Combining environmental and intrinsic benefits of parks in planning: a case study of Groningen and Berlin

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Abstract

The coming decades, cities are expected to expand to be able to maintain the rising population. With climate change affecting weather patterns and an increase in inhabitants, parks can be used to help solve two occurring challenges. First, parks can help lower temperatures, create space to store and discharge water and clean the air. Second, parks have a positive effect on human well-being and can help decrease stress levels and provide a sense of safety. This research tries to answer the question "How can urban parks be planned in a way which optimizes both the environmental and intrinsic benefits for its users?". To answer this question, surveys were conducted in Groningen, The Netherlands and in Berlin, Germany. Two parks in each city were studied and compared, in Groningen the focus was on intrinsic benefits, based on park elements defined by an interview with a landscape architect, while in Berlin the awareness of the environmental benefits was evaluated. In Groningen these parks were Park Oost Insichebuurt (N=30) and Pioenpark (N=30), in Berlin this was Volkspark Friedrischain (N=47) and the Rummelsburg Neighbourhood (N=26) which is built according to the sponge city principle. Comparing the two parks led to findings that showed how different executions of similar elements created similar or different experiences in park visitors. Results indicate that, vegetation and water have a positive effect on the happiness and relaxation potential of parks. Water does not increase the feeling of safety, for vegetation this is dependent on the density and maintenance of the green space. The results from Berlin suggest that park visitors are aware of the capabilities of parks to clean the air and lower temperatures. That parks can help prevent floods was not familiar to park visitors from Berlin, a reason for this low awareness is that Berlin citizens are not affected by floods. To conclude, climate-responsive park design is seen as the new type of planning to enhance both the environmental and intrinsic benefits of parks.

Keywords: Urban parks, environmental benefits, intrinsic benefits, case study Groningen, Berlin.

Image front page: by author.

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Introduction

In the history of urban parks, parks were seen as aesthetically pleasing and only accessible to the upper class (Byrne & Wolch, 2009; Loures et al., 2007). In the ninetieth and twentieth century however, parks were used to solve cultural, political and economic problems (Loughran, 2020). Urbanization was one of these problems, too many people lived in too small spaces. With barely any access to green spaces, the people became segregated from nature (Loures et al., 2007). Loures et al. (2007) also note that the urban park movement – which started in England – is closely related to garden design. A more practical reason of the creation of open space is explained by Loughran (2020). North-American cities are planned according to the grid-pattern, however, the geography (elevation, natural elements) of the area made continuation of the pattern sometimes impossible. As a solution, open spaces were created. These open spaces were also implemented as a reason to diminish crime and social tensions (Maller et al., 2009).

The benefits of urban parks can be divided into social, economic, environmental benefits, as well as more personal benefits affecting the physical and psychological wellbeing (Loures et al., 2007; Bedimi-Rung et al., 2005). On an individual level, positive health effects are related to the increase opportunity of exercising, and with psychological effects such as stress-relief and the feeling of 'being in nature' or 'escaping the city' (Bedimi-Rung et al., 2005; Chiesura, 2004). On top of that, De Vries et al. (2003) performed a Dutch study on the relation between self-assessed health and access to green space. They conclude that access to nature or availability of nature is positively affecting the self-reported health. This also means that self-assessed health in fully urban areas is significantly lower than in greener areas.

The study done by Chiesura (2004) shows that the researched park (Vondelpark, Amsterdam) is most frequently visited to relax, but other reasons to visit a park are to be in nature or to escape from the city. These social benefits are however not always guaranteed, there are parks barely used, unsafe parks and unattractive parks. This is already explored by Jane Jacobs in her book 'the death and life of great American cities' (1992). Corresponding to Jacobs' (1992) notion that the surrounding environment of a park can determine the value of a park, Byrne & Wolch (2009) summarize that the 'right' type of nature can create positive effects, in terms of health, intelligence, economic prosperity and moral conscience. On the other hand, a park that lacks the good aspects, will bring forth negative behaviour such as crime and corruption. In a wider context, parks can generate social benefits by promoting social interactions (Bedimi-Rung et al., 2005). These social interactions aim to strengthen the community (Loures & Costa, 2012). Multicultural and integrated social interactions are also promoted by urban parks, depending on the feeling of welcome and safety (Powers et al., 2022).

Only recently, the idea that parks can also be of help environmentally became important in spatial planning (Loughran, 2020; Brown et al. 2015). These benefits, identified by Konijnendijk et al. (2013) are: promoting biodiversity, improve the air quality, assistance in water management and help cooling urban areas (in relation to the urban heat island effect). Furthermore, urban parks can also enhance the ecological structure of the area and help reduce noise pollution (Loures & Costa, 2012).

Accessible green spaces are identified as one of the six core values for a healthy city by the municipality of Groningen (Zwaving et al., n.d.). Furthermore, Groningen has been named 'the healthiest city of the Netherlands' by Arcadis (2020). Exposure to green spaces and parks have proven to be beneficial for people's health (Maller et al., 2009; Twohig-Bennett & Jones, 2018). Population ageing, migration and urbanization result in an increase of people living in cities. This number is forecast to reach 68% of the world's population by 2050 compared to 55% in 2018 (United Nations, 2019). This translates to an expected population of 7 billion in urbanized areas in 2050 (United Nations, 2019). It is therefore interesting to see how cities, and their parks and natural areas, are able to cope with this constant expansion. Climate adaptation – in terms of urban park implementation – and social values could therefore be combined in urban park design. Based on these principles, the municipality of Groningen has created an 'Implementation plan Green Groningen: Vitamin G' (Uitvoeringsplan Groen Groningen: Vitamine G) (2020).

Research Problem

This research aims to look into optimal urban park (design) in the perspective of the user, but with a focus on environmental sustainability. With this, the elements that create a sustainable park are researched, by finding commonalities between environmental aspects of parks, and social benefits from elements in parks. The central question of this research is therefore: "*How can urban parks be planned in a way which optimizes both the environmental and intrinsic benefits for its users?"*

To answer this main question, multiple sub-questions have been formulated:

- What elements in two parks in Groningen create intrinsic benefits for its visitors?
- How are the environmental benefits of parks perceived by park visitors in Berlin?

This thesis will have the following structure: first, the theoretical framework (p.6) will discuss the theories used to base the main part of the research off. After that, the methodology (p.9) will be discussed, followed by the results (p.18). One of the sub-questions includes research conducted in Berlin on the perception of park visitors on two parks in Berlin. In the final chapter, the research question is answered, including a discussion (p.25), with a reflection and recommendation to further research, and conclusion (p.27).

Theoretical framework

According to Cranz & Boland (2004), the idea of a sustainable urban park emerged in the late 1990's. This relatively new park model combines human health and ecological health, is typically part of a larger system – using corridors – and has permeable grounds, and green infrastructure. To summarise, these parks are there to promote not only the health of humans, but also be beneficial for animals, plants and the planet in general (Cranz & Boland, 2004). The idea that urban areas can also add to biodiversity has been explored the past two decades (Konijnendijk et al., 2013). Maller et al.(2009) expect that cities will play a major role in conserving and maintaining biodiversity due to the expected acceleration of urbanisation. A result of this is the collaboration of the United Nations Convention on Biological Diversity with the International Union for Conservation of Nature. Together they formed the *Cities and Biodiversity Outlook*, containing ten key messages on how cities can play a part in creating a sustainable future and promoting biodiversity (figure 1) (IUCN, 2013). One of these key messages focuses on the importance of urban ecosystems in relation to health and well-being (IUCN, 2013). For that reason, urban ecosystems, and thus parks, can contribute to both the environmental sustainability and biodiversity and the human well-being.

Figure 1. Key messages of the Cities and Biodiversity Outlook (CBO) (From: Schewenius et al., 2014).

Environmental benefits

Cities are a leading contributor to the emissions of greenhouse gases, and because of that, climate change is speeding up (McCarthy et al., 2010). This causes the urban heat island effect, which is seen as the near-surface temperature difference between urban areas and non-urban areas (McCarthy et al., 2010). With air temperatures rising, Brown et al. (2015) emphasise on cities implementing 'shaded green space' and not merely green space. Shading can be done through implementing 'park cool islands', which are capable of bringing air temperatures in urban areas down by decreasing the incoming solar radiation. Additionally, the air can be cooled through evaporation of water in vegetation (Nguyen et al., 2019). Furthermore, greenery and parks also provide soil in which water can be retained, stored and later discharged. Yao et al. (2015) performed a case study in Beijing on how urban green space can help reduce the runoff of water. The use of green space as water storage can help decrease the pressure on rainwater collection systems and reduce the frequency of floods (Yao et al., 2015). This principle has sparked the sponge city concept. This is an urban water management system that aims to improve the drainage system and storage of water in case of floods, but also to relieve the effects of urbanisation on ecosystems (Nguyen et al., 2019). Green space and parks can also remove pollutants from the air and filter out particles in the water (Ibes, 2016).

Intrinsic benefits and elements

Alongside scientific literature, the landscape architect has specified certain elements found in parks that affect the perceptions of park visitors. These elements can be beneficial for the environment, the people visiting the parks, or both. On top of that, parks and green space can improve well-being, literature shows that green space promotes the feeling of safety and happiness (Ahmad et al., 2014; Kwon et al., 2021). A study done by Kuo et al. (1998) on trees, sense of safety and preferences in inner-cities landscapes suggests that grass maintenance and tree density contribute to an increased feeling of safety. This latter element is however an interesting finding, since other literature suggest that '*open grassy areas*' (Bjerke et al., 2006, p.36) is preferred, as well as that a lower density is preferred over a higher density of vegetation (Ahmad et al., 2014). Kuo et al. (1998) also considered this deviation from existing literature and explained the anomaly with the setting in which the research was conducted. It appeared that the area was seen as desolate, thus a high density of trees created an atmosphere that felt safer, as the trees were the only elements that were taken care of (Kuo et al., 2014). A higher density of trees in this case outweigh the perceived negative effects these trees would otherwise cause.
Furthermore, literature suggests that there is a positive relationship between subjective well-being and nature (MacKerron & Mourate, 2013), which explains why people visit parks or other natural areas to relax or 'escape the city' as found by Chiesura (2004). Maller et al. (2009) also explain that being in nature can improve concentration, give inspiration and help recover from trauma. Parks also provide space for physical activities which can help to recover from stress (Hansmann et al., 2007; MacKerron & Mourate, 2013). On top of that, Kwon et al. (2021) proved that there is a relationship between happiness and urban green space on a global scale. This corresponds with conclusions made by Lee & Kim (2015) that access to green space can increase the quality of life. Benefits generated from being in a park such as relaxation, happiness, the feeling of safety and being content with the space you are surrounded in, are in this research defined as intrinsic benefits.

This shows that vegetation can influence the perceived feeling of safety, increase happiness and bring about relaxation or recreation. Vegetation in parks- mainly trees - can also provide shade, which is not only used as a means of heat mitigation, but can also provide positive effects for park visitors. Shade can offer a protection of incoming UV-rays which can be damaging to the skin (Cimino et al., 2021). Apart from vegetation, water is also a recurring element in urban parks. Ahmad et al. (2014) concluded that water features in nature areas contribute to the feeling of safety, by drawing more people to the area creating this idea of supervision. For pathways, it is important that they are integrated in the existing road structure of the neighbourhood and to provide alternative infrastructure and increase accessibility (Ellis & Schwartz, 2016). Fletcher & Fletcher (2003) concluded that park maintenance and park cleanliness are very important for the visitors' satisfaction of the park. Therefore, barren, dirty or broken benches, pathways or playgrounds appear less attractive to park visitors and can affect the overall experience. Considering playgrounds for children, Loukaitou-Sideris & Stieglitz (2002) performed a

study on the needs and perceptions of playgrounds for children in Los Angeles, USA. Their results suggest that mainly inner-city children depend on parks for ensuring social development due to the lack of a backyard.

Conceptual Model

The conceptual model that is based on the theoretical framework is visible in figure 2. A division is made between intrinsic benefits and environmental benefits, with shade and clean air present on both sides. Black arrows indicate the causes which have been found and supported by literature. Orange arrows show that these elements are found in urban parks (e.g. Water → can be found in Urban Parks).

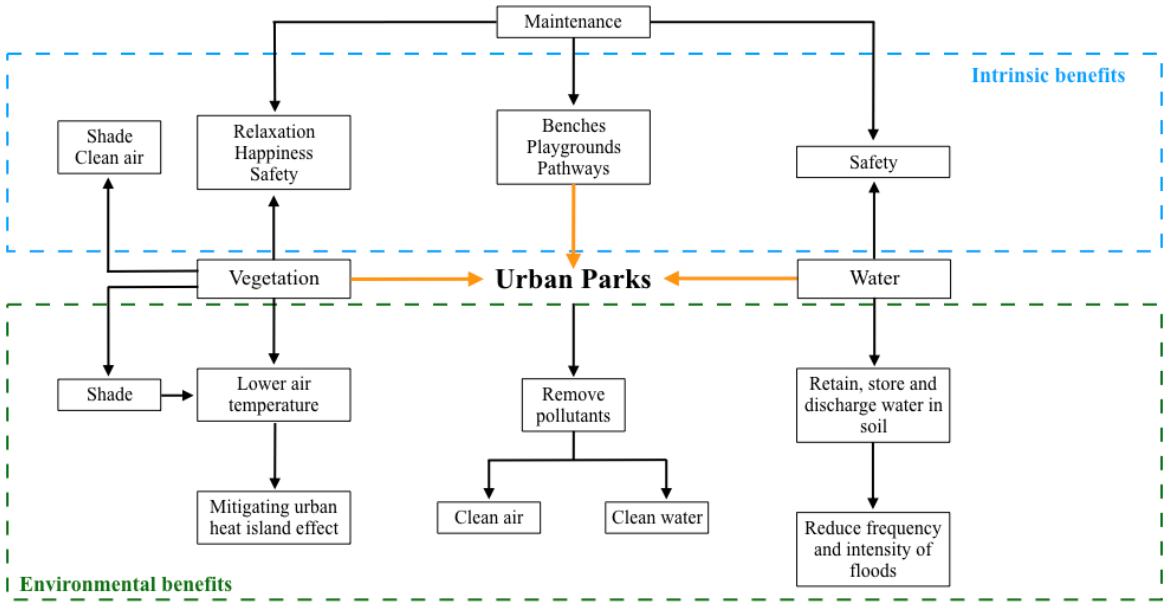

Figure 2. Conceptual Model

Methodology

To answer the previously mentioned research question (and its sub-questions), both quantitative and qualitative data are gathered. Quantitative data is collected at parks in Groningen in the form of a survey. A questionnaire will give insight into real-life situations in parks and will give a wider representation of park visitors (Kelley et al., 2003). Qualitative data is gathered through an interview with an expert in landscape architecture. According to Clifford et al. (2016 p.533), mixed methods can help to *'increase the understanding of a phenomenon and uncover new interpretations*'. Furthermore, mixed methods combine two different methods of gathering primary data, combination of this creates a more holistic perspective. The expert can give more specific information about aimed effects of parks and how this relates to their design. The main research is based on the quantitative data, the qualitative data also guided the formulation of the survey questions.

