The battle between urban green and planning density and its impact on residency

A study into the relationship between urban planning and the green environment experience of residents in the Waalsprong

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Bachelor Thesis
Geography, Planning and Environment
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Abstract

Dutch planning has become increasingly impacted by densification. With the rapid construction of new houses, dense planning has become the norm. This could result in a decrease of urban green found in new neighborhoods, which could affect the wellbeing of residents. The goal of this research is to investigate how Dutch planning influences the interactions between people and urban green by looking at the Waalsprong, a new neighborhood in Nijmegen. The following research question was formulated: How does highly dense city planning shape the interaction between residents and their access to healthy green engagement? To answer this research question, an observation within the Waalsprong was performed and five interviews were conducted with residents living in the research area. During the observation, it became clear that the quality of green in the Waalsprong is still in an early stadium. The sight of buildings and streets does not give an overall green impression forth. Further results show that the urban green amenity positively influences the wellbeing of residents. This relationship is both physically by being active outside and psychologically by interacting with others. Future planning strategies could adapt to the preferences of residents by implementing different types of green elements in neighborhoods. Further research could involve how the specific location of residential houses within a neighborhood influences their experiences in the living environment.

Preface

In front of you lies the bachelor thesis ‘The battle between urban green and density and its impact on residency’. This thesis is the completion of my bachelor in Geography, Planning and Environment. In short, this research focused on the green perception of residents living in the Waalsprong. When I was younger, I was sent out to do fieldwork for my biology classes in secondary school. Back then, planners had already anticipated the construction of a new neighborhood next to my school where we performed our fieldwork. I wondered how different the environment would start to look in the future.

Learning more about planning myself through my bachelor studies, I got interested in the way this new neighborhood was planned. Planning as related to urban green has been one of my favorite topics during my time at university, so my curiosity into the construction in the Waalsprong increased as I was cycling along this changing area every day. Investigating how people experience green in their neighborhood and what impact it has on their life got my attention, because I think its interesting to see how people experience their neighborhoods and how this might be improved.

I would like to thank several people that helped me with the research and the writing process. First of all, I would like to show my gratitude towards Adam Calo, my supervisor. His patience and helpfulness with feedback and meetings have been a great contribution to both carrying out research and writing the thesis. Starting my research was a struggle for me, but he helped me specify what to investigate with my interests.

Next, I would like to thank the participating respondents who were willing to answer my questions in interviews. Their contribution to this thesis is huge, because they gave me insight into living in the Waalsprong. All of the participants were very helpful and kind during my visit to them, which made the overall experience of interviewing people for my research a whole lot more enjoyable.

I would also like to express my gratitude to my dear family and friends. The support they gave was very needed and I learned a lot from their perspectives. The extra brains thinking about issues I was struggling with were exactly what I needed and the best I could wish for. Discussing and comparing things they encountered when writing their theses helped me greatly. They kept believing in me, so I kept my drive and believed in myself.

Enjoy reading!

Joris Pels

Nijmegen, October 2024

Table of contents

List of tables and figures

Tables

Figures

1. Introduction

The Netherlands is dealing with a huge shortage of residences which is still increasing. Factors such as population growth, limited space for construction, long procedures, high economic costs and building limitations on new construction all contribute to this increasing residence shortage. As a result, finding houses becomes more difficult (Ministerie van Algemene Zaken, 2023). In the period between 2015 and 2021, the amount of people who would like to move but could not find housing more than doubled. Young people striving to move out of the house of their parents and people aged under 40 living independently represent most of the people not being able to move (Centraal Bureau voor de Statistiek, 2022). The previous Dutch minister of housing and spatial planning, Hugo de Jonge, made agreements on building more than 900.000 houses before the end of 2030 (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2023). Province Gelderland has received the assignment of building a share of 104.000 of this total. Provincie Gelderland (2023) state that in 2022, more houses were built than originally planned. The province is performing the construction of new housing in full force.

The Waalsprong is a region within Gelderland where the construction of a new neighborhood, called Hof van Holland, started in 2022. This new construction neighborhood will eventually provide a little less than two thousand new houses. Consisting of tall buildings with appartements and terraced houses, Hof van Holland contains a variety of housing types which can be rented or purchased. Waalsprong is also developing a new shopping center: Hart van de Waalsprong, within Hof van Holland. New neighborhoods surrounding Hof van Holland are also being built (Gemeente Nijmegen, 2023).

The Waalsprong is an example of dense planning and development in new Dutch construction. The shopping center creates a dense space with tall buildings containing several floors. With the limited space available in the Waalsprong area due to the boundaries of the Waal, planners want to create as many housing as possible within the space provided. Density as a concept was first introduced in the 19th century when planners had to deal with fires, disease and social disorder (Pont & Haupt, 2023). They responded to this new phenomenon by creating planning controls which dictated maximum densities within cities.

Today, high densities have become a standard in planning as it provides solutions to several problems. Shorter distances between houses and services decreases emissions, because less energy and fossil fuels are consumed for people to travel to their destination (Teller, 2021). The reduction in emissions softens the impact of climate change. A higher density means housing is being built within less space which leads to more space elsewhere (Angel & Lamson-Hall, 2020). Additionally, the UN sees densification as a way of achieving more sustainable urban development through the increase of innovation and economic growth (Pont et al., 2021). Innovations in building methods could be achieved through densification policy according to UN Habitat (2012).

This increase in density, however, may cause negative effects for the wellbeing of residents. Studies show that housing displaces green space in densifying urban areas and new urban areas gain less green space because of densification (Haaland & Van Den Bosch, 2015). Green spaces are critical in supporting the human-nature interaction and residents' wellbeing (Marques et al., 2020). It is possible for residents to maintain a sense of wellbeing even in

highly densified urban areas (Haifler & Fisher-Gewirtzman, 2020), but the amount of green space plays a significant role for residents' wellbeing to be achieved.

Substantial research shows a relationship between human wellbeing and green space in the living environment (Bell et al., 2014). Examples of green areas in neighborhoods are urban parks, public open spaces, green sports facilities and nature reserves. The mental and general health status of people living in and near green areas is better compared to people living in less green environments (Van Den Berg et al., 2015). The presence of green in the living environment is enough for people to be positively influenced mentally, resulting in higher productivity rates (Byrd & Rasheed, 2016). Urban green directly provides residents with the facilities to be physically active outside, which positively influences their physical health (Pietilä et al., 2015). Residents could use the green space for doing exercises and sports, or simply to go on a walk (Leslie et al., 2010).

The secondary school called 'citadel college' situated in the Waalsprong received word that plans were being made to create a new neighborhood around the school. Schoolkids that would go into nature for fieldwork could easily walk around the school and see plenty of green. Nowadays, construction sites have emerged within the Waalsprong and the way of carrying out fieldwork has changed. The fieldwork that could previously be done right outside the school has vanished with buildings surrounding the school instead of green. However, new opportunities for fieldwork might arise with the arrival of new green amenities near the school.

While housing has displaced much of the open space, there have been some developments for the expansion of green. Last decade, the Waal river streaming through the city of Nijmegen was widened (Fabrique, 2017). By adding a second stream that would discharge the main stream, an opportunity for new leisure and recreation space emerged. This also provided another new opportunity, which is the construction of a new living environment at the north side of the Waal. The city center of Nijmegen that is located on the south side of the Waal has less space for new construction sites, making it difficult for city planners to contribute to the 104.000 new houses on this side of the Waal. With the widening of the Waal, a completely new neighborhood could be created that would only be the width of the Waal itself away from the city center. On top of that, the amount of space available on this north side would be sufficient for a new shopping center to be built.

Whilst the space around the second Waal stream provides an open and green space for people to walk and spend time, it is unclear if this type of green access is enough to stimulate the wellbeing benefits that have been degraded through dense construction. Planners could establish the Waalsprong with enough green space near houses, but they could also assume that the Waal would provide sufficient green space. Such assumptions regarding planning could heavily influence the green implementation in the Waalsprong.

This thesis explores the way new residents experience their green environments. The effect of urban green on health and wellbeing has briefly been discussed, but how does this relate to densification and do residents experience dense urban planning in the Waalsprong? What is the green perception of residents in the Waalsprong and how can their physical and mental health factors be measured? How could future planning benefit and learn from the green perception of residents? Those topics will have a central role in this research.

1.1 Societal relevance

The green perception of residents, how they experience the green environment in their neighborhood, could be of value when looking into the extent to which this contributes to a better living environment. In turn, planning might have been conducted with the goal of housing as many people as possible within the provided area. Densification of the neighborhood could result from this. Residents should have a pleasant living environment, and it is not yet clear whether the Waalsprong is a habitable area containing sufficient green spaces for residents to have a positive green perception. With the amount of people already living in the Waalsprong and the fact that this number is still increasing, the green perception of current residents could be of help for the remaining planning within the Waalsprong.

According to Stuiver et al (2018), green decreases stress levels of residents. People with a green environment around their home are healthier and there is a lower risk of overweight for children. Healthier people are more productive, which makes green environments have benefits for society and employment as opposed to neighborhoods with less green. Green also contributes to more space for sports and other outside activities (Stuiver et al, 2018).

In the case of China, urbanization and high-density population is related to higher amounts of greenhouse gas emissions (Liu et al., 2017). According to Pont et al (2021), it is more difficult for dense areas to mitigate high gas emissions. Hystad et al (2013) state that long-term exposure to emitted gasses in urban environments increase the risk of lung cancer. An increase in the amount of green space could decrease the pollution within cities, because emissions could be mitigated better. Urban green has a cooling effect on the atmosphere, which also leads to less energy needed to reduce temperatures in buildings and energy savings (Zhang et al., 2014). These benefits decrease the risk of lung cancer for residents. In extension to the higher productivity rate of people living in greener environments, those people also rejoice better attentional capacities and functionality of the memorizing part of the brain. The mood and emotion of people in urban areas with a higher amount of green is also improved as opposed to people in built urban areas with less green (Kondo et al., 2018).

Biodiversity also benefits from more green, strengthening the ecosystems in the area. Social cohesion takes advantage of green surroundings as well. Green public spaces are places where people can meet and thereby increase their quality of life. The social cohesion also results in less degradation and criminality in the neighborhood. With more green spaces around, people tend to interact more as the social interactions are more accessible. Additionally, the attractiveness of green draws companies towards those places. In their turn, those companies attract talent and customers (Stuiver et al, 2018). This could also be the case in Waalsprong, as there is new businesses starting within the area.

Residents are a crucial factor in planning strategies for urban development. With population growth posing a challenge for future planning, sustainable urban development has become a significant way of dealing with such challenges. The pressures on the natural environment and urban infrastructure systems can be softened through the means of green and adaptive planning. Climate change, heat waves, flooding and air pollution are threats to cities that require planning policies which counter those challenges and make well-considered use of space. Grey infrastructure, such as buildings and roads, are needed for cities to provide housing and services whilst being accessible. A balance with sufficient green and blue space should be sought (Puchol-Salort et al., 2021). The balance from the view of residents could be interesting for planners to see how residents experience the proportions of green, blue and

grey infrastructure within existing neighborhoods such as the Waalsprong. The livability and wellbeing of residents could improve by examining the dynamic relationship between green and grey infrastructure (Svendsen et al., 2012).

Implementation of urban green requires regular maintenance, which can be provided by the public and communities. The Waalsprong could be an example of urban sprawl, because this area was nature without buildings before becoming a new neighborhood. An increase in impervious surface instead of green is the result of city expansion (Anguluri & Narayanan, 2017). By investigating how residents interact with public green and the value it adds to the neighborhood from their perspective, the importance of urban green and its maintenance could be examined. A better understanding of the requirements for urban green to be maintained in a manner that fits best for residents could result in better regulations for conservation of urban green.

1.2 Scientific relevance

The neighborhood 'hart van de Waalsprong' is a new shopping center in the north of Nijmegen. It has opened in the end of 2023 and people have recently started living in these new houses (Olsthoorn, 2023). Research into the experience of those new inhabitants has not yet been done, so finding out more about their experience of the green environment could contribute to new knowledge. It would also be valuable to learn more about the relationship between residents' wellbeing and planning designs. Future urban development could benefit from deeper knowledge about this relationship. Additionally, the quality of life becomes more important because the amount of people living in urban environments increases (Mouratidis, 2021). Knowledge about this topic would therefore be relevant for an increasing number of people.

According to Jennings and Bamkole (2019), limited exposure to public green space decreases the opportunities for residents to develop social cohesion through interaction. Research into the relationship between urban green and social cohesion could improve urban residents' health. Baum et al. (2009) state that the health of residents within a neighborhood is related to their social capital. Individuals living in an urban environment with more social cohesion and social capital relish more health benefits. Bourdieu (1986) created this theory of social capital which can be used to explain the advantages of social capital resources, such as urban green and public space. Observations in the physical environment and the living experiences of residents in their neighborhood could give insight into the state of social cohesion present in the Waalsprong. The influence of social connections on their wellbeing could also be researched.

