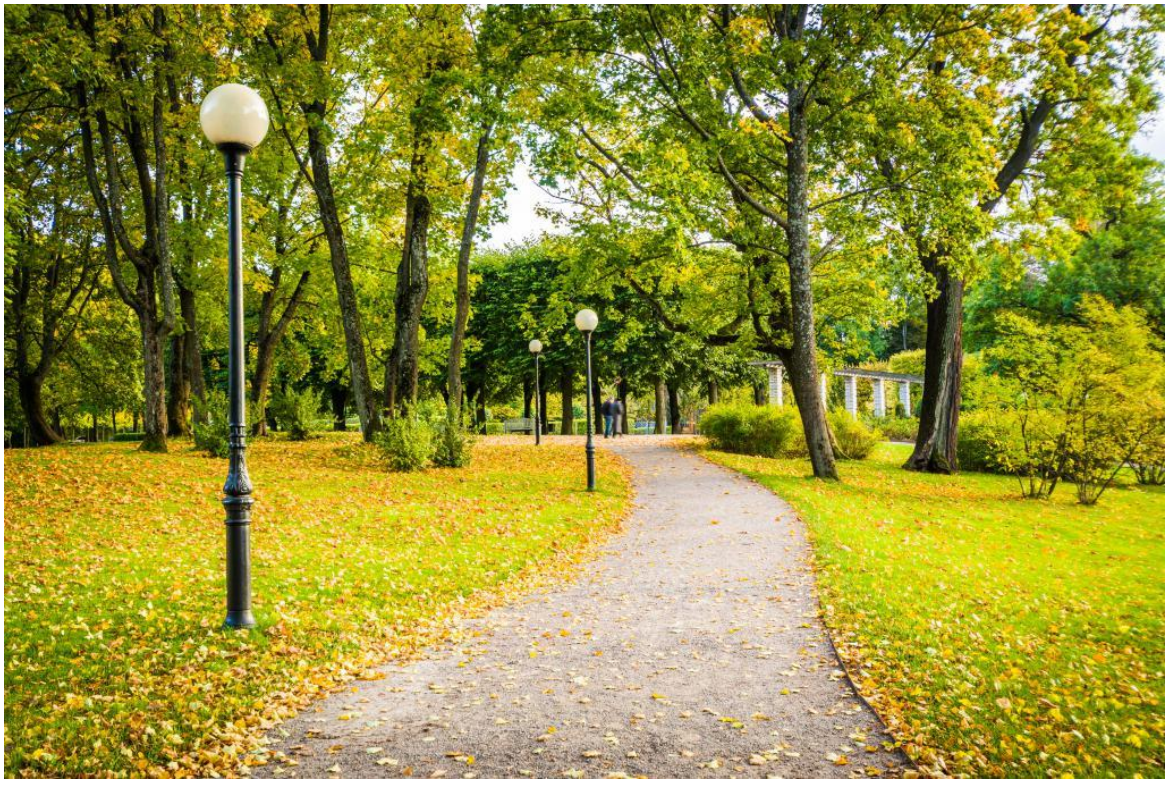
Frequency of Green Urban Area Visitation among low-socioeconomic status residents during the COVID-19 pandemic

A quantitative study into the influence of physical activity, perceived quality of green urban areas and sociodemographic characteristics on the frequency of green urban area visitation in low-SES neighbourhoods during the COVID-19 pandemic



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Preface

Before you lies my bachelor's thesis paper which is my final piece of work for the bachelor's programme Geography, Planning and Environment at the Radboud University School of Management.

The bachelor's programme was a broad programme which evidently has three different specializations. Throughout the three-year duration of the Geography, Planning and Environment course, I mainly created an interest for the planning aspects of the programme. This is also the reason why I decided to write this thesis about relevant spatial issues.

Writing this thesis throughout the first half of 2021 was a challenge. During this time, the COVID-19 pandemic was still having a big impact on our lives. For students like myself this was no exception. Since the COVID-19 pandemic hit, students were forced to follow lectures at home. As of the day I am writing this (June, 2021), I still have not been able to follow a lecture on campus since the COVID-19 pandemic has started. Evidently, during this time, it requires a lot of discipline to write this thesis when you are almost forced to be at home at any time. This made it a big challenge for me. There is a constant battle in finding the motivation to work on writing the thesis. However, ultimately, I was able to write this thesis in these difficult and demanding times. For this, I want to thank a few people.

I would first like to thank my supervisor prof. dr. Erwin van der Krabben for his support during the research process. Whenever I was struggling with something during the research process, I was always able to contact him and ask for help. I would also like to thank Pharos, which is an institution that tries to reduce health inequalities between different groups of people (Pharos, 2021). Some of the people who work at Pharos helped me and other students during the research process and gave us a lot of helpful tips in writing our thesis and conducting our research. Lastly, I would like to thank the other students that helped me during this research process, especially with collecting the data of the research. With that being said, I hope you enjoy reading my thesis!

Summary

Problem Statement

From the scientific literature, it becomes clear that the COVID-19 pandemic has changed our behaviour regarding visiting green urban areas. Overall people tend to visit green urban areas more during the COVID-19 pandemic. However, for people who live in neighbourhoods with a low socioeconomic status this is different. This group tends to visit green urban areas less during the COVID-19 pandemic. Research has shown that visiting green urban areas is beneficial to our mental and physical health, which is especially important during COVID-19 times. It is thus important to try and promote the use of green urban areas more to this vulnerable group. However, the reason why this group visits green urban areas less during the pandemic remains unclear. This problem will be further looked into by looking by trying to identify possible factors influencing the frequency of green urban area usage by low socioeconomic status groups.

Research Aim

Explaining factors of the decrease in green urban area visitation by residents living in low-SES neighbourhoods during the COVID-19 pandemic have not been widely reported yet. This research aims to gain a better understanding in this decrease by identifying three possibly influencing factors: 'physical activity', 'perceived quality of green urban areas' and 'sociodemographic characteristics of low-SES neighbourhood residents'. Furthermore, this research seeks to gain better understanding of the importance of green urban areas during the COVID-19 pandemic. Especially for residents living in low SES-neighbourhoods. Furthermore, this research aims to gain understanding of the importance of green urban areas for residents of low SES-neighbourhoods, where the pandemic could be seen as an eye-opener of this importance. The knowledge acquired about the factors (physical activity, perceived quality of green urban areas, sociodemographic factors) that possibly influence green urban area visitation for low SES-neighbourhood residents could be useful for policymakers as it could show many important aspects of planning low-SES neighbourhoods.

Research Questions

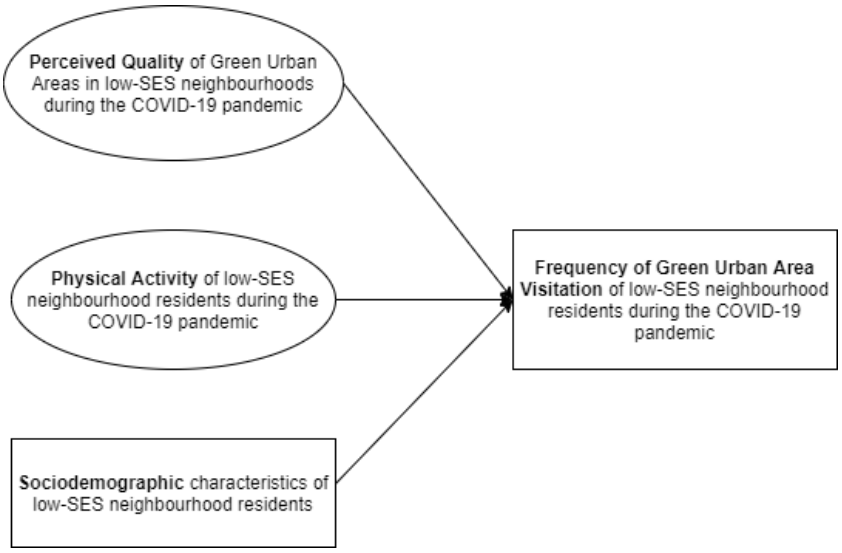
Following the problem statement and the research aim, the following main question of this research has been formulated: **What factors possibly influence the green urban area visitation frequency of low socioeconomic status neighbourhood residents during the COVID-19 pandemic?**

The main question will be answered through the following sub-questions:

1. Does the amount of physical activity of low-SES neighbourhood residents influence their green urban area visitation frequency during the COVID-19 pandemic?
2. Does the perceived quality of green urban areas in low-SES neighbourhoods influence the green urban area visitation frequency of low-SES neighbourhood residents during the COVID-19 pandemic?
3. Do socio-demographic characteristics of low-SES neighbourhood residents influence their green urban area visitation frequency during the COVID-19 pandemic?

Conceptual Framework

Following the a literature studies regarding the key concepts of the research question and sub-questions, a conceptual framework can be formulated. This conceptual framework is important to this research as it shows what exactly will be explored in this research. The figure on the right shows the three independent variables: physical activity, perceived quality and sociodemographic characteristics. The figure also shows the dependent variable of this research which is the frequency of green urban area visitation. The goal of this research is to find useful and significant correlations between the independent variables and the dependent variable.



Methods

To gain a better understanding in the relationship between the independent variables and the dependent variable shown in the conceptual framework, quantitative research will be used. The reason to conduct quantitative research is because this research is particularly interested in establishing generalizable knowledge and facts about the topic under research. This is something that quantitative research can help with. The research design that this research will follow is a survey-research, because once more, this research is particularly interested in establishing generalizable knowledge and facts.

The data collection tools that will be used are a literature review, which is mainly to see what existing data and theories exist about the concepts under discussion. As earlier mentioned, the second data collection tool is the survey. Existing and already validated survey will be used: the 'leefplekmeter' and SQUASH-survey. The data results that will be analysed in this research are collected through these two surveys.

Results & Conclusion

When looking at the main question of this research: **What factors possibly influence the green urban area visitation frequency of low socioeconomic status neighbourhood residents during the COVID-19 pandemic?,** the results of this study show that physical activity and perceived quality does not influence the frequency of green urban area visitation during the COVID-19 pandemic. Correlations between the concepts were found, however these were most of the times fairly weak. Furthermore, the sociodemographic characteristics did also not correlate nor influence the frequency of green urban area visitation. The exception to this however is gender, which seems to strongly correlate as well as influence the frequency of green urban area visitation.

Research Strengths & Limitations

One of the strengths of this research is the overall high validity. This mainly has to do with the fact that this research used surveys that have already been validated in the past. Another strength of this research is that it generated a lot of results that are contradictory to

the known theories in the current literature. This leaves the door open for a lot of future research.

Weaknesses of this research can be seen in the fact that quantitative data analysis allows allow difficulty to understand the context of the phenomena under research. Another weakness of this study is mainly related to difficulties of choosing the proper sampling method.

Research Recommendations

Recommendations regarding future research are mainly related to the fact that the findings in this research are rather contradictory to what is found in the current literature. There seem to be contradictory results regarding the key concepts between residents of low-SES neighbourhoods and the general population. Further research could verify these contradictory results as well as possibly find out why a contradiction exists.

For example, this study found that females visit green urban areas more often than males among low-SES neighbourhood residents during the COVID-19 pandemic. However, earlier research has shown that males tend to visit green urban areas more than females among a broader population during the pandemic. In other words, future research could try and verify findings in this research like these in relation to other studies.

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Part I: Introduction

1 Introduction

This chapter will cover the overall introduction to this research. It will first give a brief introduction to the topic of this research by giving background information on the COVID-19 pandemic and the main focuses of this research. Following this brief introduction to the topic of this research, the main problem, as well as the research aims and questions will be formulated. Lastly, the relevance of this study will be described by first looking at why this study is societally relevant. Following the societal relevance of the study, the scientific relevance will be described, which lists what knowledge gaps exist in the current literature regarding the topic of this research.

1.1 Topic Background

Since early 2020, the coronavirus or COVID-19 virus is holding the world and our society in its grip. According to the UN Secretary-General Antonio Guterres, the COVID-19 virus is the biggest challenge our society has faced since World War II (United Nations, 2020). As of May 2021, the COVID-19 virus has seen an estimated amount of 170 million total cases and 3.54 million deaths worldwide and this number is still rapidly rising (JHCRC, 2021).

The virus first got global attention when the first known case of COVID-19 got discovered in Wuhan, China on the 31st of December 2019 (Wang et al., 2020). Questions about how the COVID-19 virus originated in the first place still remain. Some scientists claim that the virus originated with bats and that the virus got passed over from bats to humans on the Huanan Seafood Wholesale Market (Andersen et al., 2020). This market is a place where a lot of unusual wild animals are sold, for example, live deer, peacock, wolf pups and also bats (Thiagarajan & Zheng, 2020). Other scientists claim that the virus originated from a lab located in Wuhan. The Wuhan Institute of Virology (WIV) is an institution that has been studying viruses that exist within bats for decades. The WIV lab is just located outside of the wet market, where other scientists claim the COVID-19 virus originated. These scientists that follow this 'lab-theory' argue that the virus could have leaked from the lab, spread to the wet market and ultimately caused a worldwide disaster (BBC, 2021).

The Huanan Seafood Wholesale Market was the largest seafood wholesale market in Central China (Xie, Cai, & Rui, 2020). Additionally our world is more interconnected than ever before. It was thus only a matter of time before the virus spread to other parts of the world.

The first COVID-19 case in the Netherlands was discovered on the 27th of February 2020 (RIVM, 2020a). Just two months after the first case in Wuhan was discovered. The virus led to the Dutch government to enforce many rules and measures to try and reduce the amount of COVID-19 cases. One of the most important rules and measures taken include a nation-wide lockdown, social distancing rules and a night-time curfew (Government of the Netherlands, 2021b). People are thus usually forced to stay at home and limit their social contacts throughout the day. As earlier mentioned, this has affected our society considerably. The COVID-19 virus has major implications on many aspects in our urban life.

Public green areas all over the world have also been affected by the COVID-19 virus. In the United States, the government enforced different rules across all of its big urban parks, when the virus first got discovered. Public parks received capacity limits, where only a certain amount of visitors were allowed to be in the park at one time. Some parks even got entrance reservations, where visitors needed to reserve a place to enter the park beforehand. It was also possible that parks closed down depending on local conditions of the virus (National Park Service, 2020).

In the Netherlands, public green areas like parks were also places where rules were enforced. Visitors needed to keep their distance from each other, and in some areas of some parks, face masks are even mandatory (Vondelpark Info, 2021). During the COVID-19 pandemic, public green urban areas are sometimes a place of hot discussion and controversy, which means it is sometimes needed to close them down and enforce new rules. For example, on the 23rd of May 2021, 8.000 football fans gathered in the Goffertpark in Nijmegen to celebrate their promotion to the Eredivisie. Epidemiologists of the RadboudUMC hospital were shocked and argued that this gathering could cause a new corona 'wave' in the Nijmegen area (Friedrichs, 2021). Three months before this, the Vondelpark in Amsterdam was also a place of controversy. Because of the nice weather, thousands of young people gathered in this park and violated the COVID-19 rules that were enforced in public parks. The Vondelpark was so crowded that the mayor of Amsterdam stated that it looked like a festival site (Koops, 2021). It is clear that green urban areas like parks are important places for people

and this is no different during the COVID-19 pandemic. However, it is also a place that has been majorly affected by the virus.

Furthermore, the COVID-19 pandemic has major implications on our physical activity and our daily routine relating to this. In the Netherlands, gyms were closed down on several occasions since the COVID-19 pandemic started. The first time gyms closed, was in March 2020 and they remained closed for months (RIVM, 2020b). At the end of 2020, the gyms closed yet again in December and also remained closed for months (RIVM, 2020c). Besides this, especially during the lockdowns, people were ordered to stay at home by the Dutch government (RIVM, 2021). In short, the COVID-19 pandemic also had its implications to the extent to which people get enough physical activity.

In other words, physical activity as well as our green urban area usage during the COVID-19 crisis are some of the key concepts that will be further looked into in this study. The main focus of this research will be on residents living in low-socioeconomic status neighbourhoods, also known as low-SES neighbourhoods. The following paragraph will look more into why the main focus of this research will be on this particular group and why it is important.

1.2 Problem Statement

The COVID-19 situation has caused a change in the way we use green urban areas according to multiple studies (Ugolini et al., 2020; Uchiyama & Kohsaka, 2020). People visit parks more frequently during COVID-19 times, which has seen to bring a lot of social and health benefits (Zhou & Rana, 2012). However, for residents living in low-SES neighbourhoods, the COVID-19 situation has seen a decrease in their use of green urban areas (Jay et al., 2020). For residents of low-SES neighbourhoods it is important to reap the benefits of green urban areas, especially during COVID-19 times, as they are already a vulnerable group. There is not enough evidence for policymakers to change the way green urban areas are planned to promote low-SES groups to use green urban areas more.

In other words, even though multiple studies have shown that green urban area visitation during COVID-19 times is beneficial for our mental and physical health (Levinger et

al., 2021; Slater et al., 2020; Cheng et al., 2021; Zhou & Rana, 2012), it remains unclear why residents of low-SES neighbourhoods visit green urban areas less during the COVID-19 pandemic. The unclear explanation and problem of why residents of low-SES neighbourhoods use green urban areas less during the pandemic will be looked into in this research. This is done by looking at different factors that could possibly influence low-SES neighbourhood residents' use of green urban areas. Firstly, this study will look at whether physical activity possibly influences the use of green urban areas, while it has been shown in multiple studies that residents of low-SES neighbourhoods tend to not engage in enough physical activity (Romero, 2005; Hoebeke, 2008). Furthermore, this study will look at the perceived quality of the green urban areas in these neighbourhoods as well as the socio-demographic characteristics of the residents as possible influencing factors.

1.3 Research Aim

The reasons as to why residents of low-SES neighbourhoods visit green urban areas less during the pandemic remains unclear. Even though knowledge on how green space is used, why it is used, and which factors influence its use are becoming more interesting for policymakers (Schipperijn et al., 2010), factors influencing the use of green urban areas of this particular group still remains unclear. While green urban areas are an important aspect of our urban lives, especially during the COVID-19 pandemic, this research aims to gain better understanding in the factors influencing the frequency of green urban area visitation of residents in low-SES neighbourhoods. Through quantitative research methods among Dutch residents of low-SES neighbourhoods, knowledge about these factors and the use of green urban areas can be generated to possibly serve as useful knowledge for policymakers and city planners of low SES-neighbourhoods as well as green urban areas. Furthermore, this research aims to gain understanding of the importance of green urban areas in general for residents of low SES-neighbourhoods, where the pandemic could be seen as an eye-opener of this importance. The knowledge acquired about the factors (physical activity, perceived quality of green urban areas, sociodemographic factors) that possibly influence green urban area visitation for low SES-neighbourhood residents could also be useful for policymakers as it could show many important aspects of planning these neighbourhoods. It could show policymakers what specific aspects of low-SES neighbourhoods as well as green urban areas

need more attention to promote an enjoyable experience for residents in low-SES neighbourhoods.

1.4 Research Question

Following the problem statement and the research aim, the following main question of this research has been formulated: **What factors possibly influence the green urban area visitation frequency of low socioeconomic status neighbourhood residents during the COVID-19 pandemic?**

The main question will be answered through the following sub-questions:

4. Does the amount of physical activity of low-SES neighbourhood residents influence their green urban area visitation frequency during the COVID-19 pandemic?
5. Does the perceived quality of green urban areas in low-SES neighbourhoods influence the green urban area visitation frequency of low-SES neighbourhood residents during the COVID-19 pandemic?
6. Do socio-demographic characteristics of low-SES neighbourhood residents influence their green urban area visitation frequency during the COVID-19 pandemic?

1.5 Societal Relevance

This study could be societally relevant as the results of this study could serve as evidence for policymakers to plan green urban areas in a way that also promotes use for low-SES groups, also in relation to COVID-19 times. Firstly, the results could possibly serve as evidence for policymakers to plan the living environment of low-SES neighbourhoods in a different manner that promotes physical activity, which is especially important during times of COVID-19 as earlier explained. Secondly, results of this study could possibly serve as evidence for municipalities to increase the quality of green urban areas in low-SES neighbourhoods.

Furthermore, the results can also be societally relevant for times after the COVID-19 pandemic. These results could serve as an eye-opener for policymakers to optimize green

urban areas in a better and safer way, also in reference to times after the COVID-19 pandemic. Policymakers are able to use the results of this study to see how much space we need to provide for green urban areas in these neighbourhoods to promote an active living pattern. Lastly, as earlier mentioned, the results of this study will show how residents of low-SES neighbourhoods perceive the quality of the green urban areas in their neighbourhood, whether this influences their frequency of green urban area usage, which could be useful for policymakers and city-planners also in relation to times after the COVID-19 pandemic.

To summarize, knowledge on which factors possible influence the use of green urban areas of low-SES neighbourhood residents are interesting for managers of green urban areas as well as policymakers and city planners involved in the planning of low-SES neighbourhoods. This knowledge can be used, which might ultimately lead to an increase in green urban area usage of this vulnerable group. This could lead to health benefits, increase in physical activity and possibly a higher quality of green urban areas in low-SES neighbourhoods.

When looking at the COVID-19 situation, one could argue that this study loses its societal relevance, as our society has faced many other viruses over the course of this century. Some examples include SARS, the Ebola virus and the swine flu. These people could argue that it's possible to look at COVID-19 in relation to the use of green urban areas in the same context as the other viruses we have faced before. However this is not the case. To build on this, it is thus important when describing the societal relevance of this study, to emphasize the uniqueness of the COVID-19 pandemic compared to other viruses. We should see the COVID-19 situation as a unique situation and something that can't be compared to other situations in the past.

To further elaborate on this, when looking at the numbers, COVID-19 has seen the largest amount of deaths out of any virus outbreak we have seen in the 21st century. Rongioletti (2020) mentions that this is not due to the fact that COVID-19 is deadlier than other viruses like the swine flu and SARS. However, COVID-19 is significantly more infectious than these same viruses. In other words COVID-19 is a virus that spreads more easily than other viruses we have seen in the 21st century. Another reason why COVID-19 is unique compared to other viruses of this century is the fact that COVID-19 has seen restrictions of our society on a scale that we haven't seen with the other viruses. Especially the 'lockdown'

measure is something that has major implications to our society. With other outbreaks like the Ebola virus, we have seen lockdowns implemented, for example in Sierra Leone (BBC, 2015). However, COVID-19 has seen an international implementation of the lockdown rule, as well as over a long period of time. Something we have never seen before.

Another virus that people might argue can be compared to the COVID-19 pandemic is the outbreak of the Spanish flu that lasted from 1918 up until 1920. The Spanish flu had a significantly larger amount of deaths than the COVID-19 pandemic with anything ranging in between 20 million to 100 million deaths as well as 500 million people infected (Centers for Disease Control and Prevention, n.d.). However, the Spanish flu is also a virus that cannot be compared to the COVID-19. The Spanish flu outbreak took place almost a century ago and since then the world is more connected than ever before. The fact that our world is more connected than ever has different implications than we have seen with the Spanish flu. In other words, COVID-19 should be seen as a unique phenomenon, something that cannot be compared to anything else, which makes it especially societally relevant to conduct this study.

