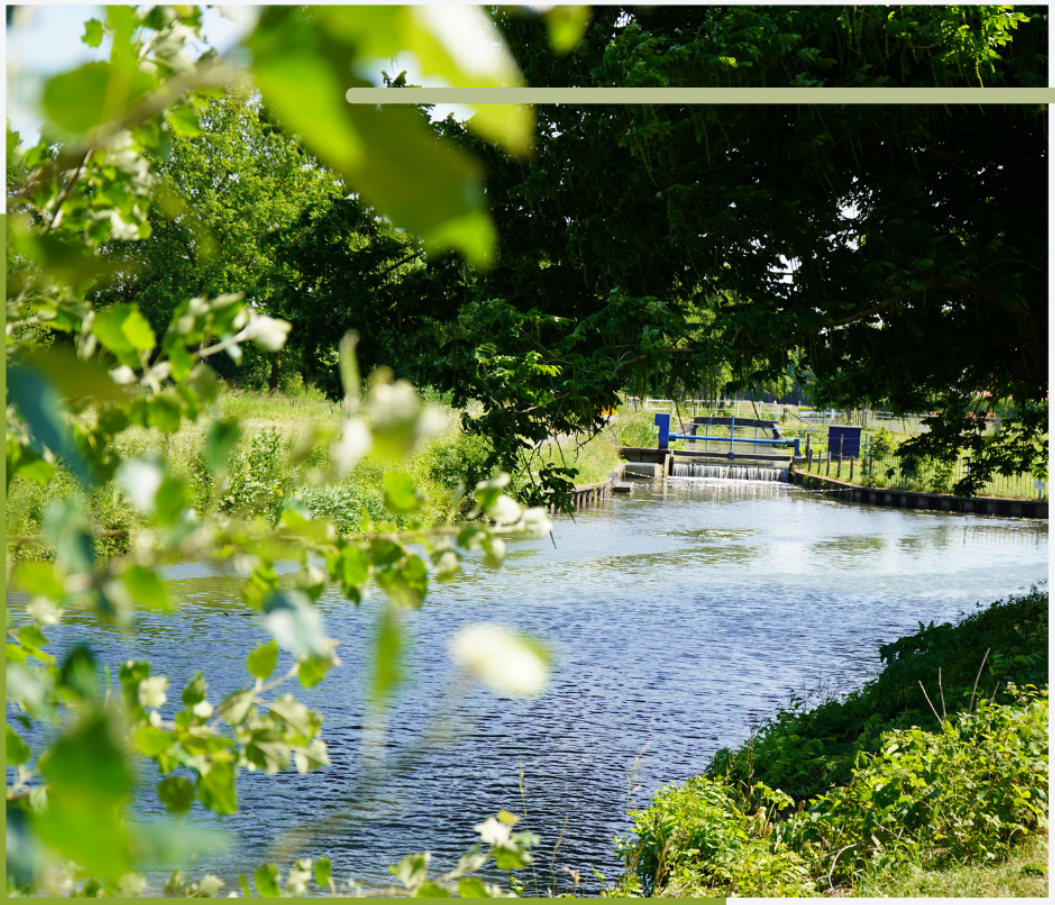
Green barriers: Exploring access challenges to green spaces around Odijk

A mixed-methods empirical study of Odijk residents' perceptions of the accessibility of the green spaces around Odijk



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Date	28/06/2024

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1. INTRODUCTION

In today's society, the importance of green spaces, which are defined as areas comprising vegetated land or water (Taylor & Hochuli, 2017), is becoming increasingly recognised as an indispensable component of a healthy living environment (Jabbar et al., 2021; Marques da Costa & Kállay, 2020). The recent pandemic reinforced the value of green spaces (Davies & Sanesi, 2022; Noszczyk et al., 2022; Venter et al., 2020). During periods of lockdown and social isolation, people sought outdoor green spaces as refuges to escape indoor constraints and maintain their mental and physical well-being. Green spaces became an indispensable component of everyday life, providing opportunities for walking, exercise, and enjoyment of nature. These green spaces, which encompass a diverse range of environments, including forests, parks, green corridors, and farmlands, offer a multitude of benefits to the human society (Wolch et al., 2014). They play an important role in purifying the air and water, regulating the climate, supporting biodiversity and serving as locations for relaxation and recreation (Wolch et al., 2014; Veen et al., 2020).

In addition to the above-mentioned services, green spaces play a crucial role in promoting the well-being and health of humans (Markevych et al., 2017; Wolch et al., 2014; Veen et al., 2020). These health benefits are attributed to several biopsychosocial pathways, including harm reduction through the reduction of environmental stressors; capacity restoration through attention and stress recovery; and capacity building through the promotion of physical activity and social cohesion (Markevych et al., 2017). These health-promoting capacities are enhanced when green spaces are more accessible (Ekkel & De Vries, 2017; Liu et al., 2021). The accessibility of green space is defined as the ease with which people can reach it (Wang et al., 2013a). However, the accessibility of green space is highly stratified among residents of different residential areas and socio-economic groups (Dai, 2011; Hoffimann et al., 2017). The unequal access to this health-promoting resource results in unequal health outcomes (Liu et al., 2021).

Over the past two decades, there has been a growing recognition of the importance of green spaces for public health. In parallel, the issue of unequal access to green spaces has been identified as an environmental justice concern (Dai, 2011; Jennings et al., 2012). Existing literature has focused, among others, on questions about how to measure access to green space (Fan et al., 2017; Lee & Hong, 2013), how low accessibility to green space affects public health (Coppel & Wüstemann, 2017; Veen et al., 2020), and how socio-demographic characteristics influence the accessibility of green space (Phillips et al., 2021; Pinto et al., 2021). Furthermore, the majority of existing research on green spaces is conducted in the United Kingdom, Australia, and the United States. Nevertheless, the organisation and perception of green spaces varies considerably between countries. In the Netherlands, green spaces such as parks, nature reserves and urban green spaces are carefully planned and managed in order to maintain a balance between nature conservation and urban development (Baycan-Levent & Nijkamp, 2009; Sijtsma et al., 2017). These green spaces are essential for recreation, biodiversity and promoting a healthy living environment for residents. They are often seen as an integral part of Dutch culture, placing high value on accessibility and quality of green spaces in both urban and rural areas. However, extensive research on the accessibility of these green spaces and the factors influencing this in the Dutch context is lacking. Furthermore, the majority of existing knowledge on the accessibility of green spaces is limited to inner cities (Fan et al., 2014; Liu et al., 2021; Tian et al., 2014; Ye et al., 2018). This research aims to address this knowledge gap by investigating the accessibility of green spaces in the rural area surrounding a Dutch village. The findings of this research will inform recommendations for the improvement of green space policy in rural areas. This can ultimately lead to the creation of more accessible green spaces in rural areas, which is beneficial for public health and for the liveability and sustainability of these areas (Liu et al., 2021; Wolch et al., 2014).

The following central question will be investigated:

How do residents of Odijk perceive the accessibility of green spaces around Odijk?

Four sub-questions have been formulated to answer this question, namely:

1. *To what extent and how do the physical characteristics of green spaces and transport-related factors influence the perceived accessibility of green spaces around Odijk?*
2. *To what extent and how do social factors influence the perceived accessibility of green spaces around Odijk?*
3. *To what extent and how do personal characteristics influence the perceived accessibility of green spaces around Odijk?*
4. *What barriers do Odijk residents experience when reaching the green spaces around Odijk?*

Scientific relevance

Despite the growing recognition of the importance of public green spaces around the world, existing knowledge about access to green space is incomplete when it comes to individual perceptions of this access (Wang et al., 2013a). Most existing studies employ solely quantitative methods, such as green area per capita, distance or proximity, in order to capture accessibility objectively (Khalil, 2014; Liu et al., 2021; Wüstemann et al., 2017). However, it has been demonstrated that such quantitative methods are inadequate for the design of green spaces in urban planning (Byrne & Sipe, 2010; Maruani & Amit-Cohen, 2007). It is of importance to gain a deeper insight into the perceptions of accessibility held by the general public, as evidenced by the inconsistencies observed between the objective measurement of geographic accessibility and the subjective perception of perceived accessibility with regard to green spaces (Ball et al., 2008; Jones et al., 2009; Lättman et al., 2016; Páez et al., 2012). Consequently, this research will contribute to the expansion of existing literature by focusing on individual perceptions of green space accessibility, employing both quantitative and qualitative methods. This research first collects quantitative data and then uses qualitative methods to complement this data. Consequently, this research makes a significant contribution to the existing literature in both a substantive and methodological sense. This research also complements existing literature as there is also no extensive literature available on green space accessibility to residents in Dutch rural regions (Fan et al., 2014; Liu et al., 2021; Tian et al., 2014; Ye et al., 2018). The majority of studies focus on green space in urban centres, with little attention paid to the significance of green space in rural areas, which the Netherlands has in abundance. It is important to conduct research into the accessibility of green spaces in rural areas, given that 26% of the Dutch population lives in such areas (Planbureau voor de Leefomgeving, 2015). This is because rural residents have a need for recreational opportunities and a healthy lifestyle.

Societal relevance

This research is not only relevant from a scientific perspective, but also from a societal perspective. There has been an increase in the number of individuals residing outside of urban areas in the Netherlands. This is largely due to the significant housing shortage, which has led to the construction of numerous new houses in rural areas (Centraal Bureau voor de statistiek [CBS], 2021a). For these residents, having sufficient accessible green space in their residential area is of great importance for recreation and their health (Markevych et al., 2017). This study can provide insights into Odijk residents' individual perceptions of the accessibility of green areas around their village and the barriers they experience that prevent this accessibility. Based on this, recommendations can be made on the barriers that need to be overcome to improve accessibility to green spaces, with the aim of increasing the number of visits to these green spaces. This increased accessibility has a positive effect on residents' health and quality of life (Hartig et al., 2014; Liu et al., 2021). The province of Utrecht has identified the goal of making green spaces more accessible to all its residents (Provincie Utrecht & Gemeente Utrecht, 2021). This study can be a first step towards more accessible green spaces around Odijk and perhaps also around other villages in the Netherlands.

2. THEORETICAL FRAMEWORK

Green space is an essential part of the human living environment and has an important impact on the quality of life of individuals and communities (Fan et al., 2017). Green spaces not only provide aesthetic value to the landscape, but also have various health and well-being-promoting effects and contribute to the sustainability of urban and rural areas (Graça et al., 2022; Markevych et al., 2017). The health-promoting capacity of green space is enhanced when the green space is more accessible to people (Ekkel & De Vries, 2017; Liu et al., 2021). However, the accessibility of green space is highly stratified among individuals (Dai, 2011; Hoffimann et al., 2017). This is because green space accessibility is determined by a great number of factors and highly depends on the context (Wang et al., 2014). This theoretical framework presents an analysis of existing theories about green space accessibility and the factors influencing it. Before discussing access to green space, it is first necessary to examine existing theories about the concept of green space. This context section describes the concept of green space, its definition in existing literature, its functions, and its reflection in Dutch urban policies.

2.1 GREEN SPACE

DEFINITIONS OF GREEN SPACE

Existing studies define the concept of green space in many different ways, with some studies failing to define the concept at all (Taylor & Hochuli, 2017). Green space is often defined as vegetated areas (Heckert, 2013; Lo & Jim, 2012) or through a land use description. The latter approach has also been used by Boone-Heinonen et al. (2010, p. 296), who define green space as “recreational or undeveloped land”. In contrast, however, some studies mention only a few examples of green spaces (Ambrey & Fleming, 2014; Shwartz et al., 2013). An example of this is given by Bastian et al. (2012), who define green space as forests, trees, parks, allotments and cemeteries. Furthermore, other studies lack even a clear definition of green space and merely refer to it without further explanation. For example, Gentin (2011, p. 155) merely stated that the area studied contained a substantial number of green elements. The lack of consensus on what constitutes green space has resulted in a lack of coherence in research on this topic (Taylor & Hochuli, 2017). The use of different definitions of green space leads to different aspects of space being examined. This results in divergent findings that make comparisons between studies very difficult. The use of a common and well-defined term for green spaces will allow greater synthesis between studies.

In their 2017 study, Taylor and Hochuli conducted a comprehensive analysis of the various definitions of green space presented in the scientific literature, with the aim of identifying a term that can be universally accepted. This research shows that green space is most accurately defined as any public or private space containing vegetated land or water. This includes areas that are partially or completely covered by grassland, shrubs, trees or other vegetation, as well as areas that contain water (Health Scotland et al., 2008; United States Environmental Protection Agency, 2023). However, the definition of green space goes beyond the mere physical presence of grass, trees, shrubs and water (Taylor & Hochuli, 2017). Furthermore, the concept of green space includes the level of biodiversity within the space, the quality of the air and soil, the ecosystem services it provides, and its accessibility to different population groups (Lachowycz & Jones, 2013; Shwartz et al., 2013; Yokohari & Bolthouse, 2011).

FUNCTIONS OF GREEN SPACE

Green spaces are a versatile element within both urban and rural environments, fulfilling a multitude of functions that are essential to the liveability and well-being of communities (Health Scotland et al., 2008; Lafrenz, 2022; Lee et al., 2015). In particular, green spaces in urban areas serve as locations where urban dwellers can relax, interact, and recreate (Fan et al., 2017; Gozalo et al., 2019). Urban green spaces encompass a diverse array of

features, including building greens, street trees, playing fields, private gardens, cemeteries, urban parks and forests, green corridors, and water bodies (European Environment Agency, 2020). These spaces are not only crucial for recreational purposes and social interaction, but also contribute to ecological conservation, food production, climate regulation, and the overall aesthetics of the living environment (Fan et al., 2017; Graça et al., 2022). Green space in rural areas is frequently associated with agricultural activities and ecological conservation initiatives. Farms, forests, and nature reserves in rural areas represent significant sources of food production, timber extraction, and recreation for local communities. Furthermore, they play a pivotal role in the conservation of biodiversity, the protection of endangered species, and the preservation of the natural landscapes that are characteristic of rural areas (Elands & Wiersum, 2003; Verheij et al., 2008). In addition, green spaces play a crucial role in climate regulation, due to their capacity to reduce temperatures and store water (Graça et al., 2022). Furthermore, the availability of high-quality green spaces in a neighbourhood has been found to have a positive influence on place attachment (Łaszkiewicz et al., 2018). For instance, Arnberger and Eder (2012) demonstrated that a greater perceived quality and availability of green spaces is associated with stronger community attachment.

A significant amount of research has also demonstrated the positive effects of green space on human well-being and health (Hartig et al., 2014; Kondo et al., 2018; Markevych et al., 2017; Tzoulas et al., 2007). Markevych et al. (2017) identified three biopsychosocial pathways through which green space produces health benefits. The first domain of pathways is harm reduction. Green space has the potential to reduce exposure to environmental stressors such as noise, air pollution and heat, thereby reducing their harmful effects on human health and well-being (Markevych et al., 2017). Green space can act as a buffer against noise pollution from traffic, reducing the harmful effects of noise on human health. Furthermore, because plants absorb air pollutants from the atmosphere, green space can improve air quality (Hartig et al., 2014). Finally, green space has a cooling effect on temperatures by absorbing solar radiation and providing shade, resulting in better overall human health (Rijksinstituut voor Volksgezondheid en Milieu, n.d.). The second domain of pathways is the recovery of capabilities. This implies that green space can promote reduced well-being, especially through attention recovery and stress recovery (Hartig et al., 2003; Van den Berg et al., 2010). The third domain is that of capacity building. In this context, Markevych et al. (2017) refer to the positive impact that green space can have on human health and well-being by encouraging physical activity. Green space provides a safe, accessible and aesthetically pleasing environment for physical activity (Almanza et al., 2012; Astell-Burt et al., 2014). Furthermore, exercise has been shown to promote physical and mental health and well-being (Bize et al., 2007; Janssen & LeBlanc, 2010).

Nevertheless, some studies have also identified null, mixed, or adverse health and well-being effects associated with exposure to green spaces (Cariñanos & Casares-Porcel, 2011; Dzhambov et al., 2020; Picavet et al., 2016). In certain contexts, the creation of green spaces may result in elevated concentrations and more extensive distribution of allergenic pollen, which could potentially lead to an increased prevalence of allergic diseases (Cariñanos & Casares-Porcel, 2011). Furthermore, green space serves as a habitat for disease vectors, such as ticks, rats, and mosquitoes. Consequently, an increase in green space could result in a higher prevalence of infections (Lõhmus & Balbus, 2015). Furthermore, large areas of green space with limited surveillance options can also serve as a place for crime or be feared because of the potential for crime (Kimption et al., 2016). Finally, in some contexts, urban greening (e.g. the construction of a new park) may result in higher property rents and higher taxes in adjacent areas, which possibly encourages the displacement of groups with a lower socio-economic status (Donovan & Butry, 2010; Wolch et al., 2014).

GREEN SPACE MANAGEMENT IN THE NETHERLANDS

In the Netherlands, the central government is responsible for the formulation of ambitious and comprehensive frameworks regarding nature policy, as evidenced by the Environmental Health Atlas (2024). The policy document entitled *'Nederland Natuurpositief'* delineates the central government's aspirations for the Dutch

natural environment until 2025 (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2022). A significant objective outlined in the policy document is the establishment of a biodiverse network of nature reserves, known as the '*Natuurnetwerk Nederland*' (NNN) (Ministerie van Algemene Zaken, 2023). Nevertheless, the policy extends beyond the mere establishment of a network of nature reserves. The central government's vision document outlines a strategy to restore nature and biodiversity within and outside the network of nature reserves. Therefore, the aforementioned policy document outlines the necessity for the restoration of nature and biodiversity in urban areas, as well as in rural areas outside of nature reserves, and in the large water bodies of the Netherlands (Ministerie van Landbouw, Natuur en Voedselkwaliteit, 2022).

The responsibility for implementing this diverse and robust nature network has been devolved to the provinces. The Dutch provinces are each responsible for the green spaces situated in and around urban areas and villages within their respective territories. Consequently, the green spaces in rural areas in the Netherlands are the responsibility of the provincial authorities. In addition to these commitments, the provinces are also responsible for the implementation of sustainable agricultural practices, the maintenance of forests, the protection of flora and fauna, and the management and connection of nature reserves (Environmental Health Atlas, 2024). Each province has developed its own policy that captures these commitments and aligns with the ambitions and guidelines of the central government.

In the Netherlands, municipalities are responsible for the implementation and upkeep of public green spaces in urban and rural areas (Environmental Health Atlas, 2024). To facilitate the fulfilment of this responsibility, the majority of municipalities have developed a '*Groenstructuurplan'*, which is a policy document that provides a long-term vision for the design and management of public green spaces (Medemblik, 2024). Furthermore, municipalities encourage residents to contribute to the creation of a more environmentally sustainable living environment. For instance, there is a growing emphasis on citizen participation, whereby residents assume responsibility for the upkeep of the green space in their vicinity. Such initiatives not only reinforce social cohesion within neighbourhoods but also facilitate the emergence of a distinctive identity for each street or neighbourhood. Additionally, some municipalities have established subsidy programs for the construction of green roofs and facade gardens (Environmental Health Atlas, 2024).

Internationally, the Netherlands plays an active role in the conservation of biodiversity and the pursuit of global environmental objectives. As a signatory of several international treaties and agreements, including the Convention on Biological Diversity (CBD), the Netherlands is committed to the conservation, expansion, and sustainable management of green spaces (Ministerie van Algemene Zaken, 2024). Furthermore, the Netherlands is engaged in the implementation of European directives for nature protection, including the Natura 2000 networks (Ministerie van Economische Zaken, Landbouw en Innovatie, 2024).

The Dutch policy on green spaces has resulted in more than three-quarters of the total surface area of the Netherlands being currently in use as green space or water (79.8 percent) (CBS, 2024a). In 2022, more than 45 percent of the surface of the Netherlands would be agricultural. Furthermore, more than a quarter (10.7 thousand square kilometres) of the Netherlands consists of arable and horticultural areas. The area of nature and forest areas represents almost 16 percent of the land area. Of this, forest areas constitute the most common nature reserves. In 2022, built-up areas covered more than 20 percent of the total area of the Netherlands.

2.2 GREEN SPACE ACCESSIBILITY

One of the key objectives of green space policies is to influence the accessibility of these spaces. Green space accessibility refers to the ease with which it can be reached by people (Wang et al., 2013a). This makes it a measure with which the relative chance of use or contact with green space can be measured (Gregory et al., 2011). This provides an indication of the match between the spatial distribution of green spaces and the demand of nearby residents (Laan & Piersma, 2021). Greater accessibility to green space leads to more frequent use of these spaces, which ensures that the positive health and wellbeing effects of green spaces are experienced by

the community to a greater extent (Ekkel & De Vries, 2017; Liu et al., 2021). However, a lack of accessibility is not solely attributable to a spatial mismatch (Johnston et al., 2009). In addition to spatial factors, non-spatial factors such as financial, cultural and information barriers also contribute to the extent to which a green space is accessible to people (Aday & Andersen, 1974; Bisht et al., 2010; Wang et al., 2013a). For instance, several researchers have proposed that accessibility research should not only include physical factors such as distance and travel time, but also integrate personal preferences and social barriers into the equation. This is intended to enhance the understanding of the accessibility concept (Aday & Andersen, 1974; Bisht et al., 2010; Kwan et al., 2003). For example, Pirie (1981) argued that accessibility is equivalent to convenience and reachability, which suggests that accessibility should be understood as an ability to access services rather than solely as a physical measurement of the distance between origin and destination. In their 2009 study, Gregory et al. defined accessibility as "the ease with which people can reach desired activity sites," considering the potential influence of social and personal factors.

GREEN SPACE ACCESSIBILITY MEASUREMENTS

Despite the growing body of literature on the accessibility of green spaces, there is no consensus among scholars on how it should be measured (Maroko et al., 2009; Talen, 2003; Wolch et al., 2014; Ye et al., 2018). As Talen (2003) notes, five distinct approaches to measuring the accessibility of green space can be discerned in the literature.

The first approach is the container approach, as outlined by Maroko et al. (2009) and Ye et al. (2018). This approach employs the number or total area of green spaces in a specific area as a means of measuring green space accessibility (Fan et al., 2017; Maroko et al., 2009; Stacherl & Sauzet, 2023). A second approach is the coverage approach, which measures accessibility by the number of green spaces within a given distance from a certain location. A limitation of these two approaches is that they focus solely on the availability of green space, thereby overlooking the spatial distribution of green space and its users (Ye et al., 2018). An alternative approach is that of minimum distance, which measures access as the distance from a specific location to the nearest green space (Talen, 2003). In contrast, the travel cost approach measures access as the distance from a specific location to all green spaces within a geographical area (Talen, 2003; Ye et al., 2018). However, these two approaches only consider the proximity of green spaces and do not consider the characteristics of green space users (Ye et al., 2018). Finally, a gravity potential approach, or spatial interaction approach, can be employed to assess accessibility (Talen, 2003). This approach measures both the proximity and density of green spaces (Stacherl & Sauzet, 2023). This approach, which considers both the availability and proximity of green space, has gained considerable traction in recent literature (McGrail & Humphreys, 2009; Stacherl & Sauzet, 2023; Ye et al., 2018).

These measurement approaches share the common feature of objectively measuring accessibility. This results in their inability to measure people's perceptions of green space accessibility and to deal with the complexity of human decision-making when it comes to green space usage (Curl et al., 2015; Lättman et al., 2018). Accordingly, Wang et al. (2013a) and Curl et al. (2015) posit that subjective measurement approaches are more efficacious in capturing green space accessibility, its dimensions, and its role in influencing green space use decision-making. A subjective approach to measuring green space accessibility is the use of perceived accessibility (Lättman et al., 2018; Wang et al., 2013a). The preferences and abilities of individuals, such as the green spaces they use, at what time of day, and their awareness of green space options, greatly impact their perceptions of green space accessibility (Lättman, 2016; Wong, 2018). Consequently, perceived accessibility is contingent upon the preferences and abilities of individuals, rather than objective data.

FACTORS INFLUENCING PERCEIVED GREEN SPACE ACCESSIBILITY

The health and well-being promoting potential of green spaces has led to greater recognition of the importance of adequate accessibility of green spaces for liveable urban areas (Chen et al., 2020). However, due to the uneven

distribution of green spaces across urban areas, not all residents have the same access to them (Krekel et al., 2016; Zhou & Rana, 2012). Existing literature shows that several factors influence the accessibility of green spaces. Most existing studies focus on spatial-physical variables when measuring accessibility, such as physical distance or proximity (Gregory et al., 2011; Hass, 2009; Nicholls, 2001). However, accessibility is a multifaceted concept that includes both physical and non-physical variables (Ferreira & Batey, 2007; Gregory et al., 2011; Wang et al., 2013a). Wang et al. (2013a) developed a conceptual framework that illustrates both physical and non-physical factors that influence the perceived accessibility of parks and green spaces in general. According to Wang et al. (2013a), these factors can be divided into three broad categories: the physical-transport dimension, the knowledge dimension and the social-personal dimension (Figure 1).