The urban health of residents is important to investigate, because the new part that has been built in the Waalsprong is urban environment. The health of the population that started living here relates to their physical and social environment and the availability of social services (Galea & Vlahov, 2005). Looking into those factors that influence the health of residents in the Waalsprong is relevant, because cities will keep growing and more urban areas will be developed in the future (Vertovec, 2015). This is also the case in the Netherlands and the Waalsprong specifically, because of the number of new housing that has to be built before 2030 (Ministerie van Binnenlandse Zaken en Koninkrijksrelaties, 2023). New construction neighborhoods being built in the near future could benefit from knowledge about the necessities of residents regarding their health.

Residents could be key in learning more about planning strategies and their effects on the environment. Busck et al. (2009) argue that to understand how planning challenges can be solved, an analysis of decisions made in practice could help. The analysis would reveal links between planning and practice, which would lead to more knowledge about the everyday planning practice in urban areas. An example of planning challenges is the concept of compact cities, a concept that is strongly correlated with densification of cities. This concept could be investigated through interviews with people that make practical use of the urban plans that have been realized. Howley (2009) introduces residential preferences as related to policy objectives. He argues that urban sprawl and compaction results from policy decisions. Residents could be subject to these policies that have a negative impact on the quality of their life. Their perspective in this context could contribute to a better understanding of well-considered planning, taking the preferences of residents into account.

Spatial planning is essential in combining adaptation and mitigation measures, but the importance of people and their behaviour in urban areas should not be neglected. Along with the physical environment, social factors are a necessary factor to be considered when looking at the adaptiveness of cities. Changes within cities can be moderated by the residents and their ability to adapt (Stead, 2013). Furthermore, residents' perceptions of the greenness of environments could be further investigated. Leslie et al. (2010) state the uncertainty regarding the perceived environment, which has been researched with a quantitative approach. This approach, however, does not delve into the individual, situational and social factors that shape the perception of residents. Engagement in physical activity is influenced by the green perception of people, meaning that knowledge about their experiences within the living environment could contribute to an increase in physical activity.

1.3 Research aim and research questions

The aim of this research is gaining more knowledge about the influence of green in the urban environment on the perception of residents. The main research question is as follows:

How does highly dense city planning shape the interaction between residents and their access to healthy green engagement?

The following sub-questions have been conducted to help answer the main research question:

1. How does the planning in the Waalsprong shape the residents' interaction with urban green?
2. How does the quality of urban green spaces influence the physical wellbeing of residents in the Waalsprong?
3. How does the quality of urban green spaces influence the psychological wellbeing of residents in the Waalsprong?
4. How can future planning strategies benefit from the green environment perception of residents in the Waalsprong?

1.4 Reading guide

The following structure is used in this thesis. The first chapter introduces the subject and discusses the relevance of this research. In the second chapter, a literature review about the two important concepts densification and wellbeing will be discussed. After that, chapter 3 further investigates the relationship between urban green and wellbeing, forming a theoretical framework. Chapter 4 will explain the methodology that has been chosen for this research with a clarification of the data collection and analysis. The fifth chapter encompasses the results, containing both the observation of the Waalsprong and the results from the interviews held with residents. Chapter 6 entails the discussion which reflects the implications and limitations. The last chapter will answer the research questions in the conclusion followed by some recommendations for further research.

2. Literature review

This chapter will interpret two relevant concepts by delving into existing literature.

2.1 Densification

Density was introduced in the 19th century when planners had to deal with fires, disease and social disorder. Their response to these factors was regulating planning through the means of controls with maximum densities in cities (Pont & Haupt, 2023). Natural resources can be used more efficiently through densification planning, because the occupied space in the city has more use (Pelczynski & Tomkowicz, 2019). The transport and energy sector become more efficient as well, because dense infrastructure creates shorter distances between functions in urban areas (Skovbro, 2002). Efficiency makes densification interesting for policy makers because it is economically beneficial for a city to become more dense (Conticelli et al., 2017). Urban land scarcity could also be countered with densification, because land could be used to its full potential when increasing the density (Gerber & Debrunner, 2022). Furthermore, the problem of urban sprawl which is also related to land scarcity could be solved by increasing the density in planning. This makes densification an important policy objective for countries such as the Netherlands (Bouwmeester et al., 2023).

Public infrastructure and transport both relate to density in a positive way as well. Public infrastructure can be categorized into technical infrastructure and recreational infrastructure and housing. Sewers management and energy efficiency benefit from higher density, as well as public and commercial services. The available services are more diverse and the services are being used more frequently. Those services make the neighborhood more inclusive and positively influence the economy. The use of public transport increases when the density increases. This also relates to the fact that residents living in denser areas travel less distance by car and are less likely to own their own car (Pont et al., 2021).

As opposed to those benefits, densification could also have negative effects. Environmental degradation, which contradicts the positive effect of reducing biodiversity loss in a sense, is one example of a disadvantage associated with density (Næss et al., 2019). Furthermore, studies into density in urban regions are found to be inconsistent, lacking clear methodologies for describing the built environment (Gren et al., 2018). Environmental, social and health factors all have a negative relation to higher densities. Urban climate problems could result from high density planning (Chokhachian et al., 2020). Surface water management is less convenient in dense regions, because less permeable surfaces make it harder for water to be regulated (Haupt et al., 2020).

Density has several environmental impacts in urban areas. Several studies have showed that biodiversity is lost because of a decrease in green space and habitats for plants and animals (Haaland & Van Den Bosch, 2015). Forest species vanish in dense neighborhoods, leading to lower population sizes and diversities. Urban adapters are specific species, mostly birds, which do thrive in dense urban areas (Winarni et al., 2022). However, those are exceptions, and most species do not manage to survive high densification (Haaland & Van Den Bosch, 2015). The previously mentioned impermeable surfaces result in negative effects for natural water and nitrogen fluxes (Zhang et al., 2023). Additionally, the urban area is covered up which leads to heat stress. The decrease in the amount of shade created by trees also contributes

to the heat island effect. Urban areas with less density and more green cover are cooler, resulting in less temperature rise within those areas (Deng et al., 2023).

The wellbeing of residents is influenced by densification. Ustaoglu & Williams (2024) found that density is negatively related to wellbeing. People living in areas with higher density are less satisfied with their life and the living environment around them. This shows that individuals experience density as negative. Thereby, social interactions between individuals also decrease within denser urban areas. One might expect more interactions because more people live closer to each other and this is true in some cases, but population density also affects social contact negatively (Honey-Rosés & Zapata, 2021).

Social effects of densification could be the segregation of people with different age, income and education levels. Dense areas are often more popular to young, highly educated people with small households, whilst peripherical low-density areas are more popular to larger households and older people. A study into densification projects in Utrecht, the Netherlands, confirmed the income segregation between residents in dense urban areas versus less dense areas (Götze et al., 2023). A distinction is made when looking at wellbeing within urban regions; wellbeing and social interaction improve as density reaches a medium level, whilst higher levels of density do decrease those aspects. Segregation in the context of income is connected to density both positively and negatively. Low-density regions contain little segregation as well as high-density regions. Moderately dense regions, however, comprise higher segregation levels (Pont et al., 2021).

Health impacts of density have several sub-aspects as well. The physical health of residents is positively influenced, because people tend to walk more in dense urban areas. This results in lower BMI rates for residents (King et al., 2016). Cerin et al., (2020) state that functional walking, compared to recreational walking, contributes more to the lower BMI. Recreational walking is less appealing to residents, because factors like traffic jams, noise and fumes negatively impact the residents' experience of walking for recreational purposes. Pont et al (2021) indicate the fact that density endangers residents through heat vulnerability, risks regarding epidemics, lower fertility rates and damage to lungs. The psychological health of residents also suffers from higher densities, because stress-related health problems and depression more frequently play a role in denser areas. In this context, the compactness of the built area and the shortage of open space especially heavily influences the health of residents. Building heights do not have as much impact on residents' health.

The residents in the Waalsprong could be related to densification in diverse ways. Examining their experiences in a neighborhood which has been influenced by Dutch dense planning policy could show how shorter distances between functions influences their means of transport. The residents' perspectives on their health could also be investigated by evaluating the theories about social and physical health in dense urban areas. Research into their health could be connected to wellbeing, the element that is heavily linked to the residents' perception of green space in their neighborhood.

2.2 Wellbeing

C. Lin et al. (2019) formulate the term subjective wellbeing (SWB) as a way of exploring the relationship between residents and their living environment in smart cities. This concept includes the individual's quality of life, which is a combination of life satisfaction and positive and negative emotions. When the environment or interactions change, the SWB of individuals changes along with those factors. C. Lin et al. (2019) also introduce the term smart infrastructure and smart services (SISS) with hard and soft infrastructure in a city. They make use of three aspects for researching SISS: security, usefulness and the ease of use. By studying those factors, more can be learnt about the relationship between the SWB of residents and the SISS present in their neighborhood.

Emotional wellbeing is the condition of experiences lived by individuals, which is felt through sensations of feelings. This can be felt in various levels of intensities, influencing the satisfaction of one's life. Smart cities make use of modern technologies to improve the quality of life of residents. Those technologies contain factors such as social capital, human capital and communication infrastructure. Both advantages and disadvantages can be distinguished when looking at smart cities. People have more services around their homes, making life easier in that regard. The higher pace of life, however, might result in more stress for residents. Stress directly affects the overall wellbeing of city residents negatively, meaning that the wellbeing of residents does not always benefit from living in smart cities. The self-determination theory explains that there are three psychological needs that can improve the subjective wellbeing: competence, relationship and autonomy. People living in smart cities experience more flexibility and control, resulting in an increased feeling of fulfilled competence needs. However, the sense of stress also decreases the positive effects of smart cities, because it affects fulfilled feelings of competence and relationship. Residents might also feel like they are being monitored by the smart city they live in, leading to a lower feel of autonomy (Yu et al., 2020).

Subjective wellbeing is influenced by the built environment. Residents' living convenience is partially determined by the degree of variation in land-use. Public activity places are an example of diverse land-use that provides people with more options for recreation, resulting in an improved quality of life. The accessibility of destinations also influences the subjective wellbeing of residents, because they experience more comfortability through easier access to destinations. Subjective wellbeing can also be influenced indirectly by the built environment, because sports participation could reduce stress and enhance physical conditions. This indirectly results in a more positive subjective wellbeing. The social capital of residents living in smart cities has an effect on their happiness level. More interaction leads to more happiness for individuals, thereby increasing the subjective wellbeing of those people (Zhang et al., 2022).

This study could be strengthened through research into the influence of psychological needs of Waalsprong residents on their wellbeing. Their means of interaction with both the green space around them and other residents could give insight into their subjective wellbeing, in social and physical respect. Whether residents think their neighborhood feels like a smart city as related to stress levels and positive and negative emotions will also be insightful, which would be instructive for this research.

3. Theoretical framework

3.1 Urban green space

Cities have a high densification level because governments strive to protect the environment outside of cities and transportation distances for resources are kept to a minimum (Conticelli et al., 2017). Those factors influence the amount of space urban citizens and ecosystems can make use of. Szulczewska et al. (2014) emphasize the influence of climate change; dense cities contribute to the creation of urban heat islands and have a negative impact on both the quality of the air and the processing of stormwater runoff. Additionally, the habits for animals as part of the ecosystems are affected by a high densification. This results in a decrease in biodiversity enhancement.

The external areas between buildings in an urban area can be divided into two different spaces: grey and green space. Grey spaces are hard surfaces, for example concrete, which do not contain any form of green or nature. Green spaces consist of soft surfaces that are less tight. Grass, trees and water are all examples of green spaces (Grilo et al., 2020). When cities decrease in their number of inhabitants, an opportunity to improve these external environments arises. In growing cities, however, grey and green spaces often receive less attention resulting in underdevelopment for those external spaces (Haaland & Van Den Bosch, 2015).

Urban green space has a vital role of providing an environment for ecosystems to accommodate biodiversity. This includes the purveyance of resources, presence of microclimates and the facilitation of recreation and other functions for society. Ecosystems are also related to socio-economic and environmental change. Green spaces are necessary for dealing with such changes by serving as a safety net, leading to more advanced ways of adapting to change. As an example, climate change would be more impactful without the ability of green spaces to adjust to changes for the environment. Through these changes, green spaces can be developed and improved which directly influences the quality of life of inhabitants. James et al. (2009) formulated a set of five research themes to find out more about urban green space, both multi- and interdisciplinary. These themes have been summed up as ecosystem services, broad drivers of change, pressures on green space, social processes and goals of provision. The themes are also interconnected and have a vice versa relationship with urban green space research.

Urban planners have focused on creating dense urban areas so that destinations and services are close to the living environment of inhabitants. It is hard for governments to manage urban green in cities, due to preferences of private landowners (Lin et al., 2015).

3.2 Relationship between green environment and human wellbeing

Human contact with nature has several positive impacts on both the health and wellbeing. Psychological benefits such as lower stress levels and more positive emotional levels are an example of this positive impact on people. In comparison to an outside environment with less green, green urban spaces result in lower negative emotions meaning that the green itself does have an effect on the emotional level of residents. In addition to activities in urban green, the view on green environments also has a positive effect on the residents' wellbeing (Bertram & Rehdanz, 2015). Specific residents, such as people with low levels of education, people living in tall buildings and single-parent families, see the highest increase in wellbeing from public green spaces (Ma et al., 2018).