1.6 Scientific Relevance

There are multiple relations within this study that are fairly underdiscussed in the current literature. Firstly, the implications of the COVID-19 pandemic on the use of green urban areas is in itself is not underdiscussed. However in relation to low-SES neighbourhoods it is fairly underdiscussed. Jay et al. (2020) suggests that low-SES groups tend to visit public spaces, like parks, less during the COVID-19 pandemic. However a reason as to why this is the case is not given. Further research is thus needed to explore green urban area visitation of low-SES groups during the COVID-19 pandemic. This research explores this concept further, which is also one of the main reasons why this research could be scientifically relevant.

Another reason is the relationship between physical activity and green urban areas, which is one of the relationships that will be looked into in this study. The influence of green urban areas on an individual's amount of physical activity is something that is widely discussed in the current literature. Wang et al. (2019) as well as Mytton et al. (2012) found a positive relation between physical activity and green urban areas. They argue that the availability of green urban areas can promote an individual's physical activity in a positive manner. However, Persson et al. (2019) found no positive relation between green urban areas

and physical activity. They even found that individuals who moved to greener areas sometimes decrease their amount of exercise. This research could provide more to this discussion and thus can be scientifically relevant in this sense. The relationship the other way around, where it is suggested that physical activity could influence the use of green urban areas, which is one of the relations under discussion in this research, is something that has not been discussed. This research can provide more knowledge into this particular relationship. In other words, this study can be scientifically relevant as it can add to already existing discussions of the relationships between green urban areas and physical activity, as well as add new knowledge about this relationship. Furthermore, it can provide knowledge about low-SES neighbourhood groups and their use of green urban areas.

The quality of green urban areas in relation to actual green urban area visitation is also not widely reported. One of the few studies looking into this relationship is by Fongar et al. (2019). This study looked into whether perceived green space quality matters for the frequency of visits. The study found that a higher perceived quality of green spaces also lead to a positive influence on green space visits. However, this study does not make a distinction between socioeconomic status of neighbourhoods and the study was also not conducted during COVID-19 times, which could have its different implications. This research could thus be scientifically relevant by looking at this relationship from a low-SES neighbourhood residents' perspective, as well as during COVID-19 times.

Lastly, sociodemographic factors influencing the use of green urban areas are not necessarily underdiscussed in the current scientific literature. A Danish study (2010) on possible factors influencing green urban area usage found that the socio-demographic characteristics (e.g. age, level of education, ethnicity) of respondents are one of the factors that influence the use of green urban areas. However, this study does not make a distinction between different types of neighbourhoods and was also not conducted in COVID-19 times, which this study tries to do.

Within the current literature there is also a lot of disagreement on what the exact effects of sociodemographic characteristics are on green area visits. For instance, when it comes to age, some studies (Dou et al., 2017) suggest that an increase in age is met with an increase in green area visits. However, other studies (Fongar et al., 2019; Uchiyama & Kohsaka, 2020) claim that an increase in age is met with a decrease in green area visits. The same can be said for level of education. There are studies (Fongar et al., 2019; Neuvonen et

al., 2007; Xie et al., 2020; Zanon et al., 2013) that argue that an individual with a high level of education visits green areas more often, while other studies (Van den Berg, 2017; De Vries et al., 2003; Maas et al., 2006; Mitchell & Popham, 2008) suggest otherwise and that individuals with a lower level of education tend to visit green areas more often. In other words, the relationship is still unclear and this study tries to add to the discussion. As Uchiyama and Kohsaka (2020) suggest, it is important to verify the relationship between sociodemographic attributes and green urban area visits by conducting further empirical research in different regions and countries with different backgrounds and contexts. In that sense, this study is also able to add to this discussion by researching this particular concept in a different region, country and context than currently exists in the literature.

To summarize, this study seeks to be scientifically relevant in two ways. Firstly, it seeks to add new knowledge by exploring concepts and relationships that have been hardly discussed in the current scientific literature. For example, looking at factors that could possibly explain why low-SES neighbourhood residents visit green urban areas less during the pandemic, which is hardly discussed in the literature. Secondly, it seeks to add new knowledge by putting relationships and concepts that have already been discussed in the current scientific literature into a new context (low-SES context; COVID-19 context).

1.7 Reading Guide

The remainder of this research is structured in the following way. This thesis consists of six different parts, with each part consisting of one chapter. Only the final part (VI: Conclusion) consists of three chapters.

Chapter 2 discusses the relevant key concepts and relationships of this study as well as the existing relevant theories in the scientific literature. This chapter concludes with a conceptual framework, which includes all the main concepts and relationships found in the theoretical framework.

Chapter 3 will look at the methodological backgrounds of the study. This chapter will outline the reasoning behind the methodological choice, the research strategy and the data collection tools as well as the operationalization process. Furthermore, it will go further into how reliability and validity are guaranteed in this research.

Chapter 4 outlines the different fields of research. A historical background for each of the different neighbourhoods will be given, as well as general information regarding them.

Chapter 5 provides an overview and discussion of the results of the study and an extensive data analysis will be given.

An overall conclusion to these results will ultimately be given in chapter 6, whereas chapter 7 will delve deeper into the strengths and weaknesses of this research and the recommendations for further research.

Lastly, chapter 8 will provide an overall reflection on the research itself and the research process.

Part II: Theories

2 Theories

This chapter will consist of the theoretical framework of this research, as well as the conceptual model that is central to this research. Firstly, the theoretical framework paragraphs will explain the existing theories regarding the key concepts and key relationships within this research. This is followed by a conceptual framework paragraph, which will place these key concepts and relationships in a conceptual model.

2.1 Theoretical Framework – Key Concepts

2.1.1 Reasoning Behind Choice of Explaining Factors

As explained in paragraph 1.3, one of the main goals of this research is to find the reason why residents of low-SES neighbourhoods tend to visit green urban areas less during the pandemic. To gain a better understanding of this phenomenon, this research thus seeks to find factors that could possibly explain the frequency of green urban area visitation by low-SES status neighbourhood residents during the COVID-19 pandemic.

However, knowledge regarding this specific subject is missing in the current scientific literature. This is why this research looked at what specific factors are mentioned in the current literature as having a (possible) influence on green urban area visitation frequency **in general**. Through an extensive literature review it became clear that the factors possibly influencing green urban area visitation frequency that are talked about the most in the current literature are: sociodemographic factors and perceived quality of green urban areas.

Besides 'sociodemographic factors' and 'perceived quality of green urban areas', this research also wants to look at is an individual's physical activity as possible factor influencing green urban area vistation. An individual's amount of physical activity is rarely mentioned in the current literature as having a possible influence on green urban area visitation, which makes it interesting to further explore. Additionally, this research is partly commissioned by 'Space2Move', which is an organization that attempts to stimulate physical activity. This is another reason why it is interesting to further explore physical activity as being a possible explaining factor of an individual's green urban area usage.

In other words, this research will in particular look at three factors that could possibly influence the frequency of green urban area visitation by low-SES neighbourhood residents during the COVID-19 pandemic. These are: **physical activity, perceived quality of green urban areas** and **sociodemographic characteristics**. The following paragraphs will further look into these concepts and other concepts that are central to this research.

2.1.2 Green Urban Areas

Defining Green Urban Areas

The European Environment Agency (2017) defines green urban areas as ''patches of vegetated land within the urban fabric for predominantly recreational use. Green urban areas can also refer to suburban natural areas that are managed as urban parks. Green urban areas may include assets of different scales from green roofs or pocket gardens to large urban parks''. In other words, green urban areas can refer to many different assets within our urban environment.

Benefits of Green Urban Areas

Looking further into the importance and benefits of green urban areas in our urban life is crucial when it comes to this research. Existing theories regarding the importance and benefits of these areas explain why this research is relevant, especially during COVID-19 times. A lot is written in the current literature regarding different benefits of green urban areas.

First of all, green urban areas have economic benefits. They could increase the property value of buildings that are close to urban green areas (Cho et al., 2006; Jim & Chen, 2006). Secondly, green urban areas provide ecological benefits. According to Haq (2011), green urban areas can be an important contributor to sustainable development. They provide our cities with different ecosystem services (e.g. the maintenance of biodiversity). Lastly and most importantly, green urban areas also provide social benefits, which are especially relevant to this research. Green urban areas provide us with recreational opportunities (Zhou & Rana, 2012). They also act as a place of relaxation and they provide us with emotional warmth (Heidt & Neef, 2008). Furthermore, these green urban areas can have a positive

impact on our mental (Nutsford et al., 2013) and physical health (Nielsen & Hansen, 2007). These benefits mostly show that green areas are important in our urban environment.

Types of Green Urban Areas

Zhao et al. (2010) distinguish six types of green urban areas. These include: park green spaces, protection green spaces, institutional green spaces, residential green spaces, street green spaces, and vacant land space.

Park green spaces are either small or large parks that can be found in our urban environment. These are public spaces, which are mainly used for 'human recreation and enjoyment' (Zhao et al., 2010, p.191). Apart from being an important area for human recreation and enjoyment, they also serve ecological as well as environmental purposes. Protection green spaces are green areas that are used for 'sanitation, insultation and security' (Zhao et al., 2010, p.191) purposes. They might include roadway protection green areas as well as windbreak forests. Institutional green spaces are green areas that are situated close to institutional areas like schools or hospitals. Residential green spaces include green areas that are usually found in residential areas. This is particularly related to green spaces that are found within neighbourhoods. These can include 'grouped greenbelts, house-side green space, and residential subdistrict roadway green space' (Zhao et al., 2010, p.191). Street green spaces are green areas that are found in relation to roadways and infrastructure. Street green spaces can include trees on the side of the road as well as parking lot green spaces. Lastly, vacant land spaces are green areas that are situated in vacant land, meaning land that is not in use.

The relevant types of green urban areas in this research are especially park green spaces, residential green spaces, and street green spaces. In other words, this research will mainly focus on green urban areas like public parks, as well as greenery found in neighbourhoods (e.g. house-side green space).

Green Urban Areas during the COVID-19 pandemic

Since the COVID-19 pandemic started, a significant amount research has been conducted regarding the influence it has had on our use of green urban areas.

A study conducted by Ugolini et al. (2020) across Croatia, Italy, Spain and many other European countries shows that the benefits that green urban spaces bring to our urban environment are amplified during the COVID-19 pandemic. The main activities that the respondents used the green urban areas for during the COVID-19 pandemic was exercising and relaxing. However, what the study also shows is that before the COVID-19 pandemic, the green urban areas were predominantly used as a place to meet other people or to observe nature. In other words, Ugolini et al. (2020) see a change in the way green urban areas are used during the COVID-19 pandemic where there is an increase in ''necessary'' activities (e.g. taking the dog out, and a decrease in ''non-essential'' activities (e.g. meeting other people and observing nature).

In an additional study regarding the same topic, however this time not in a European context, but in a Japanese context, Uchiyama & Kohsaka (2020) find a 'major behavioural pattern change' during the COVID-19 pandemic regarding the frequency of visiting green urban areas. What is especially interesting about this study is that it found a correlation between income level and the access and use of green urban areas. Uchiyama & Kohsaka (2020) mention that a study conducted before the COVID-19 focusing on a Japanese city did not find a correlation between income level and the use and access of green urban areas. In other words, Uchiyama & Kohsaka also found that the COVID-19 pandemic has influenced the use of green urban areas.

Furthermore, Geng et al. (2021) conducted a statistical analysis of the impacts of COVID-19 on the frequency of park visitation at regional, national and global scales. The study was conducted across 48 different countries and found that during the COVID-19 pandemic the park visitation increased compared to pre-COVID-19 times. The study concludes that the demand for green urban areas has increased during the pandemic. Other studies that were conducted on just a city-level also conclude that the use of green urban areas increases during the COVID-19 outbreak. For example, in Oslo, the frequency of people visiting green urban areas has increased during the COVID-19 outbreak (Venter et al., 2020).

Lastly, when looking at the frequency of park visitation of different groups, we can see that some studies suggest differences in park visitation between groups. Earlier mentioned studies conclude that park visitation has increased in general during COVID-19 times, however these studies do not make a distinction between different groups in our society. Rice & Pan (2020) argue in their study into the drivers of change in park visitation during the

COVID-19 pandemic that countries with an older population as opposed to others see a decrease in park visitation. The main reason for this is that the older population has a bigger fear of contracting the virus as opposed to a younger population. In the same way we can also look at individuals from low-SES neighbourhoods, which is especially relevant to this research. In a study conducted by Jay et al. (2020) into neighbourhood income and physical distancing during the COVID-19 pandemic in the United States, they conclude that individuals that live in low-SES neighbourhoods are more likely to work outside of their home during the pandemic as opposed to individuals from high-SES neighbourhoods. However, these individuals that live in low-SES neighbourhoods are at the same time not more likely to visit locations such as parks. The study does not mention the reason why this is the case.

To conclude this paragraph, when looking at the current literature on the effects of COVID-19 on the use of green urban areas it's clear that the overall frequency of park visitation has increased, but this number is different for different groups of people in our society. Additionally, COVID-19 has also influenced our activities in green urban areas.

2.1.3 Socioeconomic Status

This study particularly looks at residents living in low-SES neighbourhoods. This is not to be confused with the socioeconomic status of an individual. This paragraph will look into the difference between low-SES individuals and low-SES neighbourhoods.

Low-SES individuals

People with a low socioeconomic status have different characteristics compared to individuals with a higher socioeconomic status. According to Mueller and Parcel (1981) the socioeconomic status of an individual or a group is their relative position within a hierarchal social structure, which is based on their control over power, wealth, and prestige. Even though this definition is a bit outdated, it is still relevant. However, a more recent definition of socioeconomic status is argued by Miech and Hauser (2001), who argue that socioeconomic status defines to what extent certain individuals or groups have the opportunity to consume certain goods. Indicators of neighbourhoods with a low socioeconomic status are most importantly income and level of education (Shavers, 2017).

Low-SES neighbourhoods

There is a difference between the socioeconomic status of an individual and the socioeconomic status of a neighbourhood. What this means is that the socioeconomic status of an individual might not be the same as the socioeconomic status of the neighbourhood they live in. It is technically possible for a high SES individual to live in a lower SES neighbourhood, while it is also technically possible for a low SES individual to live in a higher SES neighbourhood. However, according to the fundamental cause theory (Link & Phelan, 1995), higher SES individuals are most likely to be able to live in higher SES neighbourhoods.

According to Bosma et al. (2001), determining the neighbourhood socioeconomic status can be done by using four different indicators. The first indicator is the percentage of subjects reporting primary schooling only. If this percentage of subjects reporting primary schooling only, or have only completed a low level of education (in Dutch context), is averaging above 44 (Mackenbach et al., 1994), the neighbourhood in question could be considered as having a low socioeconomic status. The second indicator is the percentage of subjects reporting that they are unskilled manual workers. If this percentage is higher than 39 (Mackenbach et al., 1994), it could indicate a low socioeconomic status neighbourhood. The third indicator is the percentage of subjects reporting that they were unemployed or disabled. A percentage of 30 or higher according to GLOBE Data (Mackenbach et al., 1994) could indicate a low socioeconomic status neighbourhood. Lastly, if the percentage of subjects reporting severe financial problems is above 15 (Mackenbach et al., 1994) then it could indicate a low-SES neighbourhood.

Furthermore, Stronks et al. (1997) also indicates more characteristics of low-SES neighbourhoods. These characteristics could be classified in four different groups. First of all the housing conditions within the neighbourhood are an important indicator of the socioeconomic status of a neighbourhood. Secondly, social factors like noise pollution and vandalism are also an important indicator. Psychological factors like depression are also defined by Stronks et al. (1997) as deciding the socioeconomic status of neighbourhoods. Lastly, behavioural factors like smoking, physical inactivity and alcohol consumption are also related to the socioeconomic status of neighbourhoods. Physical inactivity is especially an important subject in this research. A high score on these indicators means that the neighbourhood in question could possibly be considered a low-SES neighbourhood.

To summarize, Bosma et al. (2001) names four different indicators of the socioeconomic status of neighbourhoods: the level of education, job skills, employment and financial problems. Additionally, Stronks et al. (1997) names four characteristics of low-SES neighbourhoods: housing conditions, social-, psychological- and behavioural factors.

2.1.4 Physical Activity

Physical activity is usually defined as a ''bodily movement performed by skeletal muscles that demand energy expenditure'' (Shahidi et al., 2020). Thivel et al. (2018) mentions that individuals can be both sedentary and active. This could be a situation where an individual reaches their recommended amount of physical activity for their age, however spends the rest of their time in a sedentary manner. In other words, it is possible for individuals to be sedentary at some points throughout the day, but still be physically active enough to be considered healthy.

The importance of reaching enough physical activity is something that has been widely researched and discussed in the current literature. In a study conducted by Warburton et al. (2006) into the health benefits of physical activity, they show evidence that reaching the recommended amount of physical activity in a day can decrease the chance of getting several chronic diseases as well as reduce the risk of premature death. Janssen & LeBlanc (2010) further solidify the argument regarding the importance of physical activity as they conclude that enough physical activity is also important for children and it is associated with many health benefits for them. Lastly, Galloza et al. (2017) find in their study into the benefits of physical activity of older adults and elderly that a lack of physical activity for this group has negative effects on physical health, body composition and can cause premature death. In other words, the current literature suggests that physical activity is beneficial for all different demographics in our society.

When looking at physical activity in relation to low-SES neighbourhoods, which is particularly interesting for this research, Romero (2005) has studied the physical activity of adolescents in low-SES neighbourhoods. He names the inability to pay facility fees and also the lower quality of the facilities that are available as barriers for these children to reach their recommended amount of physical activity. Additionally, in a research into the perceived barriers to physical activity of low-income women by Hoebeke (2008), it becomes clear that

fatigue is also a factor why they do not engage in the recommended amount of physical activity. The reason for this is that most women work multiple jobs to get by, resulting in being too exhausted to also engage in physical activity on top of this. Lastly, the urban environment of low-SES neighbourhoods could also be a factor as to why it is difficult for low-SES neighbourhood residents to engage in physical activity. Adlakha et al. (2020) argue that developing urban environments is important to promote an active lifestyle for older adults. This can also be the case for other age groups.

According to Ainsworth et al. (2013) it is possible to identify four different types of physical activity. The first type of activity is occupational. This involves work-related activities. These could include manual labour tasks and carrying or lifting different objects on the work place. This also includes the amount of time spent walking during work. The second important type of activity is domestic activity. This relates to housework, like doing laundry and cleaning. Domestic physical activity also includes child care, chores, self-care and shopping. The third type of physical activity is transportation or utilitarian activities. These activities include the purpose of going somewhere. For example walking or cycling to work or school. The last type of physical activity is leisure time. These include recreational activities like sports, hobbies, exercise and volunteer work.

Onderdeel	Activiteiten die worden nagevraagd
Woon/werkverkeer	Lopen van/naar het werk of school
	Fietsen van/naar het werk of school
Lichamelijke activiteit op werk of school	Licht en matig inspannend werk
	Zwaar inspannend werk
Huishoudelijke activiteiten	Licht en matig inspannend huishoudelijk werk
	Zwaar huishoudelijk werk
Vrije tijd	Wandelen
	Fietsen
	Tuinieren
	Klussen/doe-het-zelven
	Sport (max. 4)
Totaal	Combinatie van fietsen, klussen, tuinieren, sporten en andere inspannende activiteiten

Figure 1: Every section of the SQUASH-survey (in Dutch) and the activities associated to these sections (Wendel-Vos & Schuit, 2002)

The four types of physical activity defined by Ainsworth et al. (2013) are also found in the SQUASH-survey seen in figure 1. The SQUASH (Short QUestionnaire to ASess Health enhancing physical activity) is a survey that measures an individual's total amount of physical

activity in a week and whether this is enough to be considered healthy. Based on four indicators of physical activity seen in figure 1 and also defined by Ainsworth et al. (2013), this total amount of physical activity is measured (Wendel-Vos & Schuit, 2002). The four indicators or sections include: residential/work related transportation, physical activity at work or school, housework activities and leisure activities. These indicators ultimately are combined to decide the total amount of physical activity of an individual in a week. This total amount of physical activity is expressed in MET-scores. More information on how the SQUASH-survey works and MET-scores will be further explained in chapter 3 and chapter 5.

Physical Activity during the COVID-19 pandemic

Since the COVID-19 outbreak started, many studies tried to research the relationship between the COVID-19 pandemic and one's physical activity. Tison et al. (2020) argue that COVID-19 in the form of social distancing measures has a negative impact on our physical activity. Their descriptive study used daily step count as a proxy for physical activity and they found that step counts decreased worldwide during the global pandemic. Even countries that had a relatively low amount of COVID-19 infections and less strict measures (e.g. lockdowns, night time curfews) found a decrease in their overall step count. Physical activity is also beneficial in improving the clinical conditions which are mostly associated with severe COVID-19, which means that physical activity is recommended during the COVID-19 pandemic as it can serve benefits for our physical health as well as our mental health (Dwyer et al., 2020).

When looking at socioeconomic status, a study into the effects of the COVID-19 pandemic on physical activity in the United States by Dunton et al. (2020) shows that reductions in walking and daily step count were even larger for low-SES groups. Sallis et al. (2020) also found in relation to low income groups that they ''do not have equipment, internet access, or indoor space to make at-home physical activity realistic''. Something that groups with a higher socioeconomic status are more likely able to do. At-home physical activity is defined as physical activity and exercise at home, which serves as a substitute of outdoors physical activity and exercise, which is difficult during COVID-19 times (Hammami et al., 2020). Furthermore, Robinson et al. (2016) argue in a study conducted pre-COVID-19 that neighbourhood income might affect the physical activity of this group.

2.1.5 COVID-19

The COVID-19 virus has spread to nearly every country recognized by the UN since it was first discovered in Wuhan, China. As of June 2021, only five countries that are recognized by the UN have not reported a single COVID-19 case. In other words, almost every country is confronted with the COVID-19 pandemic. It is however important to understand that not every country handles the pandemic in the same way. Countries have different rules and measures and it is thus important to understand the context in which this research has taken place. This paragraph will give a brief description of the relevant rules and measures that have existed (or still exist) during this research in the Netherlands, regarding the COVID-19 pandemic.

COVID-19 in The Netherlands

Since the COVID-19 outbreak started in The Netherlands, the Dutch government has applied multiple rules and measures in an attempt to reduce the amount of COVID-19 cases in the country.

The most important rule is the '1.5-metre-rule'. This rule applies to anyone and near enough anywhere (indoors and outdoors). This rule states that everyone should stay at least 1.5 metres apart from each other (Government of the Netherlands, 2020). This so-called 'social distancing rule' has an impact on many different areas of our society.