Data Collection

For collecting qualitative data, a semi-structured interview with a landscape architect is conducted. The interview consists of a set of prepared (open) questions. The course 'methods in academic research', also included in-depth interviews. Here it was noticed that during an interview, it is easier to go more into depth about a specific topic and ask follow-up questions. It also allows the interviewer or the interviewee to explain him- or herself in case the question or answer was unclear (Clifford et al., 2016). The researcher has reached out to a landscaping firm called 'Laos Landschaparchitectuur', they were responsible for the park design in Meerstad and value sustainability and health benefits of nature. The landscape architect mentioned different elements of parks, which will be included in the survey.
The interview guide and transcript of the interview can be found in Appendix A and B respectively.

For collecting data in the form of a survey, the population of interest are visitors of parks. A random sample of park-goers will represent this population. The surveys are conducted in two parks in Groningen, Pioenpark and Park Oost Indischebuurt. At these parks, people are asked and informed about filling in the survey. For both parks, 30 responses were required, making non-parametric statistical tests possible. The survey is conducted face to face, in an online format. The survey consists of closed and open questions. The closed questions use ordinal data, this is useful to create order for later analyzation, but also to make it a quick questionnaire. The open questions will provide more perspective into what people's perceptions and opinions are of this park (Clifford et al., 2016). Before participating, the participants are informed about the goal of the research and their anonymity.

A lot of research has already covered what people do at parks (Chiesura, 2004; Lee & Kim, 2015), and also based on ethnicity (Li, 2014; Derose et al., 2015). Therefore, this research continues, and is more in-depth about how people feel about certain elements of park design in the parks. These elements are pre-defined by the interview with the landscape architect and scientific literature. The survey aims to answer the first sub-question 'What elements in parks in Groningen create intrinsic benefits for its visitors?'. As indicated, data was collected in two parks. Although the sub-question 'What elements in two parks in Groningen create intrinsic benefits for its visitors?' does not call for a comparison, it can however help to show possible contrast between the responses. This contrast could otherwise be overlooked. The parks are found in similar environments, however the parks themselves have different characteristics. Studying how people experience separate elements in these parks, and then relating this to the park as a whole and comparing the two creates a wider picture on how the elements influence the park-visitors.

An overview of the survey questions, as well as the statistical analysis scheme can be found in Appendix C. The following elements, identified by the interview with the landscape architect, are included in the survey: vegetation, water, amount of shade, benches/seating areas, playgrounds, accessibility and pathways. Furthermore, the topics 'well-being', 'stress reduction' and 'community strength' will be included.

Data analysis

To be able to analyse the interview, the conversation was recorded using a mobile phone, the interviewee was informed about this. Quotes form the landscape architect are used to strengthen or explain certain phenomena seen in parks.

After the data collection, the survey data is analysed using descriptive statistics. This makes is easier to make a comparison between the different parks. The data is thus categorized in two different parks, Park Oost Indischebuurt and Pioenpark and multiple ordinal variables. This means that statistical tests that work with ordinal data can be used to compare the two groups. These are:

- The Mann-Whitney test can determine whether the mean rank of two groups (the two parks) are equal.
- To visualise the comparison, a bar chart for each question can show the frequency of each possible answer.

For the open questions, each individual answer is looked at, to find in-depth agreement among respondents.

Research Ethics

Depending on the way of the data-gathering (long interviews or a short survey) the data of the respondent is used differently. In terms of an in-depth interview, the profession and background of the interviewee should be known and he or she must allow the interviewer to ask about this. Furthermore, the interview was recorded (sound only), in order to make a transcript and for further analysis of the responses, the interviewee agreed to this. The interviewer explained all the procedures in terms of privacy and the structure of the interview before hitting record. The interviewee was also permitted to stop the interview at any moment or not answer a question if he or she does not want to or is not allowed to. Finally, the data gathered is only looked at or listened to by the interviewer, and full anonymity is kept.

When conducting a short survey on the street or in parks, it is important for the interviewer to understand her position in the study area. Recognizing your own positionality in the research area includes reflecting on who you are and how you can influence the conversations you have with participants (Clifford et al., 2016). Personal information about the participants is not necessary or included in the survey. The data is only shared between the data gatherers of this assignment (in Berlin). In Groningen, the data is only visible for the researcher.

Quality of the data

To make sure the gathered data is of good quality, the validity, reliability and accuracy must be assessed. Validity is ensured through comparing the results of both parks (in Groningen) and relating them to the physical aspects of the parks. Reliability is achieved through consistent surveying. All participants received the exact same questionnaire, in similar locations. Accuracy is also achieved, all participants were familiar with the park where the survey was held and they lived in the neighbourhood. This makes the sample representative for the population.

Limitations

During the data-collection period, certain setbacks were noted that could have had an effect on the outcomes. First of all, in the surveys (both in Groningen and Berlin), people were asked to evaluate their mood (e.g. feeling of happiness/safety) based on the surroundings. However, as researched by Keller et al. (2005), the mood can be improved in springtime when the weather is becoming more pleasant. The data-collection period was in May. Furthermore, sunny or rainy weather can affect the rating of the current mood, as well as time spent outside (Schwarz & Clore, 1983; Keller et al., 2005). On top of that, the survey does not explain or define how to evaluate happiness or stress levels, therefore respondents with similar feelings can respond differently.

Apart from the weather affecting people's mood, the participants could have also distorted the data. This is because the people filling in the survey were 1) in the park itself, meaning they would probably enjoy

spending their time there. It is not expected people would spend time in an area where they do not feel happy or safe(Bixer & Floyd, 1997). 2) The people asked to participate in the research were walking or relaxing. People who were cycling or exercising in the park were more difficult to approach and were therefore not represented in the survey. 3) A sampling bias can occur due to the researchers' way of approaching people. People can be overlooked, look intimidated or be busy which made them less approachable. Furthermore, language barriers also occurred. These are ways people can be excluded from responding to the survey.

Finally, using non-parametric tests result in a higher likelihood of accepting the null-hypothesis, because it has a higher chance of making a type II error – a false hypothesis is accepted (Burt et al., 2009).

Site characterization

The survey in Groningen is conducted in the Pioenpark and Park Oost Indischebuurt. Both are located on the East side of Groningen city (Figure 3). These parks were chosen because they are located in similar (neighbourhood) areas in Groningen, however they have different landscapes and designs. The Park Oost Indischebuurt dedicates more space to playgrounds and diverse activities, whereas the Pioenpark has bigger lawns and a dedicated space to have a seat and enjoy the scenery.

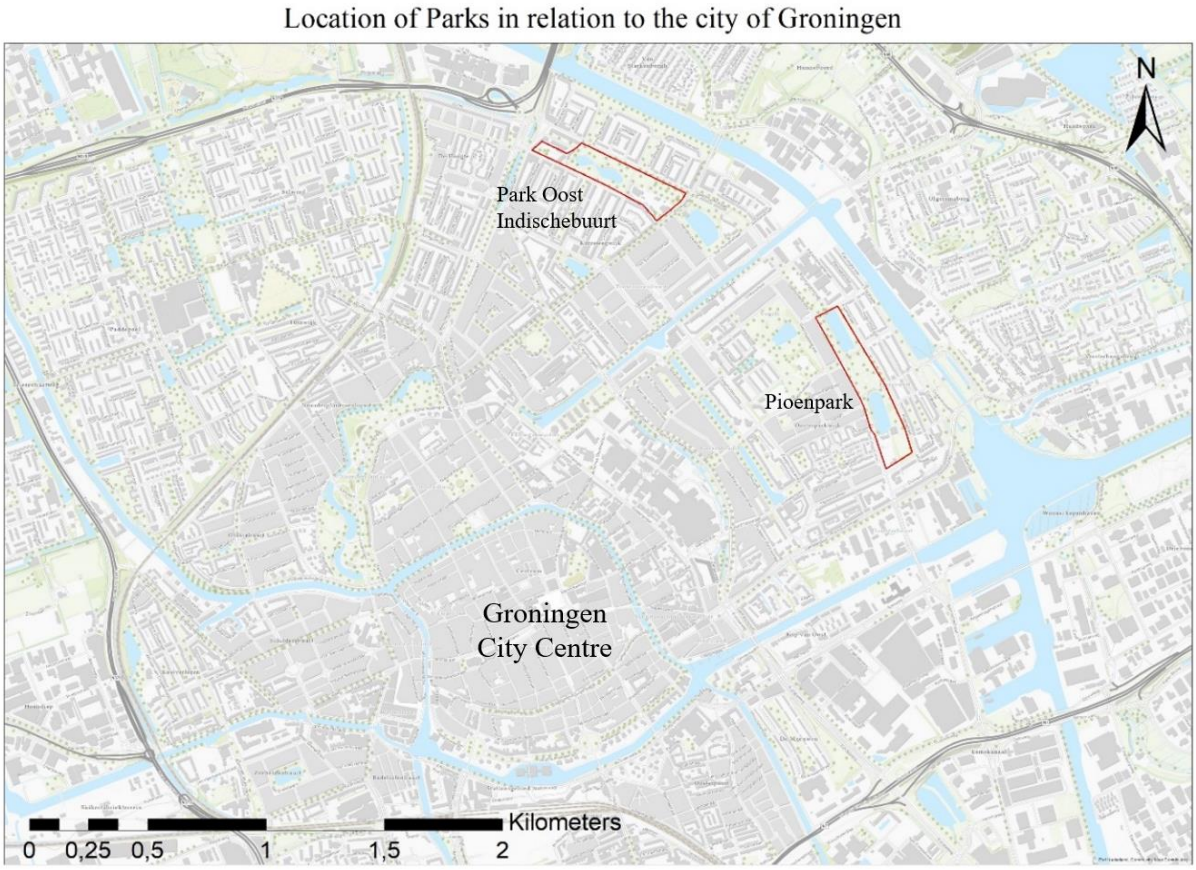

Figure 3. Map of the city of Groiningen and Park Oost Indischebuurt (North) and Pioenpark (East)

Park Oost Indischebuurt

This park is roughly 5.1 hectares in size and has multiple playgrounds for (small) kids, dedicated areas to play ball sports, an outdoor gym and multiple benches. Natural elements in this park are a big lake in the middle, and various different types of vegetation (Figure 4). Most walkways are paved, excluding only a few gravel paths. Inside the park is a primary school, the children use part of the park as playground during breaks. The park is enclosed by the Korreweg on the Southeast side, and the Oosterhamriklaan on the Northeast side, both streets have multiple bus stops. On the opposite side of the park, across the Korreweg and the Oosterhamriklaan, there are also smaller parks located that could

be used as a continuation of the Park Oost Indischebuurt. The park is also known as ‘Molukkenpark’ or ‘Molukkenplantsoen’, but to avoid confusion, only ‘Park Oost Indischebuurt will be used. The park is located in the Korrewegwijk, in the Indische Buurt. This neighbourhood the result of the growing need for housing after the first World War (Hacquebord, 1992). The neighbourhood was finished in 1956, however the 1970’s and 1980’s characterised a problematic era for the neighbourhood, with a surge in crime, feeling of unsafety and a decrease in social cohesion (Bremmers, 2016). New renovations and investments to improve the social situation seemed to have made the neighbourhood more lively, a particular area of the Indische Buurt is also included in one of the eight “protected cityscapes” (beschermde stadsgezichten). Appendix D shows an overview of the elements discussed here.

Figure 4. Park Oost Indischebuurt (orange shows how picture is taken, picture taken by author)

Pioenpark

Pioenpark is roughly 9.5 hectares and includes two big ponds at the outer ends of the park. The park has less diverse vegetation than the Park Oost Indischebuurt, and is also more open, this however emphasises the use of symmetry in the park (Kunstpuntgroningen, n.d.) (Figure 5ab). It is located in the Oosterparkwijk, in the Florabuurt, in between the Oliemuldersweg and the Pioenstraat. At the southern end of the park there is a community centre, playgrounds for kids and a football field. The two ponds in the park were created to store excess water. Contrary to the first park, this park also features a statue of a boy, in the middle of the park. Around this statue there is a rose garden, with multiple benches where visitors can enjoy the scenery. This middle section of Pioenpark has clear signage on the floor that the rose garden does not allow dogs. In two locations of the park a sign was put that said certain areas will not be mowed in order to make space for plants and animals.