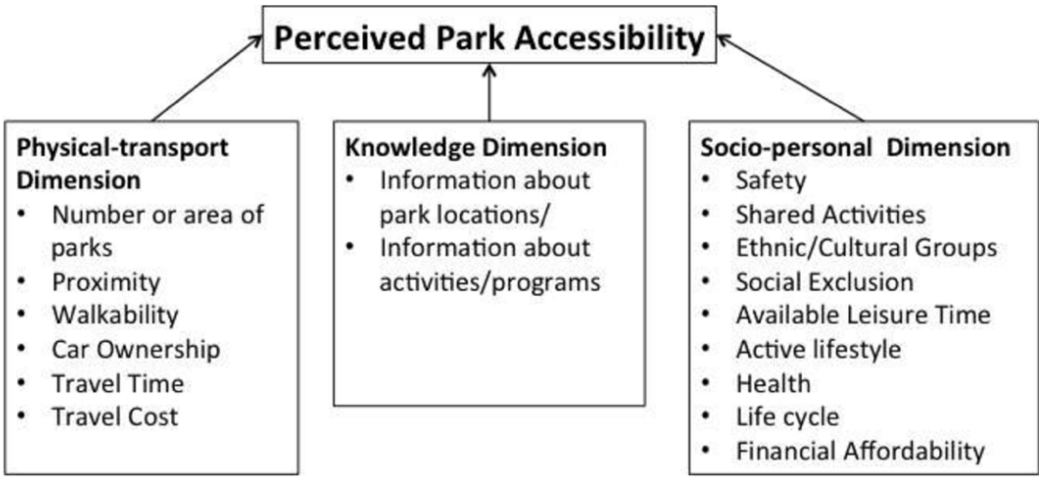

Figure 1. *Factors influencing perceived park/green space accessibility (Wang et al., 2013a).*

PHYSICAL-TRANSPORT DIMENSION

The first dimension influencing perceived green space accessibility is the physical-transport dimension. This encompasses the physical accessibility of green space and transport-related factors influencing the ease with which residents can reach green space (Wang et al., 2013a). In Wang et al.'s (2013a) conceptual framework, this dimension encompasses six factors, each of which exerts an influence on the perceived accessibility of green space.

The number and size of green spaces are among the three factors influencing the physical accessibility of green space (Wang et al., 2013b). A community will perceive greater accessibility to green space when there are more green spaces available and when these green spaces have a larger surface area. Proximity also plays a significant role in determining the physical accessibility of green spaces (Erkip, 1997; Wang et al., 2013b; Wendel et al., 2012). Pasaogullari and Doratli (2004) demonstrated that when a green space is situated in closer proximity to a residence or when it is visible from a residence, the individual will experience a higher level of accessibility to the green space. The final factor influencing the physical accessibility of green space is walkability (Wang et al., 2013b). Walkability can be defined as the ease and comfort with which people can navigate through a space on foot (Lwin & Murayama, 2011). The presence of attractive streets, with well-designed sidewalks or footpaths and minimal traffic, which connect residences to green spaces, has been demonstrated to positively influence the perceived accessibility of green space (Giles-Corti et al., 2005; Goličnik & Thompson, 2010; Pasaogullari & Doratli, 2004). The walkability of green spaces is somewhat related to the number of facilities in and around them. Examples of these facilities include seating areas, walking and cycling paths, sports facilities, playgrounds, dog walking areas, signage, and catering facilities (Lopez et al., 2021). The presence of such facilities enhances the accessibility of a green space, which in turn encourages greater utilisation of the green space (Aziz, 2012; Owen et al., 2004). For instance, research conducted by Eyler et al. (2003) and Giles-Corti and Donovan (2002)

demonstrated that the absence of convenient and secure cycling and walking routes significantly decreases the frequency of visits to a green space.

The elements of transportation, including mode, travel time, and travel cost, play an important role in determining the degree of ease in overcoming spatial separation (Maruani & Amit-Cohen, 2007; Penchansky & Thomas, 1981; Wendel et al., 2012). The mode of transport used to reach a green space can have a significant impact on the accessibility of that green space (Van Wee, 2021). For example, people who traverse a green space on foot or by bicycle generally enjoy superior accessibility to these spaces (Jiao & Dillivan, 2013; Lamíquiz & López-Domínguez, 2015; Lee et al., 2017a). This is because pedestrians and cyclists have the flexibility to choose routes that are convenient to them, such as sidewalks, bike paths, or shorter routes through neighborhoods, which may not be accessible to vehicular traffic. In fact, driving a vehicle to a green space can contribute to reducing its accessibility (Lamíquiz & López-Domínguez, 2015). This is due to the presence of parking restrictions and the distance to the park's parking lots. Those dependent on cars may be required to travel to parking facilities near green spaces, which may result in additional time and effort being spent (Lee et al., 2017b). This may result in a lower frequency of visits to green spaces compared to pedestrians and cyclists. Finally, some people rely on public transport to reach green spaces. However, accessibility to green spaces by public transport may vary depending on the availability, frequency and proximity of stops to green spaces. Those who rely on public transportation may experience limitations in terms of travel time, transfer options, and accessibility of stops (Jiao & Dillivan, 2013). In other words: the accessibility of green spaces is generally perceived as higher by pedestrians and cyclists.

As indicated in the literature, green spaces are also perceived as more accessible when it takes less time and money to get there (António & Peter, 2007; Kaczynski & Henderson, 2007). Individuals may perceive green spaces as more accessible if they are readily accessible. High travel costs may act as a barrier to visits to green spaces for those on a budget, particularly if the green space is located away from the place of residence. This may result in a reduction in the frequency of visits to green spaces and a lower perceived accessibility for these groups.

KNOWLEDGE DIMENSION

Information is also an important factor influencing people's perception of the accessibility of services (Johnston et al., 2009). In the context of accessibility to green spaces, residents' awareness of the locations, facilities and activities in these green spaces is an important factor influencing their perception of accessibility (Wang et al., 2013b). This knowledge dimension represents the accessibility aspect determined by the availability of information and people's cognitive progress (Aday & Andersen, 1974; António & Peter, 2007; Bisht et al., 2010). This is related to the way people form subjective impressions of accessibility through cognitive processes, filtering relevant information to create an awareness of it (Wang et al., 2013b). In Bisht et al. (2010), the accessibility index also mentions knowledge as one of the three most important dimensions that influence the accessibility of services. With regard to green spaces, this dimension includes information related to a range of aspects, including the location and available facilities, as well as the activities carried out in them (António & Peter, 2007). This includes benches, picnic tables, waste bins, playgrounds, sports fields, walking and cycling paths, fitness equipment and catering establishments. Greater awareness of the above aspects is associated with higher perceived accessibility of green spaces (Byrne & Sipe, 2010; Byrne & Wolch, 2009; Chiesura, 2004).

For instance, research conducted by Mowen et al. (2005) revealed that the dearth of information regarding the locations of green spaces was identified by young people as one of the four most significant factors impeding their utilization of green spaces. Nevertheless, Wang et al.'s (2013b) investigation into the factors influencing perceived accessibility of green spaces revealed that the availability of information about green spaces did not significantly impact perceived accessibility. These conflicting findings highlight the need for further research into the knowledge dimension. Furthermore, these studies were conducted in the United States, Australia, and China, thus leaving a gap in the European context regarding extensive research into the knowledge dimension.

SOCIO-PERSONAL DIMENSION

In addition to physical and knowledge factors, socio-economic constraints and individual capacities (e.g., health status, lifestyle, and life stage) also have a significant impact on people's perceptions of accessibility of services (Aday & Andersen, 1974; Johnston et al., 2009). Consequently, the third dimension that affects perceived accessibility of green spaces is that of social and personal variables. Social and personal variables are distinct factors, yet they are interrelated (Wang et al., 2013b).

The social dimension of accessibility consists of three components: safety, ethnic/cultural diversity and social exclusion. The experience of public space, including green space, is largely determined by safety (Byrne et al., 2009; Chiesura, 2004; Mehta, 2014; Winter & Lockwood, 2005). A higher sense of safety in public spaces is associated with more positive experiences in these spaces and greater satisfaction with these spaces (Weijs-Perrée et al., 2020). Consequently, a higher sense of security may improve individuals' perceptions of the accessibility of these locations, including green spaces. This ultimately results in more use of these spaces (Mehta, 2014). Various environmental factors influence the subjective perception of safety in public spaces. Research by Perkins et al. (1992) indicates that the presence of street lighting, signage with camera surveillance and greenery contributes to the perception of safety in the street environment. Moreover, the presence of police surveillance can also contribute to a perception of increased safety in public spaces (Helsloot et al., 2018; Taylor et al., 2017). Furthermore, a sense of security can be achieved simply by the constant presence of people and 'eyes' on the street (Newman, 1973). In her article on city streets, Jane Jacobs (1961) identified shops, restaurants, bars and other third places as fundamental components of surveillance and safety. Several other studies have shown that the perception of safety is negatively affected by the presence of litter, poor lighting, graffiti, vandalism and poorly maintained buildings and public spaces (Boutellier et al., 2004; Galetzka et al., 2019).

In addition to safety, social cohesion in a neighborhood also influences people's perception of the accessibility of facilities (Wang et al., 2013b). Social exclusion and its counterpart, social cohesion, are intertwined with individuals' perceptions of trust, social identity, belonging, and support (Chen & Jim, 2010). Strong community ties contribute to the development of social capital and a positive perception of public space (Chiesura, 2004). Therefore, stronger community ties can positively influence community perceptions of the accessibility of green space in their neighborhood. The bonds between the community are strengthened when residents find each other friendly, trustworthy and helpful and when they have shared interests. In addition, a stronger sense of connection between residents and their place of residence increases social cohesion (Wang et al., 2015). This connection between a place and a resident is also called place attachment. Place attachment theory posits that people develop emotional attachments to the places where they live, work, and trade (Giuliani, 2003; Inalhan et al., 2021). Strong place attachment can be seen as a long-term bond between a person and a place that makes the person feel comfortable and safe in the place and enjoy spending time there (Boerebach, 2012). This bond grows as the person spends more time in this place and builds deeper and more diverse experiences with this place (Relph, 1976). Place attachment influences how people experience and use their living environment, including green spaces. The degree of place attachment can therefore influence people's perception of their access to places in their living environment, including green spaces. Research by Fornara et al. (2019) and Moztarzadeh and Mohajer (2020) show that people with a higher sense of place attachment are generally more satisfied with their living environment. Place attachment thus influences the perception of green spaces and their accessibility in a positive way.

Furthermore, the socio-economic status of an individual also affects their perception of the accessibility of green spaces. In Wang et al.'s (2013b) model, socio-economic status is divided into two factors: cultural or ethnic groups and financial affordability. Wang et al. (2015) found that the socio-economic variables of income and language spoken at home have a significant effect on perceived access to green parks in Brisbane, Australia. This is consistent with the findings of previous studies which have demonstrated that population groups with

different socio-economic backgrounds utilise and experience green spaces in distinct ways (Byrne & Wolch, 2009; Gobster, 1998; Hutchinson, 1987). This is also true of perceptions of access to green spaces. The findings of Wang et al. (2015) corroborate this assertion, indicating that individuals with a lower socioeconomic status utilize green spaces less frequently and perceive access to these spaces as more limited.

Another factor not included in Wang et al.'s (2013a) conceptual framework is the amount of crowding in a green space (Byrne & Sipe, 2010). The presence of many other individuals at a green space can have a detrimental effect on the perceived accessibility of the space, as it may result in a less relaxing experience (Ekkel & De Vries, 2017). However, this factor has received little attention in the current literature on green space accessibility. In the domain of recreation research, it is known that the desire for peace and quiet is an important motive for visiting nature (Home et al., 2012; Weber & Anderson, 2010). Furthermore, it has been demonstrated that high visitor densities have a negative impact on the recreational experience (Arnberger & Eder, 2015). Consequently, high levels of crowding may result in a perception of reduced access to green space and a subsequent decline in recreational use of this green space (Byrne & Sipe, 2010).

In addition to social factors, personal factors (e.g., lifestyle, life stage, self-reported physical and mental health, available leisure time, and gender) also influence perceived accessibility to green spaces (Wang et al., 2013b; Wang et al., 2015). The availability of leisure time acts as a personal constraint that can impede the natural inclination to utilise services such as green spaces (Wang et al., 2013b). Those with less available leisure time are more likely to perceive the accessibility of green spaces as poor than those with more leisure time available. The health status, life stage (i.e., age, education level, familial status, career stage) and lifestyle of individuals influence their ability and desire to use facilities like green spaces and their attitudes towards these facilities. For instance, Wang et al. (2015) demonstrated that individuals with a lower self-perceived health status are more likely to experience lower levels of accessibility to green spaces in their neighbourhood. This research also demonstrated that an individual's life stage does not significantly influence their perceived accessibility to green spaces. However, Mowen et al. (2005) demonstrated that age is a significant factor limiting accessibility to green spaces. Younger individuals appeared to encounter a number of constraints that restricted their access to green space, including a lack of time, being preoccupied with familial responsibilities or other commitments, engaging in leisure activities elsewhere, and a lack of awareness about green spaces. Although younger individuals encountered a greater number of constraints that impeded their access, older adults also faced numerous constraints that diminished their perceived accessibility. For instance, they identified health concerns, the lack of public transportation, and the absence of convenient access as significant obstacles that hindered their ability to utilize green spaces.

Wang et al. (2014) posit that individuals with an active lifestyle are more inclined to utilise green spaces than those with a less active lifestyle. This divergence in usage preferences can influence perceptions of a green space and its accessibility. The term "active lifestyle" as used by Wang et al. (2014) refers to a way of life characterised by regular participation in outdoor physical activities. Individuals with such a lifestyle actively strive to spend time outdoors and be involved in activities that stimulate them physically, mentally, and emotionally. Such a lifestyle encompasses a range of activities, including walking, cycling, running, swimming, gardening, camping, and other outdoor sports and recreational pursuits. Those who engage in active outdoor lifestyles often prioritize health, wellness, and exploration of the natural environment. Such individuals perceive outdoor activities not only as a means of maintaining physical fitness, but also as a conduit for reducing stress, strengthening social bonds, pursuing adventurous pursuits, and developing a sense of connection with nature. Nevertheless, several empirical studies have demonstrated that an individual's lifestyle does not significantly influence their perceptions of green space accessibility (Coombes et al., 2010; Hillsdon et al., 2006; Wang et al., 2015). Further research into this factor should provide greater insight into the relationship between lifestyle and accessibility.

The final personal factor that affects perceived accessibility to green spaces is gender. According to Wendel et al. (2012), there are significant differences in the way men and women perceive their living environments. Indeed, women often encounter greater obstacles to accessing services and public spaces, including green

spaces. Consequently, it can be expected that women will experience lower levels of accessibility to green spaces than men.

2.3 ANALYTICAL FRAMEWORK

This research is based on the conceptual framework of Wang et al. (2013a), which can be seen in Figure 1. Nevertheless, in light of the existing theoretical framework and the results of previous studies, this study employs an adapted version of the aforementioned framework. The adapted analytical framework is presented in Figure 2. This framework incorporates two additional factors that, according to the literature, influence the perceived accessibility of green spaces, namely perceived crowding and the presence of facilities within these spaces (Byrne & Sipe, 2010). The variables ethnic/cultural groups and financial affordability from Wang et al.'s (2013a) framework have been replaced by one variable, namely socio-economic status. In this study, age is also used as a proxy for life stage, a justification for which can be found in the Methods chapter. Furthermore, travel time was not considered as a separate variable in this study. In this study, travel time is considered to be a component of proximity to green space. The proximity of green spaces can be examined based on the time required to reach them. Given that the green space is situated in close proximity to Odijk and that it is a maximum of 15 minutes' walk to the nearest green space, it is anticipated that the journey to a green space will be relatively inexpensive. In order to limit the number of variables to be measured, it was decided that travel costs would not be included in this study.

Furthermore, the socio-personal dimension has been divided into two distinct dimensions: the social dimension and the personal dimension. The personal dimension pertains to the characteristics of the resident, whereas the social variables are more closely related to the resident's experience of their environment and their interactions with other residents. Given this distinction, it was deemed appropriate to consider these variables as two distinct categories. Figure 2 also illustrates that the knowledge dimension is not considered a distinct dimension in this research, but rather falls under the social dimension. The knowledge dimension in Wang et al.'s (2013a) framework concerns a person's awareness of green space facilities, locations and activities held in it. This can also be categorized under the social characteristics of a person. Furthermore, the study by Wang et al. (2013b) demonstrated that the knowledge dimension itself had no significant influence on perceived green space accessibility. Consequently, this category is not investigated as a separate dimension. The analytical model in Figure 2 illustrates the factors within these dimensions that are investigated in relation to perceived green space accessibility among Odijk residents. The following chapter will describe the methodology employed to investigate the relationship between these factors and perceived green space accessibility in this study.

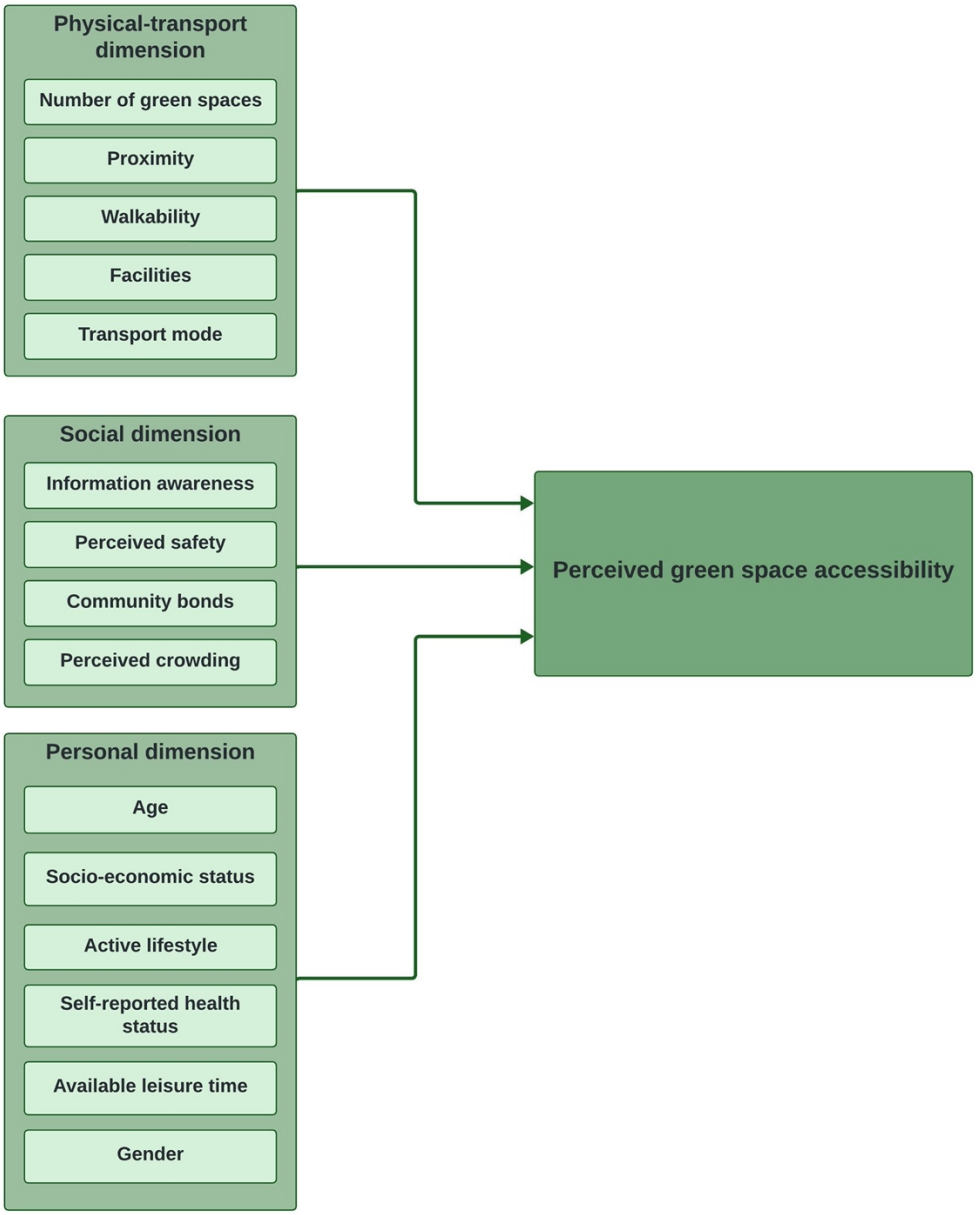

Figure 2. *Analytical framework perceived green space accessibility*

3. METHODOLOGY

This chapter outlines the methodological choices made in this study. This carefully crafted research strategy is designed not only to examine superficial perceptions of green space accessibility in the Odijk area, but also to delve deeply into the experiences of residents, ultimately contributing to a comprehensive understanding of green space accessibility in the Odijk area. In order to achieve this, this study employed a mixed methods approach. This approach combines qualitative and quantitative research methods to achieve a comprehensive and multifaceted understanding of the perceived accessibility. Mixed methods research is more labour-intensive than using only qualitative methods or only quantitative methods (George, 2023). Nevertheless, the generalizability and validity of quantitative data, coupled with the rich, detailed insights afforded by qualitative data, led to the selection of this approach. Furthermore, due to the time available for this research, it was possible to utilize both research methods.

The utilization of a mixed methods approach not only expanded the scope of the study, but also made it possible that the dual research objective of this study was investigated. The first objective of this research was to map the current perceived accessibility to green space among residents of Odijk. A quantitative study was conducted to measure the extent to which various factors influence the perceived accessibility. The quantitative research enabled the collection and analysis of a substantial amount of data about the residents of Odijk. This data allowed the relationships between various factors and the perceived accessibility of green space to be examined (Scheepers & Tobi, 2021). Prior to the commencement of data collection, hypotheses were formulated based on existing theories and methods regarding the factors that might influence the perceived accessibility of green spaces. These hypotheses were subsequently accepted or rejected through the course of this research. This enabled the identification of the variables that influence perceptions of access to green spaces in Odijk. The advantage of quantitative research is that it has made it possible to conduct large-scale field research and to process and analyse data from a significant proportion of Odijk's inhabitants (Scheepers & Tobi, 2021). All of this could be accomplished through quantitative data analysis, in the case of this study through statistical testing, in a consistent and reliable manner (Bhandari, 2022a; Scheepers & Tobi, 2021). However, quantitative research is not without its disadvantages. One disadvantage is that abstract concepts, such as accessibility and safety, are not always easy to measure. This is addressed in the research by converting these concepts into observable and quantifiable variables that can be measured with quantitative data (Scheepers & Tobi, 2021). Furthermore, numerical data, which is the predominant method employed in quantitative research, is unable to capture the deeper emotions, thoughts, and preferences of respondents (Bhandari, 2022a). Nevertheless, the integration of qualitative data into the quantitative analysis facilitated the acquisition of insights into these emotions, thoughts, and preferences.

The second objective of this study was to identify the specific obstacles that residents of Odijk encounter when attempting to access the green spaces in their vicinity. To investigate this, qualitative methods were employed. This is because this type of research is concerned with generating non-numerical data, with the objective of better understanding human experiences, emotions, and differences (Hay & Meghan, 2021). Although qualitative research can provide valuable insights, it also has some limitations. Qualitative data are inherently subjective and therefore have limited generalizability (Bhandari, 2022b). However, the data was only employed to supplement the objective, generalizable quantitative data to gain deeper insights into the barriers that limit the accessibility of green spaces.

The research used an explanatory sequential design (George, 2023). This meant that the quantitative data collection was carried out first. In this case, a survey was administered to residents of Odijk to map their perceptions of access to green space. Subsequently, the quantitative data obtained was employed as a foundation for the subsequent qualitative methods. In this research, quantitative data was obtained through interviews with residents and other stakeholders. This was done to gain deep insights into the existing barriers that hinder the accessibility of green spaces around Odijk.

3.1 STUDY AREA

The field research was conducted in Odijk, a village situated in the province of Utrecht and part of the municipality of Bunnik. Figure 3 illustrates the geographical position of Odijk in relation to Utrecht, while Figure 4 presents a map of Odijk. Odijk is renowned for its verdant character and numerous walking trails along the Kromme Rijn (VVV Kromme Rijnstreek, 2024). The river in question flows from Wijk bij Duurstede to Utrecht via Odijk (Tussen Rijn en Lek, 2024). Odijk is almost completely surrounded by the river.

Figure 3: *Location of Odijk (Google Maps, n.d.)*

Figure 4: *Map of Odijk (Google Maps, n.d.)*

In 2023, the population of Odijk was 6,113, with a total of 2,618 households (AlleCijfers, 2024). The town of Odijk comprises 2,626 residential units, with the majority of these being single-family homes (83%). The majority of Odijk residents (84%) are originally from the Netherlands. Approximately 10% of the population hails from countries outside Europe, while 6% originate from other European countries. A total of 43% of Odijk residents have attained a high level of education, with 37% having completed secondary education and 18% having a low level of education (AlleCijfers, 2024). Figure 5 illustrates the age structure of Odijk residents. For each age group, the figure indicates the percentage of residents within that age bracket.

