permission: Seek consent for recording the discussion.
- Study + personal background: who am I and what is this study about
- Residence details: Ask the participant about the street they live on and since when they have been residing there.

Community initiatives

- Initiatives: Can you tell something about the initiatives?

Lived Space

- Usage of green public spaces: How do you use the (green) public spaces in your street/neighborhood?
 - Activities: What kind of activities do you engage in?
 - Movements: What types of physical movements do you perform?
- Changes since greening: Has this usage changed since the street was greened?
 - Manifestation: If yes, how does this change manifest?
 - Stimulation: How does the greenery in your environment encourage (physical) activities or movements?

Perceived Space

- Experience of street greenery: How do you experience the greenery in your street?
 - Positives and Negatives: What aspects do you find positive and negative?
 - Description: Can you describe these experiences?
- Influencing factors: What factors affect your experience?
 - Clarification for participants: If the participant is unsure, mention potential influencing factors from literature such as safety, proximity, accessibility, quality, quantity, etc.
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Conceived Space

- Definition of good greenery: What do you consider good greenery concerning (physical) activity or movement?
- Desired green elements: What specific green elements would you like to see in your street?
 - Impact on activity: How could these green elements affect your (physical) activity or movement?
- Improvements: What could be improved about the greenery in your street?
- Suggestions or ideas: Do you have any wishes or ideas regarding green elements?

Closing

- Additional points: Are there any other points you would like to bring up?
- Thanks: thank the participant for their time and participation.

3. INFORMATION LETTER RESIDENTS

Informatiebrief afstudeeronderzoek Bas Vriezen

Ik ben Bas Vriezen en studeer de master Planologie/Ruimtelijke Ordening aan de Universiteit Utrecht. Ik werk aan mijn afstudeeronderzoek dat gaat over het verband tussen stadsvergroening en activiteit. Om precies te zijn: ik heb gekozen voor een aantal straten in Utrecht waar vergroeningsprojecten zijn gerealiseerd en wil onderzoeken of en wat voor soort straatbeeldvergroening invloed heeft op verandering in gedrag met betrekking tot activiteit.

In deze brief wil ik u vragen of u bereid bent om aan mijn onderzoek deel te nemen. Hieronder leg ik uit wat de bedoeling is.

Inzicht krijgen in verband straatbeeldvergroening en activiteit

De afgelopen decennia zijn Nederlanders steeds meer gaan zitten tijdens werk en vrije tijd, wat niet past in een gezond sport- en beweegpatroon. Een zittende levensstijl heeft diverse gezondheidsrisico's tot gevolg, zoals het risico op aandoeningen als diabetes type 2, hart- en vaatziekten en klachten aan spieren, botten en gewrichten (Kenniscentrum Sport & Bewegen, 2021). Uit onderzoek blijkt dat een groene omgeving uitnodigt om te bewegen en ontspannen (RIVM, 2022). Daarom is het belangrijk dat gemeenten rekening houden met de manier waarop groen de gezondheid bevordert. Kennis over wat 'goed groen' is, is daarom van belang om te verkrijgen.

Ik probeer met mijn onderzoek inzicht te krijgen in de manier waarop vergroening in straatbeelden invloed kan hebben op de activiteit van mensen. Daarbij ben ik benieuwd naar wat mensen 'goed groen' vinden met betrekking tot activiteit. Daarnaast wil ik kijken of de vergroeningsprojecten daadwerkelijk hebben geleid tot meer of veranderde activiteit (en welk type activiteit) van de inwoners van de vergroende straten.

Uw deelname aan mijn onderzoek zou een waardevolle bijdrage zijn aan het begrip van de relatie tussen groene omgevingen en activiteit, en kan helpen bij het creëren van gezondere en actievere leefomgevingen.

Het onderzoek* zal plaatsvinden in de periode mei-juni 2024 en zal bestaan uit een interview van 30 tot maximaal 45 minuten. Als u aangeeft dat u wilt meewerken, maak ik telefonisch of via de mail met u een afspraak voor een online of fysiek interview.

Interesse?

Ik hoop dat ik met deze brief uw interesse voor mijn onderzoek heb gewekt!

Wilt u daaraan meewerken of meer informatie daarover? Stuur me dan een e-mail of bereik mij op mijn telefoonnummer: b.p.vriezen@students.uu.nl, tel: +31683902099.

Alvast hartelijk bedankt voor uw medewerking en graag tot ziens!

Bas Vriezen

** Er wordt vertrouwelijk met de verzamelde gegevens omgegaan. Dit betekent dat elke participant die deelneemt aan het onderzoek geanonimiseerd wordt en dat er geen gegevens worden verstrekt aan derden. De gegevens worden bewaard op een beveiligde server van de Universiteit Utrecht en worden na vijf jaar vernietigd. De deelname aan dit onderzoek is vrijwillig en kan op elk moment gestopt worden. Ook kan de deelname achteraf worden ingetrokken.*

4. FLYER PARTICIPANT RECRUITMENT (RESIDENTS)

Oproep voor Deelname aan Onderzoek! *Help mij begrijpen hoe groene straten uw leven beïnvloeden*

Beste buurtbewoner,

Bent u een bewoner van een van de vergroende straten in Utrecht? Dan ben ik op zoek naar u!