Furthermore, as of the 14th of December 2020, the Netherlands entered their second lockdown. This lockdown has come with additional rules and measures that also have a big impact on the way we use our urban environment. The lockdown forces everyone to stay home as much as possible and to limit the amount of contact you have with others (Government of the Netherlands, 2021a). Additionally, households are only allowed to host one person a day or visit no more than one other household per day (Government of the Netherlands, 2021a). This second lockdown also means that bars, restaurants and cafés are closed, education is mostly in an online environment and sports and recreational events are banned (Government of the Netherlands, 2021b). Again, all these different measures limit the

amount of social interactions we have in our current society. Something that has major implications on our urban life and thus on the way the use of green urban areas, which means this information is particularly relevant to this study.

2.1.6 Perceived Quality of Green Urban Areas

Perceived Quality versus Observed Quality

Research has shown that the quality of a product or service is an indicator of whether people are going to use it or not (Nurhayati et al., 2011; Kazmierczak, 2013). However, the quality of a certain product or service (e.g. city parks) is usually a personal and subjective thought (Kothencz & Blaschke, 2017). For example, a certain city park that is deemed as having 'excellent' quality might be viewed by certain people as a boring and overall negative place. In other words, the actual quality might differ from the perceived quality. In this research, the perceived quality of city parks will be further explored as the subjects that are central to this research are individuals living in low-SES neighbourhoods. How these residents perceive a city park is what ultimately (possibly) decides whether they will visit the park or not. In other words, the main difference between perceived quality of green urban areas and actual observed quality of green urban areas is that the perceived quality is dependent on the users of these areas, while the actual observed quality is usually dependent on the managers (policymakers) of these areas. Once more, this is the reason why this research will look at perceived quality as it is more interested in the users of green urban areas rather than the planners.

The following paragraphs will partly focus on how the perceived quality of green urban areas is measured in the current literature. Regarding this it is important to note that perceived quality and actual observed quality are normally not measured with different indicators (Fongar et al., 2019).

Measuring Perceived Quality of Green Urban Areas

In the current scientific literature there is no uniformity on how to measure the perceived quality of green urban areas.

In a research conducted by Li et al. (2020) into the perceived quality of urban wetland parks, an individual's perceived quality is measured using two dimensions: comfort and environmental satisfaction. However, a study conducted by Van Herzele and Wiedemann (2003) add more dimensions when trying to measure the perceived quality of green urban areas. They argue that spaciousness, nature, the culture and history of an area, quietness and the available facilities are the most important indicators in measuring the perceived quality of green urban areas. Giles-Corti et al. (2005) argue that perceived safety of green urban areas is also an important indicator. Lastly, in a study conducted by Bai et al. (2013) into the perceptions of neighbourhood park quality, it is shown that cleanliness and attractiveness are also important indicators when it comes to measuring the perceived quality of city parks. In other words, every research uses different indicators when it comes to measuring the perceived quality of city parks. It is also shown that there are many indicators that are related to the perceived quality and that it is usually up to the researcher which indicators they want to incorporate into the research. Furthermore, it is also a choice of the user what they find important indicators of their perceived quality of a certain service or good.

In relation to low-SES neighbourhoods, there is little research conducted about the perceived quality of green urban areas among this group.

2.1.7 Socio-demographic characteristics

Socio-demographic characteristics in general

According to GESIS (n.d.), which is the largest German infrastructure institute for the social sciences, socioeconomic demographic characteristics include many different variables. GESIS mentions age, gender, level of education, migration background and ethnicity, religious affiliation, marital status, household, employment, and income as the most important ones. Education and income together form an individual's socioeconomic status. The variables that require further information from this list are: level of education and migration background and ethnicity. These are characteristics that will be further looked into later in this study and are still somewhat abstract.

The level of education in the Netherlands is divided into three different levels. A low level of education includes individuals who have either primary education, VMBO, the first

three years of HAVO/VWO or MBO-1 as their highest completed education. A middle level of education includes individuals who have completed an education in either HAVO/VWO, MBO-2, MBO-3 or MBO-4 as their highest education. A high level of education includes individuals who have completed HBO or WO as their highest education (CBS, 2019).

In the Netherlands, migration background and/or ethnicity is usually divided into 'allochtoon' and 'autochtoon'. This roughly translates to 'foreigner' and 'native'. However these translations are still somewhat incomplete as it is more complicated than just a divide between foreigner and native. According to CBS (2016), an 'allochtoon' or 'foreigner' is an individual who at least one parent is born outside of the country of origin. An 'autochtoon' or 'native' is someone who both parents are born in the country of origin. Furthermore, there is a divide between an 'allochtoon' or foreigner' with a western background or non-western background. An individual with a western background is someone who is from or who's parents are from countries in Europe (excluding Turkey), North-America, Oceania, Indonesia and Japan. An individual with a non-western background is someone who is from or who's parents are from a country that is not in the list just mentioned (CBS, n.d.).

2.2 Theoretical Framework – Key Relationships

Physical Activity and Green Urban Areas

The influence of our activity patterns on our use of green urban areas is something that is quite underdiscussed in the current literature. However the relation the other way around is something that is widely discussed in the current literature. A study into the influence of green areas on someone's physical activity by Persson et al. (2019) found no positive relation between greenness and physical activity. However this study contrasts the available literature on this topic. Wang et al. (2019) show in their study into the influence of green urban space on resident's physical activity in China that green urban spaces play important roles in promoting physical activity. Additionally, Mytton et al. (2012) found a positive association between green space and physical activity levels. In other words, there is no universal agreement into the fact that there is a positive relationship between physical

activity and green space. Research suggests that more empirical evidence is needed to support these claims.

Some studies also looked at the synergistic benefit in adopting physical activities while directly being exposed to nature. The term that relates to this is 'green exercise' (Pretty et al., 2005). According to Pretty et al. (2005), green exercise has important public and environmental health consequences. Green exercise can thus lead to positive short and long-term health outcomes for individuals (Barton & Pretty, 2010).

Perceived Quality of Green Urban Areas and Green Urban Areas

In a study conducted by Fongar et al. (2019) into the perceived quality of parks and frequency of visits of Norwegian adults, it was found that positive perceptions of green space were often met with an increased number of visits. In other words, if residents consider a green area in their area to have a satisfying quality, then it is usually met with a higher number of visits. The findings of this study are thus very useful for city planners and managers of green urban areas as well as neighbourhoods. Boosting the overall quality of green areas could lead to a better perception of the quality of these same areas. This could ultimately lead to a higher frequency of visits, which brings numerous benefits. This research will explore whether this is also the case for low-SES neighbourhoods as well as during COVID-19 times.

Sociodemographic characteristics and Green Urban Areas

The same study conducted by Fongar et al. (2019) that was used to find a relationship between perceived quality of parks and frequency of visits, also looked at the relationship between sociodemographic characteristics of the subjects and their frequency of green space visits. It was found that especially age and level of education influence the visit frequency of green space. The study found that increasing age was also met with a decrease in green space visits. This is also supported by Uchiyama and Kohsaka (2020). However some studies report the opposite. For instance, Dou et al. (2017) found in their study that an increase in age was met with an increase in green space visits. The influence of age on green space visits thus still seems to be contested. It is most likely possible that factors other than age have a more significant impact on green space visits. When it comes to level of education, Fongar et

al. (2019) found that respondents with a higher level of education visited green spaces more frequently than respondents who had lower education. The assumption that a higher level of education relates to a higher frequency of green space visits is also supported by other studies (Neuvonen et al., 2007; Xie et al., 2020; Zanon et al., 2013). However, a different study conducted by Van den Berg (2017) found that respondents with a low level of education visit green spaces more frequently than respondents with a high level of education. Multiple studies (De Vries et al., 2003; Maas et al., 2006; Mitchell & Popham, 2008) support this and suggest that lower educated subgroups seem to benefit most from green space, which is what would indicate why respondents with low level of education visit green spaces more often. However, what becomes clear from the literature is that the relationship between level of education and green space visitation is also unclear. The scientific literature seems to be divided regarding this subject.

Another study that looks into the effect of sociodemographic characteristics on green space visits is from Burnett et al. (2021). This study that was conducted in the United Kingdom is especially interesting and relevant to this study as it was conducted during the COVID-19 pandemic. The study looked at age, gender, socioeconomic status and ethnicity. When looking at age as an influence on green space visits, it was found that an increase in age was met with a decrease in green space visits. The reason given is that an older age is one of the most important risk factors for a negative outcome from COVID-19 (Office for National Statistics, 2020; Public Health England, 2020). Furthermore, it was found by Burnett et al. (2021) that significant gender differences in visiting green areas during the pandemic exist. Males are using green areas more often than females. This is also the case outside of COVID-19 times according to multiple other studies (Morris et al., 2011; Lee & Maheswaran, 2011; Ward Thompson et al., 2005; Burgess, 1996; Richardson & Mitchell, 2010; O'Brien & Morris, 2014). This difference is caused by females feeling more vulnerable than males in green spaces, especially without company. Additionally, Burnett et al. (2021) argue that the main motivation behind green space use for females was social interaction. Social interaction has become more difficult during the pandemic which could explain why females visit green space less during the pandemic. The study conducted by Burnett et al. (2021) supports other studies (Boyd et al., 2018; Morris et al., 2011; Scotland Natural Heritage, 2014) that argue that **socioeconomic status** influences frequency of green space visits. However, Burnett et al. found little to no difference in visitation of green space between pre-COVID times and during

the pandemic. Lastly, relating to ethnicity and migration background, it was also found by Burnett et al. (2021) that ethnic minorities have lower odds of visiting green space in general. It was also found that COVID-19 restrictions impacted ethnic minorities more than white respondents when it comes to green space visitation.

From the literature regarding the effects of sociodemographic characteristics on green space visitation, it becomes clear that there is a lack of ambiguity. It leads to believe that the context of the subjects is also important, which is suggested by Uchiyama and Kohsaka (2020). They suggest that further empirical research is needed to verify the relationship between sociodemographic attributes and the use of green urban areas. It is for example also important where the respondents live. In other words, this study tries to take the context into account by looking at these sociodemographic characteristics in a low-SES neighbourhood and COVID-19 context.

2.3 Conceptual Framework

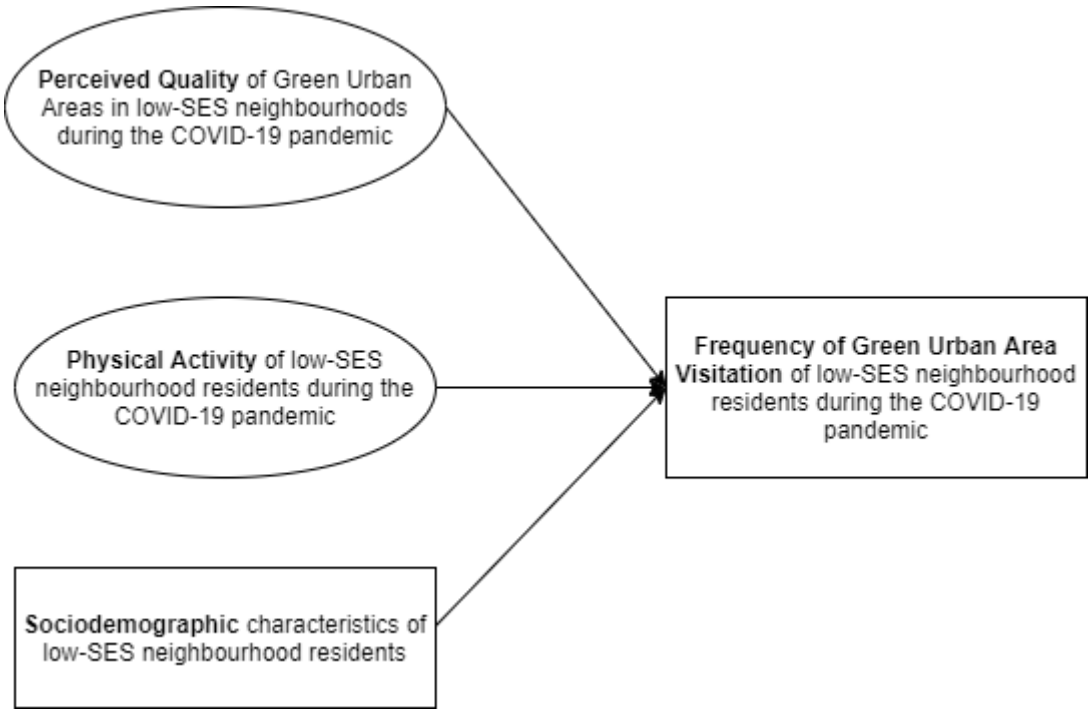

Figure 2: Conceptual Frame of this study

The key concepts mentioned in the research question as well as discussed in chapter 2 can be seen in figure 1. The model contains three different independent variables. The first independent variable is the perceived quality of green urban areas in low-SES neighbourhoods during the COVID-19 pandemic (1). The second independent variable is the amount of physical activity of low-SES neighbourhood residents during the COVID-19 pandemic (2). The last independent variable is the sociodemographic characteristics of low-SES neighbourhood residents (3). This research will explore whether one or multiple of these independent variable have an influence on the frequency of green urban area visitation of low-SES neighbourhood residents during the COVID-19 pandemic (4).

Part III: Methods

3 Methods

This chapter will explain the methods used within the research process. First, the research strategy will be discussed, which will include the reasoning behind the methodological choice, the research design, as well as the sampling method. The second paragraph will list all research methods that are used for this research. The third paragraph will explain how reliability and validity are ensured in this research. Lastly, the final paragraph will explain how the operationalization process is handled.

3.1 Research Strategy

Methodological Choice

To gain a better understanding in the relationship between the independent variables (paragraph 2.3) and the frequency of green urban area visitation, quantitative research will be used. The reason to conduct quantitative research is because this research is particularly interested in establishing generalizable knowledge and facts about the topic under research. This is something that quantitative research can help with (Korzilius, 2008).

This research is also more interested in expressing results in numbers and graphs as the key concepts of this research are of a quantitative nature.

Lastly, this study can be characterized as an explanatory research as it tries to find explaining factors for the dependent variable under research. Explanatory research mostly uses quantitative research methods (Korzilius, 2008). This means that this particular approach will help answer the research question.

Research Design

According to Ragin (1994, p.26), a research design is *''a plan for collecting and analysing evidence that will make it possible for the investigator to answer whatever questions he or she has posed.''* In other words, the research design can be defined as a plan of action and in what way the researcher seeks to collect and analyse the data. Vennix (2016) defines three main research designs: case study, experiment and survey.

The specific research design for this study will be a survey. Surveys are a form of quantitative data collection. They are especially relevant with studies that seek to explain explanatory variables of a large group or groups (Vennix, 2016). In other words, surveys are especially helpful in a research that aims to systematically collect a large number of comparable objects. This study has thus chosen to conduct surveys as its research design as it seeks to gather a relatively large number of respondents that is able to produce generalizable knowledge about the topic under research.

Population & Sampling

Population and *Sample* are important terms when it comes to choosing surveys as a research design.

The population of a survey-research refers to all the research objects or people that could be part of the research (Vennix, 2016). Following this definition, the population of this research is the households of the three neighbourhoods where the surveys will be conducted. The reason that the population of the research is defined as the number of households and not the number of residents has to do with the research procedure, which will be explained in paragraph 3.4. The neighbourhoods where this survey-research will take place are Wolfskuil in the city of Nijmegen, Holtenbroek IV in the city of Zwolle, and Oosterflank in the city of Rotterdam. According to CBS (2020) data, Wolfskuil has 3.485 households, Holtenbroek IV has 1.690 households, and Oosterflank has 5.685 households. This means that the total population of this research is 10.860 households. Conducting surveys with 10.860 people is practically impossible. This means a *sample* needs to be taken of this total population of the research.

As earlier explained, the research objects or the people that this research seeks to produce generalizable knowledge for, is people living in low-SES neighbourhoods. This means the 10.860 households - which the population of this research consists of - are all equal. In this research they are considered to have the same features and characteristics. In other words, it is considered that there are no differences between different research objects in the population. This means that according to Acharya et al. (2013), the best sampling method that relates to the above description is *simple random sampling*. In this method, every household in the population has an equal chance of being selected in the sample. The

way in which this is done is by each time randomly selecting a household to conduct a survey (when walking through the neighbourhood). The exact sample size has not been determined as this was not relevant for this research. As all research objects within this research are considered to have the same features and characteristics, this research aimed to find as much respondents in the time that was available to conduct the surveys. Ultimately, data of 142 respondents was collected through the survey process.

Non-response

Vennix (2016) defines *non-response* in survey-research as the percentage of the research objects or people that do not want to take part in the research. This research aims to have a low non-response. A low non-response rate means that it is easier to produce generalizable knowledge about the topic under research. Swanborn (1987, p.280) mentions three important ways in which researchers can keep the non-response rate as low as possible. This research tries to follow these suggestions mentioned by Swanborn.

Firstly, Swanborn suggests a good training to be followed by the researchers before conducting the surveys. The researcher(s) in this study have had multiple meetings with Pharos before conducting the surveys in the three neighbourhoods. These meetings focused on what to expect when talking to the people in the neighbourhoods, how to inform them about the research and what the best way is to convey the survey questions to the respondents.

The second suggestion of Swanborn is to give a clear and brief introduction to the respondent about what the research is about. When approaching the respondents in the different neighbourhoods this clear and brief introduction is given to them.

Lastly, Swanborn suggests to not immediately give up when a respondent refuses to take part in the survey-research. The researcher might still be able to find another way to convince the respondent to participate. This suggestion has also been taken into consideration when approaching the respondents in this research.

Even though Swanborn's suggestions are taken into consideration within this research, the non-response rate of this survey-research is relatively high. The two main reasons identified are the relatively long length of the survey, as well as the time of day that this survey has been conducted. Vennix (2016) also mentions that non-response is something

that is not completely avoidable and that increasing the sampling size is **not** a solution to non-response. This is also one of the reasons why an exact sampling size has not been determined, as explained in the previous heading.

3.2 Research Methods

According to the University of Newcastle (2020), data collection tools are the techniques used to collect relevant data for a research. During this research, two types of data collection tools were used: literature review and surveys.

The literature review is a way of collecting *secondary data*, which is data that already exists. The surveys in this research collect *primary data*. This is 'new' data which will be collected through these surveys. Both data collection tools will be extensively explained.

Literature Review

A literature review was used to collect already existing data (secondary data) and theories regarding the key concepts and relationships in this research. The literature review is used to form a theoretical basis of this research and it was thus conducted before the empirical stage of the research took place. However, according to Vennix (2016), a literature review does not only show what theories already exist about your topic, but it shows at the same time what knowledge gaps exist about this same topic. It is thus a crucial step in a research process. Because of this, an extensive literature review of the relevant concepts and relationships central in this research has been conducted and described in chapter 2.

Surveys

The survey used for this research is a combination of two different surveys: the 'Leefplekmeter' established by Pharos and the SQUASH-survey. Furthermore, some questions, that were not included in the 'leefplekmeter' and SQUASH-survey, were later added. Ultimately, the survey used for this research has a total of 134 questions and was found to take 20 minutes on average to fill in. It is important to note that not all 134 questions are relevant for this research and only the relevant questions regarding the key concepts of this research will be used.

Leefplekmeter

` The first part of the survey consists of questions from the 'Leefplekmeter'. The Leefplekmeter includes fourteen different subjects relating to the respondent's perception of their neighbourhood as well as some general questions about the respondent. The leefplekmeter survey consists of 88 questions out of the total 134 questions. The Leefplekmeter seeks to collect knowledge about respondents' perception on a certain neighbourhood and how this knowledge can ultimately give policymakers incentives to plan neighbourhoods in a way to promote a healthy living environment (Acda & Van Bruggen, 2019).

The fourteen different subjects that are included in this survey are:

- **Mobility:** Physical activity (1), Public Transport (2), Traffic and parking (3).
- **Planning & Facilities:** Streets and public spaces (4), Nature and green (5), Playing and Recreation (6), Facilities (7), Work and employment (8), Living environment (9).
- **People, Perceptions & Culture:** Social Contacts (10), Identity (11), Safety (12).
- **Ownership & Maintenance:** Tidiness and Cleanness (13), Participation (14).

The relevant subjects for this research are mainly physical activity (1) and nature and green (5). These are important for the key concepts of this research defined in the conceptual framework paragraph: perceived quality of green urban areas, frequency of green urban area visitation and physical activity.

The Leefplekmeter is a valid survey. The survey has been established by Platform31, GezondIn and Pharos and it has already been put into practice on multiple occasions. A good example is in Terneuzen, Netherlands, where the Leefplekmeter has been put into practice. The results of the leefplekmeter ultimately served as valuable input for the Municipal Strategy on Spatial Planning and the Environment (Gemeentelijke Omgevingsvisie) of Terneuzen (Acda & Van Bruggen, 2019).

SQUASH-survey

The second part of the survey consists of questions from the SQUASH-survey. The SQUASH-survey consists of 46 questions of the total 134 questions of the survey. SQUASH

stands for *Short Questionnaire to Assess Health-enhancing physical activity.* The questions of this survey are based on the *Nederlandse Norm Gezond Bewegen,* which translates to the 'Dutch Standard Healthy Physical Activity'. This standard shows whether someone (depending on age) gets enough physical activity or not. The SQUASH-survey seeks to measure the respondent's usual physical activity (Wendel-Vos & Schuit, 2002). These questions are thus especially relevant for the key concept 'physical activity' in this research.

The SQUASH-survey consists of four different parts. These four different parts are the four different indicators of physical activity that have been described in the theoretical framework chapter. These are: transportation, physical activity at work or school, housework, and leisure activities (figure 1). The results of one respondent on these four parts of the survey will ultimately determine a total score (MET-score). This total score will indicate whether the respondent meets the 'Nederlandse Norm Gezond Bewegen' and thus whether the respondent gets enough physical activity or not (Wendel-Vos & Schuit, 2002). The exact way in which the total MET-score of physical activity is calculated for each respondent will be further explained in chapter 5.

The SQUASH-survey is a survey that has been validated on multiple occasions. The SQUASH-survey was found to be a reproducible and overall valid survey to measure physical activity (Wendel-Vos et al., 2003).

3.3 Research Credibility

Reliability and validity are important concepts within quantitative research that are used to say something about the quality of the research (Korzilius, 2008). This paragraph seeks to explain what steps are taken in this study that will try to ensure both a high reliability and high validity (external, internal, construct, content, criterion) of the research.

In short, this paragraph will explain what steps are taken to ensure high reliability and validity of the research, which is written before the data collection phase.

Reliability

As this study will include quantitative data, the aim of the quantitative data analysis is to produce generalizable knowledge about the key concepts and relations in this research. A study that is reliable is one that limits the amount of errors and where the methods used

consistently measure something (Korzilius, 2008). To ensure that this study is reliable, the methods used in this study need to be applied consistently. This means that for each measurement, the same steps will be taken. Another way this study will try to ensure reliability is to operationalize the key concepts in this study in a good manner. Lastly, place and time can influence the reliability of research (Korzilius, 2008). To limit the influence of especially the time factor, this research will try to conduct the surveys around the same time frame, every day the surveys are conducted.