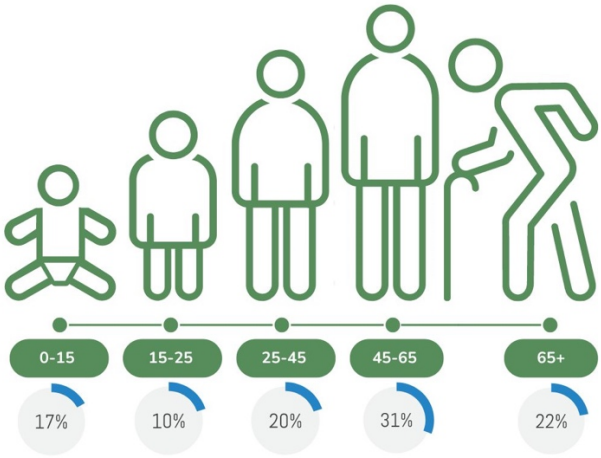

Figure 5: *Age structure of Odijk residents (AlleCijfers, 2024)*

The present study concerns the green spaces in the vicinity of Odijk. These green spaces fall under the responsibility of the province of Utrecht, as defined by the Provinciale Commissie Leefomgeving Utrecht (2023). The Groen Groeit Mee programme team of the province of Utrecht is responsible for the management of these green spaces. The objective of this team is to ensure that sufficient green spaces are created when suburban

housing is constructed, thereby providing new residents of these areas with sufficient green spaces in their living environment (Groen Groeit Mee, 2024). Furthermore, the construction of such housing will also be undertaken in the vicinity of Odijk, resulting in a notable increase in the population of Odijk (Kersenweide Odijk, n.d.). It is therefore of significant importance to the province and to the residents of Odijk that there are sufficient green areas in the vicinity of Odijk. The province has set itself the objective of creating sufficient green spaces, while also striving to optimize accessibility to these spaces, including those in the vicinity of Odijk (Van Mispelaar et al., 2021). This research will map out the extent to which the green areas around Odijk are currently accessible to Odijk residents and the obstacles they encounter when attempting to reach these spaces. Ultimately, recommendations can be made to the province on how the accessibility of these spaces can be optimized. This will be of benefit to both current and future residents of Odijk.

Figure 6 presents a map of the research area, which is located within the red outline. This area comprises the green spaces surrounding Odijk. The boundaries of the research area have been delineated in collaboration with the Groen Groeit Mee team of the province of Utrecht. In collaboration with this team, the potential for walking and cycling routes leading from Odijk into the surrounding green areas has been investigated. The following demarcation has been established based on the analysis of available walking and cycling routes that can be made from Odijk. The walking and cycling routes have been mapped on all sides of Odijk, thereby encompassing the entire green area around Odijk within the research area.

Figure 6: *Map of research area (Atlas Provincie Utrecht, 2024)*

3.2 QUANTITATIVE RESEARCH METHOD

In this study, data was initially gathered through a survey of residents of Odijk. The survey enabled the collection of data on Odijk residents' perceptions of green space accessibility and the various factors influencing this in a relatively short time frame and at a low cost (Scheepers & Tobi, 2021). Given the constraints of time and budget,

a survey was the most appropriate methodology for collecting a substantial amount of data. However, the use of a survey is not without its disadvantages. In most cases, respondents are presented with a limited number of answer options, which precludes them from providing their own input into the responses. Consequently, responses may be superficial (Scheepers & Tobi, 2021). Furthermore, it is relatively simple for respondents to provide a different answer to the one that is actually true when completing a survey. This may be due to the fact that respondents may feel compelled to provide a socially desirable answer rather than an accurate reflection of their true beliefs. Nevertheless, an effort has been made to circumvent this issue by ensuring respondents are made aware that their anonymity is guaranteed throughout the research process and that the results will not be linked to their identity. Furthermore, during the face-to-face survey, respondents were informed that their data would be handled discreetly.

The survey was administered to respondents in digital form via the Microsoft Forms platform. Consequently, the responses provided by the respondents were stored online in real-time and were immediately available for analysis. A digital survey is not only a rapid method, but also a cost-effective and adaptable approach that places minimal burden on respondents (Benders, 2022). Furthermore, the use of digital questionnaires has the advantage that only the questions relevant to the respondent are displayed, which largely avoids completion errors (Scheepers & Tobi, 2021). One potential disadvantage of digital surveys is that individuals who are less comfortable with the use of the internet may encounter difficulties in completing them. In addition to being conducted in digital form, the survey was also conducted face-to-face among residents of Odijk, thus eliminating the need for respondents to complete the survey online. The combination of both online surveys and face-to-face surveys should have ensured that as many respondents as possible could be contacted (Benders, 2022).

The survey utilized a standardized questionnaire comprising closed questions, which facilitated the statistical analysis process, enabling direct comparisons to be made between the responses. Furthermore, the use of a standardized questionnaire facilitates the replication of the study, thereby enhancing the reliability of the findings (George, 2023). Reliability is a fundamental requisite for a survey to be able to draw valid inferences from the data obtained. Furthermore, the survey was conducted consistently in comparable circumstances and respondents were approached in a uniform manner to ensure the reliability of the research (Benders, 2022).

The research is focused on the residents of Odijk, a municipality with a diverse demographic and a mix of urban and rural environments. The estimated population of Odijk is approximately 6,113 individuals, distributed across an estimated number of households of 2,618. In determining the unit of analysis, the individual was selected. This decision was made because the research focuses on individual perceptions and appreciations of green areas around Odijk. By adopting the individual as the unit of analysis, the objective is to gain a more detailed insight into the diverse experiences and values associated with green spaces. With regard to quotas, the research aims to obtain a representative sample of the Odijk population, taking into account factors such as age, gender and other demographic variables. Although no strict quotas have been established, an effort will be made to obtain a balanced sample that represents a wide range of perspectives. This will be achieved by distributing the survey through various channels and ensuring that the response representation corresponds to the demographic distribution of the Odijk population.

In order to ensure the validity of the research, the abstract concepts derived from the literature were operationalized prior to the construction of the survey questions (Benders, 2022). The operationalization can be found further on in this chapter. This operationalization ensured that abstract concepts were measurable, thereby ensuring that the survey questions actually measured what was intended to be measured.

DATA COLLECTION

The data collection period of the survey spanned from 8 April to 1 May. The data collection was conducted in a variety of ways in order to reach as many residents of Odijk as possible. Firstly, residents of Odijk were approached in person in various green spaces within the vicinity of Odijk, as well as in front of the local

supermarket. One advantage of a face-to-face survey is that the respondent can be corrected or given additional explanation while completing the survey. This enhances the reliability and validity of the research (Scheepers & Tobi, 2021). To ensure a degree of randomness in the data collection process, every third individual was contacted. This approach was selected due to the limited number of individuals present in the designated locations, which made it unfeasible to contact every passerby. The data collection was conducted at different times and days (see logbook, Appendix 2) to ensure that a diverse range of residents could be approached. For instance, during the day on weekdays most respondents were non-working or retired individuals, while working people were also approached in the evenings and on weekends. This approach was designed to enhance the representativeness of the sample and, consequently, its validity (Benders, 2022; Scheepers & Tobi, 2021). If a resident was unable to participate in the survey at the time of administration, a note was provided containing a brief description of the research and a QR code and written link (for individuals less digitally familiar) to the online survey (see Appendix 3). To prevent respondents from providing duplicate responses, it was emphasised during the face-to-face survey that the survey was also distributed via a newsletter and social media. However, respondents were informed that providing a single response was sufficient.

In addition, the survey was communicated to the residents of Odijk via the municipality of Bunnik through a news item in the local newspaper (see Appendix 3). The newspaper is distributed on a weekly basis via the postal service to all residents of Odijk, thereby ensuring that all residents have the opportunity to read the article and participate in the research. The newsletter was distributed on 17 April and has also been posted on the newspaper's website. The news item provided a brief overview of the research and included a QR code and link to the survey. As previously discussed, this may present a challenge for individuals with limited mobility and internet proficiency, potentially leading to a lower response rate (Benders, 2022).

The same message has been disseminated on the social media channels of the municipality of Bunnik and on the LinkedIn page of the Groen Groeit Mee programme team of the province of Utrecht. The text of the news article has been slightly abridged for social media posts and can be found in Appendix 3.

OPERATIONALIZATION

Following a brief introduction to the research, the questionnaire commences with the question of whether the respondent resides in Odijk. Those who respond in the negative to this question will be directed directly to the conclusion of the questionnaire, as the research is only intended for residents of Odijk. For the full questionnaire, please refer to Appendix 1. The operationalization is presented in Table 1.

Part 1: Personal characteristics

The survey then continues with general questions about the personal characteristics of the respondents. These questions are at the beginning of the survey since easier-to-answer questions at the start of a survey lead to a higher overall response rate (Scheepers & Tobi, 2021). For this reason, the more difficult to answer questions are placed at the end of the survey. These questions not only contribute to a good picture of the characteristics of the respondents, but also contribute to mapping the variables of the social and personal dimension of accessibility.

In order to categorise the responses to question 4, which concerns the level of education attained, the CBS (2021b) classification was employed, which comprises five levels of education. The response categories for question 5, pertaining to self-reported health status, were derived from Wang et al.'s (2015) investigation into the factors influencing perceived accessibility to green spaces. The seventh question concerns the respondent's leisure activities on an average weekday. A weekday was selected as it is more representative of the entire week than a day in the weekend. To clarify the concept of leisure time, it is indicated below the question that this refers to time when one is not engaged in work, household tasks, other obligations, or sleeping (Instituut voor Sport- en PrestatiePsychologie, 2008). This approach is designed to prevent any potential misinterpretation of

the concept. The response options for this question are derived from research conducted by MoVal (2015) and data from CBS (2003) regarding the available free time of the average Dutch individual.

Part 2: Visits to green spaces

The subsequent questions are not designed to test hypotheses but rather to gain insight into respondents' visits to green spaces in the vicinity of Odijk. The initial question, number 8 (see Appendix 1), enquires as to the frequency of respondents' visits to green spaces near Odijk over the past 12 months. This question and the answer options were taken from research by Kantar Public and the Provincie Utrecht (2023) into use of recreational areas in Utrecht. The selection of a month as the temporal unit was also informed by studies conducted by Lo and Jim (2010), Schipperijn (2010), and Soga et al. (2015). Should the respondent indicate that they have never visited a green space, they were redirected to question 8b, which requested the reason for this. As a respondent who never visits a green space is unable to provide a complete answer to the remainder of the questionnaire, these respondents were then directed to the conclusion of the questionnaire. Question 9 (see Appendix 1) then requests that respondents indicate which green space they most often visit, while question 10 asks them to identify the most important reason for visiting a green space. The response options for question 10 have been derived from a study conducted by Wandelnet (2021) on walking patterns in the Netherlands. Prior to these two questions, a definition of green spaces is provided, thus ensuring that the concept of 'green space' is interpreted in a consistent manner by all respondents.

Part 3: Valuation of green spaces around Odijk

The third section of the survey comprises a series of questions designed to assess a range of factors pertaining to accessibility, encompassing social, personal and physical-transport dimensions. As this section of the survey pertains solely to the research area, respondents are provided with a brief description and map of the area prior to answering the questions. The 11th question then requests that respondents indicate the means of transport they utilise to reach green spaces. The modes of transportation that can be selected as an answer to this question are the most commonly used by Dutch people, according to the CBS (2022). Subsequently, respondents are queried as to the frequency of their visits to the green spaces within the research area. Question 13 (see Appendix 1) then assesses the perceived accessibility of green spaces, which is the dependent variable in this study. The question has been slightly adapted from the question in the research by Wang et al. (2015) and asks respondents to indicate on a 5-point scale (from very easy to very difficult) how easy it is to access the green spaces around Odijk from their home. One advantage of utilizing a Likert scale is that it facilitates the operationalization of abstract concepts, such as perceived accessibility, thereby enabling their utilization in statistical analysis (Bhandari, 2022c). Furthermore, the scale offers a greater number of response options than a binary question, which enables more nuanced insights into observations, opinions, and behaviour. One disadvantage of this scale is that respondents often avoid the two extreme answer options, as this is perceived to be more socially desirable (Bhandari, 2022c).

It should be noted that questions 16, 17, 18, 20, and 21 each contain several statements that are designed to measure a single variable. A number of statements were selected as the variables in question are constructs that cannot be measured with a single question. To illustrate, question 16 concerns the respondent's awareness of the green spaces in the vicinity of Odijk. The question comprises four statements that collectively assess the respondent's level of information awareness. The statements have been adapted from the research by Wang et al. (2015). The statements were adapted since the research by Wang et al. (2015) focused on parks, whereas this research encompasses all green spaces. Question 17 assesses the respondents' perceptions of the availability and quality of various facilities in green spaces. This ultimately serves to quantify the level of facilities available in the green spaces. Additionally, walkability is a construct that cannot be adequately assessed through a single question. In question 18, respondents were therefore asked to indicate their level of agreement with five statements on a 5-point scale (from strongly agree to strongly disagree). The five statements collectively serve to assess the walkability of the green spaces. The statements were derived from the walkability checklist developed by the Pedestrian and Bicycle Information Center and the U.S. Department of Transportation (n.d.).

Question 20 also contains several statements that collectively assess perceived safety. The feeling of safety is dependent on a number of factors, including the maintenance of the green space, the cleanliness of the green space, the lighting at night in the green space, and the perceived level of crime in the green space (Boutellier et al., 2004; Galetzka et al., 2019). Each factor is measured by a statement with five response options, ranging from "strongly disagree" to "strongly agree". The final two statements inquire as to the respondents' perceptions of safety in the green spaces and during their journeys to these spaces. Once more, respondents are requested to indicate on a scale from strongly disagree to strongly agree to what extent they agree with the aforementioned statements. By including these relatively personal questions at the end of the survey, the response rate remains as high as possible (Scheepers & Tobi, 2021). Finally, question 21 also contains several statements. This measures social cohesion in Odijk. The selection of statements was informed by Wang et al.'s (2015) research into the factors influencing perceived accessibility of green spaces in China and Australia. The final question of Part 3 concerns the income of the respondents. Since income is a relatively personal question, this is asked at the end of the survey. The answer categories for this question are based on the CBS (2023) income classification.

Part 4: Obstacles

The fourth section of the survey comprises two questions. The initial question posed to respondents is to identify the most significant obstacle encountered when attempting to reach the green space in the vicinity of Odijk. This question is not obligatory. The objective of this question is to gain insight into the obstacles that residents encounter when attempting to access the green space in the vicinity of Odijk. The responses to these questions, along with the data obtained from the survey, are used to create a list of topics for interviews with residents. The second question posed to respondents is whether they would be interested in further elaborating on their responses in an interview. The survey concludes with a thank you to the respondents and the email address of the researcher's internship organization, with the suggestion that any further queries about the research may be directed to that address.

Table 1. *Operationalization table*

Question no.	Topic	Hypothesis	Literature findings
Introduction			
1	Odijk resident	-	-
Part 1: Personal characteristics			
2	Gender	Women perceive lower accessibility of green spaces than men (H18)	Marshall (2007) and Wendel et al. (2012) state that gender differences can influence perceptions of the living environment, with women often experiencing more barriers to accessing public places, including green spaces.
3	Age	Individuals younger than 21 perceive lower accessibility of green spaces than those older than 21 (H14)	Mowen et al. (2005) suggest that age is a significant factor affecting accessibility to green spaces, with younger individuals (<21 y/o) experiencing more constraints.
4	Education level	Lower socio-economic status leads to lower perceived green space accessibility (H12)	Wang et al. (2015) demonstrate that individuals with lower socio-economic status tend to make less use of green spaces and perceive lower accessibility due to various constraints. Education level is one of the most commonly used variables with which someone's socio-economic position can be determined (Rijksoverheid, 2024)
5	Self-reported health status	Lower self-reported health status leads to lower perceived green space accessibility (H16)	Wang et al. (2015) indicate that individuals with poorer health status are more likely to perceive lower levels of accessibility to green spaces.

6	Frequency of active outdoor activities	A more active lifestyle leads to higher perceived green space accessibility (H15)	Wang et al. (2014) suggest that individuals with active lifestyles desire more frequent use of green spaces, leading to higher perceived accessibility.
7	Leisure time per weekday	Less available leisure time leads to lower perceived green space accessibility (H17)	Wang et al. (2014) suggest that limited leisure time acts as a constraint to accessing services like green spaces, leading to lower perceived accessibility.
Part 2: Visits to green space			
8	Frequency of visits to green spaces around Odijk	-	-
8b	Reason no visits to green space	-	-
9	What green space visited	-	-
10	Reason for visiting green space	-	-
Part 3: Valuation of green space around Odijk			
11	Transport mode	People who walk or bike to green space perceive higher accessibility of green space than those who use other transport modes (H5)	Van Wee (2021) indicates that walking or biking to green spaces enhances perceived accessibility compared to other transportation modes.
12	Travel time	Greater proximity of green space leads to higher perceived green space accessibility (H2)	António and Peter (2007) suggest that shorter travel times to green spaces contribute to higher perceived accessibility.
13	Green space accessibility	-	-
14	Green space availability	Greater availability of green space leads to higher perceived green space accessibility (H1)	Wang et al. (2014) suggest that the number or area size of green spaces is one of the three factors that influence the physical accessibility of green space. The accessibility of green space will be perceived as higher by a community when there are more green spaces available
15	Green space proximity	Greater proximity of green space leads to higher perceived greenspace accessibility (H2)	Research by Erkip (1997), Pasaogullari and Doratli (2004), Wang et al. (2014) and Wendel et al. (2012) indicates that proximity to green spaces influences perceived accessibility, with closer distances leading to higher perceptions of accessibility.
16	Information awareness	Higher awareness of green space locations and facilities leads to higher perceived green space accessibility (H8)	Bisht et al. (2010) and Wang et al. (2015) suggest that greater information awareness about green spaces is linked to higher perceived accessibility.
17	Facilities	Higher level of facilities in a green space leads to higher perceived green space accessibility (H4)	Research by Aziz (2012), Lopez et al. (2021), and Owen et al. (2004) suggests that facilities such as seating areas, walking paths, cycle paths, playgrounds, sports facilities, dog walking areas, catering establishments and signaging can greatly increase the accessibility of a green space, which leads to people using it more often.
18	Walkability	Higher walkability of green space leads to higher perceived green space accessibility (H3)	Various studies have shown that attractive streets, with well-designed sidewalks and footpaths and little traffic, connecting homes to green spaces have a positive influence on the perceived accessibility of green space

			(Giles-Corti et al., 2005; Goličnik & Thompson, 2010; Pasaogullari & Doratli, 2004).
19	Perceived crowding	Higher perceived crowding in green space leads to lower perceived green space accessibility (H13)	Studies indicate that higher levels of crowding in green spaces result in a poorer experience of a green space visit and sometimes also in poorer perceived access to green space (Byrne and Sype, 2010; Ekkel & De Vries, 2017)
20	Perceived safety	Higher perceived safety in green space leads to higher perceived green space accessibility (H9)	Studies suggest that perceptions of safety in green spaces influence perceived accessibility, with higher perceived safety leading to higher accessibility (Boutellier et al., 2004; Galetzka et al., 2019; Mehta, 2014; Weijs-Perrée et al., 2020).
21	Community bonds among residents	Stronger community bonds lead to higher perceived green space accessibility (H11)	Research by Chiesura (2004) and Wang et al. (2015) indicates that stronger community bonds and more social cohesion in a neighborhood contribute to the development of social capital and positive perceptions of public spaces.
22	Income	Lower socio-economic status leads to lower perceived green space accessibility (H12)	Research by Wang et al. (2015) demonstrates that individuals with lower socio-economic status tend to make less use of green spaces and perceive lower accessibility due to various constraints and someone's socio-economic position can also be measured through income.
Part 4: Obstacles			
23	Most important obstacle when reaching a green space	-	-
24	Interview participation	-	-
Part 5: Closing			

DATA-ANALYSIS

Once the data had been collected, it was imported into SPSS for processing. This involved cleaning the file to ensure the data was fit for analysis. This process involved the removal of impossible values and incomplete responses, as well as adjustments to variable names, measurement levels and values (De Vocht, 2021b). Subsequently, the representativeness of the sample was evaluated through a goodness-of-fit test, in which the variables gender, age and education level were compared between the operational and theoretical populations. Subsequently, the file was weighted to ensure representativeness. Subsequently, the data was subjected to statistical analysis in order to draw conclusions that would answer the main and sub-questions.

An ordinal logistic regression analysis was deemed the most appropriate methodology for this study, as it permitted the examination of causal relationships between the independent and dependent variables. A logistic regression was selected as the most appropriate statistical analysis given that the dependent variable data were in the form of a 5-point Likert scale, which is an ordinal scale of measurement. As there are no requirements for the measurement scale of the independent variables for this test, the majority of the data on these variables did not require adjustment. However, for hypotheses 3, 4, 6, 7 and 8, the item scores for the statements were summed to obtain a total score, or Likert score. Subsequently, the scores were standardised, with all scores assigned a relative value between -1 and +1. This approach facilitated the interpretation of Likert scores (De Vocht, 2021a). Subsequently, an item analysis was conducted to ascertain the validity of the items as measurement tools for the constructs. In this instance, the items were required to demonstrate internal consistency, which was evidenced by a positive correlation between them (De Vocht, 2021a).

Subsequently, three ordinal logistic regressions were conducted. This enabled the causal relationships between the various physical, transport, social, and personal factors and the perceived accessibility of green space to be examined. One ordinal logistic regression was conducted for each dimension, with all independent variables falling under that dimension. Consequently, one regression was conducted for the physical-transport dimension, one for the social dimension, and one for the personal dimension. This analysis tested the extent to which the various types of factors affect perceived accessibility to green space. A Spearman's rho correlation test was also conducted for the personal dimension, with the objective of examining the strength and direction of the association between the dependent variable and the variables from the personal dimension. This additional test was conducted because the ordinal logistic regression model was not statistically significant. The Spearman's rho correlation test was selected as at least one of the variables, namely the dependent variable, has an ordinal scale of measurement. Furthermore, an additional ordinal logistic regression was conducted for all factors collectively to ascertain the collective influence of all factors on the perceived accessibility of green space in a single model. The table below illustrates the correspondence between variables and hypotheses, as well as the statistical test employed to test each hypothesis.

Table 2. *Data-analysis table*

Hypothesis	Variables	Statistical test
H1: Greater availability of green spaces leads to higher perceived green space accessibility.	Number of green spaces (ordinal); Perceived green space accessibility (ordinal)	Ordinal logistic regression (physical-transport dimension)
H2: Greater proximity of green space leads to higher perceived green space accessibility.	Proximity (ordinal); Travel time (ratio); Perceived green space accessibility (ordinal)	Ordinal logistic regression (physical-transport dimension)
H3: Higher walkability of green space leads to higher perceived green space accessibility.	Walkability (interval); Perceived green space accessibility (ordinal)	Ordinal logistic regression (physical-transport dimension)
H4: Higher level of facilities in a green space leads to higher perceived green space accessibility.	Facilities (interval); Perceived green space accessibility (ordinal)	Ordinal logistic regression (physical-transport dimension)
H5: People who walk or bike to green space perceive higher accessibility of green space than those who use other transport modes.	Transport mode (nominal); Perceived green space accessibility (ordinal)	Ordinal logistic regression (physical-transport dimension)
H6: Higher information awareness of green space locations and facilities leads to higher perceived green space accessibility.	Information awareness (interval); Perceived green space accessibility (ordinal)	Ordinal logistic regression (social dimension)
H7: Higher perceived safety in green space leads to higher perceived green space accessibility.	Perceived safety (interval); Perceived green space accessibility (ordinal)	Ordinal logistic regression (social dimension)
H8: Stronger community bonds lead to higher perceived green space accessibility.	Community bonds (interval); Perceived green space accessibility (ordinal)	Ordinal logistic regression (social dimension)
H9: Higher perceived crowding in green spaces leads to lower perceived green space accessibility.	Perceived crowding (ordinal); Perceived green space accessibility (ordinal)	Ordinal logistic regression (social dimension)
H10: Younger individuals perceive lower accessibility of green spaces than older individuals.	Age (ratio); Perceived green space accessibility (ordinal)	Ordinal logistic regression and correlation test (personal dimension)
H11: Lower socio-economic status leads to lower perceived green space accessibility.	Income (ordinal); Education level (ordinal); Perceived green space accessibility (ordinal)	Ordinal logistic regression and correlation test (personal dimension)
H12: A more active lifestyle leads to higher perceived green space accessibility.	Active lifestyle (ordinal); Perceived green space accessibility (ordinal)	Ordinal logistic regression and correlation test (personal dimension)

H13: A lower self-reported health status leads to lower perceived green space accessibility.	Self-reported health status (ordinal); Perceived green space accessibility (ordinal)	Ordinal logistic regression and correlation test (personal dimension)
H14: Less available leisure time leads to lower perceived green space accessibility.	Available leisure time (ordinal); Perceived green space accessibility (ordinal)	Ordinal logistic regression and correlation test (personal dimension)
H15: Women perceive lower accessibility of green spaces than men.	Gender (nominal); Perceived green space accessibility (ordinal)	Ordinal logistic regression and correlation test (personal dimension)
H1 until H15	See all variables above	Ordinal logistic regression

3.3 QUALITATIVE RESEARCH METHOD

The objective of the survey was to gain a deeper understanding of the factors that influence the accessibility of the green areas in the vicinity of Odijk. Nevertheless, the quantitative data were insufficient to provide a comprehensive answer to the research questions. Consequently, data was also gathered through interviews with a range of stakeholders. The objective of the interviews was to gain deeper insights into the specific barriers that residents of Odijk experience when reaching the green spaces around their hometown. The semi-structured interviews employed a pre-established set of questions (Genau, 2023). The order of the questions is also flexible in this type of interview, allowing respondents to answer completely freely. Furthermore, the interviewer may pose additional questions regarding responses that are particularly intriguing, thereby enabling the collection of even more profound insights and richer data.