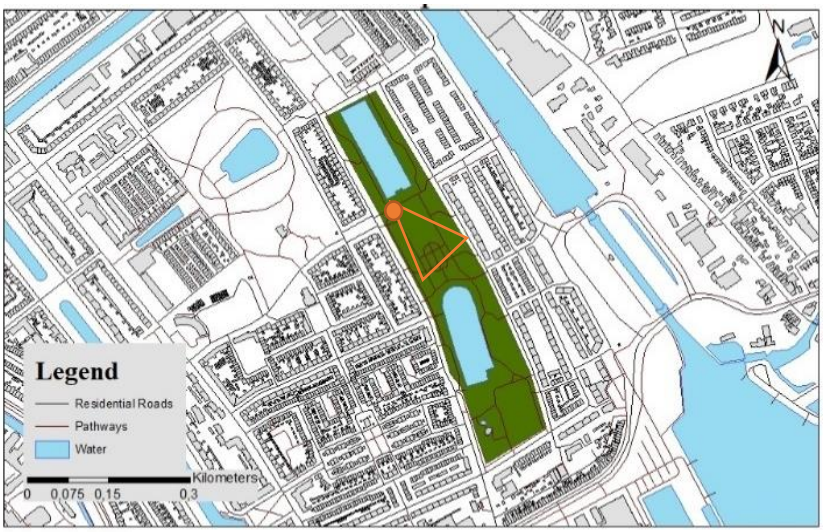

Figure 5a and 5b. Pioenpark (orange indicates how picture is taken, picture taken by author).

Just outside of the park perimeters, separated by a wide road, there is an extra strip of green space with a small playground, tennis court and two metal goals. Behind this there is a fruit and vegetable garden, accessible to anyone, managed by a non-profit organisation. Appendix D shows an overview of the elements discussed here.

Both parks have a cycling path (running from northeast to southwest) cutting the parks in half. All other paths in the parks are pedestrian only. The two parks were planned to be a part of Berlage's 'green belt' plan in the 1930's (IVN, 2015). This was however cancelled due to the excavation of the Van Starkenborghkanaal, which also created an industrial site along the Oosterhamrikkanaal (Kunstpuntroningen, n.d.). In terms of demographics, the neighbourhood-districts Korrewegwijk and Oosterparkwijk, show very similar age distributions and household composition (see figures 6 and 7). Korrewegwijk has more than 18.000 inhabitants, with a population density of 10.437 per square kilometre (CBS in uw buurt, 2020). Oosterparkwijk has a little over 12.000 citizens and a population density of 8.273 per square kilometre (CBS in uw buurt, 2020). For household size, both neighbourhoods have an average household size of 1,5 (CBS in uw buurt, 2020). In terms of income, the neighbourhoods are also similar, Korrewegwijk has an average income of 21.100 euros per inhabitant, for Oosterparkwijk this is 23.300 euros per inhabitant (allecijfers.nl, 2021ab). Figure 8 shows that there is a similar division of different types of ownerships of the dwellings in the two neighbourhood. Over 70% of dwellings in both neighbourhoods is a rental property.

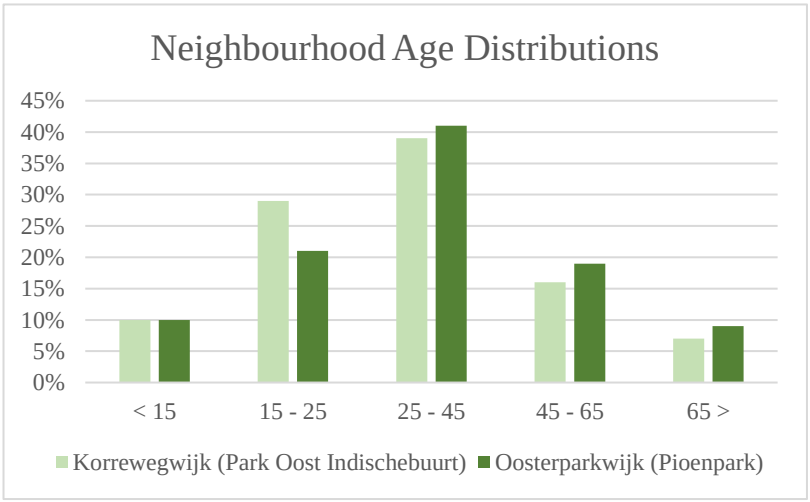

Figure 6. Age distribution of two neighbourhoods in Groningen (CBS in uw buurt, 2020).

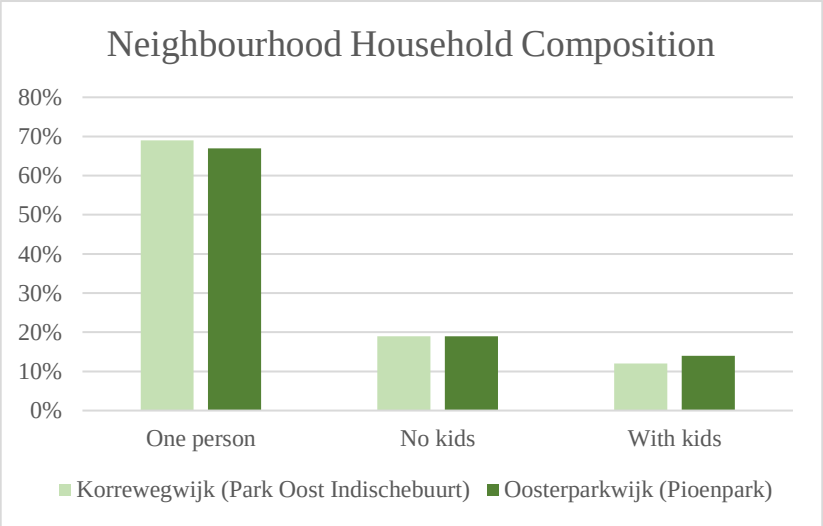

Figure 7. Household composition of two neighbourhoods in Groningen (CBS in uw buurt, 2020).

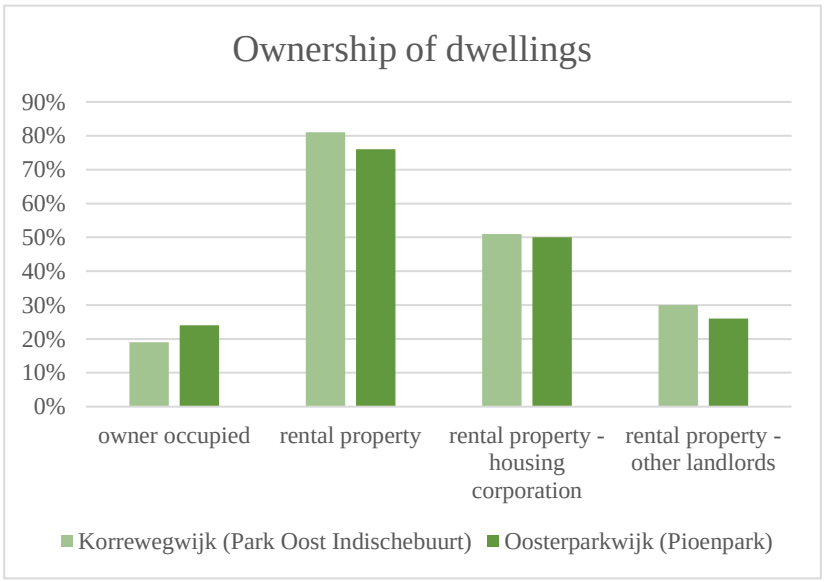

Figure 8. Ownership of dwellings distribution of two neighbourhoods in Groningen (CBS in uw buurt, 2020).

Berlin

Methods

A comparative approach will also be used for one of the sub-questions. For the question "*How are the environmental benefits of parks perceived by park visitors in Berlin?*" two parks in Berlin, Germany, will be discussed. Primary data will be assessed for both parks and compared. The comparative approach for this particular question is interesting because it allows for an international perspective on users' perspectives, values and thoughts on urban parks. In Berlin, awareness of the role of parks on flood protection, temperature and air quality will be assessed. Similarities and differences can be found by comparing two parks with similar aims, but different executions (Nijman, 2007).

Site Analysis

As part of the Sustainable Transformations of Urban Regions in Europe program (STOURIE) - an international program between the universities of Milan, Stockholm and Berlin - the researcher went to Berlin with other students from Rijksuniversiteit Groningen, to conduct research that can offer additional insights into the topic. In Berlin, a separate research objective was formulated together with a student from Groningen and two students from Stockholm, Sweden. For this research, primary data was collected in the form of a survey among people in parks in Berlin. This survey consisted of one multiple answer question, several multiple choice questions based on the Likert scale and one final open question. Data gathering was done in the Rummelsburg neighbourhood (N=26) and in Volkspark Friedrichshain (N=47) (figure 9), on May 3rd and 4th between 12:00-16:00. The whole survey fits on one single sheet of paper to make it more attractive for people to fill it in, it was also available in English and German. Among the survey questions, a focus was put on the environmental and social benefits of parks, these are: prevent floods, lowering temperatures and cleaning the air. The survey questions can be found in Appendix E.

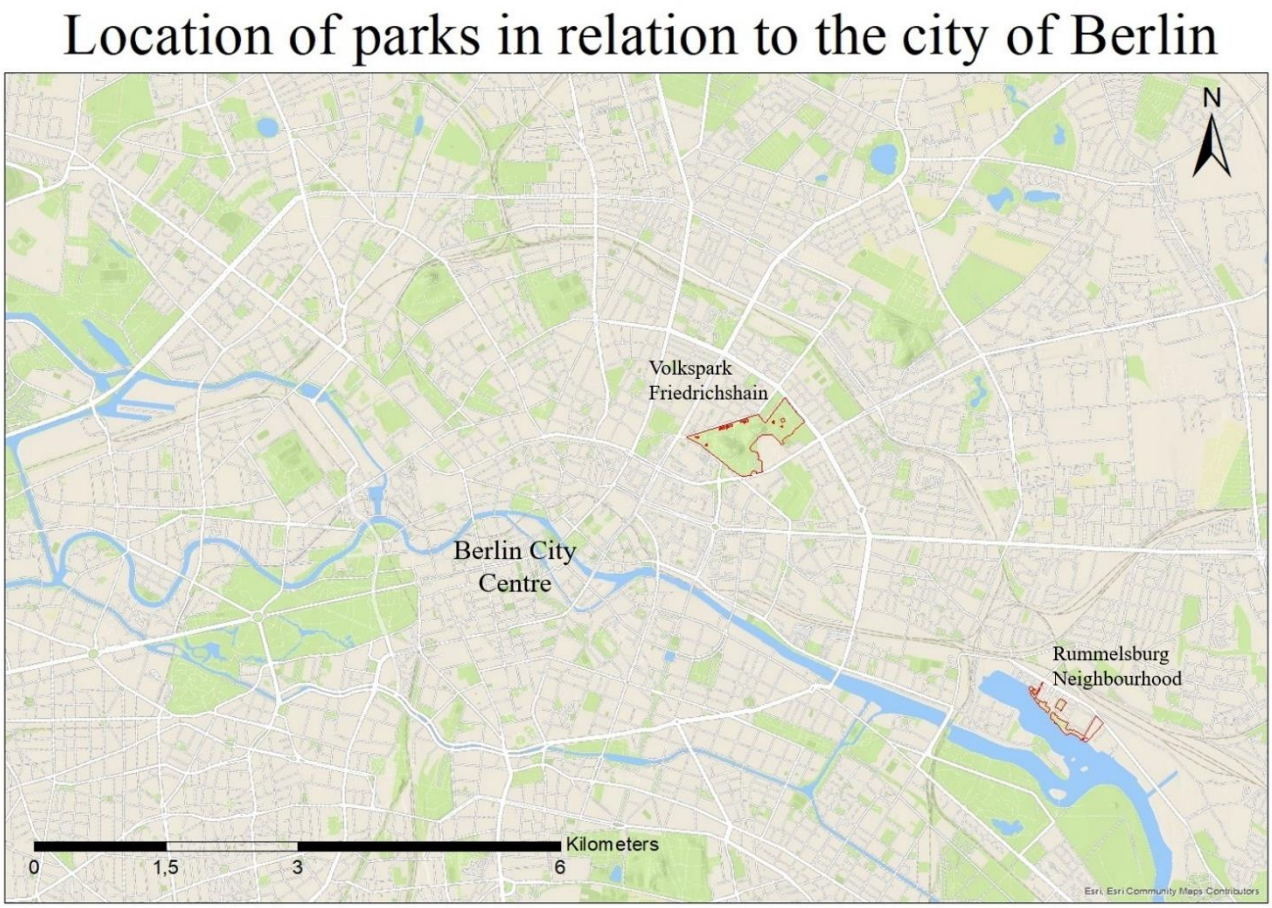

Figure 9. Map of the city of Berlin and the park Volkspark Friedrichshain (North) and the Rummelsburg neighbourhood (southeast)

Rummelsburg

Rummelsburg is a neighbourhood located in the southeast of Germany. It was built in the 1990's and had multiple goals regarding climate change (Bloomberg Quicktake, 2017; Kaul, 2020). The sponge city concept was applied here, meaning that green roofs, green spaces and other green infrastructure will help stormwater management in case of heavy rainfall. It is aimed at helping to prevent floods, coping with drought and reduce the urban heat island effect. In the neighbourhood there is a small park called 'Medaillonplatz', there is also a strip of green space – part of it surrounded by a fence to protect it - along the water (figure 10). An overview of these sponge city elements and their function can be found in Appendix F.

Figure 10. Rummelsburg Neighbourhood

Volkspark Friedrichshain

Volkspark Friedrichshain (figure 11) is 49 hectares, making it much bigger than any of the parks in Groningen (VisitBerlin.de, n.d.). The park has multiple water features such as fountains and ponds, exercise opportunities like volleyball and basketball fields and many meandering paths. On top of that, the park also includes areas for barbecuing and cafés. Cultural elements are also present in this park; monuments and statues and during the summer months, an outdoor cinema. Constructed during the 1840's; a park dedicated to the people of Berlin, hence its name (Berlin.de, 2020).