External Validity

The external validity of the research relates to the scope or the generalizability of the results to populations and other situations compared to the research population (Korzilius, 2008).

To ensure a good external validity of this research it is firstly important to have a low non-response rate under the research population. Non-response occurs when certain people cannot or do not want to take part in the research (Vennix, 2016). If the non-response rate is high, it can have a negative impact on the external validity of the research. To limit non-response within this research, the survey should have a clear and logical order, have clear instructions and should not be too long. The survey used for this research will be the 'Leefplekmeter' developed by Pharos. This survey will have all of the mentioned measures to ensure a low non-response.

Secondly, to ensure external validity within this research, it is also important that the research population reflects the total population well enough. The best way to do this is through random sampling (Korzilius, 2008). This ensures that the participants of this research will not differ substantially from the population.

Internal Validity

The internal validity of a research is about ensuring that the relationships between the key concepts researched cannot be explained by other factors (Korzilius, 2008). It is about the question whether the research measures what it is meant to measure (Vennix, 2016). To ensure internal validity, this research will try to follow a logical and systematic research design, which reduces the chance of other factors explaining the relationships between the

key concepts discussed. In relation to internal validity, Campbell and Stanley (1966) named several threats to internal validity. Before conducting this research, these threats will be considered to again reduce the chance of them occurring within this research.

Content Validity

According to Swanborn (1987), content validity is the only type of validity that can be determined before the data collection phase. A high content validity of a research refers to the extent to which a measuring instrument represents all facets of a concept or construct (Pennington, 2018). To ensure a high content validity in this research, an accurate operationalisation of each key concept and dimension needs to be formulated. In other words, a systematic approach and accurate approach to the operationalisation phase that consists of different steps needs to be given.

Another way in which a high content validity is ensured in this research is that this research makes use of already validated surveys. Subsequently, Vennix (2016) argues that a high content validity in a research can also be ensured by using measuring instruments (e.g. surveys) that have been developed and used by other researchers. This research uses the 'Leefplekmeter'-survey and SQUASH-survey as earlier explained, which are surveys that have been used previously and are known to be reasonably valid.

Criterion Validity and Construct Validity

Construct Validity and Criterion Validity are especially relevant to survey-research (Vennix, 2016). While both types of validity are especially important to verify when using a new measure, it is still important to show that this research has taken into account both types of validity, even though this research makes use of a verified and valid standard (SQUASH and leefplekmeter). Construct Validity and Criterion Validity are both part of the important types of validity, which means that this research will also look at how it tries to ensure construct validity and criterion validity in this research.

Vennix (2016) describes criterion validity as the extent to which the results of one measure predict the outcome of another measure. There are two types of criterion validity:

concurrent validity and predictive validity. ''Concurrent validity reflects only the status quo at a particular time (…) Predictive validity compares the measure in question with an outcome assessed at a later time'' (APA, AERA, & NCME, 1974). In other words, concurrent validity relates to one moment, while predictive validity is determined over time. For this research, only concurrent validity is relevant as this research was not conducted over long periods of time. When relating concurrent validity to this research, it thus means how well, for instance, the results of the concept 'socioeconomic status' are able to predict the outcome of the results of the concept 'green urban area visitation'.

Concurrent validity can be ensured by comparing the measure used in the study to a known standard (Swanborn, 1987). This means that criterion validity is usually relevant to assess when using a new measurement technique (Bellamy, 2014). Even though this research does not make use of a new measurement technique and makes use of a known standard, it is still worth noting that concurrent validity is taken into consideration within this research. By using a well-known standard this research tries to ensure a reasonable criterion validity.

Construct Validity is similar to Criterion Validity. While criterion validity looks at the degree to which the results of a measure can concurrently predict the outcome of a certain variable, construct validity looks at it in a broader perspective. Construct validity is used to determine how well a survey or other type of tool measures what it is supposed to measure (Vennix, 2016). Just like the concurrent validity, the construct validity in a research can be ensured by comparing the used measure to a verified standard. This research uses the leefplekmeter and SQUASH-survey which are already verified standards. In this way, this research tries to ensure the construct validity.

3.4 Research Procedure

This paragraph will give a description of two important steps in the data collection phase. Firstly, the operationalization of the key concepts in this research will be given. Following the operationalization, a brief description will be given on how the field work in the different neighbourhoods was conducted. The last step before the data analysis and results can be given is preparing the data. This is the process of preparing the dataset for the analysis. A brief explanation of this process will be given in chapter 5.

Operationalization

The aim of an operationalization is to turn the abstract (key) concepts into empirically observable concepts (Vennix, 2016, p.104). The main concepts of this study are: perceived quality of green urban areas (1), frequency of green urban area visitation (2), physical activity (3), and sociodemographic characteristics (4). These concepts are not easily measured. This paragraph thus seeks to formulate a way in which it is easier to measure these variables. Ultimately, these four concepts can be found in the questions of the survey, which this paragraph will also pay attention to.

The operationalization procedure can be summarized as follows. Firstly, a successful operationalization turns a key concept into different dimensions. Dimensions help the key concept to be more demarcated (Vennix, 2016, p.109). Following the formulation of the dimensions, it is also possible to formulate indicators for each dimension. This step seeks to translate the 'theoretical language' of the concepts and dimensions into 'empirical language' (Vennix, 2016, p.110). Indicators help us to measure certain concepts that were very abstract at first. The last step is to connect each indicator with one or more *items*. These items are the direct questions that can be found in the survey/questionnaire used in this research. The operationalization table can be found in the appendix, where each concept that is central to this research is operationalized to indicators and items of the survey. The operationalization process is closely related to the questions in the 'Leefplekmeter' and SQUASH-survey.

Field Work

As earlier mentioned, the surveys were taken in the neighbourhoods Wolfskuil in Nijmegen, Holtenbroek IV in Zwolle and Oosterflank in Rotterdam. The time that was available for this was Tuesday the 11th of May until Wednesday the 19th of May. The goal was to collect as much surveys as possible within this given time frame. As explained in paragraph 3.1, this is possible because the respondents within this research are considered to have the same features and characteristics.

The surveys were collected by 7 different students in total. On the 11th of May, 13th of May and the 15th of May, surveys were collected in Wolfskuil from 13:00 until 18:00. On the

12th of May, the surveys were collected in Holtenbroek IV in between 13:00 and 18:00. Lastly, on the 19th of May, surveys were collected in Oosterflank in between 13:00 and 18:00. The surveys were collected by going door-to-door in the different neighbourhoods and asking whether the residents want to take part in the research when they opened the door. Going door-to-door means that the total population is not the amount of residents living in the neighbourhoods, but the amount of households.

Part IV: Field of Research

4 Field of Research

The main goal of this chapter is to offer general information about the three neighbourhoods that were chosen for this research to survey: Wolfskuil (Nijmegen), Holtenbroek IV (Zwolle) and Oosterflank (Rotterdam). It is important to better understand the context of the three neighbourhoods. How they might differ from each other and how they might be similar to each other. By providing this information, it is possible to offer more suitable and generalizable conclusions at the final stage of this research.

4.1 Wolfskuil

Historical Context

The history of this neighbourhood goes back to the 19th century. Nijmegen was a city that was growing in a rapid rate. A lot of new houses were built during this time. This ultimately meant that a lot of residents from the workers' class started living in different areas of the city. However, these workers lived in appalling conditions with sheds built close together (Susanisweg, 2013).

The beginning of the 20th century saw a change. The health committee in Nijmegen recommended to build new workers' houses in Nijmegen-West. A lot of industry had settled in this area of the city. Nijmegen-West was also closely located to the train station. Ultimately, workers' houses were built in high concentrations in this relatively empty part of the city. A lot of terraced houses were built to accomplish a high-densely built area. This area is known as Wolfskuil today (Susanisweg, 2013).

After the second World War, Wolfskuil went through a new development. Some parts of the neighbourhood were completely renovated by replacing the old houses with new houses and apartments. New houses were also built which meant that Wolfskuil was even more high-densely built than it was before (Roodenburg, 2001).

Notable Areas

One of the notable areas of this neighbourhood is the 'Witte Molen' or 'White Windmill'. The windmill was built in 1760 and is considered a national monument. It is considered as a popular attraction within the area and it contributes to the liveliness of the neighbourhood's environment (De Witte Molen, n.d.).

Furthermore, Wolfskuil has a relatively small shopping mall which is called 'Winkelcentrum Wolfskamp'. This shopping mall is a place where the residents of Wolfskuil are easily able to go as it is in walking distance for most people.

Figure 3: The White Windmill in Wolfskuil (Wikimedia, 2007)

Sociodemographic Characteristics

As of 2020, Wolfskuil has a total of 6.435 residents and has a very high population density (Buurtkompas, 2021). Furthermore, the amount of households in this neighbourhood are 3.485 which means that the residents per household is just 1.85 (CBS, 2020). This number is very low compared to other neighbourhoods in Nijmegen and the Netherlands. These numbers show that Wolfskuil is a relatively high-densely populated area as well as a high-densely built area. Lastly, 30% of the population in Wolfskuil are immigrants (Buurtkompas, 2021).

The socioeconomic status of Wolfskuil is low. According to the 'Buurtkompas' (2021) the average income of residents living in Wolfskuil is €18.600. This is significantly lower than the national average income in the Netherlands, which is €36.500 (CPB, 2020). Only 11% of the total population of Wolfskuil has a higher average income than the national average income in the Netherlands. Furthermore, the level of education in Wolfskuil is mixed. 40% of the population has completed a high level of education, 31% has completed a middle level of education and 29 percent has completed a low level of education or has no education at all (Allecijfers, 2021).

4.2 Holtenbroek IV

Historical Context

After the second World War, Zwolle was in need of urban expansion. The neighbourhood Holtenbroek was part of these expansion plans. The aim for this neighbourhood was that there needs to be a recognizable distinction between living, working and recreation. The neighbourhood was thus build with the principal of 'functiescheiding' or 'seperation of functions'. With the construction of the neighbourhood, the most remarkable part was that the neighbourhood was going to be divided into four different smaller neighbourhoods: Holtenbroek I, II, III and IV (Canon van Nederland, n.d.).

All four neighbourhoods are characterized by their compact residential blocks as shown on figure …. Around the 1970s, the residents of Holtenbroek had started to become much more demanding. They wanted bigger bathrooms and kitchens and most of all they wanted to have a garden. The bigger demand for more facilities in the neighbourhood caused a lot of residents with high and middle income to move 'Aa-landen', which is a neighbourhood east of Holtenbroek. It was because of this that Holtenbroek is characterized as a low-SES neighbourhood to this day (Canon van Nederland, n.d.).

In the 1980s it got even worse. The neighbourhood got deteriorated by vandalism, neighbour disputes, drugs problems and pollution. The tensions within the neighbourhood were further fuelled by the increase of the immigrant community in Holtenbroek. Since the 1990s, it is slowly getting better in Holtenbroek with the organization of neighbourhood activities (Canon van Nederland, n.d.).

At the start of the 21st century, the municipality and housing corporations created plans for the restructuring of the neighbourhood. New houses were built and above all a new shopping mall was realized in the middle of Holtenbroek, which is encircled by the four Holtenbroek neighbourhoods (Canon van Nederland, n.d.).

Notable Areas

The most notable area in Holtenbroek IV is the shopping mall, which is located in the middle of the four Holtenbroek neighbourhoods. This means that the shopping mall is accessible for every resident in the neighbourhood. The shopping mall is a place with many shops and restaurants and it is surrounded by beautiful greenery.

Figure 4: Holtenbroek Shopping Mall (Winkelcentrum Holtenbroek, n.d.)

Residents & Socioeconomic Status

As of 2021, Holtenbroek has a total of 3.115 residents and has a very high population density (Buurtkompas, 2021). Furthermore, the average amount of residents per household is just 1.84. This number is very low compared to other neighbourhoods in Zwolle and the Netherlands. These numbers show that Holtenbroek IV is fairly high densely populated and high-densely built. Lastly, the neighbourhood has a high percentage of immigrants. 35.2% of the total population is not originally from the Netherlands (Buurtkompas, 2021).

The socioeconomic status of Holtenbroek IV is low. According to the 'Buurtkompas' (2021) the average income of residents living in Holtenbroek IV is €17.500. This is significantly lower than the national average income in the Netherlands, which is €36.500 (CPB, 2020). Just 7% of the total population of Holtenbroek IV has a higher income than the average national income in the Netherlands. Furthermore, the level of education in Holtenbroek IV is mostly low. 48% of the total population has a low level of education, while 34% has a middle level of education. Just 18% of the residents in Holtenbroek IV have a high level of education.

4.3 Oosterflank

Historical Context

Compared to Wolfskuil in Nijmegen, Oosterflank is a relatively new neighbourhood. The development of Oosterflank began in the 1960s. During this time, a lot of new neighbourhoods were created through different expansion plans in Rotterdam. Continuing the expansion of Rotterdam, the small area between 'Het Lage Land' and the neighbourhood 'Schollevaar' was still unused. Plans for a new neighbourhood were created for this small area and ultimately in the 1980s, Oosterflank was realized.

When the Oosterflank-project was being realized, there was a lot of demand for a small-scale living environment. This meant that a lot of single-family houses were built in Oosterflank. Single-family houses were usually meant for one resident (and possibly their family). These types of houses were usually terraced houses. During the construction of this neighbourhood, architects and project developers mainly wanted to build terraced houses that were narrower than the usual terraced houses. In this way, it was better possible to make Oosterflank high densely built, which was one of the main goals of the project. This also meant that Oosterflank is currently relatively high-densely populated.

To realise an even higher density of housing in the neighbourhood, a unique type of houses was realized: 'gestapelde woningen'. These type of houses have the characteristics of single-family houses, but they were 'stacked' on top of each other. These type of houses made it possible to create an even higher densely built area.

Notable areas

One of the notable areas of this neighbourhood is the Alexandrium Shopping Center. This shopping centre is located in the middle of Oosterflank and is at the same time the biggest shopping centre of Rotterdam. Yearly, the shopping centre attracts more than fourteen million visitors (Alexandrium, n.d.). The shopping centre is not only used for shopping but, is also used to facilitate big events. The Alexandrium Shopping Centre is thus a very lively place and always has a lot to offer, especially for the residents living in Oosterflank as the shopping centre is in walking distance.

Residents and Socioeconomic Status

As of 2021, Oosterflank has a total of 10.500 residents and has a very high population density. Furthermore, the amount of residents per household is just 1.9. This number is very low compared to other neighbourhoods in Rotterdam and the Netherlands. These numbers again show that Oosterflank is high-densely populated, high-densely built and mainly consists of narrow single-family houses.

The socioeconomic status of Oosterflank is low. According to the 'Buurtkompas' (2021) the average income of residents living in Oosterflank is €21.700. This is significantly lower than the national average income in the Netherlands, which is €36.500 (CPB, 2020). Furthermore, the educational level in Oosterflank is for the most part low or middle which is 76% of the total population. Just 24% of the residents have a high educational level.

Part V: Results

5 Results

As mentioned throughout this research, three relationships are central to this research. Firstly, physical activity on frequency of green urban area visitation. Secondly, the influence of perceived quality of green urban areas on frequency of green urban area visitation. Lastly, the influence of sociodemographic characteristics on frequency of green urban area visitation. To accurately come to conclusions about these relationships, an SPSS data analysis was conducted by using the results on the survey.

This chapter will start with explaining how the data was prepared. Following this paragraph, the descriptive statistics will be explained for each relevant variable. Following this paragraph, the individual relationships that are central to this research will be tested and interpreted. This chapter will conclude with a multiple ordinal regression analysis where the influence of each factor on the dependent variable is tested.

5.1 Data Preparation and Missing Values

According to Korzilius (2008), prior to analysing the results of the survey, a few steps other steps still need to be carried out. A full overview of all steps in the data-analysis phase of this research is given in figure 5.

Creating a database

As figure 5 shows, the first step in the data-analysis phase is creating a database. A database is an organized collection of all data collected through the survey. This database will ultimately be imported in the program SPSS, which will be used to analyse the results of the survey. The results of the survey were collected using an online program called 'Qualtrics'. This program automatically created a database, which was easily transferable to SPSS. Qualtrics thus made it possible to automatically transfer all results to SPSS, rather than manually entering all the results in SPSS.

Now that all the data is imported into SPSS, the last step is to code and label the variables if necessary. This step is import as SPSS is not properly able to analyse variables that are not translated to 'numbers'. For example, the questions: ''What is your gender?'' has two possible answers, either 'male' or 'female'. However, SPSS is not able to conduct statistical analyses using these answers, which is why they need to be coded. For instance, all answers containing 'male' can be coded as '1' and all answers containing 'female' can be coded as '2'. This way, SPSS is able to conduct proper data analyses for this question. When all relevant variables are coded in the same way, the database is now ready and it is now possible to move on to the next step of the data-analysis phase. The way in which all variable are coded is included in the codebook which can be found in the appendix.

Verifying the data

It is always possible that inconsistencies and errors exist in the database. During this step it is important to remove these inconsistencies and errors from the database as they are very likely to negatively influence the final results of this research. An example of an error or inconsistency is when someone answered the question ''what is your age?'' with '300', which is theoretically impossible. When all inconsistencies and errors are corrected as well as the missing values are coded, then it is approved to move on to the next step.

Preparing/modifying the data

The final step before it is possible to analyse the data is to prepare/modify the database. According to Korzilius (2008) this mostly includes recoding 'scale' variable into categories if necessary. For example, the question ''what is your age'' is an open question and can theoretically be answered with any number. In order to make it easier to conduct the data analysis, these type of questions are recoded into categories. When taking this question as an example, the results on this particular question are grouped into intervals of 10: 29 years or younger, 30-39 years, 40-49 years etc. The way in which these type of variables are coded is also shown in the codebook which can be found in the appendix.

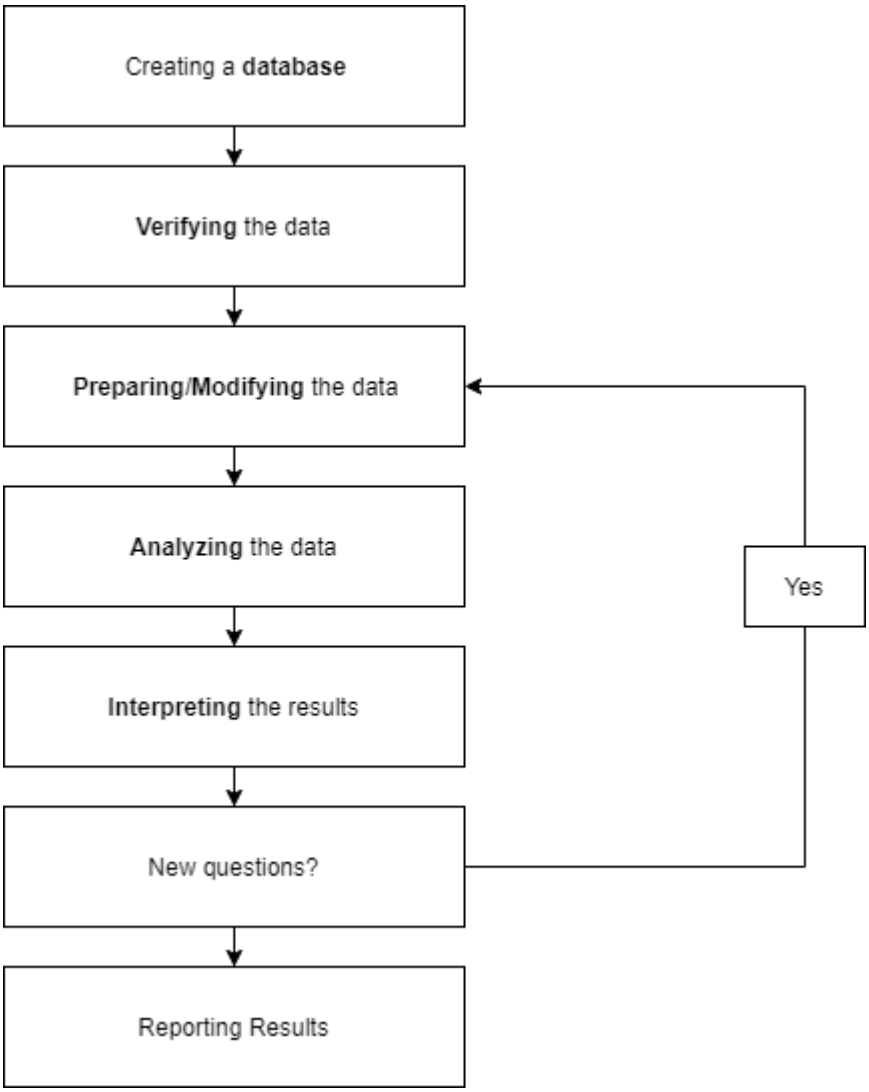

Figure 5: Data Analysis Procedure (Korzilius, 2008)

5.2 Descriptive Statistics

This paragraph will describe the statistical results of all relevant data in this research. This part of the results chapter can also be called **univariate analysis** as it seeks to describe the data of one variable. For this type of analysis, it is important to understand what level of measurement belongs to what specific variable. In short there are four important level of measurements which each requiring a different approach to presenting the results the *central tendancy, statistical dispersion* and *graphical representation*. A summary of this is shown in table 1, which was set up by Vennix (2016). The information of this table is mainly used to decide how to graphically represent the results of every variable.

	Central Tendency	Statistical Dispersion	Graphical Representation
Dichotomous	Proportions, percentages, ratios	X	Bar Chart
Nominal	Proportions, percentages, ratios Mode	X	Bar Chart
Ordinal	Median	Interquartile Range	Bar Chart
Interval/Ratio	Mean	Standard Deviation	Histogram

Table 1: Descriptive Statistics and Levels of Measurement in Univariate Analysis

The results of the survey that this paragraph will further look into are results relating to physical activity, perceived quality of green urban areas, sociodemographic characteristics and the results relating to green urban area visitation.

5.2.1 Physical Activity

To translate the amount of physical activity an individual gets throughout the week to a certain number, the MET-scores are used. The MET-score of a certain activity is decided by using three factors: ''the average amount of minutes someone carries out a specific activity per time'' (1), ''the average amount of times per week someone carries out a specific activity'' (2) and ''how much effort a specific activity takes'' (3). How much effort a certain activity takes is decided by an 'effort-score'. The effect-scores of each activity are given by Wendel-Vos & Schuit (2002) in their SQUASH-survey guide. Ultimately, to calculate the MET-score of a specific activity, it is required to multiple these factors with one another. Figure 6 shows what this looks like in a formula.