DATA COLLECTION

A total of twelve interviews were conducted with a variety of stakeholders. The study commenced with interviews of residents of Odijk. The residents were approached via the survey. As previously stated, the survey included a query in which respondents were invited to provide their email address if they wished to elaborate further on their opinions regarding the green spaces in Odijk in an interview. A total of fifteen respondents provided their email addresses. The fifteen respondents were contacted individually via email. The emails that were sent to the respondents explained the intention of the study and asked if they would be willing to participate in an in-depth interview about their views on the green spaces around Odijk. Furthermore, respondents were informed of the flexibility that would be afforded to them in terms of the timing and location of the interviews. Following the transmission of the emails, eight respondents indicated their positive response and confirmed their willingness to participate. Subsequently, arrangements were made for the interviews, taking into account the availability of both the respondents and the researcher. The interviews were conducted between the 8th and 30th of May. The interviews were conducted in a conversational manner, with the duration varying according to the depth of information shared and the experiences of the respondents.

Furthermore, four interviews were conducted with individuals other than residents. The first interview was conducted with an employee of the municipality of Bunnik. The research area around Odijk is situated largely within the boundaries of this municipality, with Odijk itself also falling under its jurisdiction. Furthermore, the research area is partially located within the municipality of Zeist, which is why an employee of this municipality was also interviewed. Furthermore, an employee of the Routebureau Utrecht was interviewed. The Routebureau Utrecht is responsible for the management of recreational routes and route networks for cycling, walking, and boating within the province of Utrecht. Finally, a volunteer from Te Voet, a Dutch foundation that is involved in walking and advocates for walkers, was interviewed.

TOPIC LISTS INTERVIEWS

Interviews with residents

The topic list for the interviews with residents was developed based on the model of Wang et al. (2013a) (see Figure 1), which highlights variables that influence the perceived accessibility of green areas. The aforementioned variables are divided into two main categories: the physical-transport and social dimension. Due to lack of statistically measurable relationships between the personal dimension and perceived green space accessibility, this dimension was not addressed during the interviews. The complete topic lists for the interviews can be found in Appendix 4.

The interviews commenced with queries pertaining to the respondents' visits to green areas and their perceived accessibility. The objective of these questions was to ascertain the frequency and motives behind visits to green areas, as well as the perceived availability and accessibility of these areas. The objective was to gain insight into the relationship between individual behaviours and access to green spaces by asking questions about usual visiting patterns, the main reasons for visits, and social aspects such as preference for visiting alone or with others.

The interviews then moved on to questions about the characteristics of the green spaces and possible ways of improving them. Furthermore, the survey inquired about the obstacles and challenges respondents encounter when utilizing the green spaces in the vicinity of Odijk. By inquiring about the current attributes of the green spaces, desired enhancements, and specific constraints that impede their utilization, the objective was to gain insight into the needs and challenges of the local community with regard to green spaces.

The subsequent section of the survey inquired about the physical characteristics of green areas, including the quantity, proximity, and variety of green spaces, as well as the quality of facilities and road safety in the area. The objective was to investigate how respondents perceive and experience the available green spaces, and which physical aspects influence their use and experience. This was done to gain insight into the role of the physical environment in promoting the green experience.

The final set of questions addressed the social aspects of the green experience, including perceptions of safety, social interactions, available activities, and information awareness. By inquiring about the social dynamics of green spaces, the influence of these factors on respondents' experiences, and the role they play in the use of green areas, the objective was to gain a comprehensive understanding of the social context in which green experiences occur. Not all social and personal factors from the model of Wang et al. (2013a) were questioned in the interviews, as variables such as age, gender, SES, and health status are highly personal and data from the survey, which is representative of all residents of Odijk, provides a more comprehensive understanding of these variables.

The extensive categories were employed as a framework during the interviews with the objective of gaining a comprehensive understanding of the barriers residents face when they want to use green spaces as well as extra insights in the factors that influence the experience and utilization of green spaces in the Odijk area. The data collected served as a valuable source of information for the subsequent data analysis, which identified patterns and themes that are important for understanding the complex dynamics of green perception in the local community.

Interview with employee of Routebureau Utrecht (province of Utrecht)

The interview with the employee of Routebureau Utrecht was conducted with the objective of gaining insight into the province's overarching green policy and strategic vision. The interview addressed the province's priorities, objectives, and long-term plans regarding green spaces and the cycling and walking network within the region. The objective was to gain an understanding of the broader context within which local initiatives take place and to determine how they fit within the provincial policy framework.

Interview with Te Voet volunteer

The objective of the interview with the Te Voet volunteer was to gain insight into the role of the organization in developing and managing walking routes and promoting walking as a recreational activity. The interview addressed the needs and preferences of walkers, the quality and diversity of existing walking routes, and collaboration with other stakeholders and municipalities to enhance and promote the walking network.

Interview with employee of the municipality of Zeist

The interview with the employee of the municipality of Zeist concentrated on local green policy and specific initiatives designed to encourage cycling and walking within the municipality. This encompasses the creation and upkeep of cycling and walking routes, collaboration with other stakeholders and municipalities, and the identification of potential avenues for further expansion and enhancement of the network.

Interview with employee of the municipality of Bunnik

The interview with the employee of the municipality of Bunnik concentrated on local green policy and the specific measures implemented to enhance the accessibility of green spaces. This encompasses the administration and upkeep of existing cycling and walking routes, the identification of bottlenecks and challenges, and the investigation of potential opportunities for the expansion and enhancement of the network within municipal boundaries.

DATA-ANALYSIS

Thematic analysis was employed to identify patterns and themes that emerged from respondents' responses to the collected interview data. Firstly, the interviews were transcribed to get a comprehensive overview of the conversations. Subsequently, the transcripts were carefully examined and analysed to identify any emerging patterns. The coding of the data was conducted by highlighting pertinent passages and assigning them to corresponding thematic categories. This process was conducted iteratively, with codes being added, modified, or redefined as new insights emerged. Following the coding and categorisation of the data, an analysis was conducted to identify key insights regarding the accessibility of green spaces in the vicinity of Odijk, with a particular focus on the barriers encountered by residents when attempting to reach these spaces. The results of the data analysis, in conjunction with the findings of the survey, are presented in the subsequent chapter, which outlines the key themes, patterns, and insights that emerged.

4. DESCRIPTIVE STATISTICS AND REPRESENTATIVENESS OF THE RESPONSE GROUP

This chapter provides a description of the response group based on various characteristics, namely gender, age, and education level. These characteristics were chosen because data about them were collected through the survey, and they provide a clear picture of the composition of the response group. The reasons for the non-response rate are also discussed in this chapter. In addition, particular results noted during the analysis are discussed. Finally, a representativeness analysis is employed to ascertain the extent to which the sample represents the entire population of Odijk. This is essential to enable the statements in the results chapter to be generalized to the entire population of Odijk.

4.1 DESCRIPTION OF RESPONSE GROUP AND NON-RESPONSE

Interviews

The interview group consisted of twelve individuals, eight of whom were Odijk residents and four of whom were employees of organisations and authorities. A total of five female residents were interviewed, along with three male residents. The ages of the respondents ranged from 44 to 68. One of these residents represented the Kromme Rijn Corridor working group. The group comprises concerned citizens in the Kromme Rijn area who are committed to preserving the cultural-historical and natural values of the landscape. They are actively engaged in exploring ways to secure the national task around nitrogen, water and climate in this area. In addition, as previously mentioned, an employee of the municipality of Bunnik, municipality of Zeist, and Routebureau Utrecht and a volunteer from Te Voet were interviewed.

Survey

The survey was distributed among the 6,113 residents of Odijk in a variety of ways. 147 residents participated in the survey. Nevertheless, not all surveys have been completed in their entirety. Consequently, these responses have been excluded from the dataset. For instance, four surveys were completed by individuals who do not reside in Odijk, rendering them unable to respond to the inquiries posed. Furthermore, three respondents indicated that they never visit the green spaces in the vicinity of Odijk. The responses were excluded from the dataset as the respondents were unable to complete the majority of the survey questions, rendering them incomplete. Nevertheless, this is an intriguing outcome that will be incorporated into the descriptive statistics. In the end, 140 responses were deemed valid. This represents a response rate of 2.3%. Of the responses, approximately 35% were collected in person in Odijk, 34% were completed via the QR code in the local newspaper, 21% were completed via the link in the Facebook post of the municipality of Bunnik, and 10% were completed via the link in the LinkedIn post of the province of Utrecht.

A number of factors may have contributed to the non-response in this study. Firstly, several respondents indicated during the face-to-face survey in Odijk that they did not wish to participate in the research, citing a lack of interest or time as the reason. This also applies to residents who have read the posts on social media or in the local newspaper but did not cooperate with the research. A further group of residents were not reached on the street, but also did not read the newspaper or see the messages on social media. Finally, several residents of Odijk were unable to participate in the survey. A few potential reasons may account for this, including low literacy, illness, a lack of access to a computer or smartphone, difficulties with internet-based surveys, or a language barrier.

A total of 64 men and 75 women completed the survey. Additionally, one individual completed the survey and selected the option of "non-binary/other/I'd rather not say". This indicates that women completed the survey more frequently than men (54% compared to 45%) (see Figure 7). However, the overrepresentation of women in this study is explicable. Smith (2008) conducted research into the disparity in survey participation between men and women. The findings of this research indicate that women are more likely to participate in surveys than men.

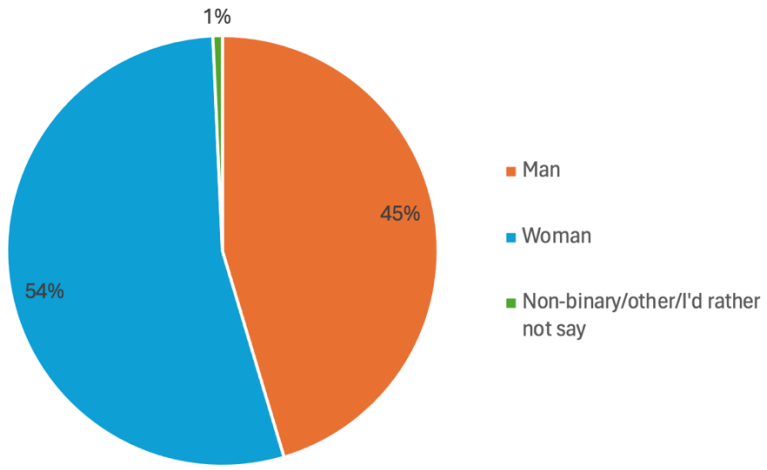

Figure 7. *Gender of the respondents from Odijk*

The age range of the respondents is 15 to 88 years. This implies that there is an absolute age distribution of 73 years. The mean age of the respondents is 54 years. The median age is 56 years. This indicates that 50% of respondents are younger than 56 years of age, while 50% are older than this. Figure 8 presents the age distribution of respondents in the form of a box plot. The box plot displays a negatively skewed distribution, indicating that a relatively small number of surveys were completed by younger individuals and a relatively large number were completed by older individuals.

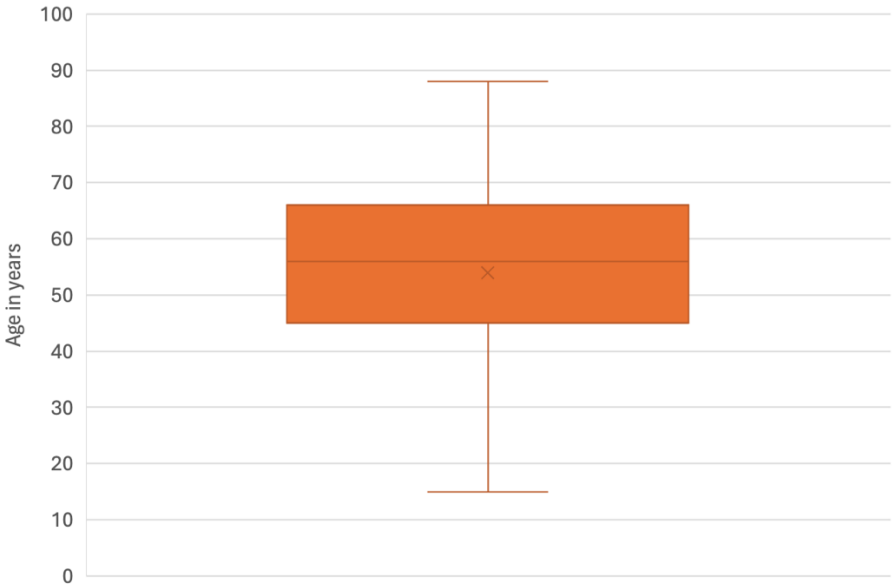

Figure 8. *Age distribution of respondents from Odijk*

Figure 9 presents the relative distribution of the respondents' educational levels. It illustrates that the majority of respondents have attained either an HBO or WO master's degree or a doctorate degree (33%). Subsequently, respondents who have completed an HBO or WO bachelor's degree (32%) and respondents with a HAVO, VWO or MBO2-4 diploma (21%) are the next most prevalent group. A total of 13% of respondents indicated that they have obtained a VMBO, HAVO- or VWO-onderbouw, or MBO1 diploma. The category of primary education is the least represented. This represents the highest level of education completed by only 1% of respondents. However, the overrepresentation of those with secondary and higher education compared to those with lower education is a common phenomenon in surveys (Visscher, 1997). One potential explanation for this discrepancy is that those with higher levels of education were more frequently engaged in research and survey work during theisr

studies or professional careers. This enables them to better empathize with the researcher. This may result in a greater willingness to participate in the study and complete the survey. Those with lower levels of education are likely to have had less exposure to research during their education and/or career, which may make them less inclined to participate in research.

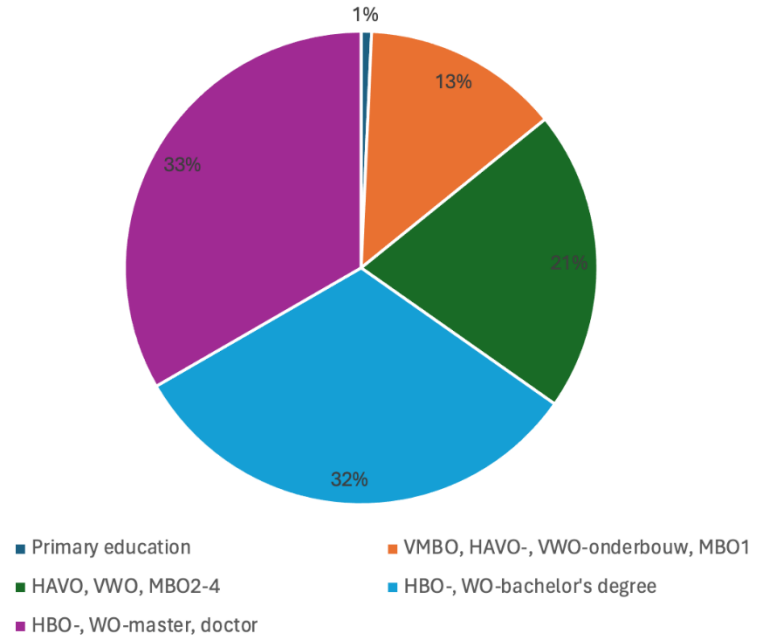

Figure 9. *Education level of the respondents from Odijk*

4.2 DESCRIPTIVE RESULTS

PERCEIVED GREEN SPACE ACCESSIBILITY

The variable 'perceived green space accessibility' is a measure of the ease with which residents of Odijk perceive access to green spaces from their homes. This perception was gauged by means of the following statement: "The green spaces around Odijk are easily accessible from my home." The respondents were presented with a five-point Likert scale, with the options "strongly disagree," "disagree," "disagree/disagree," "agree," and "strongly agree". The distribution of responses is shown in table 3.

Table 3. *Distribution of responses to the survey question on perceived green space accessibility*

Answer category	Number of respondents	Percentage
Strongly disagree	0	0%
Disagree	3	2.1%
Neither agree nor disagree	7	5%
Agree	46	32.9%
Strongly agree	84	60%

The frequency distribution of responses demonstrates a clear trend towards positive perceptions of the accessibility of green spaces. Indeed, the results indicate that an overwhelming majority of respondents (130 out of 140, or 92.9%) agreed or strongly agreed with the statement that green spaces around Odijk are easily accessible from their homes. A mere three respondents (2.1%) expressed disagreement with this assertion, while a slightly larger proportion (5%) indicated a neutral stance. Given that this is a categorical variable, it is not possible to derive the mean, mode or median. However, by converting the responses into numbers, this was possible. The response category "strongly disagree" was therefore converted to -2, "disagree" to -1, "disagree/non-disagree" to 0, "agree" to 1, and "strongly agree" to 2. The mean value is 1.51, which lies between

the response categories of “strongly agree” and “agree”. The median, or middle observation, is 2, which is above the mean, indicating a negatively skewed distribution. The most frequently occurring value, or the mode, is 2, which corresponds to the response option “strongly agree”.

Perceptions of green space accessibility were also analysed by gender and education level. The results demonstrate that both men and women hold a predominantly positive perception of green space accessibility. The percentages are comparable, although female respondents (*M* = 1.53, *SD* = 0.577) tend to perceive green space accessibility as higher on average than male respondents (*M* = 1.48, *SD* = 0.816). For both male and female respondents, the median (*Md* = 2) is above the mean, indicating a negatively skewed distribution. For both males and females, the mode is 2, which can be interpreted as indicating a strong agreement with the statement in question.

The results also show that regardless of age group, the majority of respondents agreed or strongly agreed with the statement that the green spaces around Odijk are easily accessible. The age groups 45 to 65 years (M = 1.56, SD = 0.650) and 65 years or older (M = 1.62, SD = 0.582) experienced the highest level of accessibility. The age groups of 0 to 25 years (M = 1.31, SD = 1.109) and 25 to 45 years (M = 1.31, SD = 0.679) experienced slightly lower accessibility, yet both groups expressed a positive perception of accessibility. Across all age groups, the mode and median response was 2, indicating a strong level of agreement.

When respondents with different levels of education were compared, it was evident that the perception of green space accessibility was consistently positive, regardless of education level. On average, highly educated respondents (*M* = 1.55, *SD* = 0.618) perceived green space accessibility the highest. This group was followed by the moderately educated (*M* = 1.50, *SD* = 0.577). Low-educated respondents perceived green space accessibility to be lowest on average (*M* = 1.30, *SD* = 1.081). For all education groups, both the mode and median are 2, or "strongly agree".

The analysis of responses by age, gender and education level shows that there is a broad consensus on the accessibility of green spaces in Odijk. Positive perceptions are consistent across different demographic groups, suggesting that green spaces are easily accessible to all residents regardless of age, gender or education level. This reinforces the overall perception that green spaces in Odijk are easily accessible to the entire community.

VISITS TO GREEN SPACES AROUND ODIJK

The objective of this study is to assess the accessibility of the green outdoor area around Odijk. To this end, a number of questions were included in the survey to gain insight into respondents' visits to the green spaces. The results of these questions are presented in the form of graphs below. Of note is the finding that 50% of respondents visit the green outskirts around Odijk at least once a week, with 29% of respondents reporting daily or near-daily visits (see Figure 10). Three respondents indicated that they never visit the green areas around Odijk. The reasons for this are twofold: firstly, there are insufficient green areas in the vicinity of Odijk, and secondly, the respondents themselves are unable to visit green areas. It is also noteworthy that the most frequently cited reasons for visiting a green space by respondents from Odijk were maintaining physical fitness and health, walking one's dog, and relaxation (see Figure 11). The green area most frequently visited by the majority of respondents is the area along the Kromme Rijn (see Figure 12). Finally, it is notable that the majority of respondents from Odijk travel to the green spaces on foot, with 72% of respondents indicating this mode of transportation (see Figure 13).

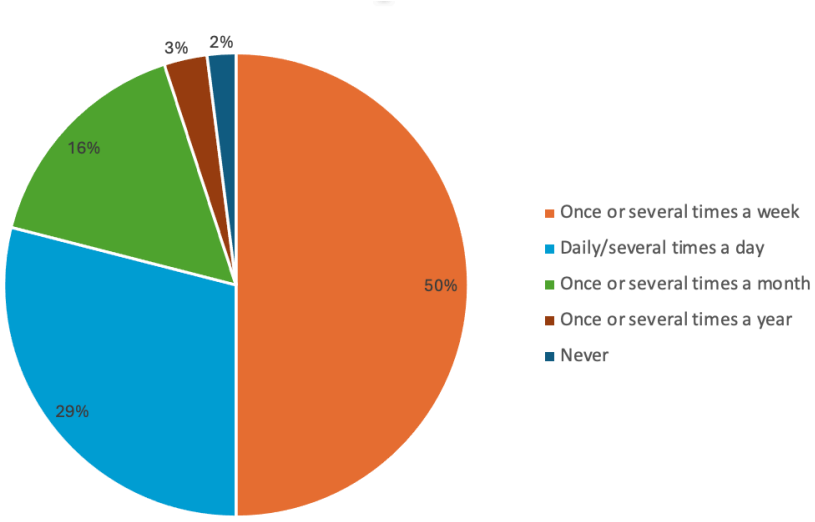

Figure 10. *Number of visits to green spaces around Odijk by respondents from Odijk*

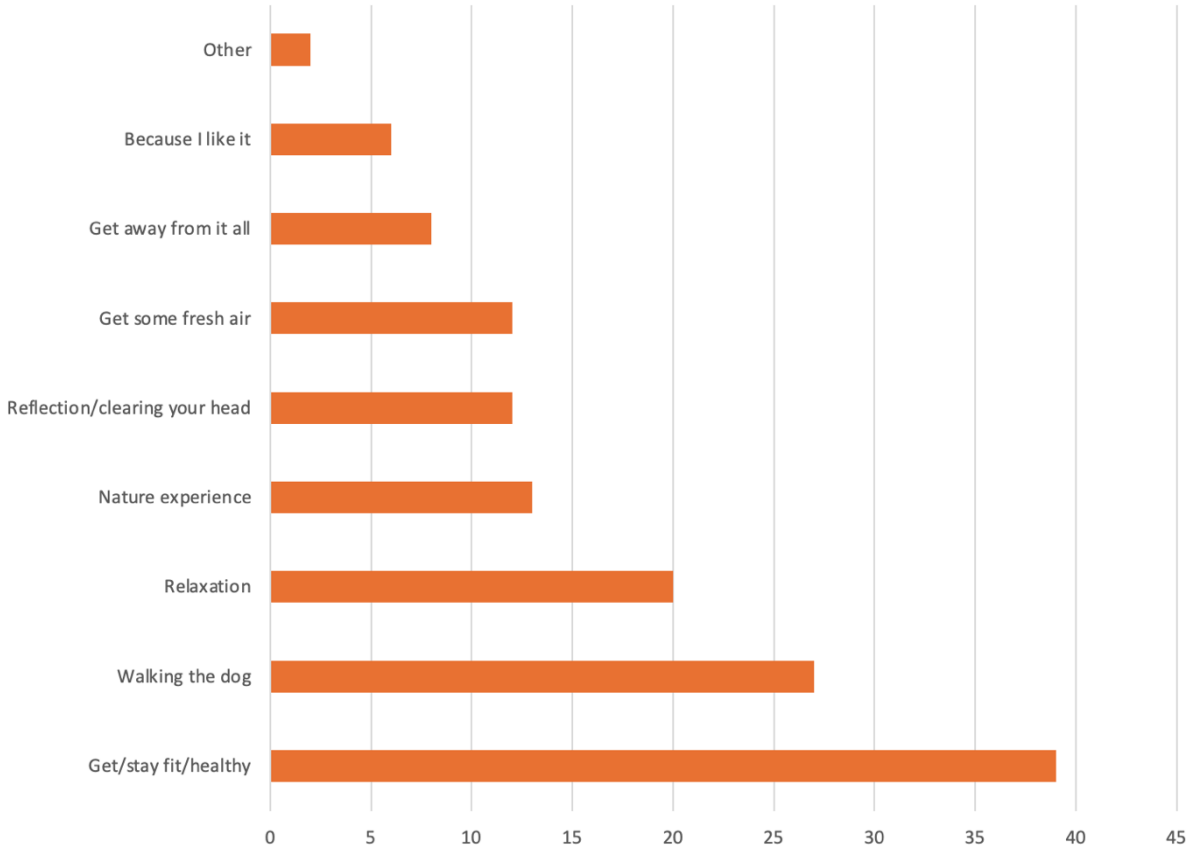

Figure 11. *Most important reasons for visiting green space for respondents from Odijk*

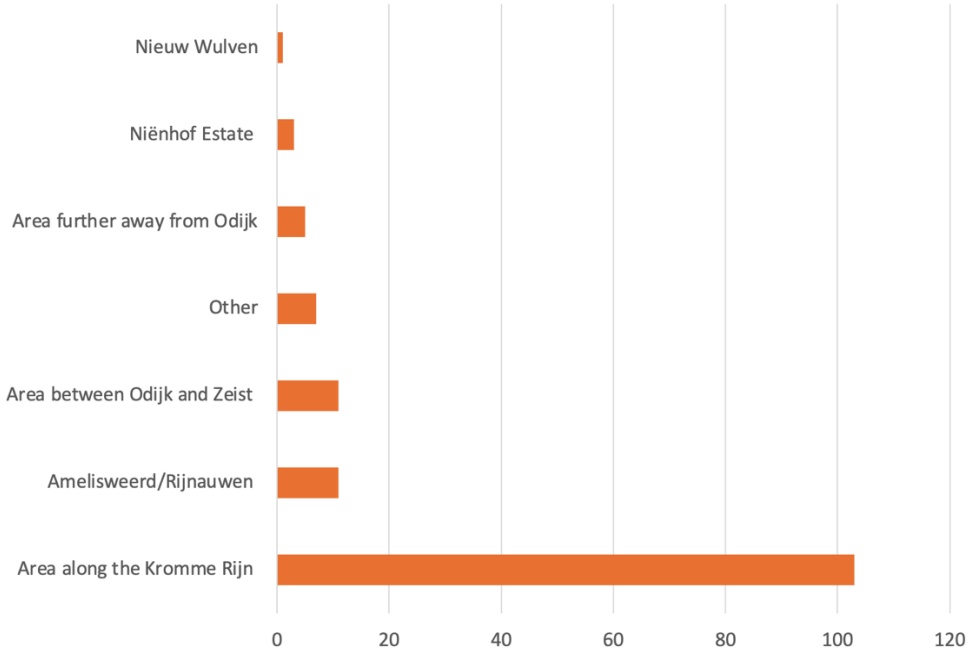

Figure 12. *Most visited green areas by respondents from Odijk*

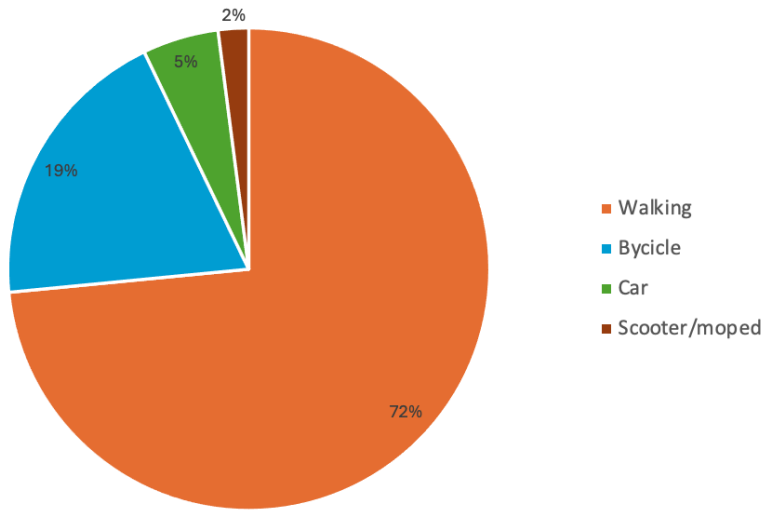

Figure 13. *Means of transport by which respondents from Odijk travel to green spaces*

4.3 REPRESENTATIVE ANALYSIS

In order to ascertain whether the frequency distributions of categorical variables in the sample correspond to those of the theoretical population, a Chi-square goodness-of-fit test was conducted. This test can be employed to ascertain the representativeness of the sample with respect to the entire population, in this case, the residents of Odijk (De Vocht, 2021b). In this study, it was decided to perform a Chi-square goodness-of-fit test on three variables: gender, age, and education level. These variables were selected for analysis because data from the entire population are also available via the CBS (2024). Gender is a categorical variable that does not require adjustment for this test. Prior to the commencement of the test, the education level was first classified into the three categories utilized by CBS, namely low, secondary, and highly educated (De Vries, 2021). Age is a ratio variable in the sample and is also divided into the same categories that CBS uses (CBS, 2024b). The following categories are of interest: The age categories were defined as follows: 15 to 25 years, 25 to 45 years, 45 to 65

years, and 65 years or older. The CBS classification includes an additional category, namely 0 to 15 years, which is not included in this study as only individuals aged 15 or older participated in the survey.