Mijn naam is Bas Vriezen, masterstudent Ruimtelijke Ordening aan de Universiteit Utrecht, en ik doe **onderzoek naar het verband tussen stadsvergroening en activiteit**.

Wilt u mij helpen? Uw deelname aan mijn onderzoek kan een belangrijke bijdrage leveren aan het begrijpen van de effecten van groene omgevingen op onze gezondheid en welzijn.

Wat houdt het onderzoek in?

Een interview van 30 tot maximaal 45 minuten.
Gesprekken over hoe u het groen in uw straat ervaart.

Uw mening en inzichten zijn van onschatbare waarde voor mijn onderzoek!
Wanneer? Het onderzoek vindt plaats in mei-juni 2024.

Hoe kunt u deelnemen?

Stuur een e-mail naar b.p.vriezen@students.uu.nl of bel naar +31683902099 om een interviewafspraak te maken (fysiek of online).

Uw privacy is gegarandeerd:

U blijft anoniem in mijn onderzoek.
Doe mee en help mee aan het verbeteren van onze leefomgeving!

Met vriendelijke groet,

Bas Vriezen



5. CODEBOOKS

5.1 Codebook residents (screenshots from examples)

- ⊕ Name
- + ○ Beheer, onderhoud
- + ○ Belemmeringen en bevorderingen beleving en beweging
- + ○ Belemmeringen en kansen groenontwikkeling
- + ○ Beleving groen
- + ○ Bereikbaarheid, nabijheid, verbinding groen
- + ○ Hittevermindering, schaduw
- + ○ Huidige fysiek activiteit
- + ○ Interesse, intrinsieke motivatie
- + ○ Meer of (geen) veranderde activiteit
- + ○ Mobiliteitsvisie moet veranderen
- + ○ Overig
- + ○ Toekomstige plannen, ideeën
- + ○ Verbeterpunten, adviezen voor gemeente
- + ○ Verkeersveiligheid en groen
- + ○ Weerstand buurtbewoners
- + ○ Wenselijke groenelementen en faciliteiten

- ⊕ Name
- ⊖ ○ Beleving groen
 - ⊕ ○ Grotere groenstructuren
 - ⊕ ○ Negatieve beleving of verbeterpunten
 - ⊖ ○ Positieve beleving
 - Aantrekkelijke speelplek kinderen buurt
 - Beleving belangrijk voor gebruik maken groen
 - ⊕ ○ Biodiversiteit
 - ⊕ ○ Esthetiek
 - Groen aangenamer dan stenen plein
 - Groen en ruimte bepaalt of je ergens wilt fietsen
 - ⊕ ○ Groen voor de deur
 - In contact zijn met groen belangrijk voor gezondheid
 - ⊕ ○ Leuk om groen te bestuderen
 - ⊕ ○ Meer neiging wandelen, naar buiten
 - ⊕ ○ Positief over vergroeningsproject
 - ⊕ ○ Prettige, gezellige sfeer
 - Respondent beleeft vergroening als positieve ontwikkelings
 - Rivier de Grift aantrekkelijke route

- ⊕ Name
- ⊖ ○ Meer of (geen) veranderde activiteit
- ⊖ ○ Effect op kinderen
 - Aantrekkelijke speelplek kinderen buurt
 - Buren met kinderen meer in beweging en buiten
 - Groen effectief voor spelen kinderen
 - Groen meer beweging kinderen
 - Groen positief effect op spelende kinderen
 - Kinderen rennen niet door door groen blokkade
 - Kinderen spelen met elkaar
 - Meer kinderen en volwassenen buiten
 - Meer ruimte om te spelen
 - Meer ruimte voor kinderen om elkaar te ontmoeten
 - Ommetjes toegankelijk voor kind
 - Speeltuin in de buurt zorgt voor beweging
 - Voor vergroening spelen in achtertuin
 - Voorheen wandelen naar Singel of Julianapark
- ⊕ ○ Geen verandering in beweging
- Groen voor meerdere activiteiten zorgt voor minder conflict
- ⊕ ○ Meer (fysieke) activiteit