METscore(housework) = effort housework activity x average amount of minutes x days per week

METscore(total) = METscore(sports&leisure) + METscore(transportation) + METscore(work) + METscore(housework)

Figure 6: Formulas for calculating the MET-score for each indicator of physical activity as well as the total physical activity

Every indicator of Physical Activity (see theoretical framework) has its own MET-score. By adding up the MET-scores of every single indicator, it is possible to calculate the total MET-score of an individual. This number ultimately says something about how much physical activity an individual gets. The higher this number, the more active this individual is. This paragraph will look at the scores of each indicator of physical activity as well as the scores on the total amount of physical activity.

Transportation to Work or School

The first indicator of physical activity is the transportation to work or school. This is referring to the physical activity someone gets, when going to work or school. The results on this specific indicator are shown in figure 7. Looking at the way the scores are distributed it is noticeable that the vast majority finds themselves in a MET-score between 0 and 250 referring to transportation to work or school. Only a small percentage of the population are more active than 250 MET-score.

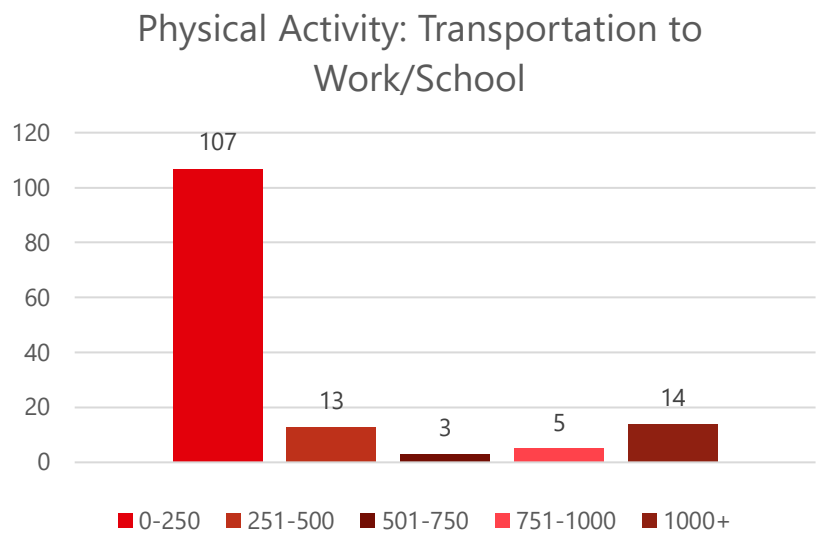

Figure 7: Physical Activity: transportation to work or school (MET-scores)

Physical Activity at Work

The second indicator of physical activity is also work-related. This time it is specifically related to the amount of physical activity someone gets in the workplace. Again it is noticeable that the vast majority is in the lowest bracket of MET-scores relating to physical activity in the workplace. However it is also noticeable that the MET-scores in general are much higher than the 'transportation' indicator, which indicates that people are generally more active at work rather than the movements to get to work.

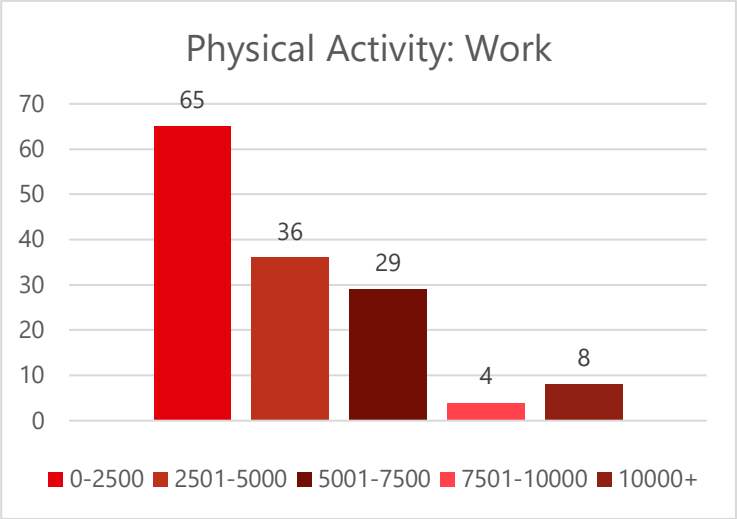

Figure 8: Physical Activity: Work (MET-scores)

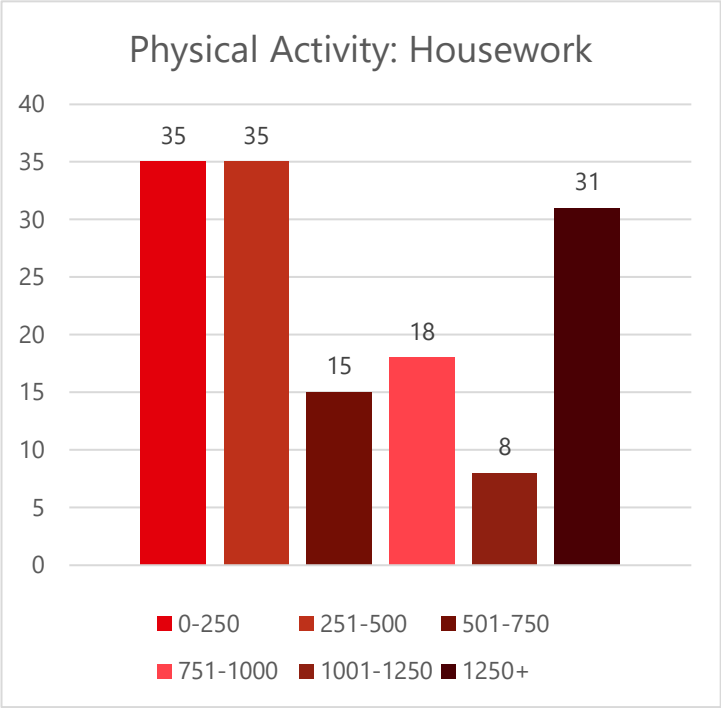

Figure 9: Physical Activity: Housework (MET-scores)

Housework

The third indicator relating to physical activity is housework. This is referring to all domestic physical activity. When looking at the distribution of the results regarding this topic, it shows that it is much more evenly distributed. There is a significant amount of people who find themselves in the lower bracket when it comes to housework MET-scores. However there is also a significant amount of people who find themselves in the higher bracket.

Sports and Leisure

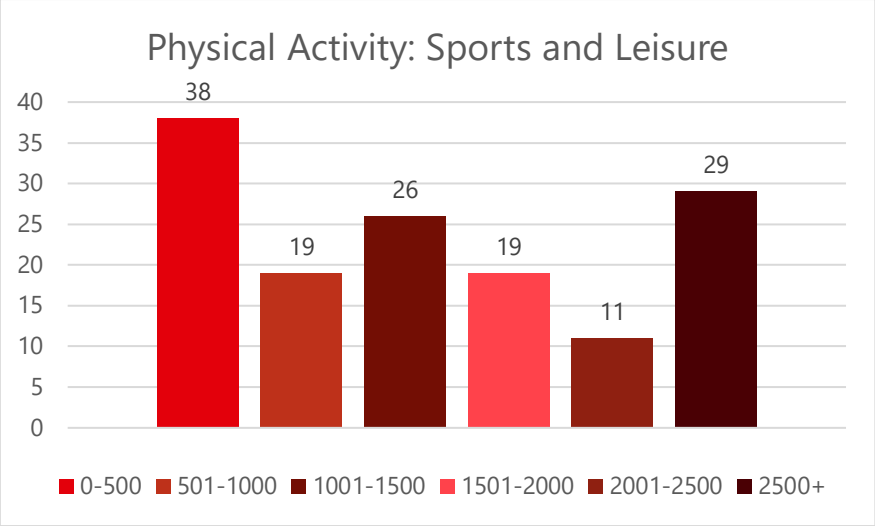

Figure 10: Physical Activity: Sports and Leisure (MET-scores)

The last indicator of physical activity is sports and leisure. This relates to all sports-related physical activity as well as the amount of physical activity people get in their spare time. Looking at the distribution of the results in figure 10, it again shows a much more even distribution of the results. There is a significant amount of people who get a relatively low amount of physical activity relating to sports and leisure, but there is also a significant amount of people who get a relatively high amount of physical activity relating to sports and leisure.

To summarize, physical activity relating to work or transportation to work/school shows a rather uneven distribution of the results (results leaning more towards the lower bracket of physical activity), while physical activity relating to housework and sports and leisure shows a much more even distribution of the results.

Total Physical Activity

The total physical activity MET-score is the combined MET-score of the four previously discussed indicators. When looking at the results in figure 11, it again shows that individuals are more on the lower amount of physical activity bracket than the higher amount of physical activity bracket.

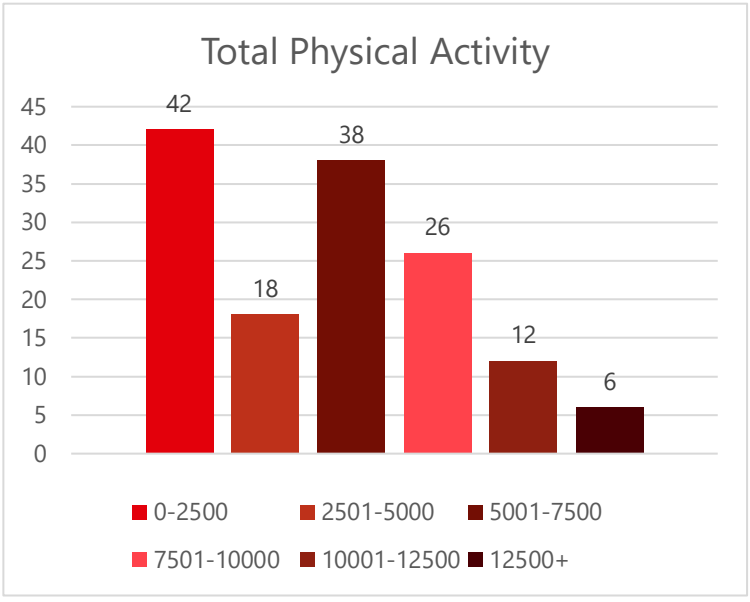

Figure 11: Total Physical Activity (MET-scores)

5.2.2 Perceived Quality of Green Urban Areas

The second concept that is central to this research is the perceived quality of green urban areas of the low-SES neighbourhood residents. The respondent was asked to rate green urban areas on a scale from 1 to 10 on overall (perceived) quality. The results on this question are shown in a graph in figure 12. These results show that most respondents are rather positive about green urban areas near them. Most of the respondents rate the quality of green urban areas near them a 7 or an 8. There are some outliers where one respondent gave the quality of green urban areas a 10, while two other respondents rated green urban areas a 1 or 2.

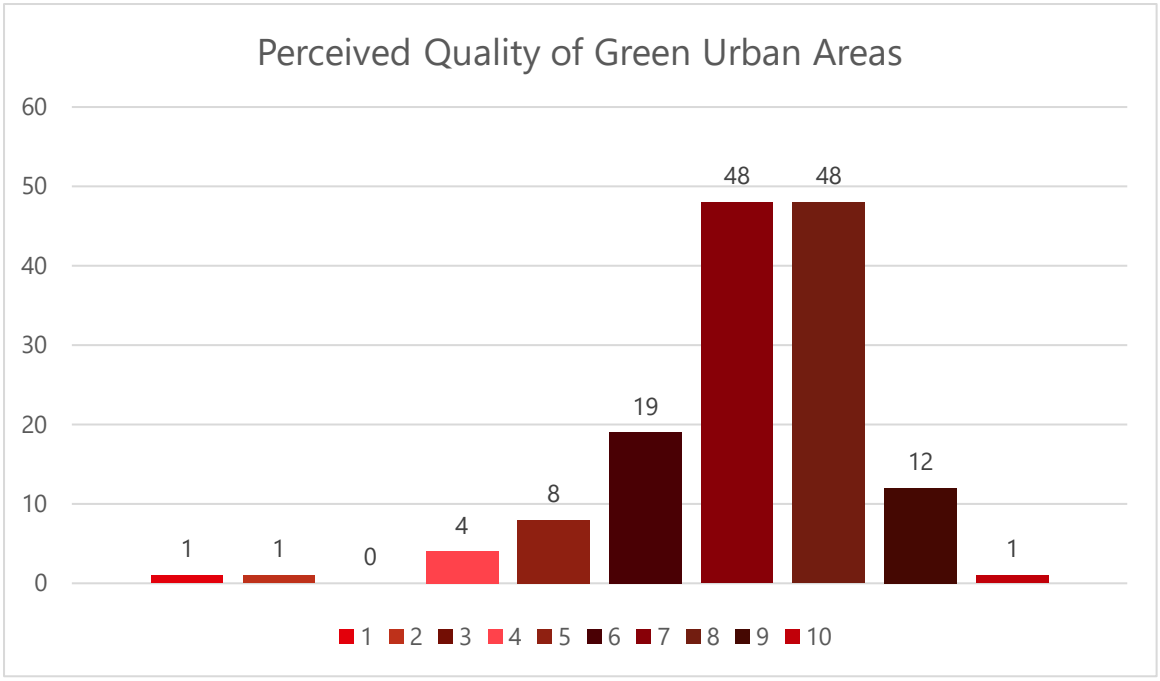

Figure 12: Perceived Quality of Green Urban Areas

5.2.3 Sociodemographic Characteristics

The last concept under discussion in this research are the sociodemographic characteristics. This research has looked at: age, gender, housing, migration background, neighbourhood and level of education. This paragraph will look at how these sociodemographic characteristics are distributed among the sample population.

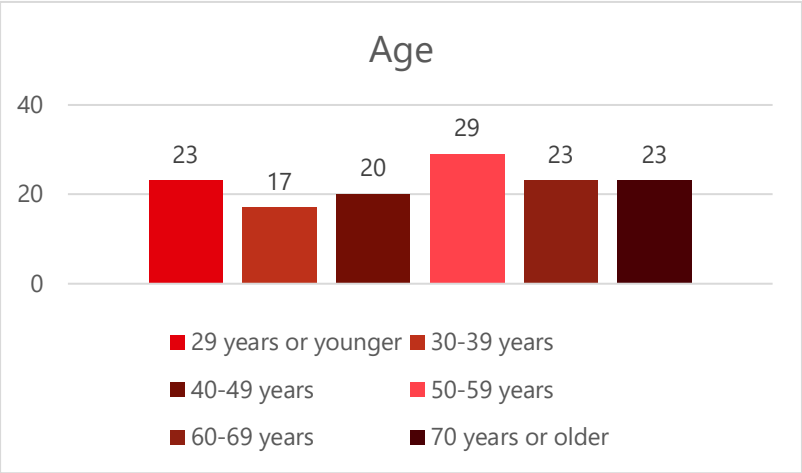

Figure 13: Age groups of sample population

Age

The first sociodemographic characteristic under discussion is age. The age of the respondents in the research population are divided into six brackets. As figure 13 shows, age is quite equally distributed. Every age group seems to be well represented in the sample population.

Gender

The second sociodemographic characteristic under discussion is gender. As the graph in figure 14 shows, gender is not equally distributed among the research population. Females are slightly overrepresented while they account for 62% of the total sample population. Males account for 38% of the total sample population

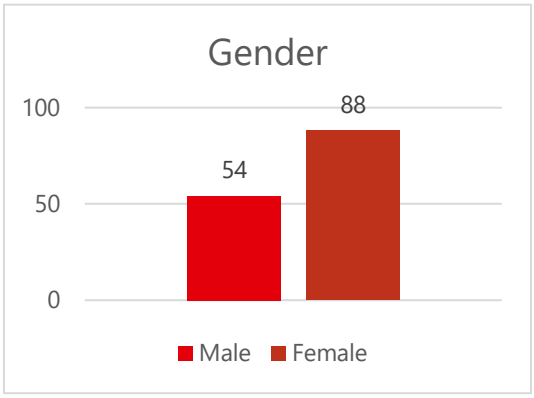

Figure 14: Gender in sample population

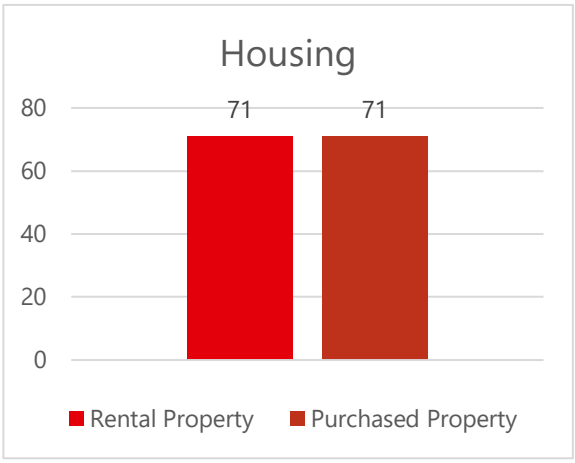

Figure 16: Housing in sample population

Housing

Another sociodemographic characteristic under discussion is the type of house the respondent lives in. This can either be a rental property or a purchased property. As figure 15 shows, both groups contain 71 respondents, which means there is a good representation of both in the sample population.

Ethnicity/Migration Background

The ethnicity or migration background of the respondents is divided into two groups. The respondent can either be native Dutch, or 'foreigner'. A foreigner in this research is described as someone that has at least one parent that is from another country. As figure 16 shows, Dutch respondents are more represented in the sample population than foreign respondents. The Dutch respondents account for 71% of the population while foreign respondents account for 29%.

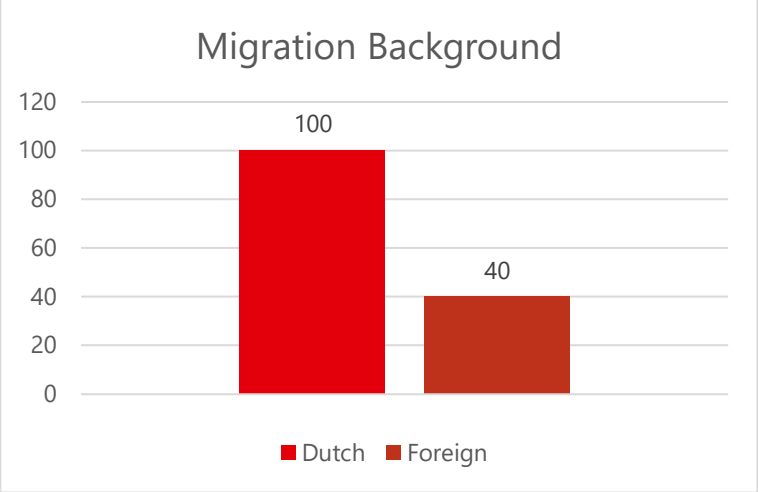

Figure 16: Ethnicity/Migration Background in sample population

Neighbourhood

This research has conducted its surveys in three different neighbourhoods. It is also important to look at how many respondents of each neighbourhood are represented in the sample population. The graph in figure 17 shows that most respondents are from Wolfskuil in Nijmegen, however not by much as Oosterflank is only 7 respondents behind Wolfskuil. Respondents living in Holtenbroek IV in Zwolle are slightly underrepresented.

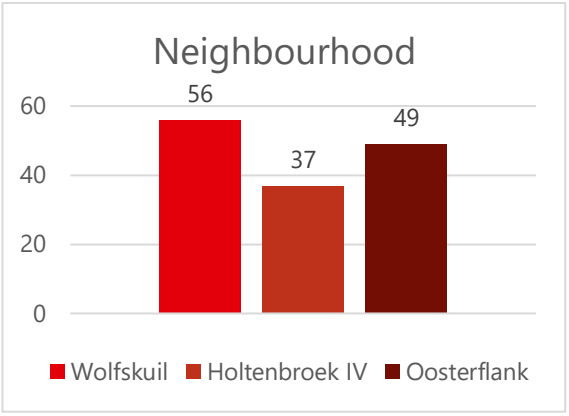

Figure 17: Respondents by neighbourhood

Level of Education

Lastly, the level of education is divided into three categories. Low level of education, middle level of education and high level of education. The results that are shown in figure 18 are quite noticeable. Even though the three neighbourhoods that this research conducted its surveys in are deemed as 'low-SES neighbourhoods, respondents with a low level of education are underrepresented compared to respondents with a middle or high level of education.

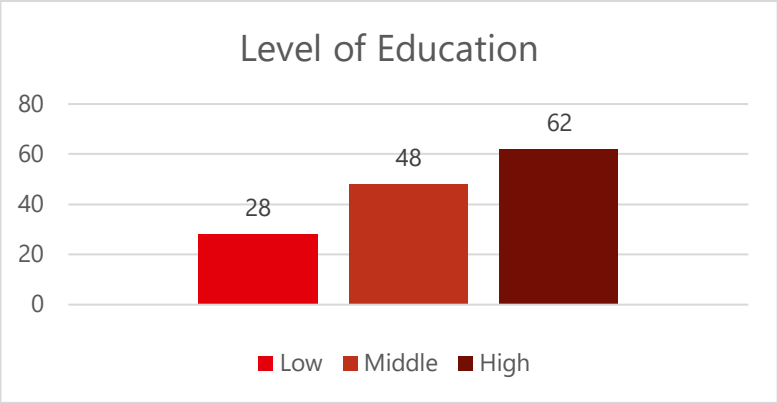

Figure 18: Level of education in sample population

5.2.4 Green Urban Area Visitation Frequency

The last concept that is central to this research is the frequency of green urban area visitation. Figure 19 shows that the results are quite evenly distributed, up until the fourth category of this question. Most respondents tend to visit green urban areas 2 to 3 times per week.

This is especially interesting when relating to gender. Figure 20 shows that females tend to visit green urban areas more frequently than males.