Gender

A Chi-square goodness-of-fit test shows that the gender distribution in the sample does not differ significantly from that in the population (see Appendix 5). Although there is a slight overrepresentation of women and an underrepresentation of men, these differences are not significant, X^2 (1, *N* = 139) = 1.226; *p* = 0.268.

Age

A Chi-square goodness-of-fit test shows that the age distribution in the sample does not differ significantly from that in the population (see Appendix 5). There is a slight overrepresentation of residents older than 45 years old and a slight underrepresentation of residents younger than 45 years old, but these differences are not significant, X^2 (3, *N* = 140) = 3.446; *p* = 0.328.

Education level

A Chi-square goodness-of-fit test shows that the distribution of education level in the sample differs significantly from that in the population (see Appendix 5). There is an overrepresentation of highly educated people and an underrepresentation of residents with a secondary and low level of education and these differences are significant, X^2 (2, *N* = 140) = 38.054; *p* < 0,001.

Weighing the file

The results of the tests indicate that the sample is not representative of the entire population with regard to all variables. Nevertheless, this representativeness can be achieved by weighting the file. By means of weighting, the distribution of the sample is adjusted in such a way that it corresponds to the theoretical distribution of the population. Consequently, the overrepresented groups will be given a reduced weighting, while the underrepresented groups will be given an increased weighting (De Vocht, 2021b). In this study, it was determined that the file should be weighted based on the variable "educational level". The variable was selected for weighting because its distribution differs significantly from that of the theoretical population. Furthermore, this variable provides a more nuanced understanding of the socio-economic status of the resident than gender and age do. Education level is associated with the occupational opportunities available to an individual and, as a consequence, also with their income and wealth levels. The existing literature indicates that socioeconomic status is a significant factor influencing perceptions of the residential environment and, consequently, access to green spaces (Byrne & Wolch, 2009; Wang et al., 2015). The weighting factors have therefore been calculated based on the education level of the residents.

The weighting factors can be calculated by dividing the proportion of the group in the population by the proportion of the group in the sample.

The weighting factor is for residents with a low education level: $\mathrm{G} = \frac{820/5410}{20/140} = \frac{0.152}{0.143} = 1.06.$

The weighting factor for residents with a secondary education level is: $\mathrm{G} = \frac{1560/5410}{28/140} = \frac{0.288}{0.2} = 1.44.$

The weighting factor for residents with a high level of education is: $\mathrm{G} = \frac{1610/5410}{92/140} = \frac{0.298}{0.657} = 0{,}45.$

This means that each poorly educated respondent counts 1.06 times, each secondary educated person 1.44 times and each highly educated person 0.45 times.

5. RESEARCH RESULTS

This chapter presents the findings of the research conducted for this study. The analysis is based on data collected through a survey of Odijk residents, interviews with residents and interviews with other stakeholders. The four sub-questions will be addressed in this analysis. First, the initial three sub-questions are addressed, with a focus on the influence of the three dimensions, namely the physical-transport dimension, the social dimension and the personal dimension, on the perceived accessibility of green spaces. To this end, the quantitative results obtained from the survey are presented, supplemented with interesting qualitative findings collected from the interviews. The fourth sub-question is then addressed by identifying and examining the key barriers that prevent residents from accessing and utilising green spaces in their living environment. The data utilized to answer this question primarily originates from the responses to the 23rd survey question.

5.1 PHYSICAL-TRANSPORT DIMENSION

The first sub-question is: *To what extent and how do the physical characteristics of green spaces and transport-related factors influence the perceived accessibility of green spaces around Odijk?* This sub-question is answered by means of an ordinal logistic regression. This test clarifies the influence of the independent variables from the physical-transport dimension (e.g. 'number of green spaces', 'proximity', 'walkability', 'facilities', and 'transport mode') on the dependent variable with an ordinal measurement scale (perceived green space accessibility). The hypotheses that are tested by this test are hypotheses 1 through 5. The quantitative data is augmented by insights derived from the interviews, thereby providing a more comprehensive response to the sub-question.

RELIABILITY ANALYSES

Before this regression analysis could be carried out, it was necessary to carry out reliability analyses for the variables 'facilities' and 'walkability' (see Appendix 6.1). The Cronbach's Alpha for the eight statements on facilities is 0.809. As this value is between 0.8 and 0.9, the statements cover the underlying construct, or the level of facilities, well (Van Heijst, 2021). If one of the statements were omitted, this would not change. Overall, the statements used are a valid measure of the level of facilities and the statements will be used in the remainder of this research.

The Cronbach's Alpha for the six statements on walkability is 0.729. Since this value is between 0.7 and 0.8, the statements sufficiently cover the underlying construct, or the walkability (Van Heijst, 2021). If one of the statements were omitted, this would not change. The statements used are therefore a valid measure of walkability and will be used in the remainder of this research.

INTERPRETATION ORDINAL LOGISTIC REGRESSION

An ordinal logistic regression was conducted to examine the effect of the physical-transport related factors of 'number of green spaces', 'proximity', 'travel time', 'walkability', 'facilities', and 'transport mode' on the perceived green space accessibility, which was measured on an ordinal 5-point scale ranging from 1 (low accessibility) to 5 (high accessibility). The output tables of this logistic regression (see Appendix 6.2) are summarized in Table 4 and will be interpreted in this section. The ordinal logistic regression model was statistically significant, $X^2(6) = 56.676$, $p = <.001$, indicating that the model fit the data better than a model with no predictors. Goodness-of-fit tests indicated that the model adequately fit the data adequately, with both the Pearson and Deviance tests not being significant (both $p = 1.0$).

The parameter estimates indicated that 'number of green spaces', 'proximity', 'walkability', and 'transport mode' were significant predictors of perceived green space accessibility. Specifically, the odds of being in a higher perceived accessibility category increased by a factor of 2.25 for an increase of 1 in 'number of green spaces' ($B = 0.812$, $SE = 0.286$, Wald $X^2 = 8.062$, $p = .005$); by a factor of 2.78 for an increase of 1 in 'proximity' ($B = 1.021$,

SE = 0.375, Wald X^2 = 7.424, p = .006); by a factor of 2.86 for an increase of 1 in 'walkability (B = 2.855, SE = 0.974 Wald X^2 = 9.096, p = .003); and by a factor of 2.18 when someone walks or uses a bike to travel to the green space instead of another transportation mode (B = 2.177, SE = 0.841, Wald X^2 = 6.710, p = .010).

In summary, the ordinal logistic regression analysis showed that 'number of green spaces', 'proximity', 'walkability' and 'transport mode' significantly predicted perceived accessibility of green spaces. Residents who are more satisfied with the number of green spaces, who perceive green spaces to be closer to their home, who perceive green spaces to be more walkable, and who walk or cycle to green spaces in their living environment are more likely to perceive the accessibility of these green spaces to be higher. The research results therefore support hypotheses 1, 2, 3 and 5. The study results do not provide evidence for hypothesis 4, that more facilities lead to higher perceived accessibility of green spaces.

Table 4. *Results of ordinal logistic regression physical-transport dimension*

	Estimate B	***SE***	***Wald Chi-Square***	***p-value***	***Odds Ratio***
Number of green spaces	0.812	0.286	8.062	0.005	2.252
Proximity	1.021	7.424	7.424	0.006	2.776
Travel time	-0.023	0.020	1.369	0.242	0.977
Walkability	2.855	0.947	9.096	0.003	17.374
Facilities	0.021	1.020	0.000	0.984	1.021
Transport mode	2.177	0.841	6.710	0.010	8.820

INSIGHTS FROM INTERVIEWS

Number of green spaces

The interviews with Odijk residents on the accessibility and experience of green spaces near Odijk yielded mixed opinions on the amount and variety of green spaces. Respondent 4 described Odijk as: "Rural and green. It's just incredibly green. There's more than enough green" [1]. Similarly, Respondent 5 felt that the area is still quite versatile due to the presence of meadows, water and forests. However, other respondents expressed a more critical view. Respondent 2 observed that "the area lacks significant green spaces" and that the green experience is "one-sided", in part due to the fragmented nature of the land. This view is shared by Respondent 7, who said:

> And in general, I think the immediate vicinity of my home in the neighbourhood is a very nice walking area, namely along the Kromme Rijn. But at the same time, it is also the limitation, because that's about it. If you want to walk in other places, you have to get in the car or bus first.

For some residents, the limited variety and fragmentation of green spaces makes them less inclined to use these areas and experience poorer access. Conversely, other residents value the quantity and versatility of green spaces, which enhances their perception of accessibility and use of these areas. Consequently, the perception of the quantity of green space is contingent upon individual preferences and the residential locations within Odijk. Overall, there is a clear appreciation for the green space present, but also a desire for more variety and accessibility.

This perspective is also reflected in the interviews with municipal employees in Zeist and Bunnik. Both describe the area around Odijk as a diverse area, with agriculture, livestock farming, large estates, a river, and a diversity of species living in the area. However, large parts of the area are less or not accessible to hikers and cyclists. According to the policy officer of the municipality of Bunnik, this is mainly due to the agricultural use of a large part of the area. In addition, according to this employee of the municipality of Bunnik, the biggest problem encountered when expanding the green spaces in the area is land holdings.

[1] Own translation from Dutch to English, which applies to all subsequent quotations.

Proximity

The results of the interviews with Odijk residents indicate that the perception of proximity to green space varies as well. Some respondents, such as 1, 3 and 5, express appreciation for the green environment and perceive it as very proximate to their homes. For example, Respondent 5 said: “No, [the green space] I really don't find far at all. That's the best thing here actually. You can do everything on foot.” However, others, such as Respondent 2, perceive a lack of variety and limited alternatives without significant travel. The proximity of meadows and specific walking routes, such as the Kromme Rijnpad, is experienced positively by some residents, while others criticize the fragmentation and limited accessibility of green areas. The diverse experiences of residents influence their perception of the accessibility of green space. Some residents perceive distance and lack of variety as limitations, while others perceive the direct proximity and versatility as positive attributes.

Walkability

The interviews with Odijk residents on the walkability of green areas revealed several themes that influence perceived access of green spaces. A significant theme that emerged from the interviews was the quality and width of the paths. According to residents, some paths are of sufficient quality and width for safe walking, while other parts are narrow and muddy, which limits accessibility and compromises safety. Furthermore, Respondent 4 observed that some paths were so narrow that they were unsafe for use with a stroller. This issue was partially addressed last year through the implementation of improvements such as the widening of certain paths with gravel. However, inconsistencies remain a concern. Te Voet volunteer says that paving the Kromme Rijnpad does reduce these inconsistencies, however, this is also not a desirable solution since: “If it were a paved path, it would be cycled on even more and you don't want that either as pedestrians.”

A further theme that emerges from the data is that of shared use of the paths. Respondent 5 drew attention to the disruption caused by young people recreating at the Kromme Rijn with loud music. Regarding the younger demographic, she states: “But nowadays, after the corona, there is more swimming [in the Kromme Rijn], but [those young people] have very loud music on, I don't think it suits nature. And they really don't clean up their mess.” Furthermore, she drew attention to the issue of cyclists using the footpaths, which is not officially permitted, yet occurs nevertheless, as a source of disturbance. Such actions give rise to conflict and diminish the walking experience. Respondent 7 corroborated this observation and proposed the following: “Actually, it should perhaps be made clearer that cycling is not allowed there.” Finally, road safety is also a factor to be considered. The narrowness and congestion of roads, such as the Odijkerweg towards Driebergen and the Langbroekerwetering towards Werkhoven, where pedestrians, cyclists and vehicles share the same space, make walking on them unpleasant and dangerous. Respondent 4 said: "The Odijkerweg is life-threatening for a pedestrian" and respondent 5 characterized the Langbroekerwetering as: “Dangerous to walk on.” This is particularly the case due to the lack of separate walking paths and the high speed of cars, as indicated by respondents 4, 7 and 8. These factors significantly diminish the perceived accessibility and enjoyment of the green spaces in the vicinity of Odijk.

The research findings indicate the necessity for enhancements in infrastructure and road user conduct to enhance the security and walkability of Odijk's green spaces. This includes the implementation of clear demarcations between different user groups, the improvement of paths through the adjustment of widths and the regular maintenance of these paths, and the instigation of information campaigns designed to promote road user awareness and behaviour.

Transport mode

The experiences of residents of Odijk regarding the means of transport to green spaces are diverse. Some residents, including respondents 1, 3, 4, 5 and 8, derive pleasure from the proximity of green spaces and choose to travel by walking or cycling, which is associated with a higher perceived accessibility. In contrast, other respondents, such as respondents 2 and 7, feel compelled to travel to other green areas by car or bus due to the limited variety and alternatives in the immediate area. For example, Respondent 7 said: “In the immediate area there are few alternatives other than walking along the Kromme Rijn ... if you want to walk in other places, you

must get in the car or bus first." The choice of transport is related to the way the residents use the green space and the perceived accessibility of it. In general, residents who walk to green spaces had a more positive view of the quality and accessibility of these spaces than residents who go to other green areas by car.

Facilities

Although the supply and quality of facilities in the green space did not appear to be a significant predictor of the perceived accessibility of green space in Odijk, this topic was still frequently discussed during the interviews. It became evident that this feature of the environment exerted a significant influence on the utilisation and valuation of the area in question. For instance, Respondent 2 stated: "The supply of walking paths, cycle paths, and benches is particularly limited." However, unlike respondent 2, a significant number of respondents had a positive opinion about the cycle paths. For instance, Respondent 1 described the cycling network around Odijk as " extensive" and " completely safe", which contributes to a positive cycling experience.

Nevertheless, most respondents do agree with respondent 2 regarding the number of seating areas. Respondent 5 indicates: "I think that there is a limited number of benches in many locations, especially along the Kromme Rijnpad." Respondent 7 made a similar observation, noting that: "In some locations, benches are consistently available, but in other parts suddenly there are none for a very long time." This respondent also noted that some benches are inadequately maintained and sometimes become overgrown by vegetation, thus limiting usability. According to the interviewed employee of Routebureau Utrecht, benches and waste bins are very nice for walkers along a walking path, but: "They create litter, and you have to maintain them. Often the purchase is not the problem. But maintaining a bench is the problem. And this is especially true now that the municipality has had to make cuts." Despite the maintenance costs and the litter they create, Respondent 8 stated: "I miss trash cans during my walks sometimes."

Another facility that was mentioned by several respondents as a wish to improve the experience in green areas was information boards about nature. For example, Respondent 6 suggests that information boards about flora and fauna could be placed along the paths, which would increase the educational value of the walks. He proposes signs with information about the vegetation, grass snake, nightingale, warblers or other birds that live in the area. Finally, catering facilities are not considered necessary by some, such as Respondent 4, while others, such as Respondent 5, experience their absence as a loss during longer walks. The diversity of opinions shows that, although not the most important factor, the presence and quality of facilities in green spaces have a significant influence on how residents experience and use these spaces.

5.2 SOCIAL DIMENSION

The second sub-question is: *To what extent and how do social factors influence the perceived accessibility of green spaces around Odijk?* This sub-question will be answered by means of an ordinal logistic regression. This shows the extent to which the perceived accessibility of green spaces is influenced by factors from the social dimension (e.g. 'information awareness', 'perceived safety', 'community bonds', and 'perceived crowding'). The hypotheses that are tested by this test are hypotheses 6 through 9. The quantitative data is augmented by insights derived from the interviews, thereby providing a more comprehensive response to the sub-question.

RELIABILITY ANALYSES

Before this regression analysis could be carried out, it was necessary to carry out reliability analyses for the variables 'information awareness', 'perceived safety' and 'community bonds' (see Appendix 6.1). The Cronbach's Alpha for the four statements about information awareness is 0.896. As this value is between 0.8 and 0.9, the statements cover the underlying construct, or the information awareness, well (Van Heijst, 2021). If one of the statements were omitted, this would not change. Overall, the statements used are a valid measure of the level of facilities and the statements will be used in the remainder of this research.

The Cronbach's Alpha for the statements on 'perceived safety' (0.767) and 'community bonds' (0.776) is both between 0.7 and 0.8. This means that the statements provide acceptable coverage of the underlying constructs (Van Heijst, 2021). If one of the statements were omitted, this would not change. All in all, the statements used are a valid instrument for measuring 'perceived safety' and 'community bonds' and the statements will be used in the remainder of this research.

INTERPRETATION ORDINAL LOGISTIC REGRESSION

An ordinal logistic regression was conducted to examine the effect of the social factors of 'information awareness', 'perceived safety', 'community bonds', and 'perceived crowding' on the perceived green space accessibility. The output tables of this logistic regression (see Appendix 6.3) are summarized in Table 5 and will be interpreted in this section. The ordinal logistic regression model was statistically significant, $X^2(4) = 31.917$, $p = <.001$, indicating that the model fit the data better than a model with no predictors. Goodness-of-fit tests indicated that the model adequately fit the data adequately, with both the Pearson and Deviance tests not being significant ($p = .286$ and $p = 1.0$, respectively).

The parameter estimates indicated that 'information awareness' and 'perceived safety' were significant predictors of perceived green space accessibility. Specifically, the odds of being in a higher perceived accessibility category increased by a factor of 29.0 for an increase of 1 in 'information awareness' (B = 3.368, SE = 0.784, Wald $X^2 = 18.462$, $p = <.001$) and by a factor of 6.4 for an increase of 1 in 'perceived safety' (B = 1.856, SE = 0.738, Wald $X^2 = 6.328$, $p = .012$).

In summary, the ordinal logistic regression analysis showed that both 'information awareness' and 'perceived safety' significantly predicted perceived green space accessibility. Residents who are more aware of information about the green spaces in their living environment and who perceive the safety of these green spaces to be higher are more likely to perceive the accessibility of these green spaces to be higher. These findings suggest that increasing information awareness and perceived safety could improve residents' perceptions of accessibility. The research results support hypotheses 6 and 7. The study results do not provide evidence for hypotheses 8 and 9, that stronger community bonds and higher perceived crowding lead to higher perceived green space accessibility.

Table 5. *Results of ordinal logistic regression social dimension*

	Estimate B	***SE***	***Wald Chi-Square***	***p-value***	***Odds Ratio***
Information awareness	3.386	0.784	18.462	<0.001	29.020
Perceived safety	1.856	0.738	6.328	0.012	6.398
Community bonds	-0.587	0.883	0.442	0.506	0.556
Perceived crowding	0.133	0.218	0.375	0.540	1.142

INSIGHTS FROM INTERVIEWS

Information awareness

The interviews with residents also indicated that information awareness influences how residents use and value the green spaces. For instance, Respondent 2 highlighted the limited awareness and inadequate indication of '*klompenpaden*', while Respondent 8 emphasised the necessity for more information regarding the responsible parties and the means of reporting issues with the paths. This lack of clarity leads to a sense of reduced information among residents, which in turn engenders feelings of uncertainty and frustration when using green spaces. Furthermore, an employee of the municipality of Zeist stated that the northern part of the research area is relatively unknown, which has resulted in a lower level of usage and lower perceived accessibility to this area. He suggested that increasing awareness of these paths could be achieved by improving signage and by creating a comprehensive walking map of the area. He noted that current walking maps of the area are often incomplete,

and thus suggested that a complete walking map should be created and made available in both digital and printed formats at the tourist office and online.

Perceived safety

During the interviews, safety was referenced as a factor influencing the use and appreciation of these spaces. The safety of the green space around Odijk is influenced by a number of factors, including maintenance, the cleanliness of the paths, lighting and the general feeling of safety. The respondents expressed concerns regarding the impact of waste issues, muddy paths, and inconsistent maintenance on the shared sense of safety during walks. The municipality of Bunnik has the following problem when it comes to maintenance of paths around Odijk: “But we also have a very limited budget. There are only more cuts to come. So, it's not going to get any better in the coming years. Money but also manpower.” However, as much maintenance as possible is carried out and this is done through a collaboration with Utrechtse Heuvelrug Nationaal Park. This collaboration, despite limited resources, underlines the importance of reporting overdue maintenance and tackling problems collectively:

> We have one colleague for roads and three BOAs (supervisors) that we use jointly for supervision, but they cannot be everywhere at the same time. We indeed rely on reports from hikers. And we really don't have time to look at it ourselves.

Furthermore, an employee of the municipality of Zeist pointed out the high costs of maintenance for the municipality and the limited budgets and said to consider a model with walking vignettes, comparable to mountain bike routes: "The costs are often too much for the municipality. But if you look for example to the Pieterpad, which is also maintained by volunteers. For mountain bike routes we have a vignette structure that is successful.” Furthermore, the '*klompenpaden*' are managed by Landschap Erfgoed Utrecht, which employs volunteers to maintain the paths. This also saves money and manpower from their own organization. In addition, hikers are encouraged to report instances of overdue maintenance on hiking trails to the Routebureau Utrecht. However, this is not known to everyone. Respondent 8 said about this: “But I don't know where I should report it [when I encounter poorly maintained paths].”

The ambivalent view of lighting also illustrates the necessity for the implementation of carefully considered safety measures that preserve both safety and the natural environment. Some residents indicated that the paths in the green areas around Odijk are not illuminated at night, which discourages walking at night and endangers safety. However, this is not experienced as a problem by other residents, they consider it a natural phenomenon and an evening walk through the illuminated village as an acceptable alternative. For example, Respondent 3 said: "I think lighting on the Kromme Rijnpad is absolutely unnecessary. No, that is also environmentally polluting.” In addition, Respondent 5 stated: “In the evening I don't take the route along the Kromme Rijn when it is dark. Then I take the inner round of Odijk which is illuminated.”

Furthermore, the condition of the trails was identified as a crucial factor in ensuring safety. The condition of the paths and the lack of clarity about the rules for, for example, allowing dogs to run loose contribute to an unsafe atmosphere. The absence of clear regulations and the lack of appropriate facilities, such as waste bins, serve to exacerbate the problem, which has a negative impact on perceptions of cleanliness and safety. This emphasises the significance of effective information dissemination and management to enhance safety and cleanliness in green spaces, thereby enhancing the overall experience of residents.