On the other hand, urban green might also evoke negative effects on people. Social dangers, for example fear of crime, could affect residents' relationship with urban green space. This specifically relates to the perceived danger or fear experienced by residents and does not include actual danger or crime present in the environment (Sreetheran & Van Den Bosch, 2014).

Bertram and Rehdanz (2015) state that the amenity value of urban green space can be used to learn more about the effect of green on human wellbeing. For their own research, they use the amount of urban green space in a particular buffer zone around the house of residents as an objective measure. However, they did not include a separation of green space in few larger areas and in more smaller areas. This distinction might be important to include, because those distinct types of green environments could influence health and wellbeing of residents differently.

Green walls can be implemented in urban regions to improve the urban health of people. When there is not enough space for green, those green walls can still be created on vertical surfaces. This contributes to less heat stress in the summer and better isolation in the winter. The quality of life of residents can also be described as livability, quality of place or the residential perception and satisfaction. All those terms more or less refer to the same concept which is the quality of life. Investments in urban forests and green areas can be beneficial for urban development regarding the wellbeing of urban residents (Panagopoulos et al., 2016).

When looking at the quality of life of residents, the level of greenness has a strong impact. Compared to people living in areas with less green, people that do live near green areas have a better physical and mental health status. This not only results from the fact that people in environments with more green have more opportunity to be physically active outside, but also from being exposed to green space itself. The perceived measure of greenness in the neighborhood resulted in different findings in comparison with objective measures of greenness. Physical activity is stimulated when the perception of access to green spaces, overall greenness of the environment and the quality of open spaces is positively being experienced by residents (Leslie et al., 2010).

Adding another concept to the relationship between people and urban green space, 'sense of place' is also a useful framework. Residents are psychologically influenced by their surroundings, especially with specific places. They can be emotionally connected to physical places which are often natural environments. Those places, for example parks, add to the identity of people that feel emotionally connected (Irvine et al., 2013). The sense of place as

experienced by residents could contribute to a better understanding of their relationship to urban green in the neighborhood. Examining whether residents emphasize their connection to specific places during research would be useful when determining if urban green is positively related to people's sense of place.

3.3 Conceptual model and operationalization

The following conceptual model will be used to describe the factors and relationship between those factors.

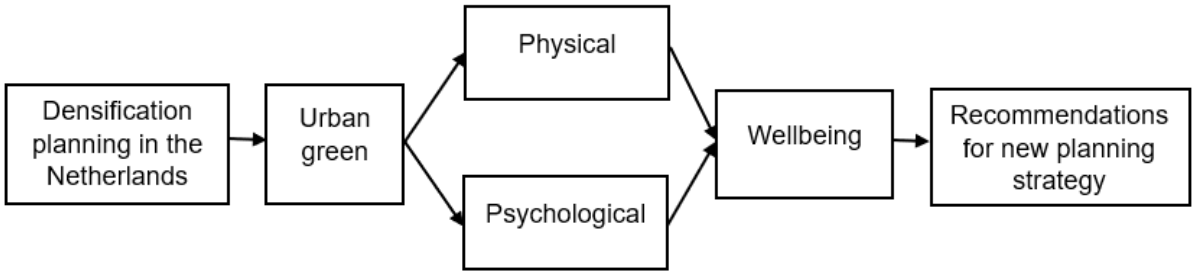


Figure 1: The conceptual model

First of all, the densification planning strategy currently being used in the Netherlands influences the amount of urban green that can be found in cities. With less density, more space becomes available for other purposes such as green. The urban green can be divided into both psychological and physical factors influencing the experiences of residents. Psychological factors can be measured through stress and emotional levels that affect the mental health of residents. Physical factors are the amount of exercise that people get from activity or general walking in the living environment outside. Those factors both influence the general wellbeing of residents, which leads to new insights for planning strategy. These insights result in recommendations for new planning strategy.

4. Methodology

4.1 Research population and recruitment

The people that will be asked to participate in the research are residents living in Hof van Holland located within the Waalsprong. More specifically, the area called Hart van de Waalsprong.

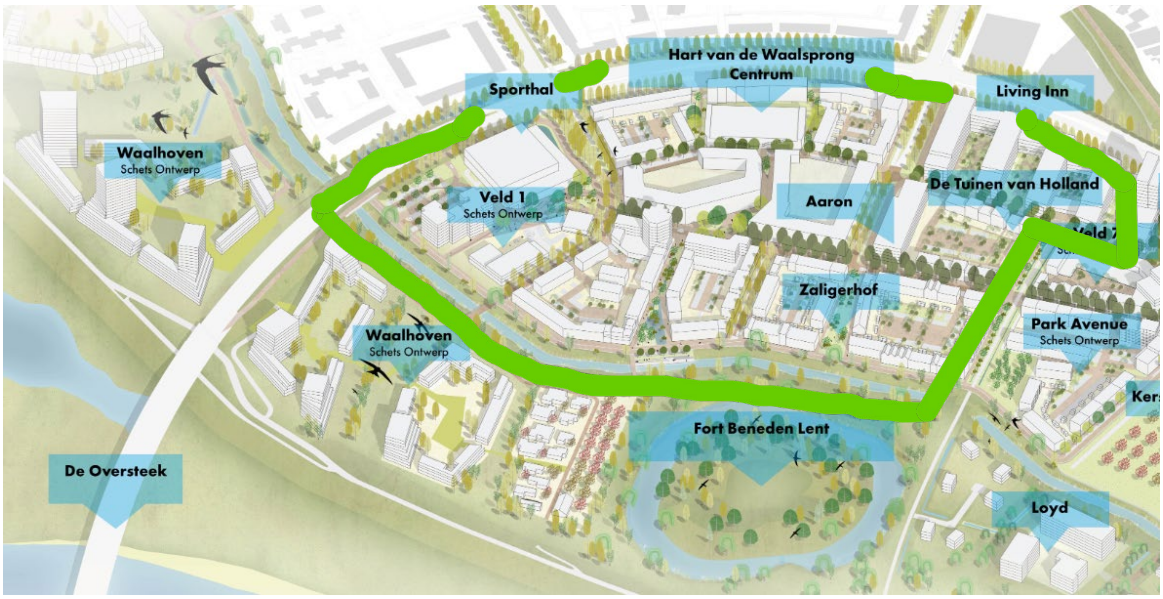


Figure 2: Research population located in Hart van de Waalsprong (Hart van de Waalsprong, 2021)

In this figure, the areas located within the green outline will be visited for research. The entire research area was green before the start of the construction. Within the research area, buildings have been constructed at white clusters and green marks show the urban green access in the neighborhood. The Waal, located near the research area, flows on the southside of the figure and is partially visible.

Residents living in the research area will be recruited to take part in the research by ringing the bell at the door and asking whether they have time and interest to participate. When the resident has interest but does not have time, they will be asked if they would like to be interviewed another time. Notes with contact information will be handed to people and placed in the letterbox if people are not home at the time of visiting. They will have the opportunity to get in contact by sending an email or with the phone number attached.

4.2 Data collection

An observation of the Waalsprong will be the first phase of collecting data. Going physically into the Waalsprong, observing the amount of greenness and general green facilities will help to gain an idea of how the neighborhood was planned. Rasidi et al. (2012) carried out a study by observing green spaces in relation to physical and social activity. They paid attention to the behaviour of people that make use of parks by noting their movement patterns. The observation was performed on different days in the week, because different usage patterns could be observed on different times and days. The parks chosen for observation were selected based on the location within an urban region; surrounded by mass housing

development. The Waalsprong is similar to their research area in this regard. Therefore, observing the research area is useful for studying people's behaviour related to urban green. According to Zhang et al. (2021), imprecise measures of qualities of green spaces could lead to a shortage of details. All green spaces present in the area should be taken into account for the research to be complete and all-encompassing. A more comprehensive observation could contain factors such as perceived attributed. Beside gaining an understanding of the urban green planning realized in the Waalsprong, observing the greenness would substantiate the interview guide used to interview participants.

Ferrer et al. (2015) state that qualitative methodologies have been used for research into the relationship between the built environment and walking. People's perception of the environment can be studied by conducting interviews. Ferrer et al. consider qualitative research the most effective way of exploring several different factors, which are focussed on the environment in this case. The contribution of urban green to the quality of life of residents has also been studied by Irvine et al. (2013). They argue that people's health and wellbeing can be studied through open questions that give depth to the thought process of people living in urban green environments.

Baum et al. (2009) explain that a qualitative approach helps research into health and place to be more comprehensive when investigating complex connections. Different residents will have various perspectives on green in the same area and combining those different views will give a better understanding of the green perception. By interviewing residents, their experience about their living environment can be explored. The literature review showed wellbeing measurements which will be used to operationalize the theories. Questions about the residents' feeling of autonomy, stress and competence needs will be asked to learn more about psychological factors influencing wellbeing. Another part of the interview will involve residents' physical activity within the neighborhood. Their response to questions about activities such as walking, cycling and other possible physical activities will result in valuable information about their practice in the Waalsprong.

Thereafter, general questions about residents' opinion and experience within the research area regarding green amenities will be asked. More specifically, participants will share their view on the quality and amount of parks, trees, walking paths, water and seating as well as the diversity of green. Additionally, participants will discuss the maintenance, cleanliness, amount of shade, accessibility, attractiveness and ease of use with regard to the urban green space in their neighborhood. These topics will help trying to learn participants' perceptions on the Waalsprong which can then be linked to their wellbeing. Follow-up questions will be asked to find out more about the argumentation for the responses participants give, which will eventually provide thorough results. The residents will be asked whether they agree on recording the interview, because this will be useful for analyzing the data afterwards.

4.3 Data analysis

After gathering the data by conducting the interviews, transcriptions will be made with the recordings of the interviews. The interviews were held in Dutch; therefore, transcriptions will be formulated in Dutch as well. Thereafter, the transcription will be analyzed through coding different aspects addressed in the interview. For this second step, the program Atlas.ti will be used in order for the raw data to be organized and analyzed. Rambaree (2014) argues that the software provided by Atlas.ti facilitates a qualitative methodology with functions that make it possible to analyze through coding, linking and finding patterns. The language used by participants will be the first coding process, in which specific words or phrases that are relevant for this research topic will be coded. Those aspects will be categorized into themes that broaden the specific codes created in the first coding phase. After that, broader domains will result from the themes (Irvine et al., 2013). Notes taken during the interview will also be used to better understand the meaning of the residents' responses. Finally, the findings will be reported with elaboration on the data. This will include quotes from participants, which have been translated from Dutch to English. The fourth sub-question will not be part of the results, because the data will not be gathered to answer this question directly. Therefore, the conclusion will discuss the fourth sub-question.

5. Results

5.1 Observations

Observations were conducted to learn more about the urban green in Hart van de Waalsprong. The focus was green that is accessible and visible to everyone, for example parks, tree circles, verges and green strokes. Attention was also focused on benches and other seating opportunities, as well as public water provision. The observations took place in the months June and July of 2024.

The following map shows the observations' locations within Hart van de Waalsprong marked with numbers corresponding to the pictures in the observation tables.

Figure 3: Observations' locations within Hart van de Waalsprong (De Urbanisten, n.d.)

5.1.1 Public green

Observation	Location in Waalsprong and function
1. Small park with picnic table 	With a low fence separating the sidewalk from this small park, this particular green space seems demarcated to some extent. The houses around this park have their own front yard, so this public green has been created additionally. Several trees have been planted within and a picnic table provides seating. The picnic table could be an opportunity for residents to feel less individual, as they could meet at this table and have a conversation. The table could also decrease the oppressive feeling this neighborhood might have, because people can go out of their home and sit outside not feeling cramped in houses. Two examples of these parks can be found in the northern part of Hart van de Waalsprong.
2. Bushes and trees in parking lot 	This parking lot has been equipped with bushes and trees in between parking spots. Hart van de Waalsprong has several examples of such parking lots, which all have these small bushes and some trees. The urban green these parking lots provide could contribute to a more spatial experience for residents as the green separates cars. Walking could also become more pleasing compared to a parking lot with less green, so this shape of urban green could also affect the physical wellbeing of residents.
3. Wadi 	Water drainage is managed through the implementation of a wadi in between rows of houses. This wadi contains small trees and some bushes, as well as a small bridge which makes it possible to cross the wadi without having to walk around it. The wadi could operate as a playground for children whilst at the same time improve the walkability in the neighborhood. On the edge of the wadi, stone walls could serve as seating opportunities which could add to social cohesion. With the wadi separating rows of houses facing each other, a more spatial feeling could arise. This is the only wadi of such magnitude, situated in the Tine Vastbinderhof Street. Another thinner wadi can be found in the Zaligestraat, a street parallel to this one.