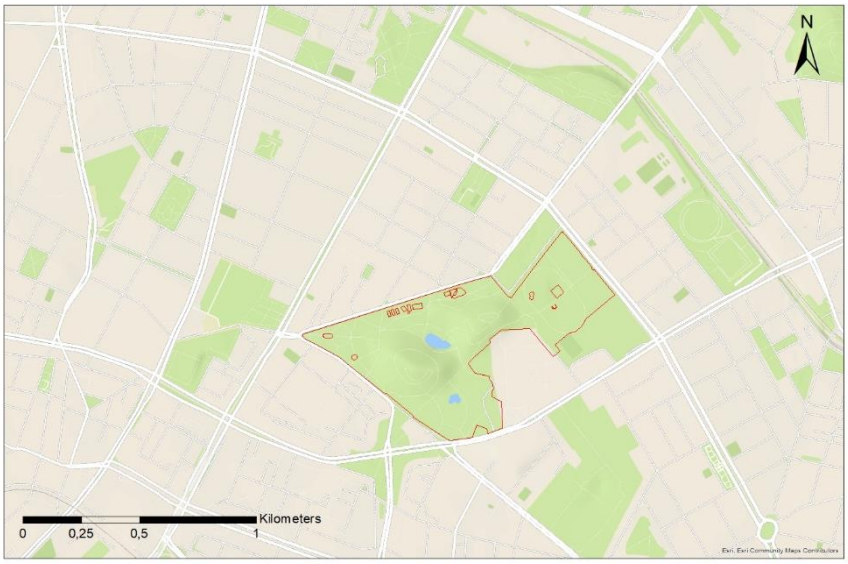

Figure 11. Volkspark Friedrichshain

Results: making comparisons

1. Intrinsic benefits of parks in Groningen

This first sub-question will look into the data gathered only in parks in Groningen. These parks are Park Oost Indischebuurt (N = 30) and Pioenpark (N = 30). Figures 12, 13 and 14 show bar charts of the answers given on open question 1, 5 and 6 from the survey. Individual results of each closed question from both parks can be found in Appendix G. A comparison of both parks is chosen to find any contrast or large differences between the park that later will be explained. This comparison is made using the Mann-Whitney test in SPSS 26 software. The null-hypothesis is: there is no difference between the mean (rank) of Park Oost Indischebuurt and Pioenpark. The alternative hypothesis would be that there is a difference. The confidence interval is 95%, with a significance level of $p < 0.05$. The results of this are visible in tables 1 and 2. The rank outcomes can be found in Appendix H.

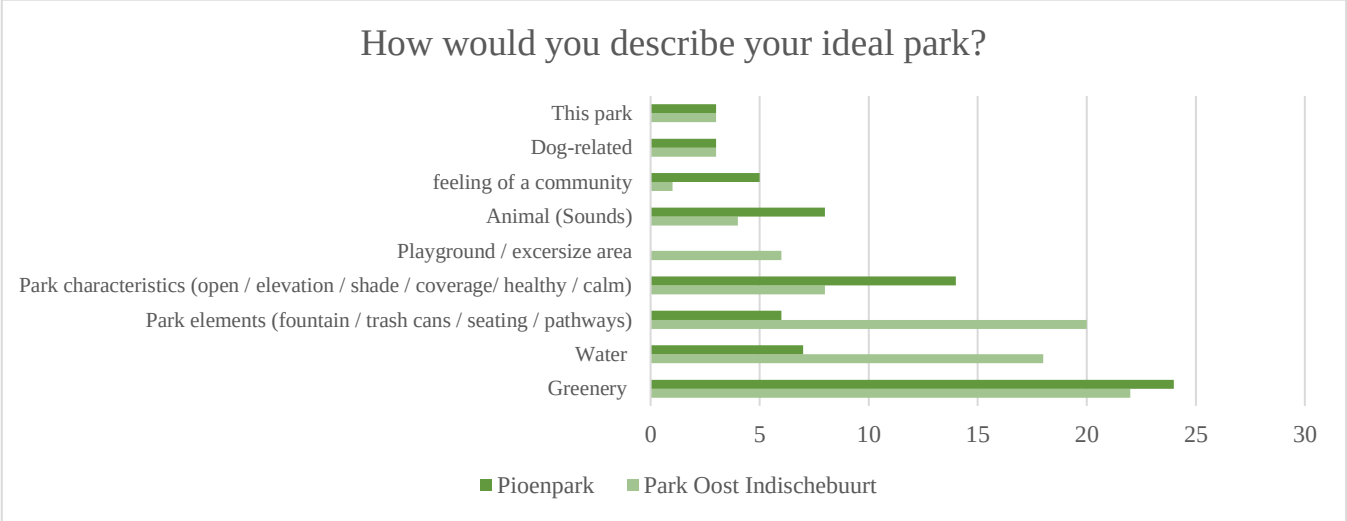

Figure 12. Answers on Q1: "How would you describe your ideal park?"

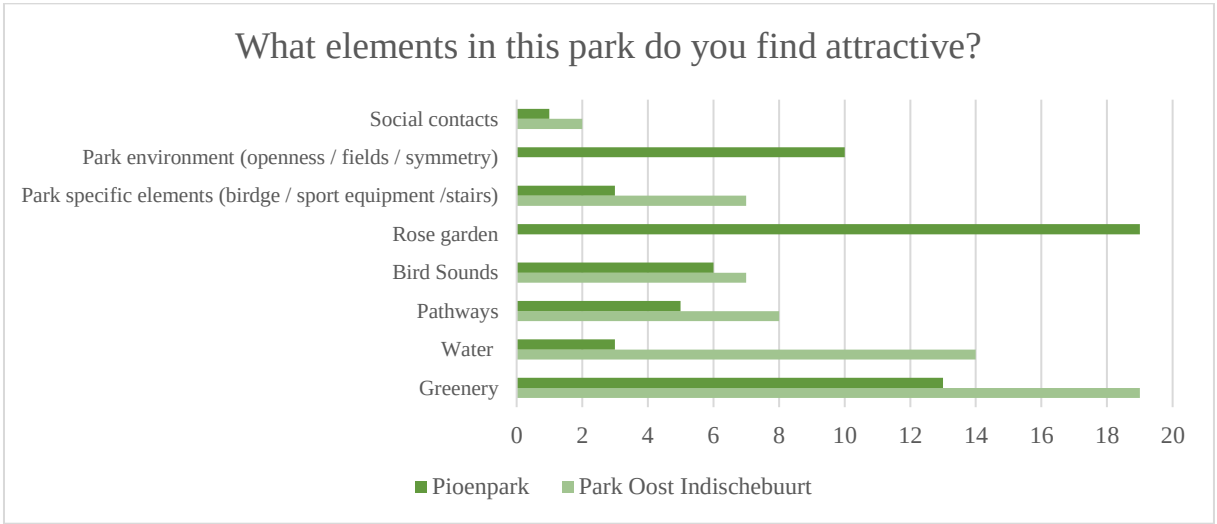

Figure 13. Answers on Q5: "What elements in this park do you find attractive?"

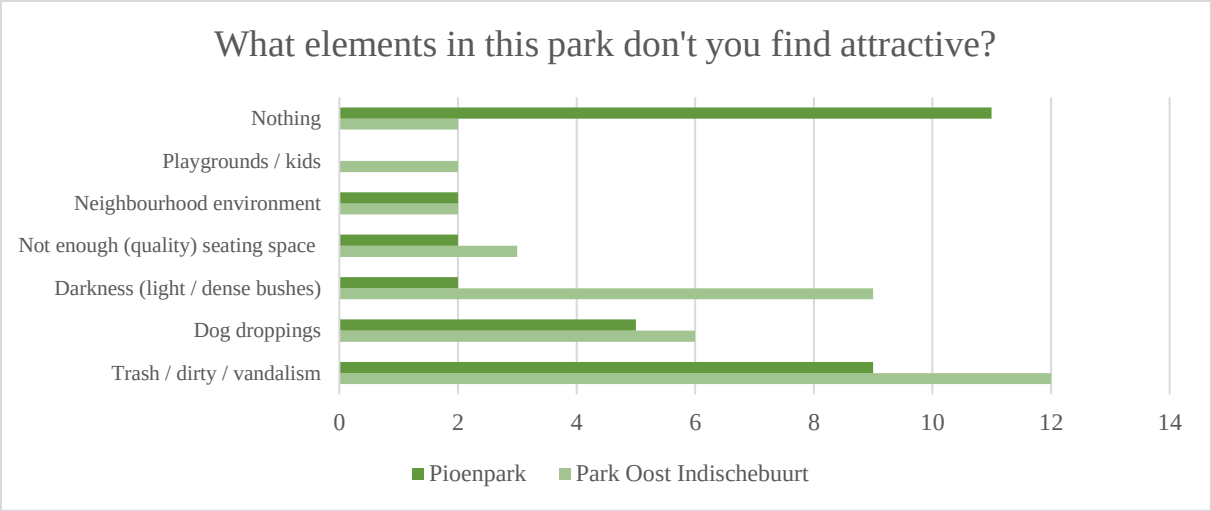

Figure 14. Answers on Q6: "Which elements in this park don't you find attractive?"

From the first question (figure 12) it is clear that vegetation (greenery) is often included in peoples ideal park. In question 5 (figure 13) a higher number of participants in Park Oost Indischebuurt mentioned greenery. This lower number of responses from participants in Pioenpark could be explained by the specific mention of the rose garden. Vegetation is however also experienced as negative. In figure 14, Park Oost Indischebuurt shows that nine people thought the dense bushes or absence of light are unattractive. On the other hand, the statistics show that more participants from Park Oost Indischebuurt agree with the statement about vegetation and perceived safety. Furthermore, one closed question about vegetation showed a significant difference ($p = 0{,}000$) between the two parks. This is the statement 'Overall, I am content with the vegetation in this park'. More participants from Pioenpark strongly agreed with this statement, in Park Oost Indischebuurt this was divided between strongly agreed and slightly agreed and a couple respondents who felt neutral. Again, this could be explained by the rose garden in Pioenpark, as well as the old trees that respondents showed fondness of during the survey. A slight agreement with this statement from participants from Park Oost Indischebuurt could be explained by the darkness created by dense vegetation.

Water is talked about more in Park Oost Indischebuurt than in Pioenpark when respondents described their ideal park. One possible explanation of this could be that the water in Park Oost Indischebuurt is more integrated in the park; it is included in the infrastructure (bridge), it has vegetation around the edges and has an irregular shape. In Pioenpark, both ponds are rectangular and they lack any signs of vegetation. Furthermore, when participants from Pioenpark were asked about the maintenance of the water, responses such as 'now it is better' or 'it has finally improved a bit' were common. When looking at the statistics of the statements about water, one significant difference ($p = 0{,}024$) arises from the statement about water maintenance. Participants from Pioenpark showed disagreement with this statement, participants from Park Oost Indischebuurt did not. There is however a peak in 'neutral' responses, especially for Park Oost Indischebuurt, respondents explained that they did not know how to evaluate the quality or the maintenance of the water, and they therefore opted with neutral. The disagreement with this statement from participants from Pioenpark becomes clear from conversations where multiple people explained dead fish would be floating on the water during the summer. This also explains the low number of water being mentioned in question 5 (figure 13). The water was however not perceived as unattractive in both parks, however, when asked about what they would change about the park (open question 7 of the survey) only people from Pioenpark suggested changes in the water.

The only statement about shade also shows a contrast between the two parks. Responses from Pioenpark are only in agreement with the statement, meaning that they experience a proper amount of shade in that park. Park Oost Indischebuurt however also has responses disagreeing with the statement, as well as neutral answers. The Mann-Whitney test also creates a significant result regarding the statement about

shade. This difference in level of agreement can be explained by the availability of vegetation throughout the park. In Pioenpark, the outer edges of the park are mostly in the shade due to large bushes and old trees. The centre however is quite open, with the two ponds and rose garden, however, observations from the data-collection period show that these are not the main areas where people walk or sit. In Park Oost Indischebuurt, the vegetation is more clustered, and benches can be found mostly in direct sunlight. Overall, Park Oost Indischebuurt shows to have a bigger distinction between areas in the shade, and areas in the sun. Pioenpark has a continuous band of trees and bushes providing shade along the outer rim of the park.

Seating areas are both mentioned in question 1 (figure 12) and question 6 (figure 14). This indicates that numerous participants expect seating areas in parks, and notice the absence or low quality of seating areas, perceiving this as unattractive. Not one respondent however thought the seating space is explicitly attractive. There do seem to be some differences between the seating areas in Pioenpark and Oost Indischebuurt. Statements included the quantity and quality of seating areas, the rank data shows that more respondents from Park Oost Indischebuurt are content with the quantity of the seating areas. In terms of quality, Pioenpark has more respondents agreeing with the statement. The latter also results in a significant value of $p = 0{,}005$, indicating that there is a difference in the mean between the two parks.

Playgrounds are only mentioned by respondents from Park Oost Indischebuurt (figure 12 and 14). It is noticeable that playgrounds are not visible in question 5, the attractive elements of a park, but in question 6, the unattractive elements. An explanation of this could be that playgrounds are related to playing (screaming) children, creating a nuisance. For both statements (quantity and quality) about the playgrounds in the park, Park Oost Indischebuurt has more respondents agreeing. This contrasting result can be explained by the placement of playgrounds. In Park Oost Indischebuurt, playgrounds are visible throughout the park, incorporated in the landscape. Pioenpark has dedicated sporting fields at the northern and southern end of the park. The fact that numerous participants responded with ‘neutral’ on both questions could be because they were not aware of these playgrounds, or they disregarded those areas from being part of the park.

Table 2 shows that the accessibility and the maintenance of pathways create insignificant results, the rank data also suggests that there is a negligible difference between Park Oost Indischebuurt and Pioenpark. In figures 12 and 13 it is visible that a number of participants experience pathways as a positive park element. The landscape architect highlighted the presence of pathways to provide a trail through the park, as well as good accessibility of the park and accessible infrastructure.

Table 1. Test statistics of survey questions in Groningen on vegetation and water.

Test Statistics[a]

	Vegetation - relaxation	Vegetation - happiness	Vegetation - safety	Vegetation - maintenance	Vegetation - general	Water - relaxation	Water - happiness	Water - safety	Water - maintenance	Water - general
Mann-Whitney U	345,500	357,000	424,000	448,500	249,000	440,000	428,000	393,500	305,000	427,000
Wilcoxon W	810,500	822,000	889,000	913,500	714,000	905,000	893,000	858,500	770,000	892,000
Z	-1,701	-1,528	-,400	-,023	-3,556	-,160	-,358	-,939	-2,257	-,394
Asymp. Sig. (2-tailed)	,089	,127	,689	,981	,000	,873	,720	,348	,024	,694

a. Grouping Variable: Pioenpark or Oost Indischebuurt?