Perceived crowding

Although perceived crowding in the green spaces around Odijk did not appear to be a significant predictor of perceived accessibility of the green space, it does influence the perception of some respondents about the accessibility of these areas. For instance, Respondent 1 stated the following: “During the weekends, the area is always quite busy, particularly in the afternoon … but you just take that into account, then I think, well, then I will walk a little earlier or a little later.” Furthermore, other respondents perceive this bustling atmosphere as a

positive and non-disruptive aspect of their experience. Consequently, their experience of the green space is to a lesser extent influenced by the crowds.

5.3 PERSONAL DIMENSION

The third sub-question is: *To what extent and how do personal factors influence the perceived accessibility of green spaces around Odijk?* This sub-question will be answered by means of an ordinal logistic regression. This shows the extent to which the perceived accessibility of green spaces is influenced by factors from the personal dimension (e.g. 'age', 'gender', 'income', 'education level', 'self-reported health-status', 'active lifestyle', and 'leisure time'). The hypotheses that are tested by this test are hypotheses 10 through 15. The quantitative data is augmented by insights derived from the interviews, thereby providing a more comprehensive response to the sub-question.

INTERPRETATION ORDINAL LOGISTIC REGRESSION

An ordinal logistic regression was conducted to examine the effect of the personal factors of 'age', 'gender', 'income', 'education level', 'self-reported health-status', 'active lifestyle', and 'leisure time' on the perceived green space accessibility. See Appendix 6.4 for the SPSS output tables. The ordinal logistic regression model was statistically non-significant, $X^2(8) = 7.131$, $p = 0.523$ (see Table 6). This non-significant result suggests that the variables included in the model do not significantly contribute to explaining the levels of the dependent variable (perceived green space accessibility). Therefore, the model does not provide a better fit to the data than a model with no predictors.

Table 6. *Model Fit Statistics table personal dimension*

	-2 Log Likelihood	***Chi-square***	***df***	***p-value***
Intercept only	188.683			
Final	181.552	7.131	8	0.523

An ordinal logistic regression with all variables from this study also showed that the variables from the personal dimension had no significant influence on perceived green space accessibility ($p > 0.05$). Only the variables 'number of green spaces', 'walkability', 'information awareness' and 'transport mode' had a significant influence on the perceived green space accessibility in this model (see Table 7 and Appendix 6.5).

Table 7. *Results of ordinal logistic regression all variables*

	Estimate B	***SE***	***Wald Chi-Square***	***p-value***	***Odds Ratio***
Number of green spaces	0.995	0.342	8.439	0.004	2.705
Proximity	0.830	0.430	3.729	0.053	2.293
Travel time	0.010	0.023	0.188	0.665	1.010
Walkability	3.877	1.257	9.507	0.002	48.279
Facilities	0.589	1.353	0.189	0.663	1.802
Transport mode	3.537	1.232	8.242	0.004	34.364
Information awareness	2.739	1.023	7.174	0.007	15.472
Perceived safety	-0.457	1.243	0.135	0.713	0.633
Community bonds	-2.166	1.244	3.033	0.082	0.115
Perceived crowding	0.415	0.291	2.030	0.154	1.514
Age	0.025	0.020	1.582	0.209	1.025
Gender	-0.265	0.621	0.182	0.670	0.767
Self-reported health status	-0.180	0.314	0.331	0.053	0.835
Active lifestyle	-0.293	0.356	0.679	0.410	0.746
Leisure time	-0.299	0.231	1.672	0.196	0.742

Education low	-0.628	0.764	0.676	0.411	0.534
Education middle	-0.548	0.638	0.737	0.391	0.578
Education high	0	.	.	.	1.000
Income	0.262	0.153	2.931	0.087	1.300

INTERPRETATION SPEARMAN'S RHO CORRELATION TEST

In order to examine the relationship between the personal variables and the dependent variable, a Spearman's rho correlation test was carried out. This allows the strength and direction of the association between these variables to be examined. The output tables of this logistic regression (see Appendix 6.6) are summarized in Table 8 and will be interpreted in this section. The results of the test showed no significant correlation between perceived accessibility and the variables of the personal dimension ($p > 0.05$). Therefore, the study results do not provide evidence for hypotheses 10 through 15.

Table 8. *Results of Spearman's rho correlation test personal dimension*

		Age	***Gender***	***SR health status***	***Active lifestyle***	***Leisure time***	***Educ. low***	***Educ. middle***	***Educ. high***	***Income***
Perceived accessibility	**Correlation coefficient**	0.075	-0.033	0.026	-0.026	-0.018	0.003	-0.003	.	0.261
	p-value	0.613	0.823	0.859	0.860	0.901	0.981	0.981	.	0.073

Given the absence of statistically discernible correlations between the personal dimension and perceived accessibility of green spaces, this dimension was not addressed during the interviews. Nevertheless, one respondent highlighted that their own health is a significant factor that restricts their access to greenery. Respondent 7, who suffers from irritable bowel syndrome, indicated that he only wakes up after 3 p.m. This limits his options, especially because at some point public transport is no longer available and he is unable to walk somewhere and take the bus back. This is why he is constrained by the limited number of walks that can be taken from Odijk. Furthermore, at the age of 68, he experiences difficulty walking due to health problems, particularly in his left calf. This impairs his capacity to walk at a brisk pace, necessitating frequent pauses and periods of rest to facilitate relaxation of the calf muscles. He underscored the necessity of installing more benches along the walking trails to allow for rest periods.

ANALYTICAL FRAMEWORK

Based on the statistical tests performed, the analytical framework from Figure 2 can be adjusted with the removal of those variables that were found not to have a significant influence on the perceived accessibility of green spaces around Odijk. Figure 14 presents the modified figure.

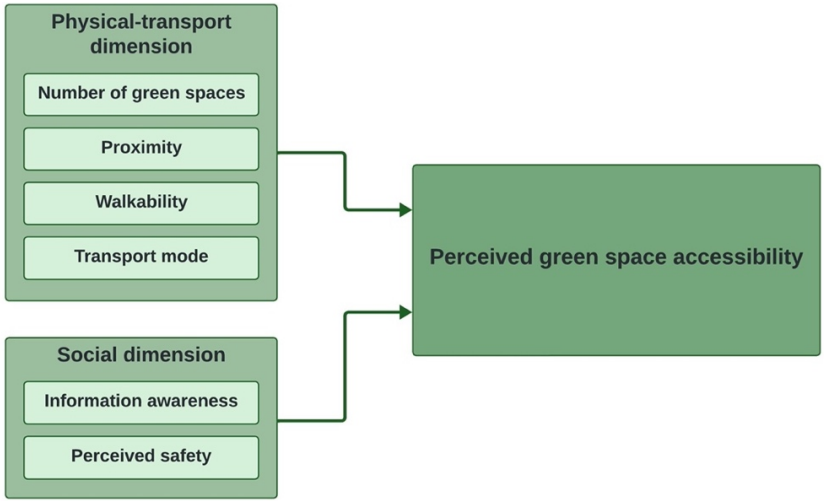

Figure 14. *Modified analytical framework perceived green space accessibility*

5.4 BARRIERS

The fourth sub-question is as follows: *What barriers do Odijk residents experience when reaching the green spaces around Odijk?* This sub-question is answered by combining the data obtained from the interviews with the data obtained from the 23rd question in the survey, which read: *What are the most important obstacles for you to reach the green spaces around Odijk? Consider, for example, a missing cycle or walking path or the lack of lighting*. The barriers will be discussed and mapped thematically, after which all barriers are jointly mapped.

Information provision

The first type of barrier that emerged was that of information provision. This theme encompasses aspects such as the accessibility of information regarding the location of green spaces and the quality of this information. Several residents of Odijk encounter substantial information barriers when attempting to reach the green spaces situated in the vicinity of the village, especially in the area between Zeist and Odijk. A significant proportion of residents is unaware of the location of green spaces or the means of accessing them. This limits the variety of recreational activities that they can engage in and impedes the exploration of new areas. It is evident that there is a necessity for enhanced information regarding walking and cycling routes. To address these issues, it is necessary to provide clear maps, improved signage and enhanced branding and communication of recreational opportunities.

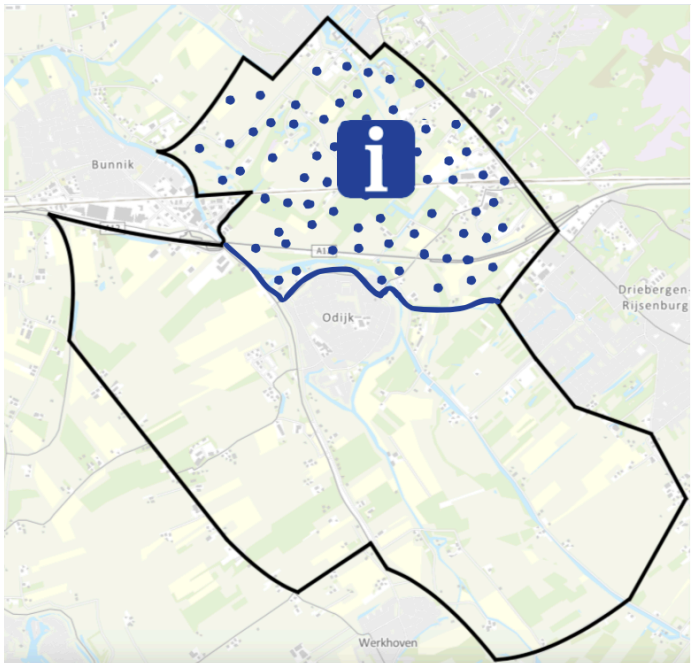

Figure 15: *Information provision barrier map Odijk (Atlas Provincie Utrecht, 2024).*

Significant physical obstacles

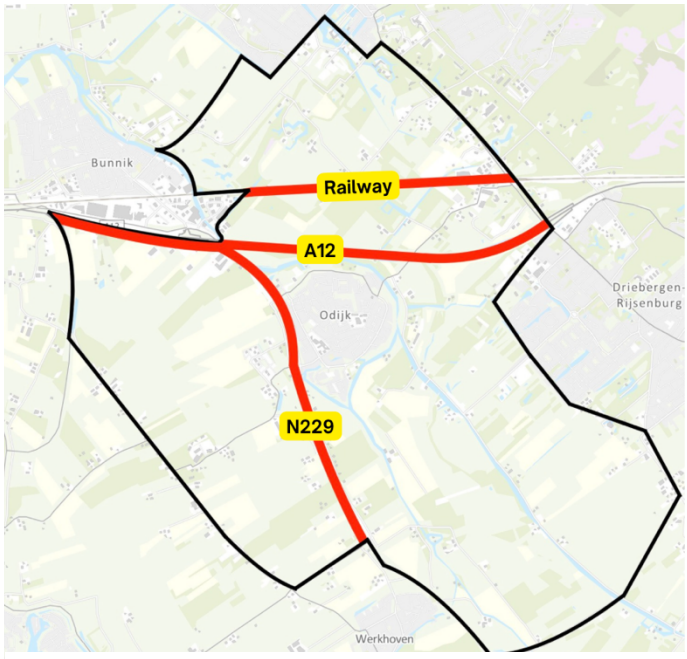

Figure 16: *Significant physical obstacles map Odijk (Atlas Provincie Utrecht, 2024).*

Access to green spaces in the vicinity of Odijk is severely constrained by physical barriers, including motorways, railway lines and provincial roads. The residents perceive these barriers as a hindrance to free walking and cycling, with the provincial road N229 and the motorway A12 being cited as major obstacles. The underpasses beneath the motorway are perceived as unattractive and unsafe, and the railway zone represents a significant obstacle to the integration of walking and cycling routes. An important reason why residents see these roads and railways as unattractive places to walk is largely caused by the noise pollution they generate. One potential solution to this issue is the implementation of noise-reducing measures, such as the planting of additional greenery. Such measures could significantly enhance the recreational value of these areas.

In addition to these significant infrastructural barriers, concerns have been expressed regarding the lack of safe crossing facilities and the limited availability of short, attractive walking routes (detours).

The employees of the Utrecht Routebureau and the municipality of Bunnik concur with these concerns and highlight the strategic challenges posed by these significant constraints. The motorway and the railway are perceived as significant impediments to the expansion and integration of recreational routes in the area. It is imperative that the infrastructure be improved, with the construction of tunnels and the establishment of safe crossings, to facilitate access to green spaces. Furthermore, enhancing the appeal of existing routes and underpasses, as well as improving signage and facilities, could markedly enhance accessibility and user experience.

Road safety

One of the most pressing concerns among Odijk residents, which is related to the above-mentioned physical obstacles, is the safety of road users in the vicinity of the town's green spaces. The N229 and N410, two busy provincial roads, present a significant obstacle to pedestrians and cyclists attempting to cross them to reach walking and cycling routes. The viaduct under the A12 is also experienced as a barrier, especially due to traffic unsafety and noise. In addition, the Langbroekerwetering is a particularly hazardous location for cyclists and pedestrians, who are frequently confronted with speeding vehicles that significantly compromise safety. Furthermore, there have been reports of the lack of safe junctions and pedestrian crossings on these roads, which have made crossing the road challenging and potentially dangerous. It is imperative that improvements be made to road safety to ensure that the green spaces around Odijk are accessible to all users in a safe manner.

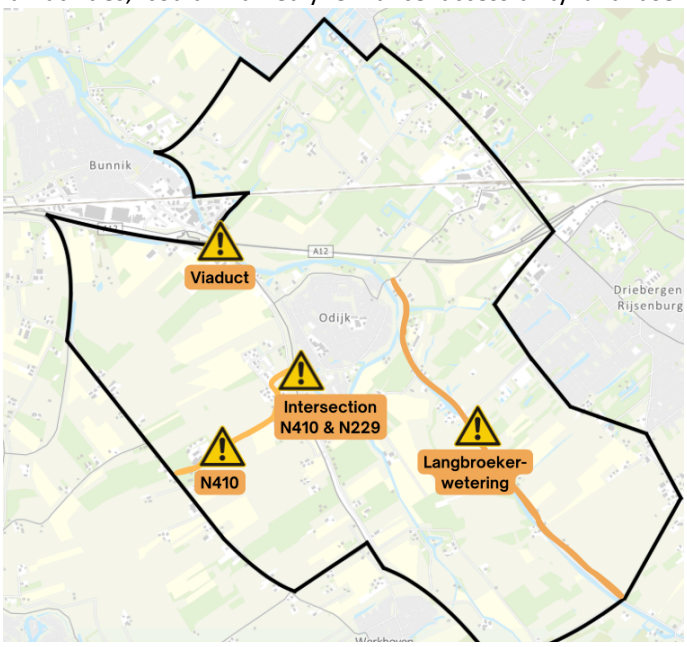

Figure 17: *Road safety barrier map Odijk (Atlas Provincie Utrecht, 2024).*

Lighting

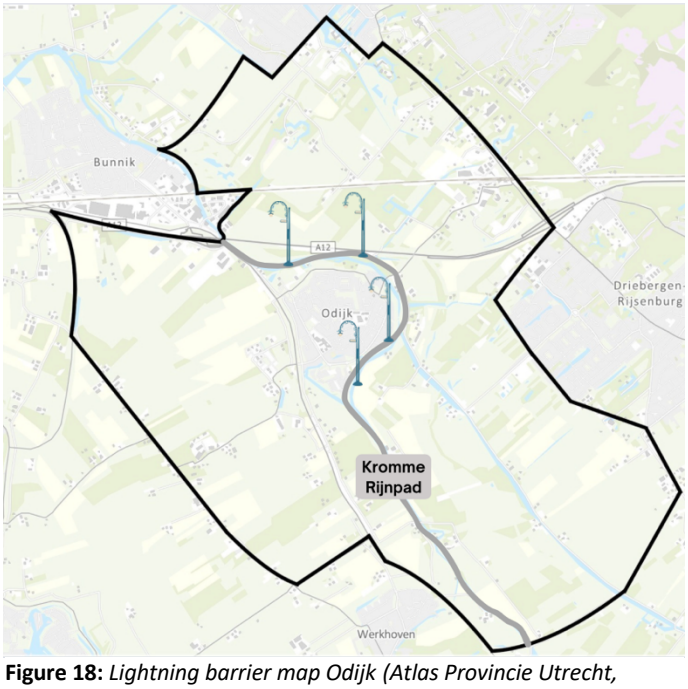

Figure 18: *Lightning barrier map Odijk (Atlas Provincie Utrecht, 2024).*

A significant proportion of the population of Odijk has also expressed concern about the lack of lighting on footpaths and cycle paths, which they perceive to make these routes much less safe and comfortable to use, especially at night. In particular, the Kromme Rijnpad is inadequately illuminated at night, rendering it an unattractive and potentially dangerous environment for running or walking after sunset. It has been observed by residents that the current street lighting is frequently misplaced, with lanterns illuminating the road rather than the cycle paths. This issue is not exclusive to built-up areas; it also occurs in rural areas, where darkness can lead to uncomfortable encounters with people living along the routes or cyclists inadvertently using

the footpaths. This underscores the pressing necessity to reassess the lighting infrastructure with a view to enhancing the accessibility and security of green spaces.

Maintenance

In addition, the green spaces and infrastructure in the vicinity of Odijk are subject to a number of maintenance issues that render them inaccessible and unusable. A significant proportion of walking and cycling routes are in a state of disrepair and have a number of deficiencies, including overgrowth of weeds, muddy surfaces and uneven or potholed terrain. In particular, the Kromme Rijnpad becomes rapidly inundated with mud and overgrown with plants such as hogweed. Furthermore, inadequate pavement maintenance, such as loose or uneven paving due to tree roots and construction, creates hazardous conditions for pedestrians. Lastly, poor maintenance of benches negatively impacts the overall experience of walking in the green spaces. To address these issues, it is necessary to implement more regular and thorough maintenance of the paths and other facilities.

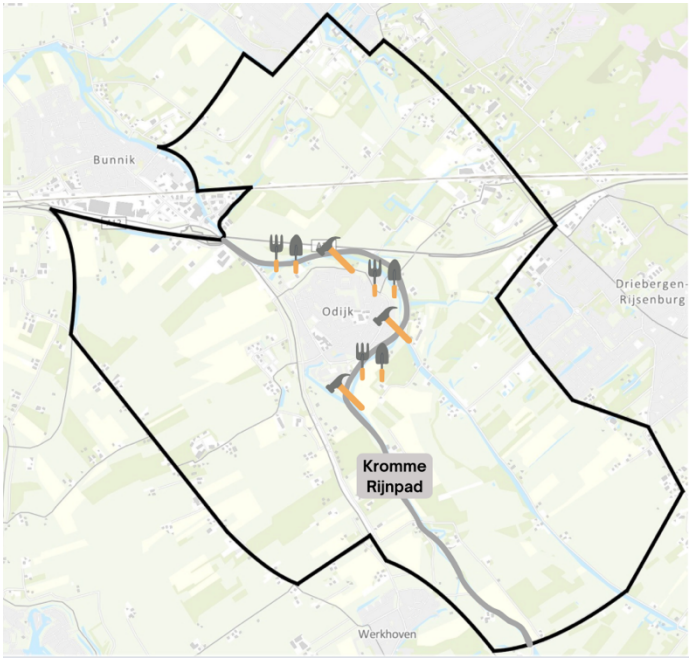

Figure 19: *Maintenance barrier map Odijk (Atlas Provincie Utrecht, 2024).*

Supervision and co-users

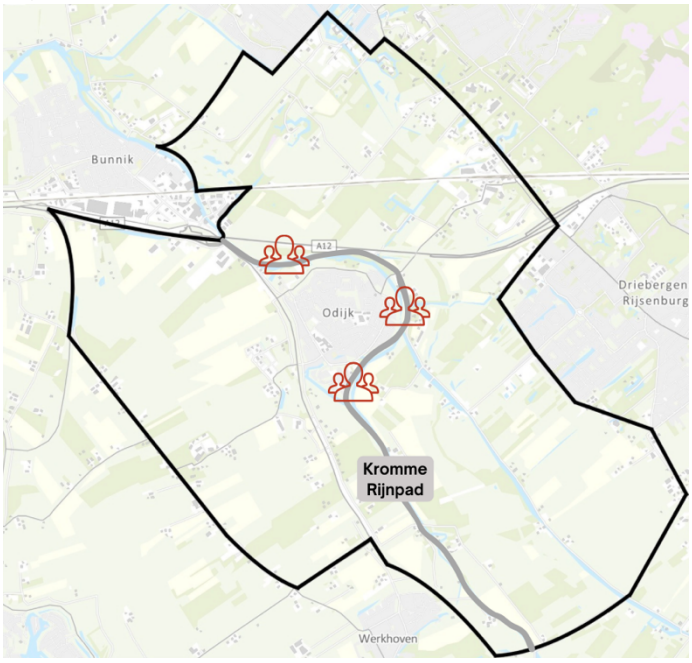

Figure 20: *Co-user barrier map Odijk (Atlas Provincie Utrecht, 2024).*

The lack of enforcement of the rules and the behaviour of those who use the paths is a significant issue. Hikers frequently encounter cyclists and mopeds on footpaths, dogs that are let loose in places where this is not allowed, and litter left by others. These issues often occur at the Kromme Rijnpad and have the potential to diminish the quality of the recreational experience and may even result in dangerous situations. To address these issues, it is necessary to implement stricter monitoring and enforcement measures, as well as awareness campaigns for trail users. This will help to create a safe and enjoyable environment for all.

Availability of walking paths and facilities along these paths

Although there are some well-maintained walking paths in the immediate vicinity of Odijk, there is a clear need for more variety and better connections between existing paths. Residents have expressed concern about the limited range of available routes, which frequently necessitates longer journeys to locate additional walking and cycling opportunities. It is evident that there are deficiencies in the network of paths, with notable absences such

as those along the Langbroekerwetering and between Odijk and Zeist. Additionally, residents think that there is an insufficient number of seating places and litter bins along the routes. Figure 21 shows a map of missing walking paths and facilities along these paths. The pink lines are missing walking paths next to roads, the missing blue line is a missing bicycle path next to a road, and de dotted pink line indicate missing walking paths in areas without roads. It is imperative that more and better walking and cycling paths, as well as improved facilities such as benches and litter bins, be constructed to enhance the accessibility and attractiveness of the green spaces in the vicinity of Odijk. However, interviews with staff from the municipalities of Bunnik and Zeist show that there are several challenges to developing the walking network and associated facilities. Firstly, cooperation with landowners is often complex; farmers sometimes have little interest in small compensation payments and can be suspicious of government agencies such as the province, making negotiations for new paths difficult. Second, communities have limited budgets and human resources, which makes maintenance of trails problematic, even when construction is possible. In addition, landowners are often reluctant to allow recreation on their land because they are concerned about disturbing nature and preserving the landscape. Finally, there is a lack of coherent policy and structural funding, which makes it difficult to find sustainable solutions for the management and maintenance of these facilities.

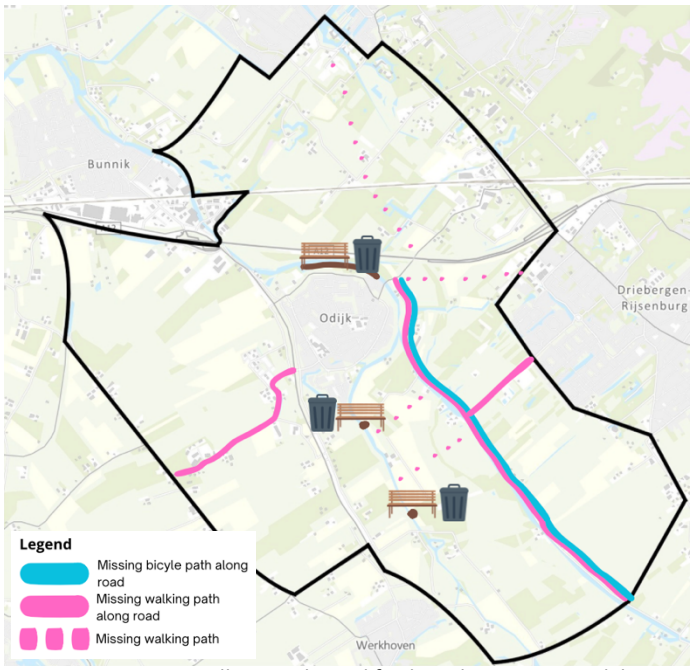

Figure 21: *Missing walking paths and facilities barrier map Odijk (Atlas Provincie Utrecht, 2024).*

In short, several barriers have been identified that hinder the accessibility and use of green spaces around Odijk (see Figure 22). These include physical barriers such as motorways, railway lines and provincial roads, which not only limit access to walking and cycling routes, but also have a negative impact on the recreational experience. The residents of Odijk perceive these barriers as a hindrance to free walking and cycling. In order to improve accessibility, it is therefore essential to implement a strategic infrastructure of tunnels, safe crossings and a well-connected network of paths. It is evident that improvements to road safety, lighting and maintenance, as well as enhanced management of supervision and rules of use, are pivotal in enhancing the attractiveness and accessibility of Odijk to both residents and visitors. Furthermore, there is an increasing necessity to extend the network of walking and cycling paths to more adequately fulfil the recreational needs of the community. This encompasses the development of novel connections, such as shortcuts and tunnels beneath the railway, and the augmentation of the network with routes that traverse points of interest, including local farms and historical sites. The proposed extensions would not only enhance recreational opportunities but also stimulate local tourism and the economy by establishing walking routes that connect with restaurants, shops, and other amenities.