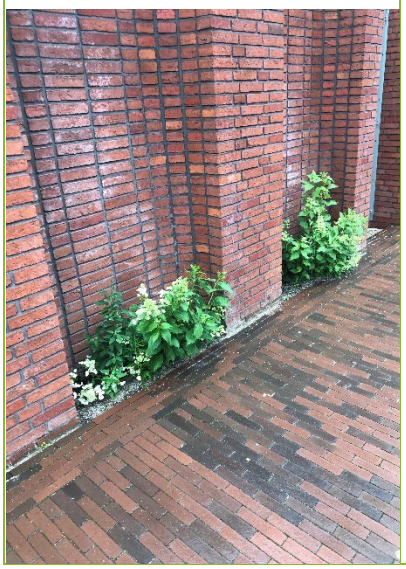
4. Space for trees 	Here, small outlines for the plantation of trees can be spotted throughout the Jeannette Geldensstraat. As of now, this street does not have any green. Trees would make the street look less filled with brick buildings and surface, so these squares for trees are important and would provide the first green in this particular street. As of now, the street could feel shabby and therefore oppressive. The feeling in the neighborhood for residents living in this street could vary from the feeling of residents living in streets that do provide more urban green. Combined with the lack of seating, this street does not promote physical activity for residents.
5. Green next to sidewalk 	The Truus Gelsingstraat does not contain trees or bushes. The plants in the picture on the left are the only green provided. Openings in the wall next to the sidewalk make room for those plants, but do not supply sufficient space for larger hedges and/or trees. The street is wide, and sidewalks provide sufficient space to walk. The deficiency of green, however, could make residents feel like this part of the neighborhood does not fill their competence needs. As this street leads to the supermarket and other shops in the center, people make use of it in a functional way. The neighborhood could feel more natural with the addition of more urban green, such as trees, in order for residents to be positively influenced psychologically.

Table 1: Public green (Own work, 2024)

5.1.2 Seating opportunities

Observation	Location in Waalsprong and function
6. Bench at parking lot 	A publicly accessible bench can be found at the parking lot. This bench is located next to a residential care center where elderly people live. They often walk by this parking lot and the bench was used to take a small rest whilst observing. Walking becomes more convenient for residents, especially the elderly, with benches providing spots to take a break and rest. Seating such as this bench could also increase the amount of social interaction of residents, improving their psychological wellbeing.
7. Sidewalk bench 	Located in the Truus Gelsingstraat, close to the Oranje Marieplein, this bench was placed on a spot where the sidewalk is broader. Located next to the shopping centre, people could use this bench to take a break from the busy part of the neighborhood.

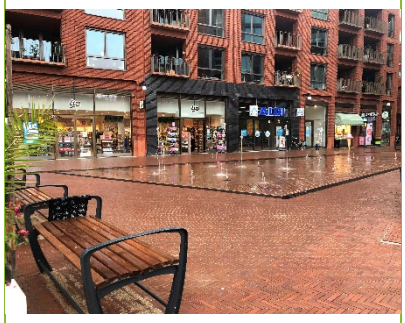
8. Chairs around tree 	The central shopping center with a plaza in the middle called the Oranje Marieplein has several types of seating spots. These chairs have been placed randomly around a tree, with sidewalks around it in the shape of a triangle. The entire plaza is triangularly shaped. The tree could make this seating spot feel more natural, which affects the residents' feeling in the neighborhood. Their competence needs could also be more fulfilled by this section, as people can interact with their environment and be in control regarding the spot they could take a seat.
9. Benches at shopping centre 	Around the middle of the Oranje Marieplein, different benches have been placed all facing the middle. Two or three people can sit on a bench and the benches have been placed close next to each other, creating the opportunity for people to have social interaction. During the observation, people seated on the benches started chatting with others arriving to the plaza. The plaza generates social interaction, decreasing the sense of individuality in a busy location with several shops. The anonymity could be best felt in occupied places like this, but the benches could oppose this psychological factor.

Table 2: Public seating opportunities (Own work, 2024)

5.1.3 Public water

Observation	Location in Waalsprong and function
10. Fountain at shopping centre 	The middle of the Oranje Marieplein includes fountains that provide a cooling effect. Children were running through the fountains during a sunny day, interacting with other children that were also playing in the water. This improves both the psychological and physical wellbeing of residents, because children and their parents interact with each other and children play outside. This shows that the fountains are functional for several factors and for different target groups. As opposed to a plaza without such fountains, the setting changes by adding water. However, the plaza does not provide green and shade in this spot. Trees could influence the residents' feeling in the neighborhood and make the plaza more accessible. On the other hand, residents could also argue that the fountains make the plaza feel more spatial.
11. Small river 	This river flows along the Nel Petersstraat on the Southwest side of the Waalsprong. Grass separates the street from the water and the other side of the river has a wilder nature appearance with trees and bushes. The spatial and green feeling this river provides is convenient for walking, cycling and other physical activities. The street itself, however, does not include any benches or other seating. Residents' competence needs benefit from the river, because it is accessible and the environment is different from the rest of the neighborhood. With the other side of the river being green as well, this area could feel less oppressive than other areas in the neighborhood.

Tabel 3: Public water (Own work, 2024)

5.2 Interviews

The interview guide used for the interviews can be found in appendix 1. The information received from doing observations was used to conduct interviews with residents living in the Waalsprong. Five face-to-face interviews were carried out with different residents. Participants living in the same street have been distinguished by adding a number. The participating respondents will be referred to as:

- Marcel
- Angela
- Liam
- Lucia
- Patrick

Marcel lives in the Moormannstraat, Angela and Liam live in the Theo Dobbestraat and Lucia and Patrick live in Tine Vastbinderhof. The names given to them are pseudonyms so their anonymity can be warranted.

5.2.1 How does the planning in the Waalsprong shape the residents' interaction with urban green?

Densification

Before asking residents questions about the urban green present in their neighborhood, they were asked about densification separately. In order for residents to elaborate on their experiences with densification in their neighborhood, the question *"How do you experience the buildings with regard to density?"* was asked. The residents' answers differed based on the location of their house within the neighborhood. Generally, their experience with densification in the Waalsprong is positive as the density does not affect their urban green accessibility. Marcel indicated that he felt like he had buildings all around him, also stating that he was looking at a wall when looking out the window. He added his experiences with houses in his surroundings when saying: *"Here on the other side of the road are pretty tight units and pretty crammed together."* He clarifies this statement by explaining that it feels like a city with buildings on top of each other. Later on during the interview, he states: *"It has been built more and more dense"* referring to the neighborhood around his house. The streets, however, feel broad and therefore pretty to him as he says this with regard to the Moormannstraat. He mentions the Italiëstraat which is just outside of the research area and emphasizes the wideness of this street.

Angela states that she does not mind the fact that buildings have been built dense, but she also acknowledges that she feels like buildings are close to each other. Her experiences with urban green in the context of physical space is limited by dense planning. Liam answers the question by saying: *"We have to collectively live in a clump, so that means you have to build up into the air when there is not enough surface. It is a necessity."* His answer shows that he also thinks his neighborhood feels dense, but he complies with this fact by accepting the situation as it is. He adds that he thinks densification is the result of financial factors and houses need to be built somewhere. This shows that this resident is aware of the density planning in the Netherlands and its influence on urban green.

Unlike residents living in the Theo Dobbestraat, residents living in Tine Vastbinderhof respond to the question with experiences resembling less feeling of dense urban planning. Lucia states that she notices densification in her neighborhood by answering: *"I do not experience it at my house but I do see it. And when I cycle through the neighborhood I see that some areas are fairly narrow, squeezed and much.''* She then further elaborates saying: *"I think that is a choice of where you decide to live.''* She refers to the exact spot people decide to start living in a house, being aware of the density in which they will live. Patrick states more or less the same, saying: *"I do not really notice that it is dense. I have nobody above me; I do have people next to me, but these are just terraced houses."* His opinion about the neighborhood is that he does not think buildings have been built close to each other. Analogous to the answer of Lucia is that he suppositions people living closer to the new city center could have a stronger sense of densification planning as buildings have been built higher there. Their opinions are similar, meaning that their interactions with urban green are not affected by densification from their point of view.

Importance of green

All interviewed participants implied the importance green has to them with different arguments to substantiate their statements.

Marcel makes this clear by saying: *"In my opinion, the more plants the better. So, I think green is very important. And I knew beforehand that it would be less green here so then you take that into account, but I would prefer a much greener environment."* Urban green is necessary for several reasons according to Angela; she says: *"It is the color of hope, green."* Later on she adds: *"Green is a color that can make you happy. It looks healthy."* These quotes not only show the importance of green, but also the diverse ways green influences residents. Angela experiences green in the neighborhood as something that positively influences her mood, she becomes happier and feels healthier with the addition of more green. Green psychologically influences her, improving her mental state level and also giving her the feeling of hope.

Lucia responds in an optimistic way to the question. She is positive about the green environment in the neighborhood and states: *"If we go right, it is green and then everything is just fine."* Her answer refers to the direction she goes from her house to find green nearby. She continues to say there are no plans to build anything in that direction, meaning that it stays green. During the interview, she also explains that she thinks that their house is in the best spot within the neighborhood because of the fact that it is the greenest area. Lucia implies that Dutch spatial planning varies within neighborhoods. She feels like the direct environment around her house is rather green, whilst other parts in the same neighborhood feel less green and more dense. Liam shares a different view. He answers by indicating the lack of green strips which he was used to in his previous living environment. He shows a picture of his previous house, pointing at the green strip that was present in between the road and the sidewalk. When being asked why he misses the green strip, he replies with: *"It gives more space (…) a more spatial view."* Later during the interview, he adds that he tries to avoid walking through the neighborhood. His preference is walking in nature, and he does not feel like he can find nature close by when going on a short walk, *"That is fine as well, but I'm inclined to look for a view.''* This also confirms that the neighborhood does not have a spatial view in his opinion, therefore he is forced to look for a view outside of the neighborhood. Dutch spatial planning results in longer trips from home for Liam, because he looks for a spatial feeling. Spatial planning with less dense areas in neighborhoods could improve the livability for Liam and his example of green strips could be an addition spatial planners could implement

for dealing with the shortage of space. In this context, the importance of green can be noticed in practice as sufficient space within the living environment for residents, instead of actual green.

Parks in neighborhood

There are different responses to questions about the parks present in the Waalsprong. The first question asked to participants concerning this theme was: *"What do you think about the number of parks present in your neighborhood?"* The follow-up question *"What do you think about the size of this/these park(s)?"* would be asked as well in order for residents to elaborate their opinions. Marcel says the following about a park with a lake outside the Waalsprong: *"The park does not represent much, it is very barren, but you can walk around it and there is a bit of green which is nice, you can look far away."* He also explains that there are no parks within the neighborhood, *"Here are hardly any parks. There is only the orchard further up ahead which has been preserved and then there are some playgrounds for children behind me."* His way of escaping the dense urban area he lives in is by visiting this lake with a spatial view. Even though there is not much green, it still provides him with a calm experience which he cannot find within the neighborhood itself. Parks near his house would lead to less travel distance for Marcel, resulting in a more accessible opportunity to escape the density of the neighborhood. He does indicate that the densification itself is acceptable and that he can live with it, but he wants to have parks to get out of the dense feeling.

With densification being a theme which can be accepted by residents under some conditions, Angela also says that she misses the parks in the neighborhood. She narrates: *"For a moment being in the green of a park, that is not offered here."* She adds that she would like a park nearby so she could walk there and sit down on a bench. Lucia, however, thinks otherwise saying: *"I think it is big, especially when moving out of the city."* Her perspective on the Waalsprong is that there are parks in the form of a wadi in front of her home. She also mentions the *"old apple orchard"* which, in her opinion, contributes to the parks in her neighborhood. Their house is also close to 'Fort Beneden Lent', a fort with green around it on the other side of the river flowing next to the Tine Vastbinderhof. She feels like there are enough opportunities to walk or sit somewhere at ease. Her experience differs from Angela, because she sees more green around her house. The accessibility of green between those residents differ, which once again proves the variation in Dutch urban planning and its distinction regarding the influence on perspectives and opinions of residents in distinct parts within the neighborhood.

Patrick answers by saying there are not many parks in his opinion. According to him, there is a lot of green but not really with respect to parks that you could walk through. He also mentions the orchard, but says that it is not open for the public to visit. He says the following about Fort Beneden Lent, *"I have to wait and see what that park will do but I think they will make something beautiful there."* With those park locations in and around the Waalsprong, this interviewed resident thinks that sufficient parks will be available to everyone living in the neighborhood. Developments made in the Waalsprong are necessary for Marcel to feel like there is sufficient green amenities. This shows the importance of green once again; without the development of green in the shape of parks, he is not satisfied with the amount of green around his house.

Another follow-up question participants received was: *"Would you prefer several smaller parks divided through the neighborhood or less parks which are bigger, and why?"* The answers

differed; Marcel says: *"When you have small children it would be nice if there is a playground nearby, a small green area no matter where."* He then adjusts his thoughts towards his own preference regarding small parks and says: *"Then time after time you feel like…there are buildings all around me still and you do not quite get the green feeling you are actually looking for."* He mentions the Vondelpark in Amsterdam, where you could find what he refers to as *"A satisfactory green area where you can walk properly."* The Vondelpark is also located in the Netherlands, therefore this example shows how Dutch planning could provide sufficient green with large parks. Marcel misses this park element in the Waalsprong which increases the degree to which he experiences densification. On the other hand, Angela would rather have several small parks, *"Then you can go left or right in the close environment. Over there is a park, over there too."* The accessibility is more important than the size and walkability of a park in her opinion. She thinks smaller parks would be closer to her home compared to less bigger parks.