Table 2. Test statistics of survey questions in Groningen.

Test Statistics[a]

	Content with shade	Content with quantity of seating areas	Content with quality of seating areas	Quantity of playgrounds is good	Quality of playgrounds is good	Easily accessible	Paths - well maintained
Mann-Whitney U	279,000	364,000	276,500	269,000	218,500	405,000	431,000
Wilcoxon W	744,000	829,000	741,500	734,000	683,500	870,000	896,000
Z	-3,107	-1,373	-2,816	-2,858	-3,630	-,932	-,304
Asymp. Sig. (2-tailed)	,002	,170	,005	,004	,000	,351	,761

a. Grouping Variable: Pioenpark or Oost Indischebuurt?

2. Perceptions of environmental benefits in Berlin

The results of four survey questions asked in the Rummelsburg Neighbourhood (N = 26) and Volkspark Friedrichshain (N = 47) are presented in figures 15, 16, 17 and 18.

The first statement that will be discussed is 'This park can help to prevent flooding (during heavy rain) in the surrounding neighbourhood'(figure 15). In general, both parks seem to have a low number of agreements on this statement. Conversations with the people visiting the Rummelsburg neighbourhood have explained that this low number is due to 'flooding' being not a big stress factor in their day-to-day life. The location of Berlin is not close to any oceans or big water bodies, and the river Spree is constantly regulated. Therefore, the chances of a flood are perceived as relatively low. However, the statement indicates we are talking about floods during heavy rain, as it is estimated that rainfall can become more intensive due to climate change and cities need to prepare for this. There is a clear peak in the 'neutral' category, and this is expected when people are asked about a topic they do not know or think a lot about. Volkspark Friedrichshain has a higher percentage of people agreeing with the statement.

To find out more about the satisfaction of the flood protective abilities of both parks, an extra question was added. Participants were asked to indicate how satisfied they are with the flood protection of the neighbourhood. The results of this are visible in figure 16. A large portion of the respondents in both parks responded with 'neutral'. More participants from Volkspark Friedrichshain seem to be dissatisfied to some extent. Interestingly, almost 60% of the respondents in Rummelsburg felt neutral towards the flood protection of the neighbourhood. This is interesting because the neighbourhood is designed using the sponge city concept, meaning that water – especially in the form of rain – is planned to be stored and retained in the soil. The neighbourhood is designed to be able to manage an increase in precipitation. However, not all participants seem to be aware of this.

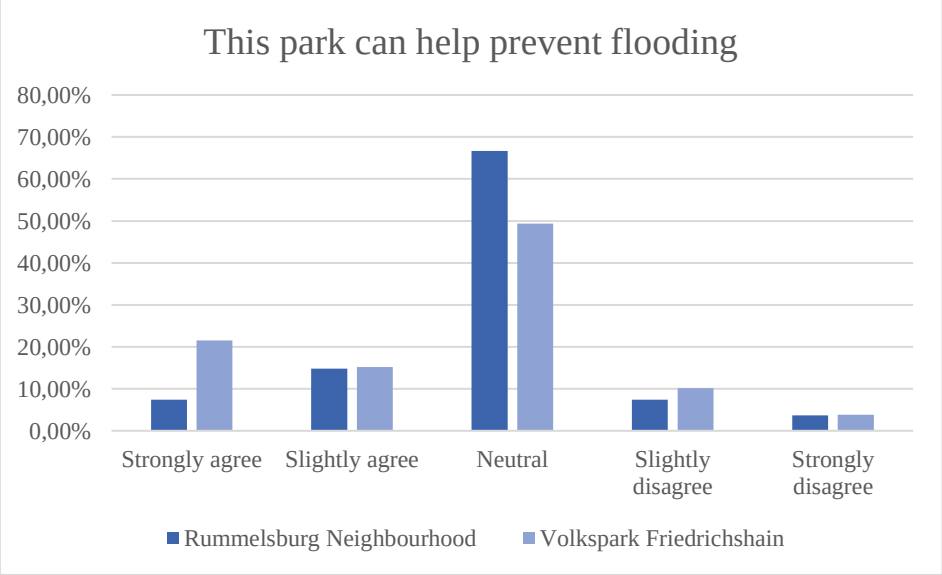

Figure 15. Histograms of the statement about flooding in both parks in Berlin.

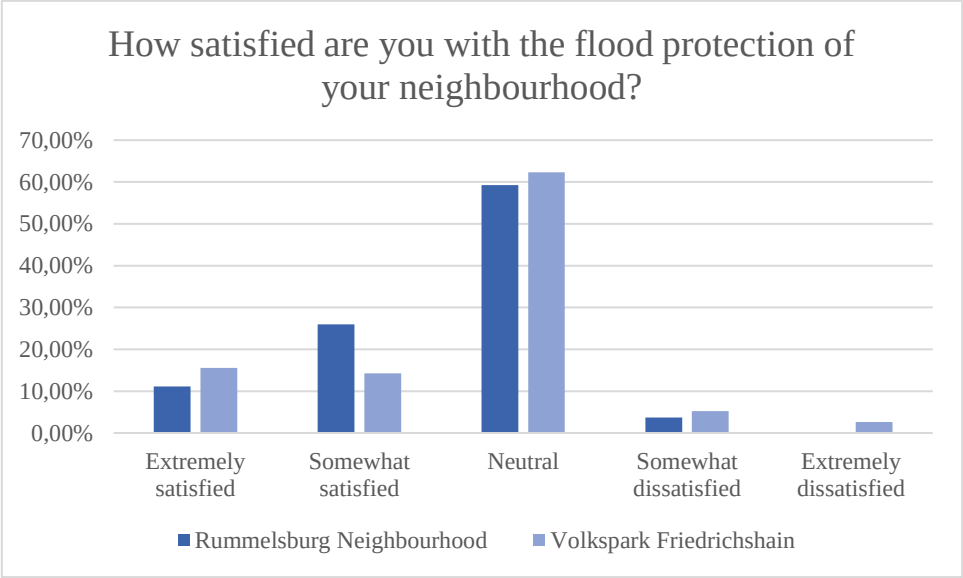

Figure 16. Histograms on the question about flood protection in the two parks in Berlin.

In Figure 17 it is visible that a high percentage of participants agreed with the statement 'This park helps to keep high summer temperatures in the park and the surrounding neighbourhood lower'. No respondents strongly disagreed and only few participants slightly disagree. This awareness of parks helping to lower the temperature of the air could come from personal experience; people genuinely feeling that the air feels cooler when they are in a park (or green area) rather than on a busy street in the city. Volkspark Friedrichshain shows 45% of the participants fully agrees with the statement, this could be explained by the location of the park; relatively close to the city centre and enclosed by busy streets.

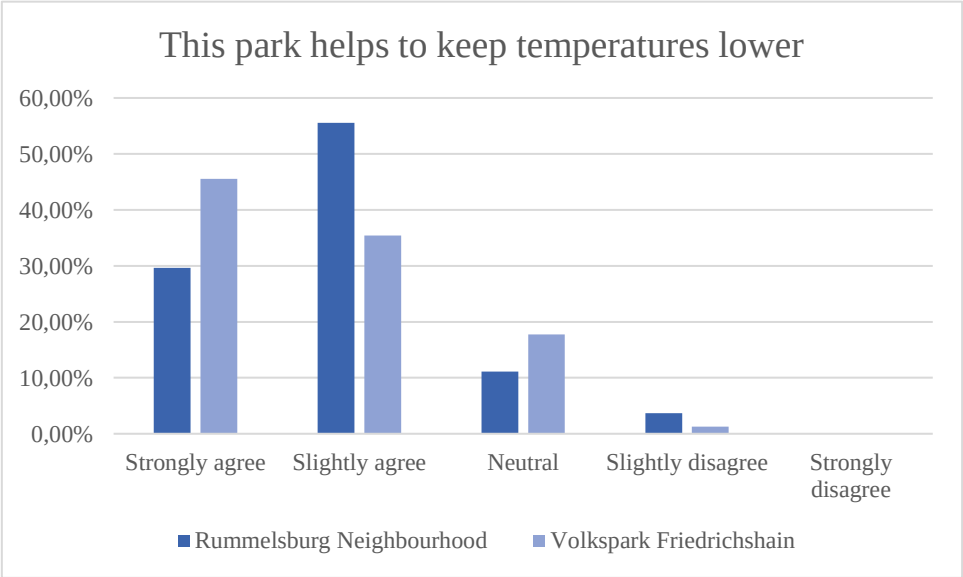

Figure 17. Histograms of the statement about temperature in both parks in Berlin.

The responses to the statement ‘This park helps to keep the air cleaner in this part of the city’ is visible in figure 18. There seems to be an overall agreement on this statement. With no participants disagreeing in Rummelsburg, and a very low percentage of participants slightly disagreeing in Volkspark Friedrichshain. The amount of participants that opted for neutral is visibly less for this statement than for previous survey questions. This could be explained by the awareness that vegetation can help filter out particles from the atmosphere. Furthermore, both parks do not have any roads or cars in the nearby environment, which can also influence how participants evaluate the quality of the air.

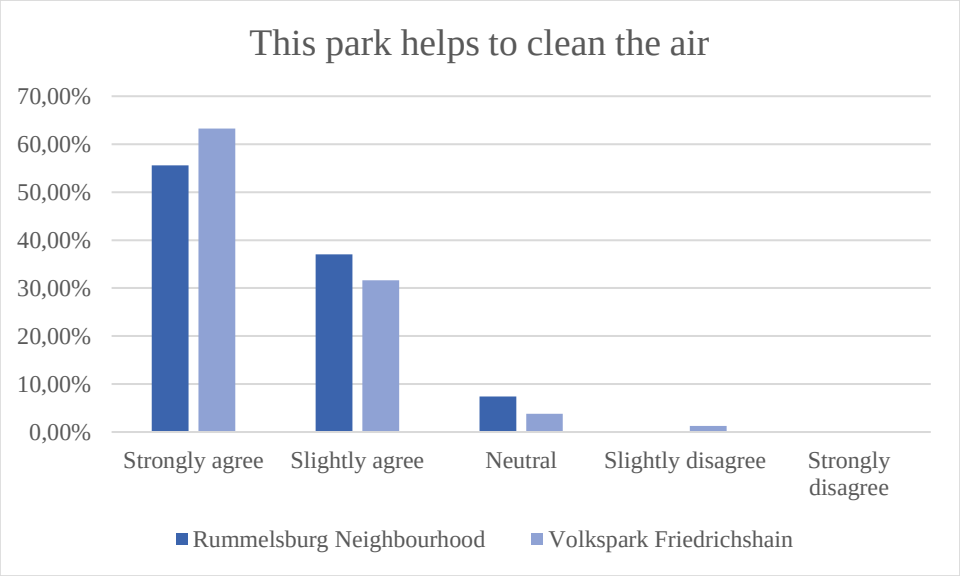

Figure 18. Histograms of the statement about clean air in both parks in berlin.

Discussion

Considering the vegetation and the preferences mentioned by participants from both parks, there is an indication towards more open areas as opposed to dense vegetation. Dense bushes/vegetation is perceived as negative, and open space is perceived as positive. This is in line with research done by Bjerke et al. (2006) and Ahmad et al. (2014), where open fields and a low density of vegetation are found to be preferred. There does seem to be some disagreement regarding the vegetation and the feeling of safety, as well as vegetation and the maintenance of it. Kuo et al. (1998) considered that a higher density of vegetation can create a feeling of safety when there is a low maintenance of the area. For Pioenpark, apart from the water, the maintenance questions are mostly agreed to, meaning that the quality of the elements is up to par. Together with the relatively low density, this should create a safer park. However, more participants from Pioenpark responded that the vegetation does not make them feel safer compared to Park Oost Indischebuurt. This contradicts the existing literature. In Park Oost Indischebuurt, there is less agreement on that the vegetation is well maintained, but more participants felt safer here, due to the vegetation, than in Pioenpark. With the higher density of vegetation in this park, there is overlap with the conclusions made by Kuo et al. (1998). The results of the survey on increased relaxation and happiness in the two parks is in accordance with the conclusions made by MacKerron & Mourate (2013). This indicates that visitors of Pioenpark and Park Oost Indischebuurt generally feel relaxed and happy spending their time in that park.

Ahmad et al. (2014) suggested that the presence of water in a park can increase the feeling of safety, due to people spending their time near the water, creating a form of supervision. In both parks in Groningen this is not applicable. Most responses on the statement of water and safety are in the 'neutral' category, and a larger portion of the participants from Pioenpark slightly agreed. The disagreement visible in Pioenpark could be explained by the low quality of the water.

Klemm et al. (2017) suggest a ratio of 40% sun, 20% half shade and 40% shade in parks. These values were found to fit the preferences of park visitors. Furthermore, Klemm et al. (2017) observed that an increase in temperature made park visitors sit in the shade, and a decrease in temperature resulted in sitting in the sun. Pioenpark provides more shade along the pathways – created by large trees – where benches are mostly found. Pioenpark can therefore better accommodate park-visitors with seating space in the shade, during summer periods. This can explain the overall agreement on the availability of shade in Pioenpark. Park Oost Indischebuurt has less seating areas in the shade, and less shade on the paths in the park. Furthermore, Talal et al (2021) support the notion that (old) trees are favoured, for both the aesthetic and the shade they provide. However, the landscape architect said that not everything is about trying to make it look aesthetically pleasing, but to find coherence and integrity. It is the aim that the surroundings add to the mental health, as well as the physical and social health of the neighbourhood.

Accessibility of parks can be improved by, as told by Ellis & Schwartz (2016), including the infrastructure of the park with the surrounding environment. The landscape architect also pointed out that pathways are important, for both creating a route for visitors to take, and connecting the park to the neighbourhood. Among other elements, such as paths, street lanterns and shade, playgrounds are important for the physical development of children (McCormack et al., 2010). McCormack et al. (2010) identified that lack of maintenance, vandalism and litter have an effect on park use. The playgrounds in Park Oost Indischebuurt were more evident, meaning the quality is better assessed and signs of vandalism are more easily noticed.