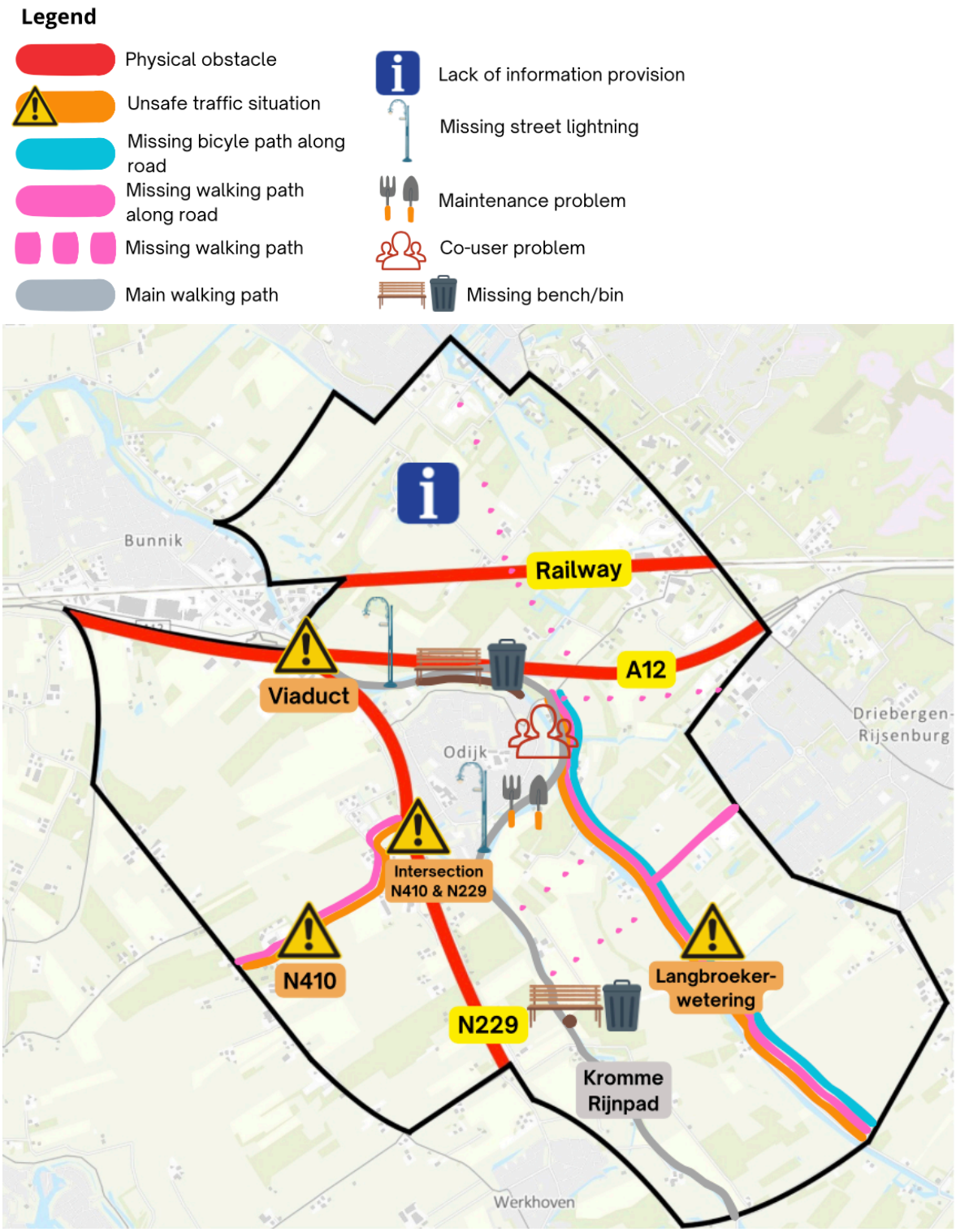

Figure 22: *Barrier map green spaces around Odijk (Atlas Provincie Utrecht, 2024).*

6. DISCUSSION

The results of this research indicate that several factors have a significant influence on the perceived accessibility of greenery near Odijk. The results show that residents who are more satisfied with the number of green spaces, who perceive green spaces as closer to their home, who view green spaces as more walkable, who walk or cycle to green spaces, who are more aware of information about green spaces, and who experience a higher level of safety in these green spaces, are more likely to experience the accessibility of these green spaces as higher. These findings are consistent with those from previous studies.

Nevertheless, research by Aziz (2012) and Owen et al. (2004) shows that the availability of facilities can indeed have a positive influence on the accessibility and use of green spaces. This discrepancy in results may be due to the different contexts in which the studies were conducted. For example, the extent to which facilities are used or perceived as useful by the community can vary considerably between communities. In addition, the results of several interviews with residents conducted during this study show that the range of facilities, and in particular the walkways and seating areas, does indeed influence the experience and use of green spaces. This also demonstrates a limitation of this study, which is that the use of both quantitative and qualitative methods has produced conflicting results. Although this approach can provide a more comprehensive and nuanced understanding of the research area than using just one of the two methods, the findings from the different methods can occasionally conflict (George, 2023; Malina et al., 2011), which is also the case with the variable 'facilities'. Nevertheless, the validity of this study is supported by the variety of methods used to collect data.

Furthermore, the variable 'community bonds' did not have a significant influence on the perceived accessibility of green spaces around Odijk, in contrast to previous studies that did find this relationship (Fornara et al., 2019; Moztarzadeh & Mohajer, 2020). The lack of this relationship in this study can be attributed to specific contextual factors at Odijk. In this small and likely close-knit community, overall social cohesion may already be so strong that variations in individual community ties have little additional influence on how accessible green spaces are perceived. Furthermore, other factors, such as physical proximity to green spaces, may be more important in the perception of accessibility.

Previous research by Byrne and Sipe (2010) and Ekkel and De Vries (2017) indicates that the perceived crowding of a green space also has a possible influence on the perceived green space accessibility. However, the findings from the research in Odijk do not correspond with those from previous research. The lack of a significant influence of perceived crowding on perceived accessibility can be attributed to the fact that the green spaces in the study area are generally not very crowded. Consequently, the influence of crowding on accessibility is probably less significant in relatively quiet green spaces, as shown by the findings of the study by Ekkel and De Vries (2017).

Ultimately, the personal factors examined in this study did not appear to exert a significant influence on perceived accessibility. The following personal factors were considered: age, gender, income, education level, self-reported health status, active lifestyle, and leisure time. The absence of significant relationships in the quantitative model indicates the potential existence of unexamined factors influencing green space accessibility. This underscores the necessity for future research to examine these variables in greater depth. Furthermore, the lack of significant influence of personal factors on perceived accessibility can be attributed to the characteristics of this relatively homogeneous respondent group. In this context, environmental factors, such as the condition of facilities and community standards, may be more influential in shaping accessibility perceptions than personal characteristics. These findings may differ from those observed in larger, more diverse communities, such as those studied in previous research where personal factors were found to have a greater influence on the accessibility of green spaces.

Another potential explanation for the discrepancy between the findings and existing literature may be that only a single Likert scale question was used to assess the dependent variable, namely perceived accessibility. The

respondents were only asked to indicate their perception of the ease with which they could access green spaces in the Odijk area, which is a limitation of this study as it reduces the accuracy of measuring this construct. A more detailed, multiple-question approach would likely provide a more comprehensive understanding of this variable and perhaps reveal other relationships with the independent variables. Furthermore, the utilisation of a multiple Likert scale question would result in the transformation of the measurement scale of the dependent variable from ordinal to interval, thereby enabling the application of regular regression techniques. This would facilitate the investigation of interrelationships between variables.

7. CONCLUSION

Green spaces provide individuals with numerous benefits, including improved health and well-being (Doick et al., 2014; Kumar et al., 2019; Markevych et al., 2017). Greater accessibility to green spaces leads to more visits to these spaces, resulting in more beneficial effects experienced by the population (Cox et al., 2017; Hartig et al., 2014; Liu et al., 2021). Therefore, the factors that influence the perceived accessibility of green spaces in the Odijk area and the barriers that prevent people from entering them were investigated in this study. The primary research question is as follows: *How do residents of Odijk perceive the accessibility of green spaces around Odijk?*

The quantitative data analysis shows that the accessibility of green space around Odijk is influenced by a number of factors. First, the study results indicate that perceived accessibility of green spaces is predicted by characteristics of the physical environment and transportation-related variables. These include the number of green spaces, their proximity, walkability and the modes of transport used to get to them. Residents who are more satisfied with the number of green spaces, the proximity of their home, the walkability and who walk or cycle to these green spaces tend to perceive the accessibility of these spaces as higher. Furthermore, two social factors had a significant influence on the perceived accessibility of green spaces. Residents experience the accessibility as higher when they are more aware of information about green spaces and experience a higher level of safety in green spaces. The personal characteristics of residents, including age, gender and socio-economic status, do not appear to have a significant influence on the perceived accessibility of green space around Odijk. To improve accessibility, it is therefore imperative to maintain and, where possible, expand the number of green spaces, reduce the distance between these spaces and homes, increase their walkability, improve safety in these spaces, provide residents with more detailed information about these spaces, and encourage the use of active transportation.

The findings of the qualitative component of this study mostly confirm those of the quantitative analysis. For example, during the interviews, several respondents emphasized the importance of increasing the number of accessible green spaces. Furthermore, various aspects of the walkability of the green spaces have been identified as important predictors of accessibility and potential areas for improvement, with the aim of increasing the accessibility of the area. This involves widening paths and increasing road safety. Furthermore, the qualitative data indicated that stricter monitoring and enforcement of regulations, in addition to the implementation of user awareness campaigns, are crucial areas for improvement to address issues such as the nuisance caused by cyclists on sidewalks, stray dogs and litter, in order to ensure a safe and create a pleasant environment. It is also important for residents that the provision of information is improved, including by placing clear signage and developing an extensive walking map. This informs residents and visitors about the recreational opportunities available. Finally, the safety aspect was also identified as a limiting factor in the accessibility of green spaces. In particular, the need for more frequent maintenance of paths and green space, as well as the provision of better lighting, was repeatedly emphasized by residents.

Furthermore, the interviews revealed several barriers that did not emerge as significant predictors of perceived accessibility based on the quantitative data, but which were nevertheless seen by several residents as important factors affecting their experience of green spaces and the accessibility of that influence spaces. In particular, the need to improve and add facilities in green space, such as benches and cycle and walking paths, was repeatedly emphasized as a means of increasing the accessibility of green space. The construction of new walking and cycling routes, connecting existing routes and enriching the network with attractive routes past local farms and historic sites would increase recreational opportunities and also stimulate local tourism and the economy. It is necessary to expand and improve the walking and cycling network. The collective implementation of these improvements and expansions represents a unified vision for creating an integrated and welcoming network of walking and cycling routes that can significantly enhance residents' quality of life and Odijk's appeal as a recreational destination.

In conclusion, the study indicates that the accessibility of green spaces in Odijk is generally perceived as adequate by residents, although there is considerable room for improvement. Addressing the physical and social barriers that limit access, such as the need for better infrastructure, maintenance and information provision, could significantly enhance the user experience of these green spaces. Involving residents and local organisations in the management and development of these spaces can lead to increased use and appreciation of green spaces, which will ultimately benefit the health and well-being of the community. Encouraging collaboration with partners such as the Utrechtse Heuvelrug National Park and volunteers, as well as exploring innovative approaches such as the use of walking vignettes, can help make the best use of limited resources and ensure sustainable management of green spaces. It is of the utmost importance to achieve a balance between the preservation of the natural value of these areas and the improvement of accessibility and safety for all users. By integrating these approaches, Odijk can not only enhance the accessibility of its green spaces, but also enhance its status as an attractive and liveable environment for both residents and visitors.

Future research could focus on how perceptions of green space accessibility vary in different types of communities, such as urban versus rural areas, and the role that demographic diversity plays in this. Furthermore, it is valuable to investigate how technology, such as mobile apps and interactive maps, can improve the provision of information and thus increase accessibility. Finally, it is crucial to investigate how specific groups, such as the elderly and people with disabilities, experience accessibility. It is evident that different population groups have varying requirements in terms of the level of accessibility, with some preferring more walkable paths in green spaces than others. This research can also address the question of whether every green space should be equally accessible to all population groups. It can examine the merits of having wide paved paths in all green spaces, or alternatively, whether a diversity of accessibility and walkability is more desirable. This research can contribute to the development of targeted support measures to ensure good accessibility to green spaces for everyone. This way, everyone can enjoy green spaces and all the benefits they have to offer, now and in the future.

REFERENCES

Aday, L. A. & Andersen, R. (1974). A framework for the study of access to medical care. *Health Services Research, 9*, 208-220.

AlleCijfers. (2024, April 13). *Woonplaats Odijk in cijfers en grafieken*. AlleCijfers.nl. Retrieved April 15, 2024, from https://allecijfers.nl/woonplaats/odijk/#:~:text=Woonplaats%20Odijk%20heeft%20afgerond%20een,zijn%20in%20totaal%202.615%20woningen.

Almanza, E., Jerrett, M., Dunton, G., Seto, E. & Pentz, M. A. (2012). A study of community design, greenness, and physical activity in children using satellite, GPS, and accelerometer data. *Health & place*, *18*(1), 46-54.

Ambrey, C. & Fleming, C. (2014). Public greenspace and life satisfaction in urban Australia. *Urban Studies*, *51*(6), 1290-1321.

António, F. & Peter, B. (2007). Re-thinking accessibility planning: A multi-layer conceptual framework and its policy implications. *The Town Planning Review,* 78**,** 429.

Arnberger, A. & Eder, R. (2015). Are urban visitors' general preferences for green-spaces similar to their preferences when seeking stress relief? *Urban Forestry & Urban Greening*, *14*(4), 872-882.

Arnberger, A., & Eder, R. (2012). The influence of green space on community attachment of urban and suburban residents. *Urban Forestry & Urban Greening*, *11*(1), 41-49.

Astell-Burt, T., Feng, X. & Kolt, G. S. (2014). Green space is associated with walking and moderate-to-vigorous physical activity (MVPA) in middle-to-older-aged adults: findings from 203 883 Australians in the 45 and Up Study. *British Journal of Sports Medicine*, *48*(5), 404-406.

Atlas Provincie Utrecht. (2024). *Atlas*. Retrieved May 13, 2024, from https://gis.provincie-utrecht.nl/Geocortex/WebViewer/?app=e691e7d6b6d348b1a331dd5d298ac85c

Aziz, N. A. A. (2012). *Green space use and management in Malaysia*. Forest & Landscape.

Ball, K., Jeffery, R. W., Crawford, D. A., Roberts, R. J., Salmon, J., & Timperio, A. F. (2008). Mismatch between perceived and objective measures of physical activity environments. *Preventive medicine*, *47*(3), 294-298.

Bastian, O., Haase, D. & Grunewald, K. (2012). Ecosystem properties, potentials and services–The EPPS conceptual framework and an urban application example. *Ecological indicators*, *21*, 7-16.

Baycan-Levent, T., & Nijkamp, P. (2009). Planning and management of urban green spaces in Europe: Comparative analysis. *Journal of Urban Planning and Development*, *135*(1), 1-12.

Benders, L. (2022, November 7). *Validiteit en betrouwbaarheid in een enquête*. Scribbr. Retrieved March 26, 2024, from https://www.scribbr.nl/onderzoeksmethoden/validiteit-en-betrouwbaarheid-een-enquete/

Bhandari, P. (2022a, October 17). *Een introductie tot kwantitatief onderzoek*. Scribbr. Retrieved March 25, 2024, from https://www.scribbr.nl/onderzoeksmethoden/kwantitatief-onderzoek/

Bhandari, P. (2022b, October 17). *Een introductie tot kwalitatief onderzoek*. Scribbr. Retrieved March 25, 2024, from https://www.scribbr.nl/onderzoeksmethoden/kwalitatief-onderzoek/

Bhandari, P. (2022c, May 10). *Likertschalen ontwerpen en analyseren voor je scriptie*. Scribbr. Retrieved March 25, 2024, from https://www.scribbr.nl/onderzoeksmethoden/likertschalen/

Bisht, S. S., Mishra, V. & Fuloria, S. (2010). Measuring accessibility for inclusive development: a census based index. *Social Indicators Research, 98***,** 167-181.

Bize, R., Johnson, J. A. & Plotnikoff, R. C. (2007). Physical activity level and health-related quality of life in the general adult population: a systematic review. *Preventive medicine*, *45*(6), 401-415.

Boerebach, J. J. (2012). Sense of place: attachment to, identity with and dependence of shopping locations. *A+ U-Architecture and Urbanism. Eindhoven University of Technology*.

Boone-Heinonen, J., Casanova, K., Richardson, A. S. & Gordon-Larsen, P. (2010). Where can they play? Outdoor spaces and physical activity among adolescents in US urbanized areas. *Preventive medicine*, *51*(3-4), 295-298.

Boutellier, H., Rijkschroeff, R. & Steketee, M. (2004). Van achteruit naar voren. *Evaluatie beleid Jeugd & Veiligheid*.

Byrne, J., & Sipe, N. (2010). Green and open space planning for urban consolidation–A review of the literature and best practice. *Urban Research Program*, *11*, 60.

Byrne, J., & Wolch, J. (2009). Nature, race, and parks: Past research and future directions for geographic research. *Progress in human geography*, *33*(6), 743-765.

Byrne, J., Wolch, J. & Zhang, J. (2009). Planning for environmental justice in an urban national park. *Journal of Environmental Planning and Management, 52***,** 365-392.

Cariñanos, P. & Casares-Porcel, M. (2011). Urban green zones and related pollen allergy: A review. Some guidelines for designing spaces with low allergy impact. *Landscape and urban planning*, *101*(3), 205-214.

Centraal Bureau voor de Statistiek. (2003, March 24). Zes uur vrije tijd per dag. *Centraal Bureau Voor De Statistiek*. https://www.cbs.nl/nl-nl/nieuws/2003/13/zes-uur-vrije-tijd-per-dag#:~:text=Zes%20uur%20wordt%20doorgebracht%20als,een%20uur%20per%20dag%20onderweg.

Centraal Bureau voor de Statistiek. (2021a, February 23). Meer verhuizingen naar regio's buiten de Randstad. *Centraal Bureau Voor De Statistiek*. https://www.cbs.nl/nl-nl/nieuws/2021/08/meer-verhuizingen-naar-regio-s-buiten-de-randstad

Centraal Bureau voor de Statistiek. (2021b). *Standaard onderwijsindeling 2021.* Centraal Bureau voor de Statistiek. Retrieved March 28, 2024, from https://www.cbs.nl/nl-nl/onze-diensten/methoden/classificaties/onderwijs-en-beroepen/standaard-onderwijsindeling--soi--/standaard-onderwijsindeling-2021#:~:text=De%20SOI%202021%20is%20een,laag%2C%20middelbaar%20en%20hoog%20onderwijsniveau.

Centraal Bureau voor de Statistiek. (2022). *Hoeveel reisden inwoners van Nederland en hoe?* Retrieved March 28, 2024, from https://www.cbs.nl/nl-nl/visualisaties/verkeer-en-vervoer/personen/hoeveel-reisden-inwoners-van-nederland-en-hoe-

Centraal Bureau voor de Statistiek. (2023, November 8). *Inkomen van huishoudens; inkomensklassen, huishoudenskenmerken*. Centraal Bureau Voor De Statistiek. Retrieved March 28, 2024, from https://www.cbs.nl/nl-nl/cijfers/detail/83932NED

Centraal Bureau voor de Statistiek. (2024a, May 2). Minder natuur- en bosgebied in Nederland. *Centraal Bureau Voor De Statistiek*. https://www.cbs.nl/nl-nl/nieuws/2024/18/minder-natuur-en-bosgebied-in-nederland

Centraal Bureau voor de Statistiek. (2024b). *Statline Odijk*. CBS Statline. Retrieved May 6, 2024, from https://opendata.cbs.nl/#/CBS/nl/dataset/84799NED/table?searchKeywords=Ministerie%20van%20Economische%20Zaken

Chen, W. Y. & Jim, C. Y. (2010). Amenities and disamenities: a hedonic analysis of the heterogeneous urban landscape in Shenzhen (China). *The Geographical Journal, 176*(3)**,** 227-240.

Chen, Y., Yue, W., & La Rosa, D. (2020). Which communities have better accessibility to green space? An investigation into environmental inequality using big data. *Landscape and Urban Planning*, *204*, 103919.

Chiesura, A. (2004). The role of urban parks for the sustainable city. *Landscape and Urban Planning, 68***,** 129-138.

Coombes, E., Jones, A. P., & Hillsdon, M. (2010). The relationship of physical activity and overweight to objectively measured green space accessibility and use. *Social science & medicine*, *70*(6), 816-822.

Coppel, G., & Wüstemann, H. (2017). The impact of urban green space on health in Berlin, Germany: Empirical findings and implications for urban planning. *Landscape and Urban Planning*, *167*, 410-418.

Curl, A., Nelson, J. D., & Anable, J. (2015). Same question, different answer: A comparison of GIS-based journey time accessibility with self-reported measures from the National Travel Survey in England. *Computers, Environment and Urban Systems*, *49*, 86-97.

Dai, D. (2011). Racial/ethnic and socioeconomic disparities in urban green space accessibility: Where to intervene?. *Landscape and Urban Planning*, *102*(4), 234-244.

Davies, C., & Sanesi, G. (2022). COVID-19 and the importance of urban green spaces. *Urban Forestry & Urban Greening*, *74*, 127654.

De Vocht, A. (2021a). *Basishandboek SPSS 27: voor IBM SPSS statistics 27*. Bijleveld.

De Vocht, A. (2021b). *Statische Methoden Syllabus*. Universiteit Utrecht.

De Vries, A. P. R. (2021). Indeling van opleidingen op basis van niveau en oriëntatie. Centraal Bureau voor de Statistiek. Retrieved May 6, 2024, from https://www.cbs.nl/nl-nl/longread/discussion-papers/2021/invulling-praktisch-en-theoretisch-opgeleiden/3-indeling-van-opleidingen-op-basis-van-niveau-en-orientatie

Donovan, G. H. & Butry, D. T. (2010). Trees in the city: Valuing street trees in Portland, Oregon. *Landscape and urban planning*, *94*(2), 77-83.

Dzhambov, A. M., Browning, M. H., Markevych, I., Hartig, T. & Lercher, P. (2020). Analytical approaches to testing pathways linking greenspace to health: A scoping review of the empirical literature. *Environmental Research*, *186*, 109613.

Ekkel, E. D. & De Vries, S. (2017). Nearby green space and human health: Evaluating accessibility metrics. *Landscape and urban planning*, *157*, 214-220.

Elands, B. H., & Wiersum, K. F. (2003). *Forestry and Rural Development in the Netherlands. Research results and policy implications of case studies in Ede and Stadskanaal* (No. 2003-03). Wageningen UR.

Environmental Health Atlas. (2024). *Green living environment*. Retrieved March 20, 2024, from https://www.atlasleefomgeving.nl/en/node/931

Erkip, F. B. (1997). The distribution of urban public services: the case of parks and recreational services in Ankara. *Cities*, *14*(6), 353-361.

European Environment Agency. (2020, November 26). *Typology of green infrastructure*. Retrieved February 26, 2024, from https://biodiversity.europa.eu/green-infrastructure/typology-of-gi

Eyler, A. A., Brownson, R. C., Bacak, S. J. & Housemann, R. A. (2003). The epidemiology of walking for physical activity in the United States. *Medicine & Science in Sports & Exercise*, *35*(9), 1529-1536.

Fan, P., Xu, L., Yue, W., & Chen, J. (2017). Accessibility of public urban green space in an urban periphery: The case of Shanghai. *Landscape and Urban Planning*, *165*, 177-192.

Ferreira, A., & Batey, P. (2007). Re-thinking accessibility planning: A multi-layer conceptual framework and its policy implications. *The Town Planning Review*, 429-458.

Fornara, F., Lai, A. E., Bonaiuto, M., & Pazzaglia, F. (2019). Residential place attachment as an adaptive strategy for coping with the reduction of spatial abilities in old age. *Frontiers in psychology*, *10*, 856.

Galetzka, M., Hoof, J. V., Vries, P. D., Abraham, M., Bloeme, R. & Soomeren, P. V. (2019). Lokale veiligheid uitgaansgebieden: case Haarlem.

Genau, L. (2023, January 23). *Semigestructureerde of half-gestructureerde interviews in je scriptie*. Scribbr. Retrieved May 2, 2024, from https://www.scribbr.nl/onderzoeksmethoden/semigestructureerd-interview/

Gentin, S. (2011). Outdoor recreation and ethnicity in Europe—A review. *Urban Forestry & Urban Greening*, *10*(3), 153-161.

George, T. (2023, March 9). *Mixed-methods onderzoek*. Scribbr. Retrieved March 25, 2024, from https://www.scribbr.nl/onderzoeksmethoden/mixed-methods/

Giles-Corti, B. & Donovan, R. J. (2002a). Socioeconomic status differences in recreational physical activity levels and real and perceived access to a supportive physical environment. *Preventive medicine*, *35*(6), 601-611.