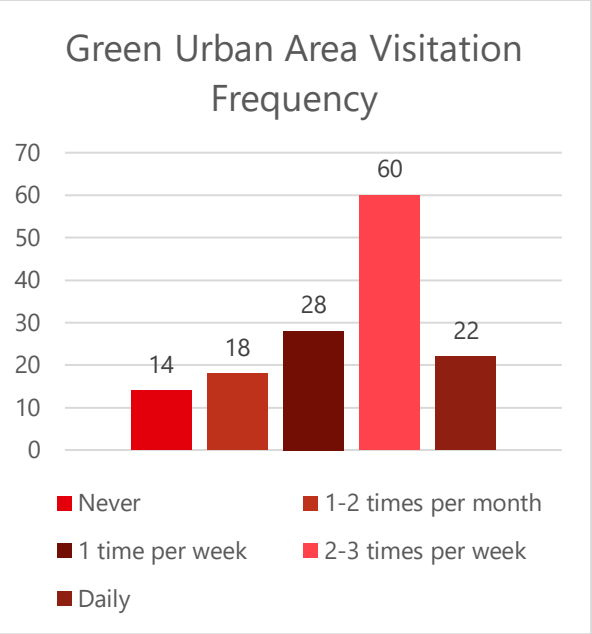

Figure 19: Green Urban Area Visitation Frequency

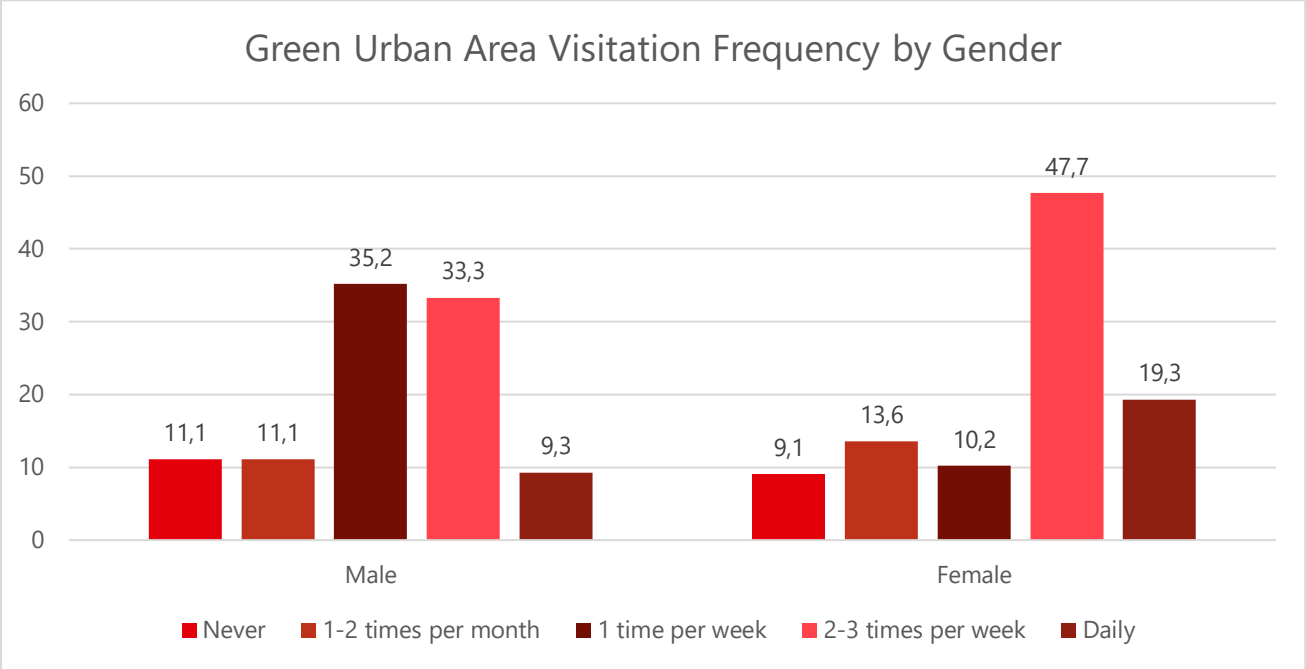

Figure 20: Green Urban Area Visitation Frequency by Gender

5.3 Bivariate Correlations

This paragraph will show whether correlations exist between the concepts central to this research. Using table 2 a relevant statistical analysis will each time be applied.

	Nominal	Ordinal	Scale
Nominal	Chi-Square Test	Chi-Square Test If appropriate: Mann-Whitney; Kruskal-Wallis	Student's t-test or Variance Analysis
Ordinal		Spearman's r Correlation	Student's t-test or Variance Analysis
Scale			Pearson's Correlation or Simple Regression

Table 2: statistical correlation analysis by level of measurement

5.3.1 Influence of Physical Activity on Green Urban Area Visitation Frequency

The correlation between physical activity and the frequency of green urban area visitation can be analysed using the spearman's r correlation test. This test is used when

comparing two variable that are measured at an ordinal level. The frequency of green urban area visitation is measured at an ordinal level as there is a certain order between the categories of this variable, however the specific distance between each category is unknown. The same can be said for the variable 'physical activity'. This variable, which was based on MET-scores, was a ratio/interval variable at first. However to make statistical analysis easier, this variable was transformed into an ordinal variable.

Table 3 shows the full spearman's r correlation test which has been executed using the four earlier mentioned indicators of physical activity, as well as the total amount of physical activity.

When looking at the table and especially the p-values (significance), all indicators of physical activity as well as the total amount of physical activity are significantly correlating to the frequency of green urban area visitation (alpha = 0,05). However, the strength of the correlation seems to be weak for all variables. The correlation coefficient for transportation and physical activity at work are both below 0,19, which indicates a very weak correlation between these variables and green urban area visitation frequency. The remaining variables are all in between 0,20 and 0,39 which also suggests a weak correlation (Zar, 2005).

In other words, even though the p-value of the spearman's r correlation test indicates that a correlation between green urban area visitation frequency and physical activity exists, the correlation coefficient is low enough to suggest that this correlation is weak to very weak.

Correlation

			Green Urban Area Visitation Frequency	MET-score Transportation to Work/School
Spearman's rho	**Green Urban Area Visitation Frequency**	Correlation Coefficient	1,000	,166
		Sig. (2-tailed)		,048
		N	142	142
	MET-score Transportation to Work/School	Correlation Coefficient	,166	1,000
		Sig. (2-tailed)	,048	
		N	142	142
Spearman's rho	**Green Urban Area Visitation Frequency**	Correlation Coefficient	1,000	,174
		Sig. (2-tailed)		,038

		N	142	142
	MET-score PA at Work/School	Correlation Coefficient	,174	1,000
		Sig. (2-tailed)	,038	
		N	142	142
Spearman's rho	**Green Urban Area Visitation Frequency**	Correlation Coefficient	1,000	,199
		Sig. (2-tailed)		,018
		N	142	142
	MET-score Housework	Correlation Coefficient	,199	1,000
		Sig. (2-tailed)	,018	
		N	142	142
Spearman's rho	**Green Urban Area Visitation Frequency**	Correlation Coefficient	1,000	,287
		Sig. (2-tailed)		,001
		N	142	142
	MET-score Sports and Leisure	Correlation Coefficient	,287	1,000
		Sig. (2-tailed)	,001	
		N	142	142
Spearman's rho	**Green Urban Area Visitation Frequency**	Correlation Coefficient	1,000	,274
		Sig. (2-tailed)		,001
		N	142	142
	Total MET-score Physical Activity	Correlation Coefficient	,273	1,000
		Sig. (2-tailed)	,001	
		N	142	142

Table 3: Spearman's r correlation test for physical activity and green urban area visitation frequency

5.3.2 Influence of Perceived Quality on Green Urban Area Visitation Frequency

The correlation between perceived quality on green urban areas and the frequency of green urban area visitation can also be tested using the spearman's r correlation test. Both variables are measured at the ordinal level which makes it relevant to use the spearman's r correlation test. The spearman's r correlation test regarding these two variables shows a p-value of 0,013. When using an alpha of 0,05 this means that the correlation is significant as

0,013 < 0,05. However, the correlation coefficient is only 0,208. Using the spearman's r guide for interpreting the correlation coefficient value, a value of 0,208 means that the correlation is weak. In other words, even though the p-value of the spearman's r correlation test suggests that a correlation between perceived quality and green urban area visitation exists, the correlation coefficient suggests that this correlation is weak.

			Perceived Quality of Green Urban Areas	Green Urban Area Visitation Frequency
Spearman's rho	**Perceived Quality of Green Urban Areas**	Correlation Coefficient	1,000	,208
		Sig. (2-tailed)		,013
		N	142	142
	Green Urban Area Visitation Frequency	Correlation Coefficient	,208	1,000
		Sig. (2-tailed)	,013	
		N	142	142

Table 4: Spearman's r correlation between Perceived Quality and Visitation Frequency of Green Urban Areas Visitation

5.3.3 Influence of Sociodemographic Characteristics on Green Urban Area Visitation Frequency

The final relationship that needs to be tested is the relationship between sociodemographic characteristics and the frequency of green urban area visitation. Gender, housing, ethnicity/migration background and neighbourhood are all variables that are measured on a nominal level. The dependent variable is measured on an ordinal level. It means that the chi-square test needs to be used for these variables in order to test the correlation. For the variables 'level of education' and 'age' this is different as these variables are measured on an ordinal level meaning the spearman's r correlation test needs to be used for these variables.

Table 5 shows the asymptotic significance of the chi-square tests involving gender, housing, ethnicity/migration background and neighbourhood. Only gender has a significance of below 5% (alpha = 0,05). In other words, there is no statistical evidence that housing, ethnicity and neighbourhood correlate to the frequency of green urban area visitation. However, according to the chi-square test's significance, it shows that gender might have a correlation to frequency of green urban area visitation. We will now take a deeper look into the chi-square test regarding gender and frequency of green urban area visitation.

Chi-square tests significance

Variable	Significance
Gender	,005
Housing	,443
Ethnicity	,880
Neighbourhood	,763

Table 5: Chi-square test for four sociodemographic variable: gender, housing, ethnicity, neighbourhood

Table 6 shows the crosstabulation between gender and green urban area visitation frequency. Scores between males and females on 'never' and '1-2 times per month' do not seem to differ much. However, scores on '1 time per week' seem to differ a lot more. Males score 25 percentage points higher on this answer, while females score 14.4 percentage points higher on the answer '2-3 times per week'. Because the chi-square test shows a significance level of below 5%, we can assume that there is an association between frequency of green urban area visitation and gender.

Crosstab

			Male	Female	Total
Green Urban Area Visitation Frequency	**Never**	Count	6	8	14
		% within Gender	11,1%	9,1%	9,9%
		Adjusted Residual	,4	-,4	
	1-2 times per month	Count	6	12	18
		% within Gender	11,1%	13,6%	12,7%
		Adjusted Residual	-,4	,4	
	1 time per week	Count	19	9	28
		% within Gender	35,2%	10,2%	19,7%
		Adjusted Residual	3,6	-3,6	
	2-3 times per week	Count	18	42	60
		% within Gender	33,3%	47,7%	42,3%
		Adjusted Residual	-1,7	1,7	
	Daily	Count	5	17	22
		% within Gender	9,3%	19,3%	15,5%
		Adjusted Residual	-1,6	1,6	
Total		Count	54	88	142
		% within Gender	100,0%	100,0%	100,0%

Table 6: crosstabulation between gender and green urban area visitation frequency

Chi-Square Tests

	Value	Df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14,705	4	,005
Likelihood Ratio	14,547	4	,006
Linear-by-Linear Association	3,088	1	,079
N of Valid Cases	142		

Table 7: chi-square test for gender and green urban area visitation frequency

When testing the correlation between gender and green urban area frequency of visitation, it is also important to look at 'Cramer's V. Cramer's V is used to test the relationship between two categorical variables, with one of the variables having more than two categories. In this case, the variable 'Frequency of Green Urban Area Visitation' has five categories, which means that Cramer's V needs to be used. Cramer's V tells us the strength of the relationship between two variables. Table 8 shows that the Cramer's V value of this relationship is 0,322. In figure 21 we can read that his is higher than 0,25, meaning that the association between gender and frequency of green urban area visitation is very strong meaning the amount of times people visit green urban areas is highly dependent on gender.

Phi and Cramer's V	Interpretation
> 0.25	Very strong
> 0.15	Strong
> 0.10	Moderate
> 0.05	Weak
> 0	No or very weak

Figure 21: rules of thumb when using Cramer's V value (Akoglu, 2018)

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	,322	,005
	Cramer's V	,322	,005
N of Valid Cases		142	

Table 8: Cramer's V value for chi-square test between gender and green urban area visitation frequency

The final two sociodemographic characteristics that need to be tested are age and level of education. As earlier mentioned, both can be tested using the spearman's r correlation test. The results of this test on both variables are shown in table 9 The results show that age and green urban area visitation frequency is a negative correlation, meaning an increase in age would indicate a decrease in green urban area visitation frequency. However the significance value of this correlation is 0,310 which is greater than an alpha of 0,05, indicating that there is no real correlation.

The same can be said for level of education. The significance value of this correlation is 0,262, which is greater than an alpha of 0,05. Again, these results indicate that level of education has no association with green urban area visitation frequency.

Correlation

			Green Urban Area Visitation Frequency	Age
Spearman's rho	**Green Urban Area Visitation Frequency**	Correlation Coefficient	1,000	-,088
		Sig. (2-tailed)		,310
		N	135	135
	Age	Correlation Coefficient	-,088	1,000
		Sig. (2-tailed)	,310	
		N	135	135
Spearman's rho	**Green Urban Area Visitation Frequency**	Correlation Coefficient	1,000	,096
		Sig. (2-tailed)		,262
		N	142	138
	Level of Education	Correlation Coefficient	,096	1,000
		Sig. (2-tailed)	,262	
		N	138	138

Table 9: spearman's r correlation test between age and level of education and green urban area visitation frequency

5.4 Multiple Ordinal Regression Analysis

The final step of the results chapter is to conduct a multiple regression analysis. The multiple regression analysis enables the researcher to assess the strength of the relationships between multiple independent variables and one dependent variable. This research consists of multiple independent variables (physical activity, perceived quality, age, gender, etc.) and one dependent variable (green urban area visitation frequency). As the dependent variable is measured on an ordinal level, an ordinal regression analysis needs to be conducted. Before conducting an ordinal regression analysis, four assumptions need to be checked. The data needs to these assumptions to ultimately get a valid result from the regression analysis.

The assumptions are:

1. The dependent variable is measured at the ordinal level
2. The independent variable(s) are continuous, ordinal or categorical
3. There is no multicollinearity
4. There are proportional odds

The first assumption is met as the variable 'green urban area visitation frequency' is measured at the ordinal level. The categories relating to this variable can be ranked, however the specific distance between the categories is unknown.

The second assumption is also met as all independent variables are either continuous, ordinal or categorical. There are no interval/ratio variables used in this regression analysis.

The third assumption is that there should be no multicollinearity. Multicollinearity suggests that there are high correlations between some independent variables. This could be problematic as multicollinearity could cause unreliable outcomes of the regression analysis. A multicollinearity test is conducted in SPSS to check whether multicollinearity exists. The variables regarding the MET-scores of 'physical activity at work', 'transportation', 'housework', and 'sports and leisure' are left out as these variables together decide the variable 'total MET-score physical activity', which would assume that multicollinearity exists between these variables. Table 10 shows all VIF-values for each dummy-variable. A rule of thumb for interpreting these values is that a value greater than 3 indicates that there might be some correlation, while a value greater than 5 indicates moderate correlation. A value greater than 10 indicates a serious problem and thus multicollinearity (Field, 2018). Table 10 shows that there is no VIF-value greater than 3, however the VIF values for level of education and age are somewhat higher than the VIF-values of the other variables. It was ultimately decided to leave out 'age' and 'level of education' from the regression analysis as they could possibly cause problems for the regression model.

Collinearity Statistics

Model		VIF
Gender	Gender	1,239
Housing	Housing	1,500
Migration Background	Migration Background	1,238
Perceived Quality	Perceived_Quality_1	1,152
	Perceived_Quality_2	1,126
	Perceived_Quality_4	1,223
	Perceived_Quality_5	1,198
	Perceived_Quality_6	1,326
	Perceived_Quality_8	1,448
	Perceived_Quality_9	1,313
	Perceived_Quality_10	1,170
Total MET-score PA	Total MET 2500-4999	1,457
	Total MET 5000-7499	1,842
	Total MET 7500-9999	1,754
	Total MET 10000-12499	1,430
	Total MET 12500-12499	1,327
Age	30-9 years old	1,706
	40-49 years old	1,854
	50-59 years old	2,180
	60-69 years old	1,981
	70 years or older	2,255
Education	Middle Education	2,082
	High Education	2,341
Neighbourhood	Holtenbroek IV	1,531
	Wolfskuil	1,938

Table 10: multicollinearity test

The last assumption that needs to be tested is whether there are proportional odds. The test of parallel lines is used to measure this. A significance which is greater than 0,05 would indicate that there are proportional odds. Table 11 shows the outcome of the test of parallel lines. It shows a significance value of 0,086 which is greater than 0,05, meaning proportional odds exist.

Test of Parallel Lines

Model	-2 Log Likelihood	Chi-Square	Df	Sig.
Null Hypothesis	338,840			
General	270,182	68,659	54	,086

Table 11: Test for proportional odds

As all assumptions are met, the multiple regression analysis can be conducted. The results of this analysis can be seen in table 12-14. Table 12 shows the model fitting information. This table shows a significance of 0,000, meaning that the regression model fits the data very well. Table 13 shows the goodness-of-fit of the model. This test shows how well the sample data represents the data that is expected to find in the population. To meet the goodness-of-fit assumption, the level of significance should be above 0,05. As table 13 shows, for Pearson this is not the case, however for Deviance it is. This indicates a mixed result regarding the goodness-of-fit of the model. Table 14 shows the pseudo R-square. This table shows what percentage of the variance for a dependent variable is explained by the independent variables in the model. A Nagelkerke pseudo R-square of 0,304 indicates that the regression model explains 30,4% of the variance in the dependent variable.

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	386,350			
Final	338,840	47,510	18	,000

Table 12: Model Fitting Information for Multiple Ordinal Regression Analysis

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	544,044	458	,003
Deviance	319,876	458	1,000

Table 13: Goodness-of-Fit for Regression Model

Pseudo R-Square

Cox and Snell	,288
Nagelkerke	,304
McFadden	,117

Table 14: R-square value

Table 15 shows the output for the ordinal regression analysis. When using an alpha of 0,05 it only shows that 'gender' is significance within this ordinal regression analysis. The frequency of green urban area visitation is 0,917 lower for males than it is for females, which indicates that males tend to visit green urban areas less than females.

Another noticeable result is the perceived quality of green urban areas. It was expected that this variable would have an effect on the amount of times people visit green urban areas. However, the ordinal regression analysis shows very high levels of significance for this variable. The variable for physical activity shows very high levels of significance as well. A full overview of the effects of each variable relating to green urban area visitation frequency can be seen in table 15.

Parameter Estimates

		Estimate	Std.Error	Wald	Df	Sig.	95% Confidence Interval	
							Lower	Upper
Threshold	[groen_bezoek=1]	-4,311	2,219	3,774	1	0,052	-8,661	0,038
	[groen_bezoek=2]	-3,171	2,202	2,074	1	0,150	-7,487	1,145
	[groen_bezoek=3]	-2,078	2,191	0,899	1	0,343	-6,372	2,217
	[groen_bezoek=4]	0,552	2,187	0,064	1	0,801	-3,734	4,838
Location	[geslacht=1]	-0,917	0,357	6,588	1	,010	-1,617	-0,217
	[geslacht=2]	0[a]			0			
	[type_woning=1]	-0,603	0,342	3,105	1	,078	-1,274	0,068
	[type_woning=2]	0[a]			0			
	[afkomst=2]	0,481	0,379	1,608	1	,205	-0,262	1,225
	[afkomst=3]	0[a]			0			
	[wijk=1]	-0,081	0,442	0,033	1	,855	-0,947	0,786
	[wijk=2]	-0,275	0,411	0,446	1	,504	-1,081	0,532
	[wijk=3]	0[a]			0			
	[groen_beoord=1]	-21,411	9404,074	0,000	1	,998	-18453,058	18410,236
	[groen_beoord=2]	18,555	0,000		1		18,555	18,555
	[groen_beoord=4]	-2,021	2,254	0,804	1	,370	-6,439	2,397
	[groen_beoord=5]	-2,421	2,132	1,290	1	,256	-6,599	1,757
	[groen_beoord=6]	-1,908	2,067	0,852	1	,356	-5,960	2,144
	[groen_beoord=7]	-1,862	2,036	0,836	1	,360	-5,851	2,128
	[groen_beoord=8]	-0,701	2,021	0,120	1	,729	-4,663	3,261
	[groen_beoord=9]	-0,619	2,097	0,087	1	,768	-4,728	3,490
	[groen_beoord=10]	0[a]			0			
	[MET_totaal=1]	-0,079	0,854	0,009	1	,926	-1,753	1,596
	[MET_totaal=2]	-0,657	0,922	0,508	1	,476	-2,464	1,149
	[MET_totaal=3]	0,275	0,849	0,105	1	,746	-1,390	1,939
	[MET_totaal=4]	1,569	0,894	3,082	1	,079	-0,183	3,321
	[MET_totaal=5]	0,323	0,969	0,111	1	,739	-1,577	2,223
	[MET_totaal=6]	0[a]			9			

Link function: Logit

a. This parameter is set to zero because it is redundant

Table 15: Multiple Ordinal Regression Analysis

Part VI: Conclusion

6 Conclusion

This research aimed to gain a better understanding into the frequency of green urban area visitation of low-SES neighbourhood residents during the COVID-19 pandemic. Previous research has shown that low-SES neighbourhood residents tend to visit green urban areas less during the pandemic than residents from higher SES neighbourhoods. This could be seen as problematic as it is important to use green urban areas especially during the pandemic as these areas bring a lot of benefits. This research thus tried to find possible influencing factors of green urban area visitation frequency under low-SES neighbourhood residents, to eventually try to make the relationship between low-SES neighbourhood residents and their green urban area visitation frequency more clear. Following this research aim, the following main question was formulated: **What factors possibly influence the green urban area visitation frequency of low socioeconomic status neighbourhood residents during the COVID-19 pandemic?.** This research looked at three different factors that could possibly influence low-SES neighbourhood residents frequency of visiting green urban areas. These were the perceived quality of green urban areas, physical activity and socio-demographic characteristics.

The sub-question that relates to the factor 'perceived quality of green urban areas' was: *''Does the perceived quality of green urban areas in low-SES neighbourhoods influence the green urban area visitation frequency of low-SES neighbourhood residents during the COVID-19 pandemic?''*. Earlier research by Fongar et al. (2019) has shown that perceived quality of parks correlate positively with number of park visits. This research, that primarily focused on number of park visits among low-SES neighbourhood residents, has also found that a positive correlation exists between number of green urban area visits and perceived quality of green urban areas. However, the correlation between these two seems to be rather weak. The regression analysis also shows that the perceived quality of green urban areas does not necessarily affect the amount of green urban area visits. In other words, to reflect back on this sub-question, this research has not found a significant influence of perceived quality of green urban areas in low-SES neighbourhoods on the green urban area visitation frequency of low-SES neighbourhood residents.

The second sub-question relates to the factor 'physical activity'. The sub-question was: *''Does the amount of physical activity of low-SES neighbourhood residents influence their green urban area visitation frequency during the COVID-19 pandemic?''*. The scientific literature was divided on this specific topic. Research by Persson et al. (2019) found no (positive) relation between physical activity and frequency of green urban area visitation. However, other studies (Wang et al., 2019; Mytton et al., 2012) did find a positive relationship. Furthermore, the current studies in the scientific literature study the influence of green urban areas on physical activity, but not the influence of the amount of physical activity on the amount of green urban area visits. This research found a positive relation between physical activity and frequency of green urban area visitation when it comes to low-SES neighbourhood residents. In that sense it follows studies from Wang et al. (2019) and Mytton et al. (2012) who also found a positive relationship between these two concepts. However, this research has shown that this relationship is rather 'weak'. Additionally, the regression analysis shows that physical activity does not necessarily have an influence on the amount of times residents of low-SES neighbourhoods visit green urban areas. In other words, when looking back at the sub-question, this study found no influence of the amount of physical activity of low-SES neighbourhood residents on their green urban area visitation frequency. However, this study did find a positive correlation between the two variables, but this correlation seems to be rather weak.