The results show that visitors of Volkspark Friedrichshain and the Rummelsburg neighbourhood perceive the environmental benefits based on flood protection, temperature decreases and air pollution to a positive extent. This means that these visitors are either aware of these positive effects of green space, or that they notice a difference when visiting the park. Research suggests that local people – people living close to the park – are more aware of the environmental benefits (Sodhi et al., 2010). This notion can be seen in the statements about air quality and temperature in parks in Berlin. The understanding of what role parks can play in flood protection seems to be lacking, even for residents

living in a neighbourhood where the sponge city concept is applied. A reason for this unawareness could be that the residents were not involved during the development of the neighbourhood, or after full implementation.

Bowler et al. (2010) note that even though it has been proved that urban green space can help decrease the temperature, no recommendations are available in the literature on how to efficiently implement urban greening. This shows there is a research gap between the theory and implementation of urban green space. However, future research should take this a step further and include people's responses on types of vegetation, but also other elements found in urban green spaces. A visual representation with different executions of the same element can help to understand what attracts park visitors and how they feel about the elements. This can then help to enhance both the environmental benefits, but also the benefits people can get from spending time in nature as well as the intrinsic benefits of the environment.

An alteration to this research would be to change the formulation of the survey questions, that would make the participant rate the park on a scale from 1 to 10. Since the questions are already posed in a positive manner ('this park helps me to relax') people might feel less inclined to disagree with this statement. Instead, the questions should be formulated more openly, and answers would be in a grading format (1 through 10 for example). Furthermore, an indication of how the complete park is graded, would provide a "basis" to which the other questions – about the elements – can be related to. Additionally, for a more holistic perspective of the park and how visitors feel in and react to that park, more data about the specific elements of that park should be gathered. Statistics about the vegetation coverage, type, water coverage, shade coverage and amount of elements (benches, playgrounds) can help answer the question 'what is seen as sufficient' in regards to how people think about it. The outcomes this research found are, to a small extent, location-specific. In Berlin it was noticed that questions about flooding were not directly understood due to a low awareness of heavy rainfall, and the fact that Berlin rarely experiences floods. If these questions were asked in a different city – where floods are more prominent – a different result is expected. For the research done in Groningen, the results per park are expected to differ, but not because of the location, but because of the different characteristics of that park.

Conclusion

In Groningen, Park Oost Indischebuurt and Pioenpark both showed that vegetation and water helps the park-visitor to relax and increase happiness. The effect of vegetation and water on safety was different in each park, the low maintenance and high vegetation density in Park Oost Indischebuurt created a safer environment than the high maintenance and low vegetation density in Pioenpark. Water did not affect the feeling of safety in both parks. Quality of seating space was rated more positively by participants from Pioenpark than from Park Oost Indischebuurt, as well as shade. It is expected that this is correlated with the different types of vegetation in the parks. Pioenpark has more trees along the pathways that provide shade on the path and seating areas. Park Oost Indischebuurt has benches that are more exposed to sunlight, lowering the quality of the seating areas.

Cranz & Boland (2004) found that the new sustainable park emerged in the late 1990's, however, a new approach is suggested by Brown et al. (2015), called 'climate-responsive park design'. This includes the environmental part of park design, and aims to make space for activities to improve the physical health of visitors (Klemm et al., 2017). This is similar to something that the landscape architect said: '*well-being, as well as environmental sustainability, have many different aspects. Therefore there is no priority list of what is more important, it is about finding a balance.'*. Finding a balance between these two aspects of parks, can help to create a park that optimizes both.

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Appendices

A – Interview landscape architect

Introduction

Words of gratitude for partaking in this interview; agree on recording the interview; short explanation of what to expect from the interview, including the rights of the interviewee.

1. short explanation by myself about my research and how this interview will help me
2. The interviewee will be asked to (shortly) explain what his/her profession is. And what role he/she has in the firm he/she works for

Environmental aspects

This section will go into specifics of how the current environmental situation (in Groningen or in the Netherlands in general) is affecting park design, and how.

1. What role does environmental sustainability play within the business you work for and what you create?
2. How is the environment in terms of climate change and safeguarding biodiversity, included in park design, and do you know of an example?
3. How are solutions (that help prevent climate change) being implemented in urban parks, can you provide one or more examples?

Social Aspects

In this section the social benefits from parks and how this correlates do park design will be discussed.

1. What design actions are taken to make sure people feel welcome in a park?
2. What role do the social benefits that parks can generate play within the business of your work. With social benefits I am thinking about the ability to exercise, socialize and escaping the city in general.
3. What is in your opinion the purpose of developing a park in a specific area? Does this differ in every park and if so, how? What factors play a role in this?

Neighbourhood characteristics

This section looks into the role of the neighbourhood character into park design.

1. How does the surrounding neighbourhood of a park affect the design? If there is a relation between the two (example)
2. In 1961, Jane Jacobs wrote a book (the death and life of great American cities), in this book, she talked about the functions of neighbourhood parks. She had one theory about parks reflecting their neighbourhood. So, if a neighbourhood is a bit sketchy and unsafe, the park will also be used for sketchy and dangerous activities. But the opposite is also true (fun, friendly neighbourhood has a fun, friendly park) Do you think this is also seen here in Groningen, or is Groningen evidence that disproves this theory?
3. Are park designs influences by the surrounding area or neighbourhood? In which way? And can you give an example?

Closing

1. Would you like to add to anything we have talked about that also fits these themes?
2. Can you recommend experts to me in your field that are open to do an interview?
3. Do you have any questions for me?
   The interviewee is thanked again and the recording will be stopped, interviewee is free to e-mail about questions and/or adjustments of the interview

B – Transcript interview landscape architect

In the following transcript the interviewer will be indicated with an 'E', the interviewee will be indicated as 'speaker 2'. Since the interview was in Dutch, the transcript will also be in Dutch.

Before the interview started, the interviewee has given consent to record this conversation.

E: Nogmaals bedankt dat u mee wilt doen met dit interview, de geluidsopname is begonnen, dus laten we beginnen.

E: Allereerst wilde ik u vragen wat uw rol binnen dit bedrijf is, zodat ik een beetje een idee heb wat u precies doet…

Speaker 2: ik ben directeur-eigenaar van dit bedrijf, ik ben landschapsarchitect, ik ben eindverantwoordelijke voor alle dingen die we hier doen. En ik ben dus zowel als landschapsarchitect aan het werk in projecten, en alles wat erbij komt in dit bedrijf. Even in het kort.

E: Ja, duidelijk, dankuwel. Het eerste onderdeel wat ik met u wilde bespreken is het milieu en parken. Mijn eerste vraag aan u is 'welke rol speelt duurzaamheid van het milieu in uw bedrijf?' Dus hoe speelt duurzaamheid binnen [naam van het bedrijf].

Speaker 2: ja, duurzaamheid is een containerbegrip, dus dat maakt het al heel erg lastig. Want daar kan je van alles onder verstaan. Uhm en het milieu is niet duurzaam of niet duurzaam zegmaar, de manier waarop we met ons milieu omgaan kan wel of niet duurzaam zijn. Maar los van de definities zegmaar denk ik dat het niet alleen voor ons geldt maar de meeste landschapsarchitect toch wel… Het hele bewustzijn van dat het handelen in de omgeving eigenlijk altijd effect heeft en dat je toch wel op zoek gaat naar de zo min mogelijk schadelijke effecten of het liefst gewoon positieve effecten.

E: en hoe past u dat toe?

Speaker 2: dat zit op een heleboel verschillende- er zijn een heleboel verschillende thema's. We hebben vorig jaar heel praktisch een 'buitenruimte boekje' gemaakt. Omdat we daar zelf ook tegenaan liepen. Maar goed er zijn zoveel verschillende dingen die je kunt doen, wat is nou handig op welke plek.. uhm. Welke combinaties zijn praktisch, dus vandaar het buitenruimte boekje. […]. En daarin hebben we verschillende thema's, zoals energie, maar daar gaat het ook over een thema als gezondheid, thema's als biodiversiteit, waterhuishouding en dat ontwerpen bestaat eruit dat je eigenlijk probeert tot een zinvol samenhang te komen en een heleboel van die aspecten zegmaar mee te nemen. Het ontwerp is niet zo zeer om het allemaal mooi te maken, meer juist om te zoeken naar samenhang en integraliteit. Zo veel mogelijk daar….

E: kunt u een voorbeeld geven? Van hoe die aspecten samenkomen in een plan of uitvoering?

Speaker 2: nou dat kan dus zijn bij de herinrichting van een euhh wegen van een dorp. Dan begin je al van: wie gaan er doorheen, en hoe ga je er door heen en wie geef je primaat, ligt dat bij de auto of ligt dat bij de fietser. Dat hangt er weer van af waar ben ik aan het werk. Dus als je misschien in de stad bent dan zou je het primaat veel meer aan de fietser kunnen geven. Dat wordt de gezonde keuze zegmaar, dan is het niet alleen voor jezelf gezond, maar je bent ook voor het milieu gezond. En ja dan wil je kijken van hoe kun je misschien iets doen aan vergroening. Dat is natuurlijk leuk om te zien, maar dat is vooral ook bekend… De verkoeling die je daarmee kan.. het vasthouden van regenwater. Er is een heleboel ondertussen gelukkig vanzelfsprekend dat je daar rekening mee gaat houden. En je merkt dat, naja, er is maar weinig ruimte vaak beschikbaar en dat het meer een strijd om de ruimte is en ook dat er heel veel mensen toch op een andere manier van denken nodig is om dingen te accepteren. Als iedereen gewend is om met de auto overal te komen en dat eigenlijk heel normaal is dat die altijd de basis is. Dan iemand die wat anders doet, dan roept iedereen wel, maar zie je toch dat het wel moeilijk is om voor elkaar te

krijgen. Het nadenken en de ruimte daarvoor nemen en daar ook budgettering voor zorgen, dat het er is, is natuurlijk ook nog best wel een punt.

E: denkt u dat er iets is veranderd – en dan heb ik het met name over bijvoorbeeld vergroening in steden, of vergroening in het algemeen – tussen nu en 20, 30 jaar geleden?

Speaker 2: nou in ieder geval, ik dat dat met andere doelen ingezet wordt. Dat is natuurlijk nu nog steeds heel veel beleidsmatig enzo. Maar het begint in de uitvoering en je ziet ook hoe moeilijk en stroperig dat soms is. Je wilt meer bomen in de stad zegmaar, maar de praktijk laat zien dat dat heel ingewikkeld is. Omdat, nou het is bovengronds heel druk, zo is het ondergronds ook heel druk, met kabels, leidingen noem maar op. En dan euh denk ik dat we nog wel wat te gaan hebben voordat de primaat zegmaar bij de vergroening ligt. Dat dat toch vaak nog best wel lastig is, om die vergroening voor elkaar te krijgen.

E: en waar ligt dat dan het meest aan? Te weinig ruimte?

Speaker 2: ja maar ook de manier.. het denken in het hoofd zegmaar, en daar dus ook prioriteit aan geven. Dus je ziet dat wegen – nou wij beheren het onderhoud- ik zie het in de stad ook, de wegen worden weer opnieuw geasfalteerd, uhm en dat staat blijkbaar zo in het onderhoudsprogramma, maar je zou ook de wegen smaller kunnen maken. En meer ruimte voor groen kunnen maken, op heel veel plekken zie ik gewoon overmaat in de weg. En blijkbaar is er dus een beheerst programma dat zegt wanneer het opnieuw moet worden geasfalteerd en andere dingen. Maar met een klein beetje meer inspanning had je eigenlijk veel meer groen kunnen maken, de weg smaller kunnen maken bijvoorbeeld. En dan zitten er volgens mij nog best wel wat schotten in de weg.

E: het besef is er nog niet helemaal?

Speaker 2: nee totaal niet op alle niveaus. En dat merken wij ook, je kunt wel komen met allerlei voorstellen maar om ze vast te houden en ze er door heen te krijgen is vaak nog wel lastig.

E: en wat voor voorstellen zijn dat? Kunt u daar een voorbeeld van geven?

Speaker 2: nou bijvoorbeeld voor uh oppervlakkig waterafvoer, dus dat je niet direct het riool zichtbaar maakt, dat vraagt om een ander beheer of dingetjes die eigenlijk net in de aanleg een keer wat duurder zijn, maar wel beter zijn. Dan zie je toch dat mensen terugvallen op de opties die – ja het moet uiteindelijk wel betaald worden – dat het toch weer lastiger om het te… Is natuurlijk net zoals energiezuinig bouwen. Vaak kost het aan de voorkant al wat meer. Dus ja, dan wordt het toch zegmaar uiteindelijk er uit gehaald, of niet meegenomen. Dus je moet dat dan meer afdwingen, maar dan wordt het in regeltjes gevat, naja ook weer lastig. Dus dan wordt het een soort rekensom, want met bomen kappen moet je ook altijd weer wat terugplanten. Dus het is niet zo makkelijk zoals het altijd lijkt. Zeker als je in een bestaande stad zit.

E: Dan wil ik het ook hebben over de meer sociale en gezondheid voordelen van hoe mensen zich voelen in natuur of parken. Dus hoe speelt, bijvoorbeeld de gedachte aan ‘we willen een gezonde plek creëren’, hoe speelt dat een rol in het design proces.