Giles-Corti, B., Broomhall, M. H., Knuiman, M., Collins, C., Douglas, K., Ng, K., ... & Donovan, R. J. (2005). Increasing walking: how important is distance to, attractiveness, and size of public open space?. *American journal of preventive medicine*, *28*(2), 169-176.

Giuliani, M. V. (2003). *Theory of attachment and place attachment* (p. 137). na.

Gobster, P. H. (1998). Urban parks as green walls or green magnets? Interracial relations in neighborhood boundary parks. *Landscape and urban planning*, *41*(1), 43-55.

Goličnik, B., & Thompson, C. W. (2010). Emerging relationships between design and use of urban park spaces. *Landscape and urban planning*, *94*(1), 38-53.

Google Maps. (n.d.). Map of Odijk. Retrieved April 16, 2024, from https://maps.app.goo.gl/pURL8ULZcH4ga7Su5

Gozalo, G. R., Morillas, J. M. B., & González, D. M. (2019). Perceptions and use of urban green spaces on the basis of size. *Urban Forestry & Urban Greening*, *46*, 126470.

Graça, M., Cruz, S., Monteiro, A., & Neset, T. S. (2022). Designing urban green spaces for climate adaptation: A critical review of research outputs. *Urban Climate*, *42*, 101126.

Gregory, D., Johnston, R., Pratt, G., Watts, M., & Whatmore, S. (Eds.). (2011). *The dictionary of human geography*. John Wiley & Sons.

Groen Groeit Mee. (2024, April 4). *Website*. Retrieved April 15, 2024, from https://www.groengroeitmee.nl/

Hartig, T., Evans, G. W., Jamner, L. D., Davis, D. S., & Gärling, T. (2003). Tracking restoration in natural and urban field settings. *Journal of environmental psychology*, *23*(2), 109-123.

Hartig, T., Mitchell, R., De Vries, S. & Frumkin, H. (2014). Nature and health. *Annual review of public health*, *35*, 207-228.

Hass, K. (2009). *Measuring accessibility of regional parks: A comparison of three GIS techniques*. San Jose State University.

Hay, I., & Meghan, C. (2021), Qualitative Research Methods in Human Geography. Fifth edition. Oxford University Press.

Health Scotland, Greenspace Scotland, Scottish Natural Heritage & Institute of Occupational Medicine. (2008). *Health Impact Assessment of Greenspace – A Guide*. Stirling, United Kingdom: Greenspace Scotland.

Heckert, M. (2013). Access and equity in greenspace provision: A comparison of methods to assess the impacts of greening vacant land. *Transactions in GIS*, *17*(6), 808-827.

Helsloot, M., Helsloot, I. & Scholtens, A. (2018). Meer blauw op straat. *Publieksonderzoek. Renswoude: Crisislab*.

Hillsdon, M., Panter, J., Foster, C., & Jones, A. (2006). The relationship between access and quality of urban green space with population physical activity. *Public health*, *120*(12), 1127-1132.

Hoffimann, E., Barros, H., & Ribeiro, A. I. (2017). Socioeconomic inequalities in green space quality and accessibility—Evidence from a Southern European city. *International journal of environmental research and public health*, *14*(8), 916.

Home, R., Hunziker, M. & Bauer, N. (2012). Psychosocial outcomes as motivations for visiting nearby urban green spaces. *Leisure Sciences*, *34*(4), 350-365.

Hutchison, R. (1987). Ethnicity and urban recreation: Whites, Blacks, and Hispanics in Chicago's public parks. *Journal of Leisure Research*, *19*(3), 205-222.

Inalhan, G., Yang, E., & Weber, C. (2021). Place attachment theory. *A handbook of theories on designing alignment between people and the office environment*, 181-194.

Instituut voor Sport- en PrestatiePsychologie. (2008). *Leisure Time and Sports Questionnaire*. Retrieved March 28, 2024,
from https://www.google.com/url?sa=t&source=web&rct=j&opi=89978449&url=https://access.gesis.org/dbk/15953&ved=2ahUKEwjancnP4ZaFAxVegv0HHadtDeAQFnoECBkQAQ&usg=AOvVaw2qbvW2C9sUFBL9zfZOGp40

Jabbar, M., Yusoff, M. M., & Shafie, A. (2021). Assessing the role of urban green spaces for human well-being: A systematic review. *GeoJournal*, 1-19.

Jacobs, J. (1961). Jane Jacobs. *The Death and Life of Great American Cities*, *21*(1), 13-25.

Janssen, I. & LeBlanc, A. G. (2010). Systematic review of the health benefits of physical activity and fitness in school-aged children and youth. *International journal of behavioral nutrition and physical activity*, *7*(1), 1-16.

Jennings, V., Johnson Gaither, C., & Gragg, R. S. (2012). Promoting environmental justice through urban green space access: A synopsis. *Environmental Justice*, *5*(1), 1-7.

Jiao, J., & Dillivan, M. (2013). Transit deserts: The gap between demand and supply. *Journal of Public Transportation*, *16*(3), 23-39.

Johnston, R. J., Gregory, D., Pratt, G., Watts, M. & Whatmore, S. (2009). *The Dictionary of Human Geography,* UK, Wiley-Blackwell.

Jones, A., Hillsdon, M., & Coombes, E. (2009). Greenspace access, use, and physical activity: Understanding the effects of area deprivation. *Preventive medicine*, *49*(6), 500-505.

Kaczynski, A. T., & Henderson, K. A. (2007). Environmental correlates of physical activity: a review of evidence about parks and recreation. *Leisure sciences*, *29*(4), 315-354.

Kantar Public & Provincie Utrecht. (2023). *Bezoekersonderzoek recreatiegebieden Utrecht*. Retrieved March 29, 2024, from https://www.provincie-utrecht.nl/sites/default/files/2023-02/Bezoekersonderzoek_recreatiegebieden_Utrecht_%28hoofdrapport%29_2023.pdf

Kersenweide Odijk. (n.d.). *Kersenweide Odijk*. Retrieved April 15, 2024, from https://www.kersenweideodijk.nl/default.aspx

Khalil, R. (2014). Quantitative evaluation of distribution and accessibility of urban green spaces (Case study: City of Jeddah). *International journal of geomatics and geosciences*, *4*(3), 526-535.

Kimpton, A., Corcoran, J. & Wickes, R. (2017). Greenspace and crime: An analysis of greenspace types, neighboring composition, and the temporal dimensions of crime. *Journal of Research in Crime and Delinquency*, *54*(3), 303-337.

Kondo, M. C., Fluehr, J. M., McKeon, T. & Branas, C. C. (2018). Urban green space and its impact on human health. *International journal of environmental research and public health*, *15*(3), 445.

Krekel, C., Kolbe, J., & Wüstemann, H. (2016). The greener, the happier? The effect of urban land use on residential well-being. *Ecological economics*, *121*, 117-127.

Kwan, M. P., Murray, A. T., O'Kelly, M. E., & Tiefelsdorf, M. (2003). Recent advances in accessibility research: Representation, methodology and applications. *Journal of Geographical Systems*, *5*, 129-138.

Laan, C. M., & Piersma, N. (2021). Accessibility of green areas for local residents. *Environmental and Sustainability Indicators*, *10*, 100114.

Lachowycz, K., & Jones, A. P. (2013). Towards a better understanding of the relationship between greenspace and health: Development of a theoretical framework. *Landscape and urban planning*, *118*, 62-69.

Lafrenz, A. J. (2022). Designing multifunctional urban green spaces: an inclusive public health framework. *International journal of environmental research and public health*, *19*(17), 10867.

Lamíquiz, P. J., & López-Domínguez, J. (2015). Effects of built environment on walking at the neighbourhood scale. A new role for street networks by modelling their configurational accessibility?. *Transportation Research Part A: Policy and Practice*, *74*, 148-163.

Łaszkiewicz, E., Kronenberg, J., & Marcińczak, S. (2018). Attached to or bound to a place? The impact of green space availability on residential duration: The environmental justice perspective. *Ecosystem Services*, *30*, 309-317.

Lättman, K. (2016). *Perceived Accessibility: Capturing the Traveller Perspective* (Doctoral dissertation, Karlstads universitet).

Lättman, K., Friman, M., & Olsson, L. E. (2016). Perceived accessibility of public transport as a potential indicator of social inclusion. *Social inclusion*, *4*(3), 36-45.

Lättman, K., Olsson, L. E., & Friman, M. (2018). A new approach to accessibility–Examining perceived accessibility in contrast to objectively measured accessibility in daily travel. *Research in Transportation Economics*, *69*, 501-511.

Lee, A. C. K., Jordan, H. C., & Horsley, J. (2015). Value of urban green spaces in promoting healthy living and wellbeing: prospects for planning. *Risk management and healthcare policy*, 131-137.

Lee, G., & Hong, I. (2013). Measuring spatial accessibility in the context of spatial disparity between demand and supply of urban park service. *Landscape and Urban Planning*, *119*, 85-90.

Lee, R. J., Sener, I. N., & Jones, S. N. (2017a). Understanding the role of equity in active transportation planning in the United States. *Transport reviews*, *37*(2), 211-226.

Lee, Y., Gu, N., & An, S. (2017b). Residents' perception and use of green space: Results from a mixed method study in a deprived neighbourhood in Korea. *Indoor and Built Environment*, *26*(6), 855-871.

Liu, D., Kwan, M. P., & Kan, Z. (2021). Analysis of urban green space accessibility and distribution inequity in the City of Chicago. *Urban Forestry & Urban Greening*, *59*, 127029.

Lo, A. Y. & Jim, C. Y. (2010). Differential community effects on perception and use of urban greenspaces. *Cities*, *27*(6), 430-442.

Lo, A. Y. & Jim, C. Y. (2012). Citizen attitude and expectation towards greenspace provision in compact urban milieu. *Land use policy*, *29*(3), 577-586.

Lõhmus, M. & Balbus, J. (2015). Making green infrastructure healthier infrastructure. *Infection ecology & epidemiology*, *5*(1), 30082.

Lopez, B., Kennedy, C., Field, C. & McPhearson, T. (2021). Who benefits from urban green spaces during times of crisis? Perception and use of urban green spaces in New York City during the COVID-19 pandemic. *Urban forestry & urban greening*, *65*, 127354.

Lwin, K. K., & Murayama, Y. (2011). Modelling of urban green space walkability: Eco-friendly walk score calculator. *Computers, Environment and urban systems*, *35*(5), 408-420.

Malina, M. A., Nørreklit, H. S., & Selto, F. H. (2011). Lessons learned: advantages and disadvantages of mixed method research. *Qualitative Research in Accounting & Management*, *8*(1), 59-71.

Markevych, I., Schoierer, J., Hartig, T., Chudnovsky, A., Hystad, P., Dzhambov, A. M., Vries, S. de, Triguero-Mas, M., Brauerk, M., Nieuwenhuijsen, M. J., Lupp, G., Richardson, E. A., Astell-Burt, T., Dimitrova, D., Feng, X., Sadeh, M., Standl, M., Heinrich, J. & Fuertes, E. (2017). Exploring pathways linking greenspace to health: Theoretical and methodological guidance. *Environmental research*, *158*, 301-317

Maroko, A. R., Maantay, J. A., Sohler, N. L., Grady, K. L., & Arno, P. S. (2009). The complexities of measuring access to parks and physical activity sites in New York City: a quantitative and qualitative approach. *International journal of health geographics*, *8*(1), 1-23.

Marques da Costa, E., & Kállay, T. (2020). Impacts of green spaces on physical and mental health.

Marshall, A. (Ed.). (2007). *UNFPA state of world population, 2007: Unleashing the potential of urban growth*. United Nations Population Fund. Thoraya Ahmed Obaid, Executive Director.

Maruani, T., & Amit-Cohen, I. (2007). Open space planning models: A review of approaches and methods. *Landscape and urban planning*, *81*(1-2), 1-13.

McGrail, M. R., & Humphreys, J. S. (2009). Measuring spatial accessibility to primary care in rural areas: Improving the effectiveness of the two-step floating catchment area method. *Applied Geography*, *29*(4), 533-541.

Medemblik. (2024, February 2). *Groenstructuurplan*. Lokale Wet- En Regelgeving. Retrieved March 20, 2024, from https://lokaleregelgeving.overheid.nl/CVDR714756/1

Mehta, V. (2014). Evaluating public space. *Journal of Urban design*, *19*(1), 53-88.

Ministerie van Algemene Zaken. (2023, February 8). *Natuurnetwerk Nederland*. Retrieved March 20, 2024, from https://www.rijksoverheid.nl/onderwerpen/natuur-en-biodiversiteit/natuurnetwerk-nederland

Ministerie van Algemene Zaken. (2024, January 4). *Internationale bescherming biodiversiteit*. Retrieved March 20, 2024, from https://www.rijksoverheid.nl/onderwerpen/natuur-en-biodiversiteit/internationale-bescherming-biodiversiteit

Ministerie van Economische Zaken, Landbouw en Innovatie. (2024, January 30). *Natura 2000*. Retrieved March 20, 2024, from https://www.rijksoverheid.nl/onderwerpen/natuur-en-biodiversiteit/natura-2000

Ministerie van Landbouw, Natuur en Voedselkwaliteit. (2022, April 12). *Nederland natuurpositief*. Retrieved March 20, 2024, from https://www.rijksoverheid.nl/onderwerpen/natuur-en-biodiversiteit/documenten/rapporten/2019/10/01/nederland-natuurpositief

MoVal. (2015). *Leisure Time and Quality of Life*. Retrieved March 28, 2024, from https://www.moval.org/GPUlive/pdfs/Board3a.pdf

Mowen, A. J., Payne, L. L., & Scott, D. (2005). Change and stability in park visitation constraints revisited. *Leisure Sciences*, *27*(2), 191-204.

Moztarzadeh, H., & Mohajer, E. (2020). Effect of green space on residents place attachment in residential spaces (case study: villa and apartment dwellers in shiraz). *International Journal of Architecture and Urban Development*, *10*(2), 13-24.

Newman, O. (1973). *Defensible space: Crime prevention through urban design*. New York: Collier Books.

Nicholls, S. (2001). Measuring the accessibility and equity of public parks: A case study using GIS. *Managing leisure*, *6*(4), 201-219.

Noszczyk, T., Gorzelany, J., Kukulska-Kozieł, A., & Hernik, J. (2022). The impact of the COVID-19 pandemic on the importance of urban green spaces to the public. *Land Use Policy*, *113*, 105925.

Owen, N., Humpel, N., Leslie, E., Bauman, A. & Sallis, J. F. (2004). Understanding environmental influences on walking: review and research agenda. *American journal of preventive medicine*, *27*(1), 67-76.

Páez, A., Scott, D. M., & Morency, C. (2012). Measuring accessibility: positive and normative implementations of various accessibility indicators. *Journal of Transport Geography*, *25*, 141-153.

Pasaogullari, N., & Doratli, N. (2004). Measuring accessibility and utilization of public spaces in Famagusta. *Cities*, *21*(3), 225-232.

Pedestrian and Bicycle Information Center & U.S. Department of Transportation. (n.d.). Take a walk with a child and decide for yourselves. In *Walkability Checklist*. Retrieved March 28, 2024, from https://www.nhtsa.gov/sites/nhtsa.gov/files/walkingchecklist.pdf

Penchansky, R. & Thomas, J. W. (1981). The Concept of Access: Definition and Relationship to Consumer Satisfaction. *Medical Care, 19***,** 127-140.

Perkins, D. D., Meeks, J. W. & Taylor, R. B. (1992). The physical environment of street blocks and resident perceptions of crime and disorder: Implications for theory and measurement. *Journal of environmental psychology*, *12*(1), 21-34.

Phillips, A., Khan, A. Z., & Canters, F. (2021). Use-related and socio-demographic variations in urban green space preferences. *Sustainability*, *13*(6), 3461.

Picavet, H. S. J., Milder, I., Kruize, H., De Vries, S., Hermans, T. & Wendel-Vos, W. (2016). Greener living environment healthier people?: Exploring green space, physical activity and health in the Doetinchem Cohort Study. *Preventive medicine*, *89*, 7-14.

Pinto, L., Ferreira, C. S., & Pereira, P. (2021). Environmental and socioeconomic factors influencing the use of urban green spaces in Coimbra (Portugal). *Science of The Total Environment*, *792*, 148293.

Pirie, G. H. (1981). The possibility and potential of public policy on accessibility. *Transportation Research Part A: General*, *15*(5), 377-381.

Planbureau voor de Leefomgeving. (2015). *De stad verbeeld: 12 infographics over de stedelijke leefomgeving*. Retrieved June 9, 2024, from https://www.pbl.nl/sites/default/files/downloads/PBL_2015_De_stad_verbeeld_1744.pdf

Provinciale Commissie Leefomgeving Utrecht. (2023). *Groen: een kwestie van doen!* Retrieved April 15, 2024, from https://www.provincie-utrecht.nl/sites/default/files/2023-04/Groen_in_de_stad.pdf

Provincie Utrecht & Gemeente Utrecht. (2021). *Groen Groeit Mee Opgaven in beeld*. Retrieved January 20, 2024, from https://www.groengroeitmee.nl/sites/groengroeitmee/files/2021-11/Groen%20Groeit%20Mee%20-%20Opgaven%20in%20beeld%20-%20v16112021.pdf

Relph, E. (1976). *Place and placelessness* (Vol. 67, p. 45). London: Pion.

Rijksinstituut voor Volksgezondheid en Milieu. (n.d.). *Groene adaptatie*. Retrieved January 17, 2024, from https://www.rivm.nl/klimaat-en-gezondheid/klimaatadaptatie/groene-adaptatie

Scheepers, P. & Tobi, H. (2021). *Onderzoeksmethoden*. Boom.

Schipperijn, J. J. (2010). *Use of urban green space* (pp. 45-2010). Forest & Landscape.

Shwartz, A., Cheval, H., Simon, L., & Julliard, R. (2013). Virtual garden computer program for use in exploring the elements of biodiversity people want in cities. *Conservation Biology*, *27*(4), 876-886.

Sijtsma, F. J., van der Bilt, W. G., van Hinsberg, A., de Knegt, B., van der Heide, M., Leneman, H., & Verburg, R. (2017). Planning nature in urbanized countries. An analysis of monetary and non-monetary impacts of conservation policy scenarios in the Netherlands. *Heliyon*, *3*(3).

Smith, W. G. (2008). Does gender influence online survey participation? A record-linkage analysis of university faculty online survey response behavior. *Online submission*.

Soga, M., Yamaura, Y., Aikoh, T., Shoji, Y., Kubo, T. & Gaston, K. J. (2015). Reducing the extinction of experience: Association between urban form and recreational use of public greenspace. *Landscape and Urban Planning*, *143*, 69-75.

Stacherl, B., & Sauzet, O. (2023). Gravity models for potential spatial healthcare access measurement: a systematic methodological review. *International Journal of Health Geographics*, *22*(1), 34.

Talen, E. (2003). Neighborhoods as service providers: a methodology for evaluating pedestrian access. *Environment and Planning B: Planning and Design*, *30*(2), 181-200.

Taylor, L. & Hochuli, D. F. (2017). Defining greenspace: Multiple uses across multiple disciplines. *Landscape and urban planning*, *158*, 25-38.

Taylor, R. B., Gottfredson, S. D. & Brower, S. (2017). Block Crime and Fear: Defensible Space, Local Social Ties, and Territorial Functioning. In *The Fear of Crime* (pp. 429-457). Routledge.

Tian, L., Chen, J., & Yu, S. X. (2014). Coupled dynamics of urban landscape pattern and socioeconomic drivers in Shenzhen, China. *Landscape ecology*, *29*, 715-727.

Tussen Rijn en Lek. (2024, March 12). *Geschiedenis Odijk | Tussen Rijn en Lek*. Retrieved April 15, 2024, from https://www.tussenrijnenlek.nl/geschiedenis/geschiedenis-odijk/

Tzoulas, K., Korpela, K., Venn, S., Yli-Pelkonen, V., Kaźmierczak, A., Niemela, J., & James, P. (2007). Promoting ecosystem and human health in urban areas using Green Infrastructure: A literature review. *Landscape and urban planning*, *81*(3), 167-178.

United States Environmental Protection Agency. (2023, 5 January). *Green Streets and Community Open Space*. Retrieved January 17, 2024, from https://www.epa.gov/G3/green-streets-and-community-open-space

Van den Berg, A. E., Maas, J., Verheij, R. A., & Groenewegen, P. P. (2010). Green space as a buffer between stressful life events and health. *Social science & medicine*, *70*(8), 1203-1210.

Van Heijst, L. (2021, October 27). *Cronbach's alpha in SPSS: Berekenen en interpreteren*. Scribbr. Retrieved May 6, 2024, from https://www.scribbr.nl/statistiek/cronbachs-alpha/

Van Mispelaar, A., Copping, M., Visser, M., Beemsterboer, R., & Provincie Utrecht. (2021). *Groen Groeit Mee – opgaven in beeld* [Report]. Retrieved April 15, 2024, from https://www.groengroeitmee.nl/sites/groengroeitmee/files/2021-11/Groen%20Groeit%20Mee%20-%20Opgaven%20in%20beeld%20-%20v16112021.pdf

Van Wee, G. P. (2021). Transport Modes and Accessibility. *International Encyclopedia of Transportation*, *5*(1).

Veen, E. J., Ekkel, E. D., Hansma, M. R., & de Vrieze, A. G. (2020). Designing urban green space (Ugs) to enhance health: A methodology. *International journal of environmental research and public health*, *17*(14), 5205.

Venter, Z. S., Barton, D. N., Gundersen, V., Figari, H., & Nowell, M. (2020). Urban nature in a time of crisis: recreational use of green space increases during the COVID-19 outbreak in Oslo, Norway. *Environmental research letters*, *15*(10), 104075.

Verheij, R. A., Maas, J., & Groenewegen, P. P. (2008). Urban—rural health differences and the availability of green space. *European Urban and Regional Studies*, *15*(4), 307-316.

Visscher, G. (1997). De blinde vlek van het CBS: systematische vertekening in het opleidingsniveau. De nonrespons in de Enquête Beroepsbevolking. *Sociologische gids*, *44*(3), 155-179.

VVV Kromme Rijnstreek. (2024). *Odijk*. Retrieved April 15, 2024, from https://www.vvvkrommerijnstreek.nl/nl/verken-de-streek/verrassende-plaatsen-in-de-kromme-rijnstreek/odijk

Wandelnet. (2021). Nationale Wandelmonitor 2021. Retrieved March 27, 2024, from https://www.wandelnet.nl/l/library/download/urn:uuid:b5cb916f-a100-41ec-bbfe-731c762a8813/nationale+wandelmonitor+2021_wandelnet.pdf

Wang, D., Brown, G., & Liu, Y. (2014). The physical and non-physical factors that influence perceived access to urban parks. *Landscape and urban planning*, *133*, 53-66.

Wang, D., Brown, G., & Mateo-Babiano, D. (2013b). Beyond proximity: an integrated model of accessibility for public parks. *Asian Journal of Social Sciences & Humanities*, *2*(3), 486-498.

Wang, D., Brown, G., Zhong, G., Liu, Y., & Mateo-Babiano, I. (2015). Factors influencing perceived access to urban parks: A comparative study of Brisbane (Australia) and Zhongshan (China). *Habitat international*, *50*, 335-346.

Wang, D., Mateo-Babiano, I., & Brown, G. (2013a). Rethinking accessibility in planning of urban open space. Using an integrative theoretical framework. 6th State of Australian Cities Conference, 26-29 November 2013, Sydney, Australia.

Weber, D. & Anderson, D. (2010). Contact with nature: Recreation experience preferences in Australian parks. *Annals of Leisure Research*, *13*(1-2), 46-69.

Weijs-Perrée, M., Dane, G., & van den Berg, P. (2020). Analyzing the relationships between citizens' emotions and their momentary satisfaction in urban public spaces. *Sustainability*, *12*(19), 7921.

Wendel, H. E. W., Zarger, R. K., & Mihelcic, J. R. (2012). Accessibility and usability: Green space preferences, perceptions, and barriers in a rapidly urbanizing city in Latin America. *Landscape and urban planning*, *107*(3), 272-282.

Winter, C. & Lockwood, M. (2005). A model for measuring natural area values and park preferences. *Environmental conservation,* 32**,** 270-278.

Wolch, J. R., Byrne, J., & Newell, J. P. (2014). Urban green space, public health, and environmental justice: The challenge of making cities 'just green enough'. *Landscape and urban planning*, *125*, 234-244.

Wong, S. (2018). The limitations of using activity space measurements for representing the mobilities of individuals with visual impairment: A mixed methods case study in the San Francisco Bay Area. *Journal of transport geography*, *66*, 300-308.

Wüstemann, H., Kalisch, D., & Kolbe, J. (2017). Access to urban green space and environmental inequalities in Germany. *Landscape and Urban Planning*, *164*, 124-131.

Ye, C., Hu, L., & Li, M. (2018). Urban green space accessibility changes in a high-density city: A case study of Macau from 2010 to 2015. *Journal of Transport Geography*, *66*, 106-115.

Yokohari, M., & Bolthouse, J. (2011). Planning for the slow lane: The need to restore working greenspaces in maturing contexts. *Landscape and Urban Planning*, *100*(4), 421-424.

Zhou, X., & Rana, M. P. (2012). Social benefits of urban green space: A conceptual framework of valuation and accessibility measurements. *Management of Environmental Quality: An International Journal*, *23*(2), 173-189.