The last sub-question relates to the factor 'socio-demographic characteristics'. The sub-question was: *''Do sociodemographic characteristics of low-SES neighbourhood residents influence their green urban area visitation frequency during the COVID-19 pandemic?''*. The specific sociodemographic characteristics this research looked at were: age, gender, housing, ethnicity/migration background, neighbourhood and level of education. When it comes to age, there is a lot of divide in the current literature. Some studies (Dou et al., 2017) claim that an increase in age is met with an increase in park visits, while other studies (Fongar et al., 2019; Uchiyama & Kohsaka, 2020) argue that an increase in age is met with a decrease in park visits. The results of this study are more in line with the latter. However, the results of this research regarding age were found to be not significant enough to show a correlation and influence of age on green urban area visitation frequency. When it comes to gender, the results of this study contradict what is found in the current literature. Burnett et al. (2021) found that significant gender differences in visiting green areas during the pandemic exist

among UK adults. They found that males are using green areas more often than females. This research also found significant gender differences, however this study found that females visit green urban areas more often than males do. This leads to believe that there is a difference between low-SES neighbourhoods and the general population when it comes to gender differences and green urban area visitation frequency. Furthermore, it was found that the remaining characteristics: housing, ethnicity/migration background, neighbourhood and level of education did not correlate or have an influence on the frequency of green urban area visitation.

When going back to the main question of this research ''**What factors possibly influence the green urban area visitation frequency of low socioeconomic status neighbourhood residents during the COVID-19 pandemic?''**, it can be concluded that the perceived quality of green urban areas as well as the physical activity of people living in low-SES neighbourhoods does not have an influence on the amount of green urban area visits. When looking at the sociodemographic characteristics it can be concluded that gender has an influence on how much people visit green urban areas. Why certain factors do not have an influence and why gender does have an influence seems to be interesting for further research. Chapter 7 will delve deeper in to this discussion.

7 Discussion

7.1 Strengths and Limitations of this Research

What can be seen as a strength of this research is the fact that surveys were taken in three different low-SES neighbourhoods across the Netherlands. By expanding the sample population to three different neighbourhoods, with different people, with different backgrounds, the results of the surveys become more generalizable. In other words, the fact that surveys were taken in three different neighbourhoods increases the reliability of the results of this research.

Another strength of this research is the surveys that are used to collect all the data. These include the SQUASH-survey and the 'leefplekmeter'. These surveys have been used on many different occasions and are also known to have been validated in the past. In other words, one of the strengths of this research is that it has a high internal-, criterion-, construct- and content validity.

What could be seen as a limitation is the little amount of significant results that are found in this research. Only 'gender' was found to have a significant influence on the amount of green urban area visits. Even though some might see this as a weakness, it can also be seen as a strength of this research. Many results of this research contradict general findings in the current literature that apply to a broader population. As this research was conducted in a very specific context (low-SES neighbourhood, COVID-19) that has not been discussed yet in the current literature, it leaves the door open for a lot of possibilities for further research. For example, perceived quality was found to have no influence on visits to green urban areas in this research, however this contradicts findings by Fongar et al. (2019) in the current literature. This leaves the door open for further research that could look into why research conducted in low-SES neighbourhoods found no relation between these two concepts, while the current literature does find a relationship between these two concepts.

One of the limitations of this research is the difficulty to understand the context of a phenomenon. This limitation is mainly related to quantitative research. For example, this research found that females tend to visit green urban areas more often than males. However, with this research, we are not able to understand the underlying context behind this phenomenon. We do not know **why** females visit green urban areas more often than males in low-SES neighbourhoods. This is where qualitative research comes into play. In other words, this research lacks a certain amount of depth. This is something that future qualitative research can solve.

Another limitation of this research is sample size. The sample size only consisted of 142 respondents. It is difficult to make generalizable statements when the sample population only consists of 142 respondents. Furthermore, the sampling method used in this research is also a limitation. Some subpopulations have a skewed distribution. For example, from the total sample population, 26 respondents have followed a low level of education while 62 respondents have followed a high level of education. When subpopulations have a skewed distribution, it is sometimes difficult to make generalizable statements about the results. This mainly has to do with the sampling method used. The sampling method in this research was a simple random sampling method, however a stratified sampling method would have been better on second thoughts. However, what needs to be said is that it is almost impossible to carry out such a sampling method as not enough information about the residents is available.

7.2 Recommendations for future research

One of the main findings of this research was that gender differences exist within residents living in low-SES neighbourhoods when it comes to how often they visit green urban areas. It was found that females visit green urban areas more than males. However, this finding directly contradicts the study of Burnett et al. (2021), which found that males visit green urban areas more than females. Further research could try to explore what the implications of low-SES neighbourhoods are in this relationship. Additionally, further research could explore why this difference exists.

Secondly, the perceived quality of green urban areas was found in this research to not have an influence on the frequency of green urban area visits. However, research conducted by Fongar et al. (2019) found that there is a positive correlation between perceived quality of green urban areas and visitation. Further empirical research is needed to verify this relationship, however further research can also more look into the implications of low-SES neighbourhoods into this relationship. For example, why does the perceived quality of green urban areas in low-SES neighbourhoods not seem to matter for the amount of visits (according to this study), while other empirical research has shown that it does matter when looking at a broader population? This is one of the questions that comes to mind, relating to the findings of this research.

Furthermore, this study has only looked at a certain phenomenon in a certain timeframe. However, it could also be interesting for further research to conduct comparative research regarding the same topics. For example, further research could look into the specific effects that COVID-19 has had on the relationship between the explaining factors central in this research and green urban area visitation frequency and whether there are differences in findings between pre-COVID times and during COVID-19 times. Additionally, it could be interesting for further research to compare residents from a low-SES neighbourhood with residents from a high-SES neighbourhood to see what the differences between the two groups are when it comes to green urban area visitation frequency also in relation to the concepts used in this research.

Lastly, as suggested by Uchiyama and Kohsaka (2020), further empirical research is required to verify the relationship between sociodemographic attributes of individuals and their use of green urban areas. They advocate for further research in different regions and countries with different backgrounds and contexts so it is better possible to understand the relationship between sociodemographic attributes and the use of green urban areas. This research only looked at these concepts from a Dutch low-SES neighbourhood perspective. In other words, other perspectives in further research are needed when it comes to the relationship between sociodemographic attributes and green urban area usage. However, this does not only apply to sociodemographic attributes, but also to other concepts under

discussion in this research: further empirical research is needed to verify the relationships central in this research.

8 Reflection

This chapter will devote special attention to the reflection on the research process. This chapter will especially look at what issues occurred during the research process and how I personally dealt with these issues. Furthermore, this chapter will look at how I experienced certain parts of the research process and what I learnt from this research.

8.1 Research Process Experiences

The fieldwork of this research consisted of going to three different neighbourhoods (Wolfskuil, Holtenbroek, Oosterflank) in the Netherlands. Surveys were taken by going door-to-door and asking residents if they wanted to take part in this research. This part of the research I have personally learnt a lot from. Going door-to-door in different neighbourhoods and convince residents who do not know you to take part in your research was a great challenge. You only have a small amount of time to talk to these people and convince them. Throughout the days of going to these neighbourhoods, I have learnt how to better talk to people who do not know me and how to talk loud and clear as well as sound convincing. What I have also learnt during the research process was something about the research population. Before going into these neighbourhoods, I participated in a 'test-session' from Pharos. This test-session consisted of a Pharos employee going over a letter from the 'Rijksoverheid' together with someone who is (partly) illiterate and see whether this letter was easily understandable for these people. These people who are (partly) illiterate were people who I could possibly speak to during the fieldwork process. This test-session thus served a purpose of familiarizing myself with the kind of people I might possibly speak to. During this test-session I learnt that a lot of words that seem normal to me, are not easily understood by (partly) illiterate people. I thus learnt how to better talk to these people. This was a very helpful but also enjoyable session.

8.2 Research Process Obstacles

One of the main obstacles during the research process was mainly in the beginning stage of this study. I knew what my interests were for my bachelor's thesis. I was mainly

looking to focus on the planning side of the Geography, Planning and Environment course. I also knew fairly early that I wanted to focus on the impact that the COVID-19 pandemic has had on our lives. However, translating these particular interests into a clear research proposal was difficult. One of the main reasons why this was difficult, was because there was a lot of information to be found in the scientific literature regarding my interests. At times this great amount of information got overwhelming in regards to finding inspiration for the bachelor's thesis proposal. Ultimately, by discussing ideas with my supervisor, I was able to finally translate the overwhelming amount of information as well as my research interest into a proper research proposal, which formed a strong basis for the whole study.

Another obstacle was the big gap in between finishing my research proposal and doing the fieldwork for the research project. I finished writing my research proposal fairly early into the research process. It was not until May that I went into the different neighbourhoods to survey. This gap made it hard to collect myself again and to fully focus on the research topic again, as it was a relatively long time since I had worked on this study. Other students who had the same research interest as me and who I surveyed with were in the same situation and felt the same way. By discussing thoughts about the research it has really helped me to put my full focus on the research again.

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Appendix

Appendix 1: Leefplekmeter survey

Only the questions that were used for the data analysis are listed below. The full survey can be found using this link: https://fmru.az1.qualtrics.com/jfe/form/SV_bsx1subXZUDuv1c

Natuur en groen

1.Bent u blij met de natuur en het groen in uw buurt?

U kunt denken aan deze vragen bij het bepalen van uw score:
• Zijn er genoeg bomen, struiken en groen in uw buurt?
• Is de natuur en het groen mooi in uw buurt?
• Kunt u genieten van de natuur en het groen?
• Gaat u graag naar het bos in de buurt?

1 = Het is heel slecht, alles kan beter.

10 = Het is heel goed, niks kan beter.

Uitleg: schuif het balkje naar rechts en links om uw score te geven.

1----------10

2. Hoe vaak gaat u naar plekken met veel groen in uw buurt?
Bijvoorbeeld naar een park of het bos.
0 Elke Dag
0 2-3 keer per week
0 1 keer per week
0 1-2 keer per maand
0 Nooit

3. Ik ben een:
0 man
0 vrouw

4. Mijn geboorte jaar is: _____

5. Mijn hoogst afgeronde opleiding: _____

6. Ik woon in:
0 een huurhuis
0 een koophuis

7. Ik ben geboren in (land): _____

8. Mijn ouders zijn geboren in (land(en)): _____

Appendix 2: SQUASH survey

The full survey can be found using this link:
https://fmru.az1.qualtrics.com/jfe/form/SV_bsx1subXZUDuv1c

Q0-2 De volgende vragen gaan over uw beweegpatroon. Graag de vragen invullen volgens uw beweegpatroon in een normale week (van voor het COVID-19 virus).

Q9 Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk)

- ☐ Lopen van/naar werk of school (1)
- ☐ Fietsen van/naar werk of school (2)
- ☐ Rijden met motorvoertuig van/naar werk of school (3)
- ☐ Met het openbaar vervoer (4)

Display This Question:

If Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk) = Lopen van/naar werk of school

Q9a Aantal dagen per week (lopen)

- ○ 1 (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 (6)
- ○ 7 (7)

Display This Question:

If Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk) = Lopen van/naar werk of school

Q9b Gemiddelde tijd per dag (lopen)

- Minder 15 minuten (1)
- Tussen de 15-30 minuten (2)
- Tussen de 30-45 minuten (3)
- Tussen de 45-60 minuten (4)
- Meer dan 1 uur (5)

Display This Question:

If Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk) = Lopen van/naar werk of school

Q9c Inspanning (lopen)

- Langzaam (1)
- Gemiddeld (2)
- Zwaar (3)

Display This Question:

If Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk) = Fietsen van/naar werk of school

Q9d Aantal dagen per week (fietsen)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk) = Fietsen van/naar werk of school

Q9e Gemiddelde tijd per dag (fietsen)

- Minder dan 15 minuten (1)
- Tussen de 15-30 minuten (2)
- Tussen de 30-45 minuten (3)
- Tussen de 45-60 minuten (4)
- Meer dan 1 uur (5)

Display This Question:

If Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk) = Fietsen van/naar werk of school

Q9f Inspanning (fietsen)

- Langzaam (1)
- Gemiddeld (2)
- Zwaar (3)

Display This Question:

If Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk) = Rijden met motorvoertuig van/naar werk of school

Q9g Aantal dagen per week (motorvoertuig)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Welk vervoersmiddel gebruikt u om naar uw werk/school te gaan? (meerdere antwoorden mogelijk) = Rijden met motorvoertuig van/naar werk of school

Q9h Gemiddelde tijd per dag (motorvoertuig)

- Minder dan 15 minuten (1)
- Tussen de 15-30 minuten (2)
- Tussen de 30-45 minuten (3)
- Tussen de 45-60 minuten (4)
- Meer dan 60 minuten (5)

End of Block: Woon- werkverkeer (SQUASH)

Start of Block: Lichamelijke activiteit, werk/school (SQUASH)

Q10 Hoe inspannend is uw werk? (meerdere antwoorden mogelijk)

- ☐ Licht en matig inspannend werk (zittend/ staand werk, met af en toe lopen, zoals bureauwerk of lopend met lichte lasten) (1)
- ☐ Zwaar inspannend werk (lopend werk of werk waarbij regelmatig zware dingen moeten worden opgetild) (2)
- ☐ Niet van toepassing, geen werk of school (3)

Display This Question:

If Hoe inspannend is uw werk? (meerdere antwoorden mogelijk) = Licht en matig inspannend werk (zittend/ staand werk, met af en toe lopen, zoals bureauwerk of lopend met lichte lasten)

Q10a Gemiddeld aantal uur per dag (licht en matig inspannend werk)

- ○ Minder dan 1 uur (1)
- ○ Tussen de 1-2 uur (2)
- ○ Tussen de 3-4 uur (3)
- ○ Tussen de 4-5 uur (4)
- ○ Tussen de 5-6 uur (5)
- ○ Tussen de 6-7 uur (6)
- ○ Meer dan 7 uur (7)

Display This Question:

If Hoe inspannend is uw werk? (meerdere antwoorden mogelijk) = Zwaar inspannend werk (lopend werk of werk waarbij regelmatig zware dingen moeten worden opgetild)

Q10b Gemiddeld aantal uur per dag (zwaar inspannend werk)

- ○ Minder dan 1 uur (1)
- ○ Tussen de 1-2 uur (2)
- ○ Tussen de 2-3 uur (3)
- ○ Tussen de 3-4 uur (4)
- ○ Tussen de 4-5 uur (5)
- ○ Tussen de 6-7 uur (6)
- ○ Meer dan 7 uur (7)

End of Block: Lichamelijke activiteit, werk/school (SQUASH)

Start of Block: Huishoudelijke activiteiten (SQUASH)

Q11 Als u huishoudelijke activiteiten doet, hoe inspannend is dat dan? (meerdere antwoorden mogelijk)

- ☐ Licht en matig inspannend huishoudelijk werk (staand werk, zoals koken, afwassen, strijken, kind eten geven/in bad doen en lopend werk, zoals stofzuigen, boodschappen doen) (1)
- ☐ Zwaar inspannend huishoudelijk werk (vloer schrobben, tapijt uitkloppen, met zware boodschappen lopen) (2)

Display This Question:

If Als u huishoudelijke activiteiten doet, hoe inspannend is dat dan? (meerdere antwoorden mogelijk) = Licht en matig inspannend huishoudelijk werk (staand werk, zoals koken, afwassen, strijken, kind eten geven/in bad doen en lopend werk, zoals stofzuigen, boodschappen doen)

Q11a Aantal dagen per week (licht en matig inspannend huishoudelijk werk)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Als u huishoudelijke activiteiten doet, hoe inspannend is dat dan? (meerdere antwoorden mogelijk) = Licht en matig inspannend huishoudelijk werk (staand werk, zoals koken, afwassen, strijken, kind eten geven/in bad doen en lopend werk, zoals stofzuigen, boodschappen doen)

Q11b Gemiddeld aantal uur per dag (licht en matig inspannend huishoudelijk werk)

- Minder dan 30 minuten per dag (1)
- Tussen de 30-60 minuten (2)
- Tussen de 60-90 minuten (3)
- Tussen de 90-120 minuten (4)
- Meer dan 120 minuten (5)

Display This Question:

If Als u huishoudelijke activiteiten doet, hoe inspannend is dat dan? (meerdere antwoorden mogelijk) = Zwaar inspannend huishoudelijk werk (vloer schrobben, tapijt uitkloppen, met zware boodschappen lopen)

Q11c Aantal dagen per week (zwaar inspannend huishoudelijk werk)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Als u huishoudelijke activiteiten doet, hoe inspannend is dat dan? (meerdere antwoorden mogelijk) = Zwaar inspannend huishoudelijk werk (vloer schrobben, tapijt uitkloppen, met zware boodschappen lopen)

Q11d Gemiddeld aantal uur per dag (zwaar inspannend huishoudelijk werk)

- Minder dan 30 minuten (1)
- Tussen de 30-60 minuten (2)
- Tussen de 60-90 minuten (3)
- Tussen de 90-120 minuten (4)
- Meer dan 120 minuten (5)

End of Block: Huishoudelijke activiteiten (SQUASH)

Start of Block: Sport (SQUASH)

Q12 Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk)

- ☐ Geen (1)
- ☐ Sport 1 (2) _____
- ☐ Sport 2 (3) _____
- ☐ Sport 3 (4) _____
- ☐ Sport 4 (5) _____

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 1

Q12a Aantal dagen per week (sport 1)

- ○ 1 (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 (6)
- ○ 7 (7)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 1

Q12b Gemiddelde tijd per keer (sport 1)

- Minder dan 30 minuten (1)
- Tussen de 30-60 minuten (2)
- Tussen de 60-90 minuten (3)
- Tussen de 90-120 minuten (4)
- Meer dan 120 minuten (5)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 1

Q12c Inspanning (sport 1)

- Langzaam (1)
- Gemiddeld (2)
- Zwaar (3)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 2

Q12d Aantal dagen per week (sport 2)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 2

Q12e Gemiddelde tijd per keer (sport 2)

- ○ Minder dan 30 minuten (1)
- ○ Tussen de 30-60 minuten (2)
- ○ Tussen de 60-90 minuten (3)
- ○ Tussen de 90-120 minuten (4)
- ○ Meer dan 120 minuten (5)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 2

Q12f Inspanning (sport 2)

- ○ Langzaam (1)
- ○ Gemiddeld (2)
- ○ Zwaar (3)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 3

Q12g Aantal dagen per week (sport 3)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 3

Q12h Gemiddelde tijd per keer (sport 3)

- Minder dan 30 minuten (1)
- Tussen de 30-60 minuten (2)
- Tussen de 60-90 minuten (3)
- Tussen de 90-120 minuten (4)
- Meer dan 120 minuten (5)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 3

Q12i Inspanning (sport 3)

- Langzaam (1)
- Gemiddeld (2)
- Zwaar (3)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 4

Q12j Aantal dagen per week (sport 4)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 4

Q12k Gemiddelde tijd per keer (sport 4)

- Minder dan 30 minuten (1)
- Tussen de 30-60 minuten (2)
- Tussen de 60-90 minuten (3)
- Tussen de 90-120 minuten (4)
- Meer dan 120 minuten (5)

Display This Question:

If Aan hoeveel sporten doet u? (meerdere antwoorden mogelijk) = Sport 4

Q12l Inspanning (sport 4)

- ○ Langzaam (1)
- ○ Gemiddeld (2)
- ○ Zwaar (3)

End of Block: Sport (SQUASH)

Start of Block: Vrije tijd (SQUASH)

Q13 Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk)

- ☐ Wandelen (1)
- ☐ Fietsen (2)
- ☐ Tuinieren (3)
- ☐ Klussen/doe-het-zelven (4)
- ☐ Anders, namelijke ... (5) _____

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Wandelen

Q13a Aantal dagen per week (wandelen)

- ○ 1 (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 (6)
- ○ 7 (7)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Wandelen

Q13b Gemiddelde tijd per dag (wandelen)

- Minder dan 30 minuten (1)
- Tussen de 30-60 minuten (2)
- Tussen de 60-90 minuten (3)
- Tussen de 90-120 minuten (4)
- Meer dan 120 minuten (5)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Wandelen

Q13c Inspanning (wandelen)

- Langzaam (1)
- Gemiddeld (2)
- Zwaar (3)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Fietsen

Q13d Aantal dagen per week (fietsen)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Fietsen

Q13e Gemiddelde tijd per dag (fietsen)

- Minder dan 30 minuten (1)
- Tussen de 30-60 minuten (2)
- Tussen de 60-90 minuten (3)
- Tussen de 90-120 minuten (4)
- Meer dan 120 minuten (5)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Fietsen

Q13f Inspanning (fietsen)

- Langzaam (1)
- Gemiddeld (2)
- Zwaar (3)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Tuinieren

Q13g Aantal dagen per week (tuinieren)

- 1 (1)
- 2 (2)
- 3 (3)
- 4 (4)
- 5 (5)
- 6 (6)
- 7 (7)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Tuinieren

Q13h Gemiddelde tijd per dag (tuinieren)

- Minder dan 30 minuten (1)
- Tussen de 30-60 minuten (2)
- Tussen de 60-90 minuten (3)
- Tussen de 90-120 minuten (4)
- Meer dan 120 minuten (5)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Tuinieren

Q13i Inspanning (tuinieren)

- ○ Langzaam (1)
- ○ Gemiddeld (2)
- ○ Zwaar (3)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Klussen/doe-het-zelven

Q13j Aantal dagen per week (klussen/doe-het-zelven)

- ○ 1 (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 (6)
- ○ 7 (7)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Klussen/doe-het-zelven

Q13k Gemiddelde tijd per dag (klussen/doe-het-zelven)

- ○ Minder dan 30 minuten (1)
- ○ Tussen de 30-60 minuten (2)
- ○ Tussen de 60-90 minuten (3)
- ○ Tussen de 90-120 minuten (4)
- ○ Meer dan 120 minuten (5)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Klussen/doe-het-zelven

Q13l Inspanning (klussen/doe-het-zelven)

- ○ Langzaam (1)
- ○ Gemiddeld (2)
- ○ Zwaar (3)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Anders, namelijke ...

Q13m Aantal dagen per week (anders)

- ○ 1 (1)
- ○ 2 (2)
- ○ 3 (3)
- ○ 4 (4)
- ○ 5 (5)
- ○ 6 (6)
- ○ 7 (7)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Anders, namelijke ...

Q13n Gemiddelde tijd per dag (anders)

- ○ Minder dan 30 minuten (1)
- ○ Tussen de 30-60 minuten (2)
- ○ Tussen de 60-90 minuten (3)
- ○ Tussen de 90-120 minuten (4)
- ○ Meer dan 120 minuten (5)

Display This Question:

If Wat voor activiteiten doet u in uw vrije tijd? (meerdere antwoorden mogelijk) = Anders, namelijke ...