- ⊕ Name
- [-] ○ Mobiliteitsvisie moet veranderen
 - ⊕ ○ Onnodig versteende ruimte vergroenen
 - [-] ○ Visie gericht op andere mobiliteit
 - Anders faciliteren fiets verandert perceptie inwoners
 - Bakfiets niet meegenomen in plannen
 - Beleid bakfiets bestaat niet
 - Faciliteren bepaald vervoer bepaalt gedrag inwoners
 - Fietsenrekken prominenter neerzetten
 - Fietsparkeerplekken moet prioriteit krijgen boven autop
 - Manier faciliteren zorgt voor gedragsverandering
 - Manier van soorten vervoer faciliteren belangrijk
 - Parkeerplek auto transformeren naar parkeerplek fiets
 - Perceptie betreft fiets en auto moet veranderen
 - Ruimtelijke indeling laat zien welk vervoer belangrijkst i
 - ⊕ ○ Visie niet gericht op de auto
- ⊕ ○ Overig
- ⊕ ○ Toekomstige plannen, ideeën
- ⊕ ○ Verbeterpunten, adviezen voor gemeente
- ⊕ ○ Verkeersveiligheid en aroen

5.2 Codebook municipality (screenshots from examples)

- ⊕ Name
- + ○ Aantrekkelijkheid openbare ruimte
- + ○ Actieve mobiliteit
- + ○ Beheer, onderhoud
- + ○ Betrekken bewoners
- + ○ Biodiversiteit
- + ○ Doel projecten
- + ○ Doelgroepen
- + ○ Egelantierstraat-plein en Laan van Chartroise
- + ○ Energie wijk
- + ○ Ervaring bewoners
- + ○ Gemeente moet sturender zijn
- + ○ Groen combineren met andere doelstellingen
- + ○ Groen en verkeersveiligheid
- + ○ Groen netwerk
- + ○ Groen verschillende schalen
- + ○ Groene ommetjes
- + ○ Groenelementen
- + ○ Omgeving beïnvloedt gedrag
- + ○ Omgevingsfactoren groen

- Overheid, politiek
- Parkeerplekken, auto's
- Randvoorwaarden
- Routes naar voorzieningen belangrijk
- Ruimte bepalend voor vergroening
- Schaduw
- Sociaal aspect groen
- Uitdagingen, belemmeringen, knelpunten
- Verdichting en groen
- Vergroening is noodzaak
- Vervolgonderzoek
- Visie transitie
- Voetgangeraanpak
- Voorbeeldprojecten
- Voorzieningen, faciliteiten
- Weerstand vergroening
- Wijkbureau

- ⊕ Name
- ⊕ ○ Groen verschillende schalen
- ⊖ ○ Groene ommetjes
 - ⊕ ○ Combineren met bestaand straatgroen
 - ⊕ ○ Groene ommetjes in ontwikkeling
 - Groene ommetjes verschillen van bewoner
 - ⊖ ○ Nieuwe strategie
 - Bij groene ommetjes en ambities kijk j
 - Bij groene ommetjes kijken naar demog
 - Groen voor verbinden straatjes, je moe
 - Groene ommetjes komt vanuit geme
 - Groene ommetjes worden bekeken va
 - Met groene ommetjes lusjes creeëren
 - Netwerk groene ommetjes inrichten o
 - ⊕ ○ Richtlijnen groene ommetjes
- ⊕ ○ Groenelementen
- ⊕ ○ Omgeving beïnvloedt gedrag
- ⊕ ○ Omgevingsfactoren groen
- ⊕ ○ Overheid, politiek

- ⊕ Name
- ⊕ ○ Vervolgonderzoek
- ⊖ ○ Visie transitie
 - ⊕ ○ Anders kijken naar de ruimte
 - ⊕ ○ Denkwijze groen
 - ⊕ ○ Groen is noodzaak
 - ⊕ ○ Integrale verandering
 - ⊖ ○ Veranderende visie beweging
 - Andere manieren van verplaatsing facilit
 - Beweging maken van alles wat rijdt krij
 - De auto is een heilige koe
 - Deelauto's zorgen voor meer groen op
 - Dichterswijk voorbeeld waar betaald p
 - Ervaring leert dat uiteindelijk meevalt a
 - Meer kijken door bril van de mens hoe
 - Mensen doen hun auto weg of nemen
 - ⊕ ○ Verandering en weerstand
 - ⊕ ○ Voetgangersaanpak
- ⊕ ○ Voetgangersaanpak
- ⊕ ○ Voorbeeldprojecten

- ⊕ Name
- ⊕ ○ Visie transitie
- ⊖ ○ Voetgangersaanpak
 - ⊕ ○ In ontwikkeling
 - ⊕ ○ Integraal werken met voetganger
 - ⊕ ○ Uitdagingen
 - ⊕ ○ Verschil met fietsaanpak
 - ⊖ ○ Visie
 - Beloopbare buurten bij hoogbouw, vo
 - Groen op hoogteniveau voetgangers
 - Hoe faciliteer je looproutes ouderen
 - Letten op oversteekplekken, voorrang
 - Lopen faciliteren en uitnodigen
 - Richten op kunnen en willen lopen
 - Tuinstraten hebben geen hoogteverschil
 - Utrecht focust zich op lopen vanuit vo
 - Voetganger gaat verder dan alleen acti
 - Voetgangersaanpak buiten verbinding
 - Voetgangersaanpak vereist lange ade
 - Voetganger komt meer terug in RSU