Liam does not mind the way parks are created; he says he likes it when parks are interesting to live close to without a preferred park size. Lucia answers by telling she thought Kronenburgerpark in Nijmegen was big but always busy, which she did not like. Therefore, she prefers more smaller parks over a few bigger parks. Patrick contradicts Marcel when responding that children could play better in a bigger park. He himself also chooses fewer bigger parks over less smaller ones, *"Because you have an intensified feeling of being in nature. With a small park…that feels just off meanwhile with a bigger park you do have that feeling. I also think people with dogs can walk them better there."* A nature-like feeling is achieved with bigger parks according to Patrick, meaning that more green in one spot contributes to a decrease in feeling of density. A small park would not provide enough nature to deal with densification, as shown by the answers of Marcel and Patrick.

Green elements in neighborhood

Trees in the context of densification have led residents to express their feelings about the neighborhood within this theme. The question *"Do you think there is a sufficient number of trees in the neighborhood and why/why not?"* was asked in order for interviewees to express their opinion about the tree amenity in the Waalsprong. Marcel states that there are quite some trees, with more new trees well on the way. Liam also mentions the fact that more trees are being planted, *"In this street for example, they planted some new trees recently"* while pointing at the Truus Gelsingstraat which he sees when looking at the window. He states that he experiences the environment as more pleasant when more trees are added. Lucia indicates that there are enough trees, and Patrick would welcome more trees although there are enough trees for now. Angela is the only one who argues that there could be more trees, "*There are too few of them, so I would like more."* She adds details about how trees could be supplemented by saying: *"A lane would be great."* Overall, residents are satisfied with the number of trees in the Waalsprong, knowing that more trees will be planted. Their responses do not imply that trees should be planted bigger in order for the neighborhood to feel green. Therefore, the planning that has been done in the Waalsprong contains sufficient trees in the light of urban green according to the participating residents.

Apart from trees, other questions during the interview were directed towards general green as part of urban green. Marcel thinks the addition of green on and around facades could help directing the attention away from the, clearly visible, stone. He says: *"You could place and grow all sorts of things against those facades, which you do not see anywhere yet whilst that could be very possible. It takes up minimal space and makes it a lot more green."* He compares

the Waalsprong to another neighborhood more to the north and emphasizes that neighborhoods become more green through the years, meaning that the Waalsprong will increase in greenery over the years. The city center, however, is hard to combine with a lot of green according to him. His general opinion about his neighborhood is that *"As of now, it is not very green."* His response implies that Dutch planning in city centers does not focus on urban green and from his perspective, implementing green in those areas is harder than in other spaces that are not city centers. By answering this way, he claims that residents who interact more with city centers automatically interact less with urban green.

For Angela, the grass in the neighborhood is most important as part of the green amenity. The grass in between the Nel Petersstraat and the small river in particular, which is on the far northwest side of the Waalsprong. She explains how she sees the grass and flowers: *"It is brilliant to see…I pause for a moment and look at it. Sometimes I gather one."* Patrick gives an answer explaining that there is more green in the west direction of the neighborhood. He says the following about green in the Waalsprong: *"It is a good intermediate step between living in a suburban neighborhood which is relatively close to the center and a nature environment which is quite close."* The comparison with his previous, more green residence in Arnhem makes it relatively less green where he lives now. About urban green, he says: *"There is a lot of green and quite some space has been reserved for green. Relatively spoken for a new construction area, I do not live next to a forest of course."* From his perspective, planning in the Waalsprong has satisfied him with the extent to which he can interact with urban green.

Another question regarding green was asked. Interviewees had to express their view on the green variation by answering the questions: *"How do you experience the variation of green in the neighborhood?"* and *"Does a diversity in plants influence your experience in the living environment?"* All residents indicated that they think it is important to have a variety of green in the neighborhood. Marcel argues that the neighborhood is monotone with trees all being the same, *"There is not really a broad variation."* Liam answers in opposite manner, saying that there is indeed a variety of trees in the neighborhood. Angela further stresses the pleasure she gains from grasses. Her following quotes clarify the importance: *"I love looking at all those different grasses." "[The grass] is nearly as high as myself, which is beautiful and omnifarious. I did not know there were this many kinds of grass."* According to Lucia, the planners planted different green elements. Corresponding with Liam, she also thinks that trees are diverse, mentioning the apple trees and tall trees near Fort Beneden Lent. She says the wadi in front of her house also contains all sorts of flowers, poppies and wildflowers for example. She describes the flowers as: *"A wild bouquet in front of the door."* The biodiversity is also cited by Patrick as he says he likes variation; *I think it is important for the biodiversity."* He then claims that he is not sure whether biodiversity actually benefits from the variation of green in the wadi. The residents all have interactions with these green elements in their neighborhood. Planners could have implemented a broader variety of green elements, but the overall amount of green positively influences the living experience of these residents.

Green maintenance

In the interviews, it became clear that a relationship between biodiversity and green maintenance exists. Interviewees were asked *"What is the green maintenance in the neighborhood like?* with the follow-up question: *"Is the nature mainly being left alone or is maintenance carried out (for example mowing or pruning)?"* Biodiversity was mentioned in three out of the five interviews. Marcel says: *"I understand that you have to let it grow for the*

sake of biodiversity, but the time period in which it stays unaffected without having the effect of helping biodiversity is way too long.'' He explains that insects benefit from less green maintenance and agrees that it is for the better, but he also argues that maintenance has to be done. The Italiëstraat, which he mentioned earlier, has an obscure view because of the tall grass that was not mowed. He continues by saying: *"And the Italiëstraat, that was alright, but it is so tall now it is becoming a mess. The trees are sort of drowning in the abundance of grass.''* Lucia describes the dilemma regarding green maintenance by using the wadi as example: *"In the month May they did not mow the wadi which meant that children could not play there anymore, but it is good for the biodiversity. (…) My son could not play in it; it was that tall.''* Both residents living in Tine Vastbinderhof with the wadi in front of their house say that biodiversity is important. Lucia thinks that people are busy performing maintenance in and around the wadi, whereas Patrick feels like no maintenance is being done. He would prefer the addition of bushes and plants instead of the wild grass currently being present. Residents indicate that green maintenance influences how they interact with urban green in the Waalsprong. The planning might not have considered this relationship, as the grass is either mowed or left to grow. By adding more types of grass and reserving more space for this form of green, the maintenance could be split up. Some grass could be mowed for people to be able to interact with it and play in it, whilst another grass area could be utilized to improve biodiversity.

Angela and Liam prefer the way green is being left alone. Angela states that the green is being maintained in a good way: *"They let it grow longer and longer, I enjoy it a lot.''* She also declares that she likes the decrease in mowing compared to the years prior and specifies grass by stating: *"They especially let grass grow nowadays, not many pruning is being performed.''* The neighborhood is designated as *"cared for"* by Liam. He states that maintenance is not being forgotten, but rather left unpruned so flowers could grow longer. The comparison with former times is also being done by him: *"Back in the day everything was immediately mowed. They thought all verges had to be flat.''* As indicated by these two residents, green could now contribute more to biodiversity than before which is an improvement in their opinion. Planning in the Waalsprong has made it possible for green to continue growing without being an obstruction, except for the decrease of sight in the Italiëstraat.

Water

The water indicator was measured by asking the question: *"What do you think about the presence of water in the neighborhood?"* The follow-up question *"What influence does the presence of water have one your experience of the neighborhood?''* was also asked.

Marcel mentions the lake which can be found to the northside of the Waalsprong. He visits this lake and especially enjoys the long view over the lake. He also says he likes *"The small river flowing to the lake of Oosterhout''* which is the small river next to the Nel Petersstraat. Angela solely visits this small river within the neighborhood. She likes to see the small waves forming in this river and talks about visiting water stating: *"It is a necessity for me.''* On top of that, she enjoys seeing ducks at this river. The lake mentioned by Marcel is also attended by Liam. He goes there to see the view over the water. Apart from the lakes, he visits the Waal where he enjoys the view as well. In his opinion, the Waalsprong contains sufficient water amenities as well as the environment close by.

The lake on the northside of the Waalsprong and the lake in Lent were listed by Lucia as water locations she visits. She states that she does not know any more water amenities apart from the lakes, the small river and the Waal. Moreover, she says: *"The wadi is full of water when it rains a lot (…) but with this many children running around in the neighborhood it can also be inconvenient, water."* Patrick visits the Waal and the lake at Lent, *"Those are the two areas with water I like to go."* Later on during the interview, he also mentions the small river which he visits, because there is more green. With all interviewed residents stating that they visit water when going outside, it has become clear that water is important to them. The small river being the only water element in the nature within the Waalsprong could be insufficient. Older residents might want to visit more water areas as part of their urban green needs. More water amenities could contribute to an improved urban green experience in the Waalsprong. Planners did not implement many types of water within the neighborhood itself, resulting in residents finding their water elements elsewhere outside the neighborhood. For planners, the water areas could also be seen as hard to implement. People could visit water somewhere else if they want to, so more space within the Waalsprong can be used for housing.

Residents were also asked about the fountains in the new city center. They all expressed their joy seeing the children playing in these fountains. Marcel says: *"My children, who are not very young anymore, went ahead and still ran through the fountains."* What Lucia likes about those fountains is *"You can decide for yourself whether you want to be wet or not."* Angela and Liam both mention the fact that they receive happiness just looking at children playing in the fountains. Patrick says: *"Better than one big tiled…[plaza], children love it."* Planners positively influenced how residents look at the city center with the implementation of the fountains. People, especially children, actively interact with the water which is an addition to the total amount of interaction between residents and urban green.

Shade

The residents' experiences regarding shade were measured by asking: *"Do you feel like there is sufficient shade outside in the neighborhood?"* Afterwards, the follow-up questions *"Where does this shade come from?* and *"Is shade important to you and why?"* were asked. Marcel answers saying he experiences shade *"Only from buildings, not from trees or plants as of now."* He states that large trees could contribute to the profile of the street, with the addition of leaves and shade. The trees currently present in his street are too small for him to enjoy shade coming from them. Angela was unaware of the fact she would prefer more shade in the neighborhood; when being asked how she feels about this topic she says: *"I am so used to things that I do not actively miss it."* When sitting down under a tree, she would like to have shade from a tree. To Lucia, shade is not a necessity in the neighborhood: *"I think I am alright, I would not want to walk in the shade."* The walking path towards the Waal is covered with shade from large trees according to her, but she wants to walk in the sun when being outside. Returning to the seating under a tree, Lucia does not feel the need to sit on a bench under a tree. Liam thinks the neighborhood has sufficient shade, both from buildings and from trees. He expresses his need for shade when the temperature is high outside: *"When it is very warm, it is nice to have a tree every now and then to rest in shade."* Patrick does not have a strong opinion about the amount of shade trees produce; his primary source of shade is from buildings. He thinks the trees that have been planted in the neighborhood will not grow big enough to provide shade eventually, but he will welcome it if it happens in the future. Tall buildings in the neighborhood have the extra, external effect of providing shade. They are being planned and built the way they are in order for more space to be used, and therefore

more space is covered in shade. Planning has not considered shade as much in the Waalsprong but as indicated by the interviewed residents, shade is not as important. It is experienced as a pleasant side effect when created by buildings and trees, but it is not the main objective for planning.

Cleanliness
The question *"Do you have the feeling your neighborhood is clean?"* was asked, so participants could share their experiences with public spaces regarding this indicator. Marcel talks about the building materials that were, in his opinion, littering the neighborhood. Furthermore, he feels like his neighborhood is clean. The other residents indicate that the neighborhood is clean, apart from the building materials previously mentioned by Marcel. With the exception of some residents throwing cigarettes on the ground as stated by Liam, no litter can be found in the neighborhood. Marcel says that he things enough waste containers are present in his street and the same applies to Angela. Lucia also mentions the cigarettes she finds on the street, but she does not think more waste containers would be helpful: *"I am not sure whether a waste container would solve this problem (…) maybe it is not about the waste containers but just how people are."*

Accessibility
The extent to which residents experience their neighborhood as accessible was measured with the following question: *"How do you experience the accessibility of urban green in the neighborhood?"* The residents were generally positive about their access to urban green. Patrick says: *"Things are nearby. Whether you want to go to the city center for shopping (…) or to the busy city center of Nijmegen. The public transport, busses, bicycles, trains, everything is pretty accessible."* The impression of Liam is that there could be more green nearby in the neighborhood, because searching for nature feels like a whole undertaking. His response also relates to accessibility of water, as discussed before. When urban green is more accessible for residents, they tend to interact with it more quickly. This factor shows how planning influences the amount of interaction residents have with urban green in their environment, because too large of a distance could be an obstacle for people to visit green.

5.2.2 How does the quality of urban green spaces influence the physical wellbeing of residents in the Waalsprong?

Now that the urban green perception of participants has been discussed, the connection towards their wellbeing can be further analyzed. Different activities connected to urban green have been distinguished, all influencing the wellbeing of residents in the Waalsprong.

Walking
Interviewees were asked whether they go for walks and if so, where, when and for how long they walk. They were also asked why they go for walks and what their walking routes are. All residents indicated that they do go for walks.