Speaker 2: een van de vele aspecten die we meenemen waar we al heel lang geleden mee begonnen met denken over gezondheid en ruimte. Maar eigenlijk is dat natuurlijk al heel oud he, want het aanleggen van riolering kwam er al uit voort, luchtruim enzo. Bij het begin van de stedenbouw zat dat er al heel erg bij, aspecten zoals gezondheid. En wij hebben in 2009 ofzo voor het eerst ook weer onderzoek naar gedaan, naar aanleiding van congressen die we hier ook hadden. We proberen het altijd in het denken van het ontwerp gewoon mee te nemen, maarja het hangt ook… Ook dit zit weer op verschillende schaalniveaus. Soms heb je een heel praktisch klein ontwerp, maar soms heb je ook een heel hoog schaalniveau met beleid dan moet je dat denken ook weer in coöpereren. Om maar weer die auto en de stad te nemen, gezondheid heeft heel veel aspecten dus zorg dat de fiets altijd het beste alternatief is – of lopen, walkable city – heeft heet veel effect op je gezondheid. Nou dat begint met heel abstract het beleid, dat daarna laten doorwerken want dat betekent uiteindelijk dat je eens een straat met een ander

soort profiel maakt, waarbij er meer ruimte is voor de voetganger, meer ruimte is voor de fietser. En minder voor de auto en de auto's, voetgangers en fietsers moeten dan heel goed kijken, wat en waar welke plek dit is. Ja, en dan heb je andere gezondheidsaspecten, dan kom ik meer op milieu aspecten zoals het zuiveren van de lucht en de waterherkomst scheiden en dat soort aspecten. En dan heb je nog een andere vorm van gezondheid, de mentale gezondheid. Dus het zien van groen is wel ondertussen meer dan wetenschappelijk aangetoond dat het mensen rustiger maakt en gezonder maakt. Dus maar kijken of de voldoende groen in de directe omgeving is dan wel plekken die vrij dichtbij zijn en dat die bereikbaar zijn. En dat die ook voor iedereen toegankelijk zijn, dat heeft er ook mee te maken. Dus ook het zorgen voor voldoende bankjes zodat bijvoorbeeld ouderen een bepaalde route kunnen maken. Tegelijkertijd speelruimte voor jongeren, er zijn allerlei aspecten en allerlei schaalniveaus. Dus het is niet een dingetje dat je kunt zeggen 'ja daar moet je rekening mee houden' of 'ja daar moet je rekening mee houden'. Eigenlijk op al die aspecten, en dat is eigenlijk altijd in ons vak geweest, probeert zoveel mogelijk dingen bij elkaar te brengen. Dat bedoelde ik met die zuivere samenhang. Dus wat je doet is afhankelijk van welk schaalniveau je gebruik maakt, probeer je die dingen aan te stippen, bij elkaar te brengen. En dan maakt het uit of je op een gegeven moment een park ergens ontwerpt of dat je een stedenbouwkundige opzet maakt waarin een park zit. Want dan gaat het gezondheid, veel over de structuur. En als je het over het park hebt misschien over het park zelf…

E: ja want stel dat u een park ontwerpt, hoe 'hoog op de ranglijst' staat dan de gezondheid? Is dat iets wat juist heel erg wordt betrokken of meer met het idee van 'een park is al groen dus het zal al een positief voor de gezondheid' waardoor de gezondheid minder een rol speelt.

Speaker 2: wat ik probeerde te zeggen is dat gezondheid, net als duurzaamheid, op heel veel aspecten zit. Dus dat het meegenomen wordt in de afweging van het totaal. Je begint met het maken van een programma van eisen, normaliter, maar dus meer de meetbare dingen zoals een speelveld of ontmoetingsplek. En daarnaast technische wijzen, paden moeten toegankelijk zijn, en noem maar op. En er zitten wat meer abstracte eisen in. En dat breng je bij elkaar. Maar daar zet je niet een ranglijst in, zo werkt dat niet. Men denkt tegenwoordig dat alles in een ranglijst moet, maar daar gaat het juist niet om. Het is niet zo gezondheid is veel belangrijker dan ecologie of ecologie staat altijd bovenaan en dit niet.

E: dat snap ik

Speaker 2: het gaat om de balans van de dingen. Dus in die zin kan ik daar geen antwoord op geven

E: snap ik, maar het is duidelijk wat u bedoelt. Verder heb ik nog een vraag over hoe – als u een park ontwikkelt – de omgeving, dus de mensen die er omheen wonen, hoe dat is betrokken bij het design.

Speaker 2: ja dat hangt er van af, we hebben park meerstad gedaan terwijl de omgeving er nog niet was. Er was wel een bewoner betrokken, iemand heeft inventarisering van parken gedaan, bewoners die er omheen wonen meegenomen in het plan proces. Het hangt er ook vanaf wat de politiek wilt, wat de opdrachtgever wilt. We zijn nu bezig met een stuk groen in de stad, naja niet echt een park, maar het is wel een hele grote groenstrook. Daar worden echt bewoner sessies georganiseerd, kinderen bijgehaald…

E: waar is dat?

Speaker 2: het spoorgroen in de Hoogte. Dus daar zit een hele participatieve, sociale kant aan. Juist ook door mensen die het groen minder gebruiken, minder makkelijk uit huis komen, sociaal achtergesteld zijn. Daar hebben we eerst 'van woonwijk naar leefwijk' onderzoek gedaan, dat was ook heel erg inzettend. Zegmaar zorgen dat die omgeving ook echt bijdraagt aan die mentale gezondheid maar ook aan de fysieke gezondheid en de sociale gezondheid van die wijk. Dus al die aspecten, dat gaat dus ook over hele simpele dingen, zoals hoe makkelijk kun je er komen. Dan merk je ook dat heel veel gebouwen er juist op afgericht zijn. Maar dat mensen ook hele andere sociale problemen hebben, die los je niet allemaal op met groen. Dus ja, de complexiteit van wat er achter ligt waarin je wel van alles zou kunnen doen. Dus wij krijgen de opdracht van de gemeente om met het spoorgroen aan de slag te gaan. Wat kun

je er aan doen? Hoe programmeer je dat? Kun je er alleen maar doorheen lopen en kijken. Of ga je er ook sportactiviteiten plaatsen, en zijn die dan juist zichtbaar of niet zichtbaar? Dan kan je ook overlastproblemen krijgen, waar je stress van kunt krijgen en dat is ook weer slecht voor de gezondheid. Iedereen heeft iets met die openbare ruimte dus ja, conflicten komen er ook zo. Dus daar zit ook weer heel veel participatie in, dus dat is heel erg afhankelijk van de context.

E: precies, maar in dat voorbeeld wat u noemde, dat weinig mensen gebruik maken van het groen. Wordt er dan juist participatie gebruikt zodat meer mensen er meer bewust van zijn en er hopelijk gebruik van zullen maken?

Speaker 2: naja inderdaad achterhalen waarom mensen er niet komen. En wat we er aan kunnen doen waardoor mensen er wel zullen komen. Dus je probeert ook een beetje, naja niet elke buurt is hetzelfde, dus ja daar gebruik je dat voor. En ook voor de sociale samenhang binnen die wijk te versterken. Er gebeurt nog veel meer, wij doen 1 traject, maar er zijn er nog veel meer. En wordt natuurlijk ook gekeken naar de samenhang tussen die trajecten.

E: Dan heb ik voor u alleen nog de vraag of u nog iets wilt toevoegen, of dat u nog een voorbeeld heeft dat bij deze onderwerpen past.

Speaker 2: ik was wel benieuwd wat je nog meer gaat onderzoeken

E: ik ga een enquête houden onder mensen die in een park zijn. En ik ga aan hen vragen wat zij vinden van bepaalde elementen in parken. U had het bijvoorbeeld al over sportfaciliteiten, speeltuintjes en bankjes…

Speaker 2: ja bijvoorbeeld he, wij kijken vanuit de gezondheid ook naar de ecologie, en dat heeft ook te maken met een duurzame toekomst met groen. En klimaatverandering zorgt er voor dat bepaalde soorten het minder goed doen, en dat nieuwe soort geïntroduceerd worden. Dat het ook leefbaar blijft, ja er zitten heel veel verschillende aspecten aan. Ook heel veel aspecten die de gemiddelde bezoeker helemaal niet kent. Je ziet ook verandering in gebruik, je ziet bijvoorbeeld steeds meer mensen buiten sporten. Dat deed men 20 jaar geleden nog niet. Dus je ziet ook een verandering in die plek. Vroeger werd er in het Noorderplantsoen en dergelijker alleen maar gedeald, dat was geen gezonde omgeving met vooral junks.

E: waardoor denkt u dat die verandering er is? Tussen vroeger en nu

Speaker 2: tja ik denk dat dat een stukje bewustzijn over gezondheid is. Aan de andere kant zie je steeds meer persoonshuishoudens, dus die hebben een andere manier van leven. De stad groeit, het is drukker in de stad, dus ik denk dat ook, omdat zoveel mensen bij elkaar wonen, met weinig ruimte, zoals je vroeger al had in New York of Parijs. Het wordt drukker, mensen wonen in hokjes en steeds kleiner, dus daardoor ga je nog meer naar buiten. En dan ga je ook een andere waarde hechten aan de ruimte die je hebt. En je gaat het anders gebruiken. Het klimaat verandert, dus dan ga je op zoek naar een coole plek. Ik denk dat er een heleboel factoren zijn die daar aan bijdragen. En het denken is ook al veranderd. Er is nu al vraag van de samenleving dat de fietsers uit de binnenstad moeten worde geweerd. Kijk maar naar de jaren 70 toen stond de vismarkt helemaal vol met auto’s, die zijn nu ook allemaal weg, maar de fietsen staan daar nu, maar dat zal ook veranderen.

E: nogmaals bedankt voor dit interview, mocht u nog vragen hebben kunt u mij altijd benaderen.

C - Survey conducted in Park Oost Indischebuurt and Pioenpark

Statistical analysis scheme

Question	Data Type	Answer Options	Research Aim
The vegetation in this park helps me relax	Nominal	Open Answer	To see how the 'ideal park' of participants fits with the park they are visiting
The vegetation in this park makes me feel happy	Ordinal	Strongly Agree Somewhat Agree Neutral Somewhat Disagree Strongly Disagree	To see how vegetation influences the feelings and perceptions of park visitors
The vegetation in this park makes me feel safe	Ordinal	"	
The vegetation in this park is well maintained	Ordinal	"	
Overall, I am content with the vegetation in this park	Ordinal	"	
The presence of water in this park helps me relax	Ordinal	"	To see how the presence of water influences the feelings and perceptions of park visitors.
The presence of water in this park makes me feel happy	Ordinal	"	
The presence of water in this park makes me feel safe	Ordinal	"	
The water in this park is well maintained	Ordinal	"	
Overall, I am content with the water in this park	Ordinal	"	
I am content with the available shade in this park	Ordinal	"	To see if park visitors are satisfied with the amount of shade the park offers → shade is linked to be beneficial for human health
I am content with the quantity of seating areas in this park	Ordinal	"	To see if park visitors are satisfied with the quantity and quality of available seating areas/opportunities
I am content with the quality of seating areas in this park	Ordinal	"	
This park has a proper amount of space for children/teens to play	Ordinal	"	To see if park visitors are satisfied with the quantity and quality of available playgrounds
The quality of the playgrounds/play areas is good	Ordinal	"	
This park is easy to access	Ordinal	"	

The roads in this park are well maintained	Ordinal	"	To see if park visitors are satisfied with the accessibility of the park and the paths running through the park
Being in this park improves my well-being	Ordinal	"	To see to what extent park visitors feel positive social benefits from being in this park
Being in this park helps me get rid of stress	Ordinal	"	
This park strengthens the community of the neighbourhood	Ordinal	"	
What is the reason you chose to visit **this** park?	Nominal	Open Answer	To give a general idea of why people chose to visit this park
How do you think this park is affecting your well-being?	Nominal	Open Answer	To see how people think parks affect their health
Which elements in this park do you find attractive?	Nominal	Open Answer	To see how these elements are presented in the park, and how they affect park visitors (based on previous questions)
Which elements in this park do find unattractive?	Nominal	Open Answer	To see how these elements are presented in the park, and how they affect park visitors (based on previous questions)
What would you change about this park?	Nominal	Open Answer	To see how park visitors would change the park and to see if this reflects the answers in the first question 'how would you describe your ideal park?'.

D – Overview of park elements in Groningen

Pictures are taken by author

Study Sites Park Elements	Pioenpark	Park Oost Indischebuurt
Vegetation	 	
Water		

Amenities	 Tennis Court  Johan Cruijff Veld (Football field)	 Fitness Station  Basketball field

Playgrounds		 

Pathways	 	

Miscellaneous	 Statue  Drinking Water Station	 Bridge

Pictures taken by author

E – Survey questions Berlin

Survey about parks and green spaces in Berlin

We are four students from the University of Groningen and Stockholm University who are researching parks and urban green spaces in Berlin. We want to collect information about Berlin park visitors' perceptions about parks and other green spaces. We ask you kindly to help us by filling out this survey.

What activities bring you to this park today? (multiple options are ok)

⌑ Nature experience	⌑ Take a walk	⌑ Reading	⌑ Sunbathing
⌑ Working out	⌑ Relaxation	⌑ Drinking alcohol	⌑ Walk the dog
⌑ Meet with friends	⌑ Playing games	⌑ Picknick	⌑ Other:_____

Here are a few statements on parks and/or green spaces in Berlin. Please tell us if you agree or disagree with each of the following statements. There's no right or wrong answers.

This park helps me to get rid of stress

⌑ Agree ⌑ Somewhat agree ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

This park helps to strengthen the community in the surrounding neighbourhood

⌑ Agree ⌑ Somewhat agree ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

This park can help to prevent flooding (during heavy rain) in the surrounding neighbourhood

⌑ Agree ⌑ Somewhat agree ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

This park helps to keep high summer temperatures in the park and the surrounding neighbourhood lower

⌑ Agree ⌑ Somewhat agree ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

This park helps to keep the air cleaner in this part of the city

⌑ Agree ⌑ Somewhat agree ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

I think green roofs/walls are good for the environment

⌑ Agree ⌑ Somewhat agree ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

It's important for me to have parks and green areas near my house

⌑ Agree ⌑ Somewhat agree ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

I would like to have green walls/roof on the house where I live

⌑ Agree ⌑ Somewhat agree ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

It's important for me to live near water

⌑ Agree ⌑ Somewhat agree ⌑ ⌑ Don't know ⌑ Somewhat disagree ⌑ Disagree

How satisfied are you with each element of your neighbourhood?