Q13o Inspanning (anders)

- ○ Langzaam (1)
- ○ Gemiddeld (2)
- ○ Zwaar (3)

Appendix 3: Operationalization Table

Concept	Dimension	Indicator	Item
Sociodemographic Characteristics	Age	Age	• What is your age?
	Gender	Gender	• What is your gender?
	Housing	Housing	• What type of house do you live in?
	Migration Background/Ethnicity	Migration Background/Ethnicity	• Where were you born?

			• Where were your parents born?
	Neighbourhood	Neighbourhood	• What neighbourhood do you live in? [Wolfskuil/Oosterflank/Holtenbroek IV]
	Level of Education	Level of Education	• What is the highest level of education you finished?
Green Urban Area Visitation Frequency	Visitation Time	(Visitation Time)	• How often do you visit green urban areas?
Physical Activity	Transportation	Transportation Means	• What means of transport do you use to go to work or school?
		Transportation Time	• How many days a week do you use this/these means of transport? • What is the average amount of time spent using this/these means of transport at a time?
		Transportation Effort	• How much effort does using this/these means of transport take?

	Physical Activity at work	Work Effort	• How much effort does your work take?
		Work Time	• How many days a week do you work? • What is the average amount of time you work at a time?
	Housework	Housework Effort	• How much effort does housework take?
		Housework Time	• How many days a week do you do housework? • What is the average amount of time you do housework at a time?
	Leisure Activities	Sports	• How many and what sports do you practice?
		Sports Effort	• How much effort does each sport take?
		Sports Time	• How many days a week do your practice sports? • What is the average amount of time you

			practice sports at a time?
		Leisure Activities	• What activities do you undertake in your free time?
		Leisure Activities Time	• How many days a week do you undertake these activities • What is the average amount of time you undertake these activities?
		Leisure Activities Effort	• How much effort do these activities take?
Perceived Quality of Green Urban Areas	Amount/enjoyability/prettiness/etc.	Amount/enjoyability/prettiness/etc.	• How would you rate the green urban areas in your area on a scale from 1-10?*

*Respondents were asked to give a rating from 1-10 on how they perceive the quality of green urban areas in their area. The indicators used are up to the respondent according to the Leefplekmeter

Appendix 4: Codebook SPSS

Gender
- 1=male
- 2=female

Age
- 1=29 years or younger
- 2=30-39 years
- 3=40=49 years
- 4=50-59 years
- 5=60-69 years
- 6=70+ years

Housing

- 1=rental property
- 2=purchased property

Ethnicity/Migration Background

- 2=Dutch
- 3=foreign

Neighbourhood

- 1=Holtenbroek IV
- 2=Oosterflank
- 3=Wolfskuil

Level of Education

- 1=Low
- 2=Middle
- 3=High

Perceived Quality

- 1=1
- 2=2
- 3=3
- 4=4
- 5=5
- 6=6
- 7=7
- 8=8
- 9=9
- 10=10

Frequency of Green Urban Area Visitation

- 1=Never
- 2=1-2 times per month
- 3=1 time per week
- 4=2-3 times per week
- 5=Daily

Physical Activity at Work

- 1=MET between 0-2499
- 2=MET between 2500-4999
- 3=MET between 5000-7499
- 4=MET between 7500-9999
- 5=MET of over 10000

Transportation to Work

- 1=MET between 0-250

- 2=MET between 251-500
- 3=MET between 501-750
- 4=MET between 751-1000
- 5=MET of over 1000

Housework

- 1=MET between 0-250
- 2=MET between 251-500
- 3=MET between 501-750
- 4=MET between 751-1000
- 5=MET between 1001-1250
- 6=MET of over 1250

Sports and Leisure

- 1=MET between 0-500
- 2=MET between 501-1000
- 3=MET between 1001-1500
- 4=MET between 1501-2000
- 5=MET between 2001-2500
- 6=MET of over 2500

Total Physical Activity

- 1=MET between 0-2499
- 2=MET between 2500-4999
- 3=MET between 5000-7499
- 4=MET between 7500-9999
- 5=MET between 10000-12499
- 6=MET between 12500-14999
- 7=MET of over 15000

Appendix 5: SPSS-Output

Statistics

Leeftijd_ordinaal1

N	Valid	86
	Missing	2
Median		4,0000
Range		5,00
Minimum		1,00
Maximum		6,00

Leeftijd_ordinaal1

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	29 jaar of jonger	9	10,2	10,5	10,5
	30-39 jaar	12	13,6	14,0	24,4
	40-49 jaar	14	15,9	16,3	40,7
	50-59 jaar	19	21,6	22,1	62,8
	60-69 jaar	15	17,0	17,4	80,2
	70 jaar of ouder	17	19,3	19,8	100,0
	Total	86	97,7	100,0	
Missing	-99,00	2	2,3		
Total		88	100,0		

MET_sportvrijetijd_ordinaal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-500	38	26,8	26,8	26,8
	501-1000	19	13,4	13,4	40,1
	1001-1500	26	18,3	18,3	58,5
	1501-2000	19	13,4	13,4	71,8
	2001-2500	11	7,7	7,7	79,6
	2500+	29	20,4	20,4	100,0
	Total	142	100,0	100,0	

MET-score totaal werk ordinaal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-2499	65	45,8	45,8	45,8
	2500-4999	36	25,4	25,4	71,1
	5000-7499	29	20,4	20,4	91,5
	7500-9999	4	2,8	2,8	94,4
	10000+	8	5,6	5,6	100,0
	Total	142	100,0	100,0	

MET_totaal_ordinaal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-2499	42	29,6	29,6	29,6
	2500-4999	18	12,7	12,7	42,3
	5000-7499	38	26,8	26,8	69,0
	7500-9999	26	18,3	18,3	87,3
	10000-12499	12	8,5	8,5	95,8
	12500-14999	6	4,2	4,2	100,0
	Total	142	100,0	100,0	

MET_huishoud_ordinaal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-250	35	24,6	24,6	24,6
	251-500	35	24,6	24,6	49,3
	501-750	15	10,6	10,6	59,9
	751-1000	18	12,7	12,7	72,5
	1001-1250	8	5,6	5,6	78,2
	1250+	31	21,8	21,8	100,0
	Total	142	100,0	100,0	

MET_vervoer_ordinaal

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	0-250	107	75,4	75,4	75,4
	251-500	13	9,2	9,2	84,5
	501-750	3	2,1	2,1	86,6
	751-1000	5	3,5	3,5	90,1
	1000+	14	9,9	9,9	100,0
	Total	142	100,0	100,0	

Opleidingsniveau

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Laag	28	19,7	20,3	20,3
	Middelbaar	48	33,8	34,8	55,1
	Hoog	62	43,7	44,9	100,0
	Total	138	97,2	100,0	
Missing	-99	4	2,8		
Total		142	100,0		

Beoordeling van groenvoorzieningen in de wijk

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	1	1	,7	,7	,7
	2	1	,7	,7	1,4
	4	4	2,8	2,8	4,2
	5	8	5,6	5,6	9,9
	6	19	13,4	13,4	23,2
	7	48	33,8	33,8	57,0
	8	48	33,8	33,8	90,8
	9	12	8,5	8,5	99,3
	10	1	,7	,7	100,0
	Total	142	100,0	100,0	

type_woning

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	een huur	71	50,0	50,0	50,0
	een koop	71	50,0	50,0	100,0
	Total	142	100,0	100,0	

afkomst

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nederlands	100	70,4	71,4	71,4
	Niet-Nederlands	40	28,2	28,6	100,0
	Total	140	98,6	100,0	
Missing	-99	2	1,4		
Total		142	100,0		

Wijk van bewoner

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Holtenbroek IV	37	26,1	26,1	26,1
	Oosterflank	49	34,5	34,5	60,6
	Wolfskuil	56	39,4	39,4	100,0
	Total	142	100,0	100,0	

Hoe vaak groen bezoeken per week

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Nooit	14	9,9	9,9	9,9
	1-2 keer per maand	18	12,7	12,7	22,5
	1 keer per week	28	19,7	19,7	42,3
	2-3 keer per week	60	42,3	42,3	84,5
	Elke dag	22	15,5	15,5	100,0
	Total	142	100,0	100,0	

geslacht

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Man	54	38,0	38,0	38,0
	Vrouw	88	62,0	62,0	100,0
	Total	142	100,0	100,0	

Correlations

			Beoordeling van groenvoorzien ingen in de wijk	Hoe vaak groen bezoeken per week
Spearman's rho	Beoordeling van groenvoorzieningen in de wijk	Correlation Coefficient	1,000	,208*
		Sig. (2-tailed)	.	,013
		N	142	142
	Hoe vaak groen bezoeken per week	Correlation Coefficient	,208*	1,000
		Sig. (2-tailed)	,013	.
		N	142	142

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

Correlations

			Hoe vaak groen bezoeken per week	Leeftijd_ordinaal1
Spearman's rho	Hoe vaak groen bezoeken per week	Correlation Coefficient	1,000	-,088
		Sig. (2-tailed)	.	,310
		N	142	135
	Leeftijd_ordinaal1	Correlation Coefficient	-,088	1,000
		Sig. (2-tailed)	,310	.
		N	135	135

Correlations

			Hoe vaak groen bezoeken per week	Opleidingsniveau
Spearman's rho	Hoe vaak groen bezoeken per week	Correlation Coefficient	1,000	,096
		Sig. (2-tailed)	.	,262
		N	142	138
	Opleidingsniveau	Correlation Coefficient	,096	1,000
		Sig. (2-tailed)	,262	.
		N	138	138

Hoe vaak groen bezoeken per week * geslacht

Crosstab

			geslacht		
			Man	Vrouw	Total
Hoe vaak groen bezoeken per week	Nooit	Count	6	8	14
		% within geslacht	11,1%	9,1%	9,9%
	1-2 keer per maand	Count	6	12	18
		% within geslacht	11,1%	13,6%	12,7%
	1 keer per week	Count	19	9	28
		% within geslacht	35,2%	10,2%	19,7%
	2-3 keer per week	Count	18	42	60
		% within geslacht	33,3%	47,7%	42,3%
	Elke dag	Count	5	17	22
		% within geslacht	9,3%	19,3%	15,5%
Total		Count	54	88	142
		% within geslacht	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	14,705[a]	4	,005
Likelihood Ratio	14,547	4	,006
Linear-by-Linear Association	3,088	1	,079
N of Valid Cases	142		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 5,32.

Symmetric Measures

		Value	Approximate Significance
Nominal by Nominal	Phi	,322	,005
	Cramer's V	,322	,005
N of Valid Cases		142	

Crosstab

			type_woning		
			een huur	een koop	Total
Hoe vaak groen bezoeken per week	Nooit	Count	9	5	14
		% within type_woning	12,7%	7,0%	9,9%
		Adjusted Residual	1,1	-1,1	
	1-2 keer per maand	Count	11	7	18
		% within type_woning	15,5%	9,9%	12,7%
		Adjusted Residual	1,0	-1,0	
	1 keer per week	Count	14	14	28
		% within type_woning	19,7%	19,7%	19,7%
		Adjusted Residual	,0	,0	
	2-3 keer per week	Count	29	31	60
		% within type_woning	40,8%	43,7%	42,3%
		Adjusted Residual	-,3	,3	
	Elke dag	Count	8	14	22
		% within type_woning	11,3%	19,7%	15,5%
		Adjusted Residual	-1,4	1,4	
Total		Count	71	71	142
		% within type_woning	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	3,735[a]	4	,443
Likelihood Ratio	3,779	4	,437
Linear-by-Linear Association	3,385	1	,066
N of Valid Cases	142		

a. 0 cells (0,0%) have expected count less than 5. The minimum expected count is 7,00.

Crosstab

			afkomst		
			Nederlands	Niet-Nederlands	Total
Hoe vaak groen bezoeken per week	Nooit	Count	9	4	13
		% within afkomst	9,0%	10,0%	9,3%
		Adjusted Residual	-,2	,2	
	1-2 keer per maand	Count	11	7	18
		% within afkomst	11,0%	17,5%	12,9%
		Adjusted Residual	-1,0	1,0	
	1 keer per week	Count	20	7	27
		% within afkomst	20,0%	17,5%	19,3%
		Adjusted Residual	,3	-,3	
	2-3 keer per week	Count	44	16	60
		% within afkomst	44,0%	40,0%	42,9%
		Adjusted Residual	,4	-,4	
	Elke dag	Count	16	6	22
		% within afkomst	16,0%	15,0%	15,7%
		Adjusted Residual	,1	-,1	
Total		Count	100	40	140
		% within afkomst	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	1,187[a]	4	,880
Likelihood Ratio	1,135	4	,889
Linear-by-Linear Association	,434	1	,510
N of Valid Cases	140		

a. 1 cells (10,0%) have expected count less than 5. The minimum expected count is 3,71.

Crosstab

			Wijk van bewoner			
			Holtenbroek IV	Oosterflank	Wolfskuil	Total
Hoe vaak groen bezoeken per week	Nooit	Count	5	6	3	14
		% within Wijk van bewoner	13,5%	12,2%	5,4%	9,9%
		Adjusted Residual	,9	,7	-1,5	
	1-2 keer per maand	Count	4	7	7	18
		% within Wijk van bewoner	10,8%	14,3%	12,5%	12,7%
		Adjusted Residual	-,4	,4	-,1	
	1 keer per week	Count	5	12	11	28
		% within Wijk van bewoner	13,5%	24,5%	19,6%	19,7%
		Adjusted Residual	-1,1	1,0	,0	
	2-3 keer per week	Count	16	17	27	60
		% within Wijk van bewoner	43,2%	34,7%	48,2%	42,3%
		Adjusted Residual	,1	-1,3	1,2	
	Elke dag	Count	7	7	8	22
		% within Wijk van bewoner	18,9%	14,3%	14,3%	15,5%
		Adjusted Residual	,7	-,3	-,3	
Total		Count	37	49	56	142
		% within Wijk van bewoner	100,0%	100,0%	100,0%	100,0%

Chi-Square Tests

	Value	df	Asymptotic Significance (2-sided)
Pearson Chi-Square	4,948[a]	8	,763
Likelihood Ratio	5,164	8	,740
Linear-by-Linear Association	,306	1	,580
N of Valid Cases	142		

a. 3 cells (20,0%) have expected count less than 5. The minimum expected count is 3,65.

Correlations

			Hoe vaak groen bezoeken per week	MET_totaal_ordinaal
Spearman's rho	Hoe vaak groen bezoeken per week	Correlation Coefficient	1,000	,273**
		Sig. (2-tailed)	.	,001
		N	142	142
	MET_totaal_ordinaal	Correlation Coefficient	,273**	1,000
		Sig. (2-tailed)	,001	.
		N	142	142

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

Correlations

			Hoe vaak groen bezoeken per week	MET-score totaal werk ordinaal
Spearman's rho	Hoe vaak groen bezoeken per week	Correlation Coefficient	1,000	,174*
		Sig. (2-tailed)	.	,038
		N	142	142
	MET-score totaal werk ordinaal	Correlation Coefficient	,174*	1,000
		Sig. (2-tailed)	,038	.
		N	142	142

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

Correlations

			Hoe vaak groen bezoeken per week	MET_huishoud_ordinaal
Spearman's rho	Hoe vaak groen bezoeken per week	Correlation Coefficient	1,000	,199*
		Sig. (2-tailed)	.	,018
		N	142	142
	MET_huishoud_ordinaal	Correlation Coefficient	,199*	1,000
		Sig. (2-tailed)	,018	.
		N	142	142

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

Correlations

			Hoe vaak groen bezoeken per week	MET_vervoer_ordinaal
Spearman's rho	Hoe vaak groen bezoeken per week	Correlation Coefficient	1,000	,166*
		Sig. (2-tailed)	.	,048
		N	142	142
	MET_vervoer_ordinaal	Correlation Coefficient	,166*	1,000
		Sig. (2-tailed)	,048	.
		N	142	142

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

Correlations

			Hoe vaak groen bezoeken per week	MET_sportvrijetijd_ordinaal
Spearman's rho	Hoe vaak groen bezoeken per week	Correlation Coefficient	1,000	,287**
		Sig. (2-tailed)	.	,001
		N	142	142
	MET_sportvrijetijd_ordinaal	Correlation Coefficient	,287**	1,000
		Sig. (2-tailed)	,001	.
		N	142	142

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

Test of Parallel Lines[a]

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Null Hypothesis	338,840			
General	270,182[b]	68,659[c]	54	,086

The null hypothesis states that the location parameters (slope coefficients) are the same across response categories.

Statistics

		geslacht	type_woning	afkomst	Wijk van bewoner	Hoe vaak groen bezoeken per week	Opleidingsniveau	Beoordeling van groenvoorzieningen in de wijk	MET_huishoud_ordinaal	MET_vervoer_ordinaal	MET_sportvrijetijd_ordinaal	MET-score totaal werk ordinaal	MET_totaal_ordinaal
N	Valid	142	142	140	142	142	138	142	142	142	142	142	142
	Missing	0	0	2	0	0	4	0	0	0	0	0	0
Median		2,00	1,50	2,00	2,00	4,00	2,00	7,00	3,0000	1,0000	3,0000	2,0000	3,0000
Range		1	1	1	2	4	2	9	5,00	4,00	5,00	4,00	5,00
Minimum		1	1	2	1	1	1	1	1,00	1,00	1,00	1,00	1,00
Maximum		2	2	3	3	5	3	10	6,00	5,00	6,00	5,00	6,00

Model Fitting Information

Model	-2 Log Likelihood	Chi-Square	df	Sig.
Intercept Only	386,350			
Final	338,840	47,510	18	,000

Link function: Logit.

Goodness-of-Fit

	Chi-Square	df	Sig.
Pearson	544,044	458	,003
Deviance	319,876	458	1,000

Link function: Logit.

Pseudo R-Square

Cox and Snell	,288
Nagelkerke	,304
McFadden	,117

Link function: Logit.

Case Processing Summary

		N	Marginal Percentage
Hoe vaak groen bezoeken per week	Nooit	13	9,3%
	1-2 keer per maand	18	12,9%
	1 keer per week	27	19,3%
	2-3 keer per week	60	42,9%
	Elke dag	22	15,7%
geslacht	Man	52	37,1%
	Vrouw	88	62,9%
type_woning	een huur	70	50,0%
	een koop	70	50,0%
afkomst	Nederlands	100	71,4%
	Niet-Nederlands	40	28,6%
Wijk van bewoner	Holtenbroek IV	37	26,4%
	Oosterflank	48	34,3%
	Wolfskuil	55	39,3%
Beoordeling van groenvoorzieningen in de wijk	1	1	0,7%
	2	1	0,7%
	4	4	2,9%
	5	8	5,7%
	6	19	13,6%
	7	48	34,3%
	8	47	33,6%
	9	11	7,9%
	10	1	0,7%
MET_totaal_ordinaal	0-2499	41	29,3%
	2500-4999	18	12,9%
	5000-7499	37	26,4%
	7500-9999	26	18,6%
	10000-12499	12	8,6%
	12500-14999	6	4,3%
Valid		140	100,0%
Missing		2	
Total		142	

Parameter Estimates

							95% Confidence Interval	
		Estimate	Std. Error	Wald	df	Sig.	Lower Bound	Upper Bound
Threshold	[groen_bezoek = 1]	-4,311	2,219	3,774	1	,052	-8,661	,038
	[groen_bezoek = 2]	-3,171	2,202	2,074	1	,150	-7,487	1,145
	[groen_bezoek = 3]	-2,078	2,191	,899	1	,343	-6,372	2,217
	[groen_bezoek = 4]	,552	2,187	,064	1	,801	-3,734	4,838
Location	[geslacht=1]	-,917	,357	6,588	1	,010	-1,617	-,217
	[geslacht=2]	0[a]	.	.	0	.	.	.
	[type_woning=1]	-,603	,342	3,105	1	,078	-1,274	,068
	[type_woning=2]	0[a]	.	.	0	.	.	.
	[afkomst=2]	,481	,379	1,608	1	,205	-,262	1,225
	[afkomst=3]	0[a]	.	.	0	.	.	.
	[wijk=1]	-,081	,442	,033	1	,855	-,947	,786
	[wijk=2]	-,275	,411	,446	1	,504	-1,081	,532
	[wijk=3]	0[a]	.	.	0	.	.	.
	[Groen_beoord=1]	-21,411	9404,074	,000	1	,998	-18453,058	18410,236
	[Groen_beoord=2]	18,555	,000	.	1	.	18,555	18,555
	[Groen_beoord=4]	-2,021	2,254	,804	1	,370	-6,439	2,397
	[Groen_beoord=5]	-2,421	2,132	1,290	1	,256	-6,599	1,757
	[Groen_beoord=6]	-1,908	2,067	,852	1	,356	-5,960	2,144
	[Groen_beoord=7]	-1,862	2,036	,836	1	,360	-5,851	2,128
	[Groen_beoord=8]	-,701	2,021	,120	1	,729	-4,663	3,261
	[Groen_beoord=9]	-,619	2,097	,087	1	,768	-4,728	3,490
	[Groen_beoord=10]	0[a]	.	.	0	.	.	.
	[MET_totaal_ordinaal=1,00]	-,079	,854	,009	1	,926	-1,753	1,596
	[MET_totaal_ordinaal=2,00]	-,657	,922	,508	1	,476	-2,464	1,149
	[MET_totaal_ordinaal=3,00]	,275	,849	,105	1	,746	-1,390	1,939
	[MET_totaal_ordinaal=4,00]	1,569	,894	3,082	1	,079	-,183	3,321
	[MET_totaal_ordinaal=5,00]	,323	,969	,111	1	,739	-1,577	2,223
	[MET_totaal_ordinaal=6,00]	0[a]	.	.	0	.	.	.

Link function: Logit.

a. This parameter is set to zero because it is redundant.

Coefficients[a]

Model		Collinearity Statistics	
		Tolerance	VIF
1	geslacht	,807	1,239
	type_woning	,666	1,500
	afkomst	,808	1,238
	Groen_beoord_1	,868	1,152
	Groen_beoord_2	,888	1,126
	Groen_beoord_4	,818	1,223
	Groen_beoord_5	,835	1,198
	Groen_beoord_6	,754	1,326
	Groen_beoord_8	,691	1,448
	Groen_beoord_9	,762	1,313
	Groen_beoord_10	,855	1,170
	MET totaal score 2500-4999	,687	1,457
	MET totaal score 5000-7499	,543	1,842
	MET totaal score 7500-9999	,570	1,754
	MET totaal score 10000-12499	,699	1,430
	MET totaal score 12500-14999	,754	1,327
	30-39 jaar	,586	1,706
	40-49 jaar	,539	1,854
	50-59 years	,459	2,180
	60-69 jaar	,505	1,981
	70+ jaar	,443	2,255
	Midden Opleiding	,480	2,082
	Hoge Opleiding	,427	2,341
	Holtenbroek IV	,653	1,531
	Wolfskuil	,516	1,938

a. Dependent Variable: Hoe vaak groen bezoeken per week