Marcel goes for a walk approximately once per month. These walks differ from half an hour to one and half an hour. They are zigzag routes through the neighborhood and for recreational purposes, *"A good friend of mine also lives here so every now and then we go for a walk."* The chosen moments for going on such walks are random and the lake to the north of the Waalsprong is one of the main walking spots. Furthermore, he walks through the

neighborhood with functional purposes when bringing his daughter to school or picking her up. He says that he would go on more walks if he had more reason to go on a walk, for example when going out for lunch or visiting a coffee shop in the neighborhood. Having a reason to go outside, such as those points of interest within the neighborhood, would contribute to Marcel being physically active outside. Furthermore, he notices a lot of elderly people walking through his street. One elderly man in particular, who goes for a walk every morning.

Angela walks every morning between ten and twelve o'clock. She goes for a walk of about one hour with the goal of seeing green. In her opinion, she walks very slow as she is in her 80s and she uses a walker. She visits the small river where she also enjoys the grass. Liam goes for a walk everyday if possible and also uses a walker as his age is over 80 as well. Whether he walks mostly depends on the weather as he states: *"When it is bad weather…I am not going to walk in the rain deliberately you know."* The walk often takes about one hour to one and half an hour. He explains that he has a weak kidney from birth, which makes it even more important for him to exercise by walking for example. His route choice has changed since Veur-Lent, which is next to the Waal, has been finished. When he first started living in the Waalsprong, he preferred walking to the lake on the north side just like Marcel. He describes his walk as follows: *"I walk from Lent-Noord and the Waalbrug to Nijmegen and the Oversteek."* Crossing both bridges that connect the Waalsprong to the city center of Nijmegen, he says: *"Also pleasant sojourn when going out. For example the floodplains here, at the Waal. At those bridges over the floodplains."* He points out the smaller bridges in between the bigger Waalbrug and Oversteek bridge where he walks as well. He does say that this walk towards the Waal can be a bit of a hassle, *"You have to go out because it is not directly next to the house. You have to undergo a few steps."* Because of his walker, he is still able to reach the walking destinations he likes to visit. In his case, the weak kidney is an extra cause to go out for walks. A better quality of urban green increases his chances of being physically active outside, resulting in a better physical health status for Liam.

Lucia walks about three or four times a week in summer and less often during the winter. She describes the motive for walking as follows: *"Doing groceries, drinking coffee and go back [home]."* Another motive for her to go on a walk is the market on Saturday. She says: *"It is market then and we like to visit the city."* Additionally, she talks about her small child and the fact that they have to go outside with their child too. Apart from Saturdays, their walks take place around their working hours. Her husband has older children who like to for walks to the Waal. She clarifies the direction in which walks often go: *"We never walk in the neighborhood itself; we sort of walk out of the neighborhood."* She explains the reason for this by saying: *"That direction is less pretty, so we are not walking that way."* As Tine Vastbinderhof is on the edge of the Waalsprong, they decide to walk out of the neighborhood instead of going the other way, thereby avoiding buildings. Her living location influences her walk; they go towards green outside of the neighborhood itself. She experiences the green outside the area with houses as a higher quality of green, therefore she is being positively influenced by this benefit of green being present close to her home. Patrick walks every other day in and around the neighborhood. He does not walk all the way to the center of Nijmegen over the Waal. His usual walk is alongside the small river near his house. Compared to Lucia, he is not as attracted to the green outside the neighborhood. Staying close to home gives him a sufficient feel of urban green. This results in shorter walks, because his walk does not go outside the neighborhood. He does go for walks within the neighborhood which is beneficial for his physical health. Longer walks which are further from home, however, would increase the amount of physical

activity from one walk. The quality of urban green can have positive effects in this context, but it can also decrease physical wellbeing when urban green is more accessible. Patrick also notices a lot of people walking through Tine Vastbinderhof; when being asked why he thinks this is the case he answers with the seating opportunities present around the wadi.

Seating

As related to physical activity, a question about seating in the neighborhood was asked: *"Are there sufficient seating opportunities present in the neighborhood?''* Angela answers saying there is few seating spots but there are some. Lucia mentions the low stone walls brought up by Patrick, where people can sit around the wadi. She would not want more benches around her house, because she thinks this would attract loitering. She would like more benches around the Waal, but the number of benches present within the Waalsprong itself are sufficient. Liam also indicates that the addition of more benches along the Waal would be beneficial to him, because he suffers from intermittent claudication which increases his need for seating opportunities. The quality of urban green can be high, but Liam would not be able to enjoy and make use of the urban green when opportunities to take a seat are missing. When taking this relationship into account, more seating would result in a better physical wellbeing. More residents like Liam with physical disabilities and elderly people in general could make more use of urban green with the implementation of more seating. With regard to seating opportunities, Patrick states: *"The center has a lot of spots. Furthermore, no seating spots I think. Here and in the center, but not around it.''* Seating in the city center is being made use of, because there is a high concentration of people visiting this area. The available seating in the center could be occupied, meaning that people who would like to sit or need to sit are unable to go on a walk in the neighborhood or visit the city center. An increase in the amount of seating around the city center could improve their physical wellbeing, as there are more separated places to sit and less chance of low availability of seating.

Cycling

Three out of the five interviewees indicated that they use a bicycle as a way of moving through the neighborhood. The most used movement type of Marcel is cycling, because he prefers this mode of physical activity over walking. Cycling to work is the biggest part of his total cycling activity. Lucia talks about the neighborhood and says: *"I think it is possible to reach everything just fine, you can cycle everywhere.''* She uses the bicycle in a functional context when shopping or picking up her child from daycare. Together with her child, she also cycles around going over the cycling bridge and alongside the Waal. She also describes how the children of her husband take their bicycle to go outside: *"They do not go for walks because they think walking is stupid. Instead, they take the bicycle and use it in and around the neighborhood.''* Their children stay close to their home, which means that they spend most of their time cycling in the Waalsprong itself. Urban green within the Waalsprong influences in what kind of environment children play outside. The physical wellbeing of children could especially improve with a better urban green quality, because they often stay close to their residence. Additionally, Lucia expresses how convenient the bicycle as a mode of transport is for them by saying: *"When you cycle a few minutes you are in the center [of Nijmegen].''* The location of the Waalsprong promotes cycling as a mode of transport for its residents. The effect of the location of the Waalsprong within Nijmegen also influences their physical wellbeing, but the quality of urban green does not influence this specific factor.

According to Liam, cycling along rivers is exceptionally beautiful and one of the best things to do when exercising outside. He cycles with a 'cycling mate' who looks out for him. Whether he cycles depends on his cycling mates, because he is not able to cycle alone anymore. He describes the cycling route he takes most of the time as follows: *"I start from this environment because it is familiar to me. Then I cycle over the cycling bridge, next to the train rails in the direction of Malden. In Malden, I cycle through the forest until Mook."* Having arrived in Mook, he takes a break and sits down on a bench. He also mentions the dike next to the Rijn in Arnhem, which is remarkably busy in his opinion. His preference is the Waal dike because it is less busy. Those long cycling trips go further than just the Waalsprong. The quality of urban green is not directly influential in this context, but a higher green quality could improve the amount of people that cycle within the Waalsprong.

Other physical activities

Participants were asked about physical activity with the questions: *"Do you use the environment for physical activities and if so, what activities?"* and *"How could you make more use of the environment with respect to physical activity?"* The elderly respondents living in the Theo Dobbestraat do not participate in other physical activities and the same applies to Lucia. Marcel answers saying he goes mountain biking with his son. They go to Groesbeek to do the actual mountain biking, but they also cycle through the neighborhood when going in that direction. He thinks the direct cycle environment is not adventurous enough to cycle through, which is why they go to Groesbeek. This specific type of physical activity cannot be improved by increasing the quality of urban green. Patrick answers saying: *"Roller skating and running, but that is not very often. Roller skating only when the weather is nice of course."* He roller skates either towards Oosterhout, which is on the northwest side of the Waalsprong, or towards a lake in Lent where the cycling road is flat. The flat road is pleasing for him whilst roller skating which is why he likes to go to Lent. Urban green increases Patrick's joy when roller skating, and this physical activity can be exercised within the neighborhood itself. The urban green quality therefore positively influences his physical wellbeing. Marcel and Lucia also mention swimming as a physical activity, but they do not swim anywhere nearby themselves. Regarding the Waal, Marcel states: *"The water there is very disgusting, I would not swim there."* Lucia likes to go to the Bizonbaai or the lake at Lent for swimming. The water within the Waalsprong does not provide opportunities to take a swim. If this were to be changed with the implementation of water accessible for swimming, residents would have a broader set of exercising options to choose from. People that like to go swimming could do this closer to their home. Adding this to their routine of physical activities would benefit their physical wellbeing. The small river could become an area suitable for swimming if it is clean and accessible.

With a lot of starters living in the Waalsprong, children make up for a huge part of the total physical activity. Marcel mentioned playgrounds, there are enough playing opportunities in the living environment in his opinion. Lucia states there is a sufficient number of playgrounds as well, but she notices the absence of a football pitch in the neighborhood. She says: *"He has nowhere to take his ball to. Over there, he ends up in the small river and there he stands in between cars. So something like a sports field, does not have to be huge or something but someplace where he can play football."* The addition of a football field is also brought up by Patrick, *"You can find children playing football on the road or in the backyard. That is unavoidable."* He continues by clarifying: *"That is the result of the absence of a football pitch or something, so if that was added to the neighborhood a lot of people would be happy."* The

addition of a grass field would both be adding to the amount of urban green and to the opportunities for children to play. Lucia's children would be happy to have a spot specifically suited for playing football and other children would also make use of a field for this physical activity. Playing on the road is unsafe for children, so parents might discourage playing outside. The physical wellbeing of those young residents could therefore be affected by the absence of a green and safe area available for playing.

A question about sport facilities was asked: *"Are there sport facilities in the neighborhood and do you make use of it?"* Residents did not know of any sport facilities in the neighborhood. Marcel declares that he makes use of sport facilities inside of a building, but him and the other respondents would not be interested in having sport facilities outside for public use. Patrick argues that children would probably like the addition of such facilities. He would agree that children could be more physically active when playgrounds for sports and such facilities would be added. Residents do not think other target groups within the neighborhood would benefit from those additions.

Working outside

In order for interviewees to indicate whether they would work outside, the following questions were formulated for measurement: *"Would you be able to work outside in the neighborhood?"* and *"Have you ever thought about working outside or seen others doing this?"* The follow-up question *"How could the environment be improved for people to work outside?"* was also asked. Marcel has never worked outside, but would consider this an option if he can sit properly and work in shade. He adds: *"I would not do that an entire day but briefly for an hour would be nice."* This idea of working an hour outside is also mentioned by Lucia: *"I think when you sit outside for an hour, that would also be very convenient."* She then continues explaining that she has to call frequently for work, which is less appealing to be doing outside in her opinion. Patrick also needs to speak to people through the internet while working, for which he requires access to internet. He does work in front of his own house, where he still has internet connection. This means that he is able to work whilst seeing the urban green in his street. Angela and Liam have both retired and do not notice any people working outside as far as they know.

5.2.3 How does the quality of urban green spaces influence the psychological wellbeing of residents in the Waalsprong?

Feeling in neighborhood

As part of the wellbeing of residents in the Waalsprong, questions about psychological factors were asked. Firstly, interviewees were asked about their general feeling in the Waalsprong with the question: *"How do you feel in the neighborhood where you live now?* If necessary, the question could be made more concrete by asking them about feelings and thoughts when moving through the environment.

Marcel answers by explaining he is glad he does not live inside the city, but still close by. When he was younger, he liked the fact that everything was nearby when living in the city, *"But not when you grow older."* His answer implies that preferences regarding the residents' house location change when people age. Marcel did not experience the city as busy when he was younger, but nowadays he prefers a calmer living environment. This means he is further away from shops and other factors that would attract him to live in the city itself, with which he is fine. Angela reacts very satisfied: *"A nice neighborhood, very nice. [I feel] only happiness,*

with the nature and with the grass without house rules.'' Further on in the interview, she also refers to the Waalsprong as a *"barren house environment''* but she stays positive about the neighborhood despite this quote. In her case, the Waalsprong is livable with sufficient urban green amenity whilst buildings have been planned dense. Liam states the barren environment regarding houses as well: *"I think the buildings are a bit scanty, without a balcony for example. In Brakkenstein, we had the opportunity to sit outside [on the balcony], that is not the case here.''* Furthermore, he says that he enjoys the neighborhood describing that he has a holiday feeling sometimes.

Both Angela and Liam emphasize their ability to adjust to the living environment, which helps with getting used to the new neighborhood. Urban green could have a positive effect on the ability of residents to get used to a new neighborhood, because Angela and Liam state the barren housing which is not too disturbing for their quality of life in their opinion. Lucia was afraid that she would require some time to get used to the Waalsprong, but she was happily surprised saying: *"That was not the case. It all went automatically which was actually quite nice.''* As related to her quote from before regarding their spot within the Waalsprong which she experiences as the most green, she says: *"It is very comfortable living, especially now that almost everything has been finished.''* Patrick is also satisfied: *"Beautiful neighborhood."* The general feeling of the interviewed residents is positive. They describe the neighborhood as barren, though with sufficient green elements. The fact that they have a feeling they settled down and got used to the neighborhood whilst living there for approximately two years indicates the neighborhood is fit to be adapted to by several different people. Adding the fact that the Waalsprong is still under construction with more urban green having to be implemented in the future, the psychological wellbeing of residents is positively influenced by the present urban green.

Spatial feeling

The spatial feeling is influenced by the density of the neighborhood, so the responses from residents to both themes correspond with each other. The question *"Do you have a feeling of being monitored regarding the way you live in this neighborhood?''* was asked. Marcel, Angela and Patrick indicate that they feel like the neighborhood is spatial enough for them not to experience any nuisance. Lucia does not feel monitored but argues: *"The gardens could have been more spacious.''* She also explains that people living near the new city center could feel oppressed because of the tall buildings. She sees the buildings from her house, but it does not have impact on her. Her personal psychological wellbeing is not affected by the sight of buildings, but she argues people living closer to tall buildings might be negatively influenced psychologically. Marcel states that smaller gardens would make him feel oppressed, not monitored. Liam mentioned the green strip that could give him a more spatial feeling and when asked whether buildings are too close to him, he agrees. More environmental space between buildings, for example green strips, broader sidewalks or more squares could contribute to a psychological wellbeing improvement for Liam. Angela brings up that a forest directly next to her house would feel oppressive to her, so not only buildings but also trees could make her feel oppressed. This response implies that urban green in the shape of a bundle of trees which could be interpreted as a forest could also negatively affect the psychological wellbeing of residents.

In addition to the sense of being monitored or oppressed, Marcel notices a sense of individuality with others in the neighborhood, *"One [person] wants to live on himself. We have*

others in the street who do not want anything to do with others, which is fine. They can decide for themselves.'' He makes a statement about residents in cities as well: *"It is very typical in a city; the closer people live to each other the more a sense of individuality increases.''* Lucia and Patrick do not experience a sense of individuality, Patrick says: *"Not yet, because the city center is relatively new. I do not have that feeling as of now.''* The difference in responses could imply that some streets within the Waalsprong are more individually focused than others. Lucia and Patrick live in the same street and their answers correspond to each other. Tine Vastbinderhof is relatively spatial compared to the Moormannstraat, which confirms the statement of Marcel that people who live closer to each other become more individual or are more individually focused in the first place. Marcel himself is fine with people being on their own, his psychological wellbeing is not affected by their individual behaviour.

Another psychological factor is competence. Residents were asked: *"Do you have a feeling of fulfilled competence needs with regard to green in the neighborhood?"* Marcel states that he does not feel like his competence needs regarding green are fulfilled; he would like to see more green in order for his feeling towards green to be more positive. Therefore, the existing urban green in the Waalsprong is not beneficial for Marcel's psychological wellbeing when taking this factor into account. Patrick says: *"I do feel like my competence needs are fulfilled, I have quite some nature around me (…) I think the green amenities in the neighborhood will become more and more beautiful.''* He is hopeful that more urban green will be implemented, resulting in positive changes for his psychological wellbeing in the Waalsprong. Compared to Marcel, however, he is already satisfied with the current urban green environment.

Social cohesion

Different questions regarding social cohesion were asked. The main question: *"When you make use of green in the neighborhood, do you chat with others?* was asked. Follow-up questions clarifying their answer to the main question were also formulated by asking: *"Who do you speak to when being outside?''*, *"How does social interaction influence your mental mood?* and *"Is the public green a place to meet other people?''* Marcel declares that he chats with neighbors and others he knows in the neighborhood. *"I often have a chat with people I know either from seeing them before or some other way laterally.''* Those interactions contribute to the social cohesion present in the Waalsprong. Even though short and shallow, his chats with neighbors and other people he sees in the area increase his level of mental wellbeing. While going on walks, Angela explains that she speaks briefly with people she has seen before, greeting them or having a small talk. Liam states that he, despite being introvert according to himself, does make contact with people he meets outside. Residents do have social contact with each other, despite living in an urban area where anonymity could lurk and decrease social cohesion. How people interact with each other differs; some chats are longer whilst others are more on the surface or merely greeting. All different types of interactions contribute to the psychological wellbeing of the residents, and they state that those moments of contact are important to them.

The interviewees living in Tine Vastbinderhof said they had a barbecue which they liked, Lucia says: *"It started with the street but then the opposite side got informed, then it became the whole courtyard (…) eventually with about sixty people or so. [It] was really great.''* Furthermore, she talks about social interaction in the neighborhood in general and says: *"You have to try really hard not to chat with others.''* In her opinion, people have a lot of social interactions with each other. She points out that neighborhoods in new construction often have

social contact, *“Everyone was working in the garden at the same time, when we started living here in the first spring.”* The newness of the Waalsprong contributes to social cohesion in this context, because everyone starts living in the area at the same time, not knowing anyone who lives there. Patrick also indicates that new residents in new construction have a lot of social interaction and explains this with the same argument: *“It is a new construction, people are all new here which already results in social cohesion, because everyone is new.”* He elaborates by saying: *“You have to get to know each other so the social tension has decreased.”* Moreover, he does not feel the need to know everything about all people living nearby. The neighbors, however, are important to get to know in his opinion. Having long conversations with everyone in the neighborhood would not increase Patrick’s wellbeing psychologically, which could be seen as a form of anonymity with regard to people who live further away from him in the Waalsprong.

6. Discussion

The five residents that were interviewed have shared their thoughts and experiences about the Waalsprong thoroughly. However, with almost two thousand new residents living in Hof van Holland, the amount of people interviewed is low for the results to be generalized. The participants differed in age and gender, so a variety of different green space users were able to share opinions and experiences about their neighborhood from different perspectives. This helps the external validity, because a significant part of the residents was represented by the diversity of participants.

Interviewed respondents were living in three different streets within the Waalsprong, all situated near the southern side of the city center. Hof van Holland consists of several other streets surrounding the city center from other sides. Therefore, the location of the housing used to interview respondents is specific to one side of the neighborhood. The specification is a limitation to the research, because respondents living in other streets could experience their neighborhood differently. Their evaluation of urban green could be influenced by factors that were not mentioned by this set of respondents.

Another limitation in this research is the willingness of respondents to be interviewed. Participation would require residents to be interested in sharing their thoughts about the neighborhood. The ability to have enough spare time for participation also limits the research population, because residents with time-consuming activities in their life might be forced to skip the opportunity to participate when they could actually be interested. They could intensively make use of the neighborhood and its urban green, creating a valuable insight which could be useful for the research.

The observation was performed on three different days, one being in the weekend. Distinct moments in the day and several weather conditions have been selected, yet the observation is limited to the number of days it was carried out. Other contexts such as the exact day and time in the week could change the results with regard to the usage of public green.

As the results indicate, urban green is important to residents. The literature corresponds to these findings, therefore the standpoints of existing research regarding the influence of urban green on residents have been confirmed. However, not all themes found in the literature applied to the residents. For example, two residents had retired and could not reply to the topic of working outside. They were asked whether they would work outside if they had not retired yet, but this does not represent their thoughts in practice. As a result, the working outside responses have been underrepresented compared to other themes that apply to all participants.

The respondents' view of urban green is shaped by several factors. The same questions could be interpreted differently by respondents depending on their relation to the topic. The respondents were aware of the green in their neighborhood, but the concept densification was more difficult for them to elaborate their experiences upon. The term was explained to participants at the start of the interview, but a full understanding of the concept is not immediately expectable in this context. Residents with prior knowledge about density in neighborhoods might respond in a deep and wide sense, whereas residents that learnt about the concept through the explanation at the start of the interview could be less capable of sharing their supposition about densification.

7. Conclusion

This chapter answers the sub-questions and the main research question as formulated in chapter 1.3, by connecting the found literature and theories to the results.

How does the planning in the Waalsprong shape the residents' interaction with urban green?

Residents living in the Waalsprong share different opinions about the way they experience densification in the neighborhood. Depending on the location of their house within the area itself, they notice dense planning either more or less than in other locations. In general, residents feel like the Waalsprong offers sufficient space between buildings. The way they experience densification depends on the broadness of the streets and whether residences have been built on top of each other. Furthermore, residents believe that people who live closer to the city center experience their living environment as more dense, compared to houses located further away from the center.

Interactions of residents with their living environment are also influenced by the value they attach to urban green in their neighborhood. All participating residents stress the importance of green. In diverse ways, they express how their neighborhood contains sufficient green or how it could benefit from the implementation of more green. Residents often relate urban green to a feeling of nature, which feels healthy to them. Additionally, urban green indirectly shapes the spatial feel of residents. The presence of urban green ensures that other functions, such as buildings, are not in that particular space reserved for urban green.

Different important aspects shape urban green as a whole. The presence of parks in the neighborhood are one of those crucial factors. Residents generally feel like there is few parks available to them within the Waalsprong itself. They refer to parks outside of their neighborhood, which could be accessible to some residents and less so to other residents. The orchard in the area is interpreted differently by residents; as a park, it contributes to the urban green amenity, but it is supposed to be closed to the public which means it is unavailable for interaction. As related to the spatial feeling mentioned before, residents visit parks to gain a longer view and to escape the dense feeling of the neighborhood they live in. The opinions on preferred park sized differ between residents as well. A higher quantity of smaller parks would be preferable to increase accessibility and proximity of parks within the neighborhood. Escaping the feeling of density and welcoming the feeling of nature, however, is better achieved by implementing less parks which are bigger according to residents. A balance should be sought between those two options. Considering both accessibility and sufficient size could help when trying to satisfy different residents.

In addition to parks, trees are another element that shape residents' interactions with urban green. Overall, they feel like the planning in the Waalsprong has implemented a sufficient number of trees. The fact that more trees will be planted also contributes to their satisfied feeling regarding trees in the neighborhood. The city center contains less green whereas more green can be found in the west direction of the Waalsprong. Furthermore, interviewed participants agree that a variety of green is important for their living experience. They view the variety in their neighborhood differently, depending on the green elements they pay attention to. The grass is designated to grow long in order for the biodiversity to flourish. This is preferred by some residents, but others think the tall grass has a messy and therefore negative influence on the environment.

Water is another factor that shapes the residents' interaction with urban green. The small river within the Waalsprong is the sole water amenity in the neighborhood itself. Residents visit lakes and the Waal as well, but these are all located outside the research area. In regard to water, planning in the Waalsprong had a positive effect on the way residents look at the city center with the implementation of fountains. Water could have a cooling effect to residents, which also applies to shade. The shade mostly comes from buildings and sometimes also from trees. A larger amount of shade could be provided for residents, but they do not think the shortage is big enough that it is a necessity. Residents generally experience their neighborhood as clean. The accessibility of urban green, however, could be increased. Visiting green could take too much effort for some residents, because distances between their residence and green are too high.

How does the quality of urban green spaces influence the physical wellbeing of residents in the Waalsprong?

Walking is the most performed type of physical activity regarding residents in the Waalsprong. The walking durations do differ; from shorter walks which take about half an hour to longer walks along the Waal or towards the city center of Nijmegen. Shorter walks are being undertaken within the Waalsprong itself, often near the small river. Also, the frequencies residents tend to walk vary from once a month to daily. Elderly participants often walk every day, whereas other residents walk less frequently. The physical wellbeing of residents is positively influenced by the quality of urban green spaces, because people tend to walk towards green spaces. The presence of urban green spaces promotes walking, because it provides an area where people like to walk. Therefore, people are more likely to go on a walk with a green environment available. With walking being an important influence on the physical wellbeing of residents, the importance of seating opportunities increases. Residents with physical disabilities and elderly people in general would benefit from more seating, because this would result in more urban green interactions for them. The amount of seating in the Waalsprong is limited; some benches can be found in the city center. On the other hand, residents feel like more seating opportunities would attract loitering, which they would not be satisfied with.

Another physically active mode of transportation is cycling. Residents take the bicycle to reach destinations functionally, but cycling is also recreational. Most residents cycle out of the Waalsprong when going on a trip with their bicycle, whilst children often stay within the Waalsprong itself. Similar to walking, people are drawn towards green environments when cycling. Therefore, this physical activity also contributes to a better physical wellbeing of residents. In addition, residents participate in other physical activities such as roller skating and running. The quality of urban green has a positive effect on those activities, because people go to green environments to exercise those activities, and they can be performed within the Waalsprong. Swimming is another physical activity which is being carried out by Waalsprong residents. However, the Waalsprong does not provide any public water amenity where people can take a swim. A football field or some grass area where residents, mostly children, can play could also be implemented for an increase in urban green interaction and physical wellbeing. The same applies to outdoor sporting facilities. Working outside would be an opportunity for residents to move their workspace into urban green spaces. Factors such as internet connection and calls implicate this option, but it would be beneficial to both physical and psychological wellbeing to work outside.

How does the quality of urban green spaces influence the psychological wellbeing of residents in the Waalsprong?

Urban green spaces have a positive influence on the ability of residents to adapt to their neighborhood. Experiencing the houses as barren could have a negative effect on their wellbeing, but a sufficient number of green elements outweighs this feeling resulting in an improvement of psychological wellbeing. Residents have gotten used to their neighborhood in a positive manner with regard to urban green, which results in a generally good psychological wellbeing.

The mental health of residents could also be affected by a sense of being monitored in the neighborhood. This feeling could originate from tall buildings and dense planning, but most residents do not experience the Waalsprong this way. Densification also results in a higher sense of individuality; residents living in more spatial streets experience less individuality whilst people living in less broad streets notice more individually focused people in their direct neighborhood. The current urban green elements in the Waalsprong are fulfilling the competence needs of residents, but the implementation of more urban green would increase the amount of people with this feeling. The social cohesion within the Waalsprong is another factor that influences residents' psychological wellbeing. The fact that this neighborhood and its residents are new contributes to social cohesion, because no one knows each other on forehand. Social connections are sought by residents and urban green provides areas outside where people can meet and interact with each other while finding themselves in green environments. Urban green results in more social cohesion and therefore improved psychological wellbeing.

How can future planning strategies benefit from the green environment perception of residents in the Waalsprong?

The interviews with residents have given insight into the areas for improvement in the Waalsprong regarding the urban green environment. The implementation of green strips separating sidewalks and streets could contribute to a more spatial feeling. Residents in the Waalsprong tend to travel outside their neighborhood in order for them to achieve this feeling, because the Waalsprong itself does not feel spatial due to high densities of buildings. Planning strategies could be adjusted to this preference of residents by paying more attention to the space between buildings, streets and sidewalks. Additionally, planners could think about implementing green to the side of buildings. This would result in less visibility of the buildings and more visual green. Without changing the division of space between buildings and urban green, more green could be created within the planning designs.

Residents have also indicated that a grass field could contribute to the usefulness of urban green spaces. Planning strategies could better fit the activities of children through the addition of an open green space where people can play. This promotes going outside and avoids children playing in unsafe environments. Other residents could be bothered by children playing in areas that actually serve another purpose, such as a parking lot or the sidewalk. A green space specifically designed for residents to visit and play would, in their opinion, be a great addition to a neighborhood. The Waalsprong houses a large number of starters. Planners

could take such information into account and adapt strategies regarding urban green to target groups.
The importance of adapting to the people that will live in the planned environment could also be noticed when thinking about the fountains in the city center. The Waalsprong provides entertainment for children to play in these fountains and for other residents to see the children having fun. However, the fountains do attract more people to the city center. Future planning could think about the location of such fountains. A park could be a more suitable location, because more space is available compared to a city center. Elderly, on the other hand, would benefit from the addition of more seating throughout the neighborhood. Future planning strategies could involve more benches, because the Waalsprong provides limited seating opportunities excluding the city center. A wadi positively influences the green environment perception of residents as well. In their opinion, biodiversity is important and the fact that a wadi could improve the biodiversity in the neighborhood results in a positive feeling towards the wadi. Wadis also contribute to a wider variation of green elements and the spatial feeling of residents living near a wadi increases.

How does highly dense city planning shape the interaction between residents and their access to healthy green engagement?

Densification is experienced differently by residents depending on several factors. Residents indicate different levels of importance they relate to urban green in the neighborhood, which is influenced by the presence and size of parks, as well as tree and water amenities. Urban green influences residents both physically and psychologically. Physical activity is promoted by urban green, because green has a positive effect on the frequency and duration of walks. Sufficient seating opportunities increase the number of residents that could make use of urban green. Other types of physical activity, such as cycling, running and swimming, also become more approachable when the quality of urban green increases. On the psychological side, residents experience urban green as beneficial for their ability to adapt to the new living conditions in the neighborhood. Dense planning increases the general sense of being monitored and individuality, whereas a more spatial environment could avoid those feelings. The urban green environment also provides an environment where people can interact, improving social cohesion. A higher quality of urban green in the neighborhood improves the wellbeing of residents. Future planning strategies could implement different elements to the general urban green environment in a neighborhood, adjusting to the preferences of residents.

Recommendations for further research

This thesis focused on the Waalsprong as a whole, with different residents spread throughout the entire neighborhood. However, residents with houses in the same street gave corresponding responses during the interviews. Further research could focus on the street level within the neighborhood and compare different streets. Residents could develop different perspectives through a difference in experiences between specific living locations within the neighborhood. Through lowering the level of research from neighborhood specific to street specific, more knowledge about the preferences of residents as related to their living environment could be acquired.

Additionally, new studies could look into the way more green could be implemented in the Waalsprong. Learning more about the experiences of residents in this research has been useful to gain an idea of the current greenness situation in the area. Intervening, however, is the next step in increasing the livability for residents. This could be done by comparing the Waalsprong to other, similar residential areas in Nijmegen or in other cities. Residents living in those other areas might indicate an elevated level of wellbeing in their neighborhoods, which could be interesting to learn from. Applying the beneficial factors that would be learned from this further research could help in adjusting the Waalsprong and increasing its quality of green.

Furthermore, different elements of green have been separated during this research. In the future, studies could delve deeper into those elements and investigate how much influence they have on the livability of the neighborhood. What is the impact of more or less water amenities in a neighborhood? How could the addition of more trees contribute to a decrease of heat stress and what other benefits do trees have in areas? In extension to this, which type of tree is best fit to provide shade? Studying how green elements impact the quality of urban green could improve the effectiveness and efficiency of implementation of new green.

Finally, further research could investigate the difference in needs between target groups in regard to planning in urban areas. During the process of this research, it became clear that younger residents would like to see other elements added by planners compared to adults and elderly. Through the comparison of requirements and preferences of certain target groups, knowledge about planning which better fits for those groups could be obtained.

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Attachments

Appendix 1 – Interview guide

Introductie
Goededag, mijn naam is Joris en ik ben derdejaars student van de opleiding geografie, planologie en milieu aan de Radboud Universiteit. Ik doe onderzoek naar de groenperceptie die inwoners van de Waalsprong hebben in hun wijk. In Nederland komen we vaak stedenplanning tegen waarbij dicht op elkaar wordt gebouwd. Dit heeft voordelen, maar kan ook maken dat de leefomgeving groen verliest aan de dichte bebouwing. Met groen worden dingen als bomen, parkjes en grasveldjes bedoeld. Mijn onderzoek wil een beeld schetsen van de Waalsprong, om via inwoners te zien of er voldoende groenvoorziening aanwezig is en hoe dit de kwaliteit van leven voor inwoners beïnvloedt.

Het interview zal ongeveer 40 minuten duren.
Is het goed als het interview wordt opgenomen? Hiermee zou ik het interview beter kunnen uitwerken om het zo goed mogelijk te kunnen gebruiken voor mijn scriptie.
Heeft u voor het interview nog vragen? U mag elk moment gedurende het interview vragen stellen of het interview stopzetten als u daar behoefte aan heeft.

Onderwerp	Vragen	Doorvraagvragen
Introductie (zie bovenstaande)	Vindt u het goed als dit interview wordt opgenomen? Wilt u uw identiteit anoniem houden? Heeft u nog vragen voordat we met dit interview beginnen?	-
Introducerende vragen over welzijn	Hoelang woont u inmiddels in deze wijk? Hoe voelt u zich in de buurt waar u woont?	Wist u hoe de wijk eruit zou gaan zien toen u besloot hier te komen wonen? Welke gevoelens en gedachtes worden opgeroepen als u door de wijk beweegt; lopend, fietsend, etc.?
Introducerende vragen over densificatie	Hoe ervaart u de dichtheid waarop gebouwen bij elkaar gebouwd zijn?	Als u de wijk had ingedeeld, hoe zou u dit gedaan hebben (met betrekking tot densificatie)?

Fysieke factoren	Gaat u weleens wandelen in de omgeving? Gebruikt u de omgeving voor fysieke activiteiten en zo ja, wat doet u dan? Zijn er (sport)faciliteiten in de buurt en maakt u hier gebruik van? Zou u in de omgeving kunnen werken? Heeft u hier weleens over nagedacht/ziet u anderen dit weleens doen?	Waar gaat u meestal wandelen? Waarom gaat u hier wandelen? Hoelang gaat u meestal wandelen? Op welke dagen wandelt u? Hoe zou u (nog meer) gebruik willen/kunnen maken van de omgeving voor fysieke activiteit? Heeft u het idee dat deze faciliteiten gebruikt worden? Zou u gebruik maken van faciliteiten als deze (meer) aanwezig zouden zijn? Hoe zou de omgeving de mogelijkheid kunnen bieden voor mensen om buiten te werken?
Groenvoorziening	Hoe vindt u de hoeveelheid parkjes die aanwezig zijn in uw omgeving? Wat vindt u van de looppaden in de omgeving? Vindt u dat er voldoende bomen aanwezig zijn in de omgeving? Hoe vindt u de variatie aan groen in de buurt? Wat vindt u van de aanwezigheid van water in de omgeving? Zijn er voldoende plekken aanwezig waar u kunt zitten? (bankjes, stenen, trappen)	Wat vindt u van de grootte van deze parkjes? Zou u liever meer kleine parkjes verspreidt hebben of minder parken die groot zijn? Zijn er volgens u voldoende looppaden? Zijn deze paden gebruiksvriendelijk? Wat vindt u van de grootte van de bomen? Zijn de bomen bijvoorbeeld recent gepland en daardoor (te) klein? Heeft een diversiteit van planten invloed op uw ervaring van de omgeving? Welke invloed heeft de aanwezigheid van water op uw beleving van de omgeving? Terugkomend op de vraag over sociaal contact buiten; denkt u dat zitplek bijdraagt aan sociale interactie?

Groen ervaring in leefomgeving	Heeft u het gevoel dat uw buurt schoon is? Vindt u dat er buiten voldoende schaduw aanwezig is? Wordt het groen in de omgeving goed onderhouden? Heeft u het gevoel dat u met gemak gebruik kunt maken van het groen in uw omgeving? Vindt u de omgeving een uitnodigende en/of aantrekkelijke uitstraling hebben? Hoe ervaart u de toegankelijkheid van het groen in de omgeving?	Zou u meer prullenbakken in de buurt willen zien? Waar is deze schaduw voornamelijk afkomstig van? (Bomen?) Vindt u schaduw belangrijk en waarom? Wordt de natuur voornamelijk met rust gelaten of wordt er veel aan gedaan (grasmaaien, snoeien)? Zijn parkjes dichtbij? Zou u meer gebruik maken van parkjes als deze gemakkelijker bereikbaar waren? Wat vindt u aantrekkelijk aan uw buitenomgeving? Wat zou er aangepast kunnen worden zodat het er uitnodigender uitziet? Vindt u de toegang tot het groen inclusief (voor alle doelgroepen toegankelijk)? Hoe zou de toegankelijkheid verbeterd kunnen worden?
Psychologische factoren	Heeft u een gevoel van voldoening met betrekking tot het groen in de omgeving? Als u gebruik maakt van groen in de omgeving, maakt u dan weleens een praatje met anderen? Heeft u weleens het gevoel dat u gecontroleerd wordt door de manier waarop u in de stad woont?	Had u moeite bij het wennen aan de leefomgeving? Wie spreekt u weleens buiten? Hoe heeft sociaal contact invloed op uw gemoedstoestand? Is het openbare groen voor u een plek om anderen te ontmoeten? Ja: levert dit gevoel stress op? Nee: hoe komt het dat u zich niet gecontroleerd voelt? Heeft u dit gevoel wel eerder ooit gehad? Heeft u het gevoel dat u zelf regie heeft over uw leven?

Er zal niets anders gedaan worden met de audio-opname en deze zal na het transcriberen verwijderd worden. Alle informatie die uit dit interview voortkomt zal enkel en alleen voor mijn scriptie gebruikt worden en alleen mijn begeleider en ik hebben toegang tot de data. Wilt u uw identiteit anoniem houden?

Appendix 2 – List of codes

Total of 69 codes, some codes have been classified in several code groups.

Attractions (22 codes)

- Benches
- Bigger park
- Biodiversity
- Building size
- City centre
- Ducks
- Fountain
- Improvement in neighbourhood
- Lake
- Parking lot
- Parks in neighbourhood
- Playground
- River
- Seating
- Smaller parks
- Sport facilities
- Tree size
- Trees
- Wadi
- Walking paths
- Waste containers
- Water

Settings (17 codes)

- Accessibility
- Attractiveness
- Cleanliness
- Densification
- Duration of living in neighbourhood
- Feeling in neighbourhood
- High temperature
- Importance of seating
- Improvement in neighbourhood
- Inclusivity
- Long view
- Neighbourhood unfinished
- Shade
- Start of living in neighbourhood

- Tree size
- Waste collection
- Wind

Activities (16 codes)

- Children
- Cycling
- Loitering
- Movement type
- Physical activity
- Playground
- Seating
- Swimming
- Use of neighbourhood
- Walk duration
- Walking
- Walking elderly
- Walking frequency
- Walking moment
- Walking motive
- Working outside

Other locations (9 codes)

- Boszicht
- Fort Beneden Lent
- Groesbeek
- Grote Boel
- Klif
- Lake
- Oosterhout
- Waal
- Waalsprong before

Urban green (8 codes)

- Bigger park
- Green maintenance
- Green variation
- Greenery in neighbourhood
- Importance of green
- Parks in neighbourhood
- Smaller parks
- Trees

Psychological

- Competence
- Feeling in neighbourhood
- Oppressive
- Sense of being monitored
- Sense of individuality

- Spatial feeling

Social cohesion

- Benches
- Children
- Playground
- Social interaction