	Very satisfied	Somewhat satisfied	Neutral	Somewhat dissatisfied	Very dissatisfied
Amount of public green space	⌑	⌑	⌑	⌑	⌑
Access to water features	⌑	⌑	⌑	⌑	⌑
Public seating places near greenery	⌑	⌑	⌑	⌑	⌑
Flood protection	⌑	⌑	⌑	⌑	⌑
Connection with nature	⌑	⌑	⌑	⌑	⌑

What is your age group? ⌑ 0-30 ⌑ 31-60 ⌑ 61+ **Do you live close to this area?** ⌑ Yes ⌑ No

Is there any other opinion about parks or green spaces you want to add?

_____

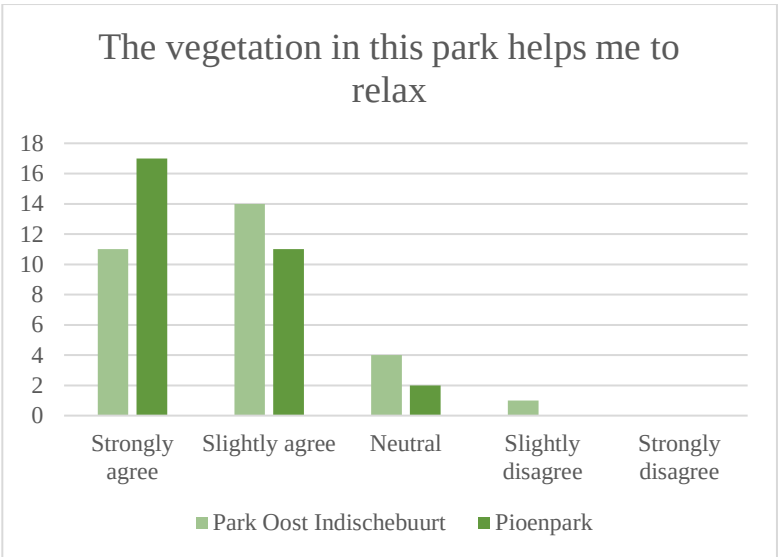
_____

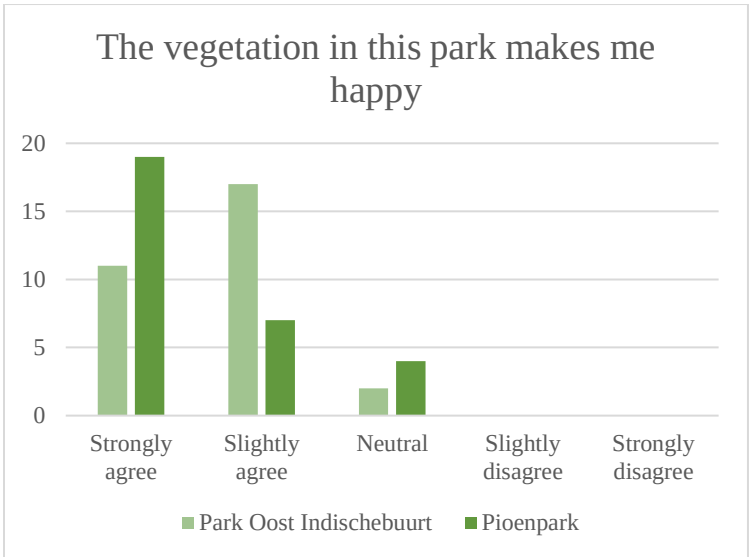
F – Sponge city concepts in Rummelsburg

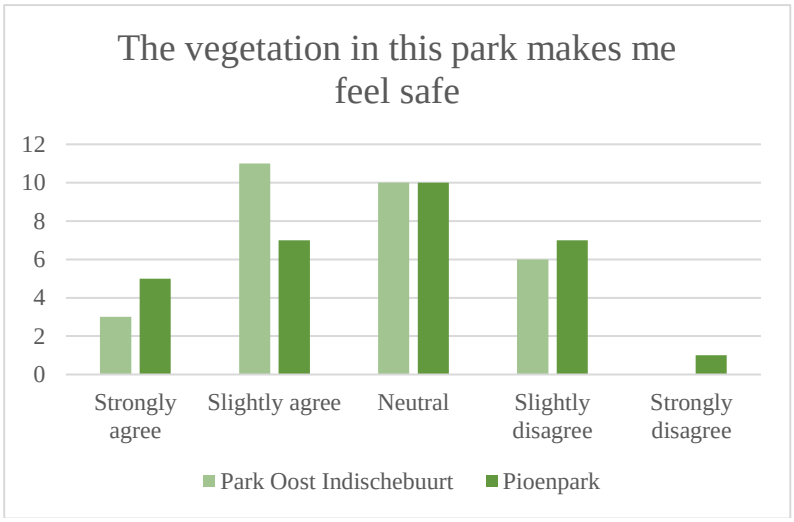
Example	Function
	Water drainage onto soil.
	Inlet in curb to let water flow from paved road into soil.
	Inlet in curb + gravel on top of soil to prevent impermeable mud layer during rain. Includes plants that do not need care and help to hold and evaporate water.
	Bowl-shaped green space that can be filled with water during heavy rainstorms.

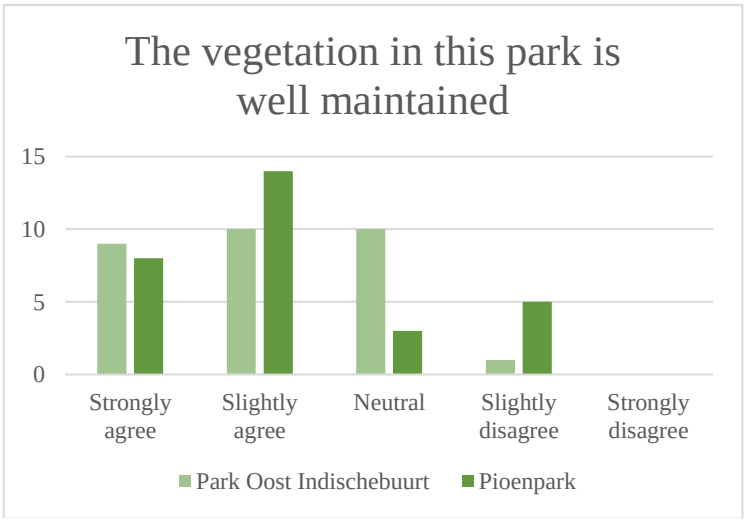
Pictures taken by author

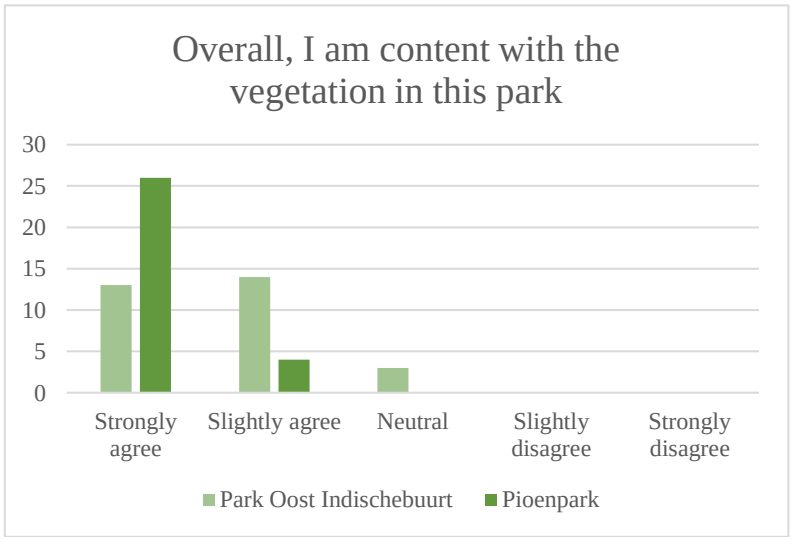
G – Survey results Groningen

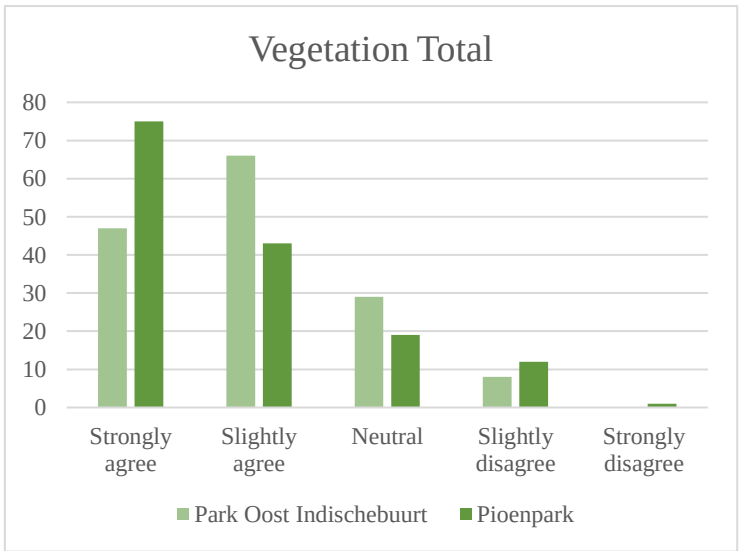


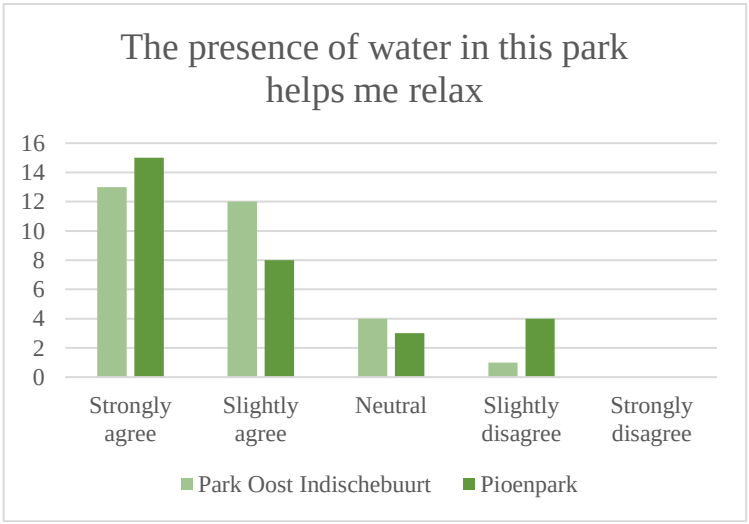


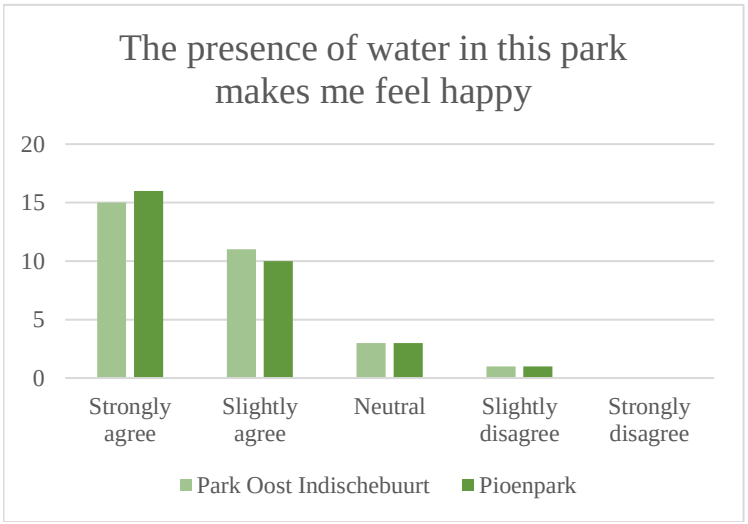


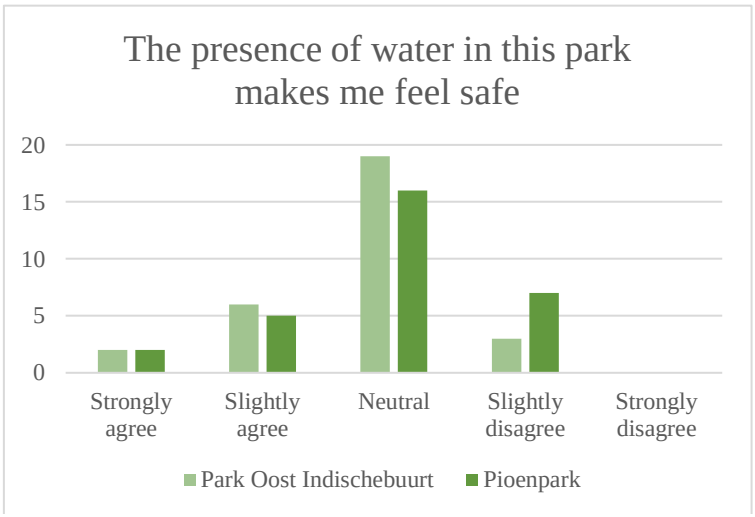


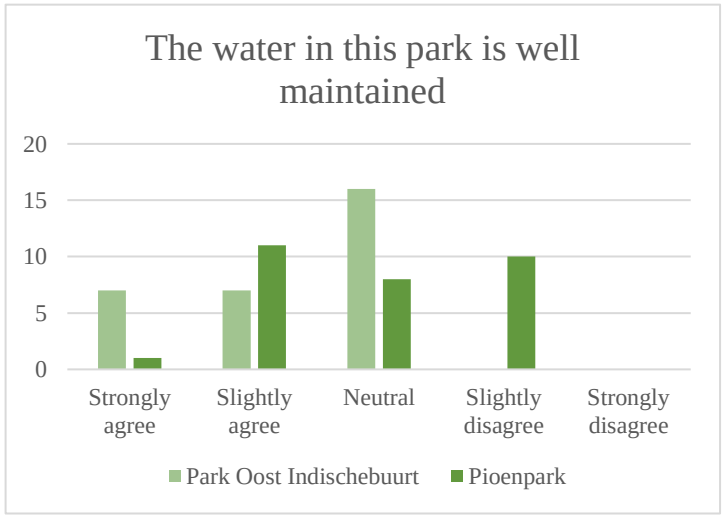


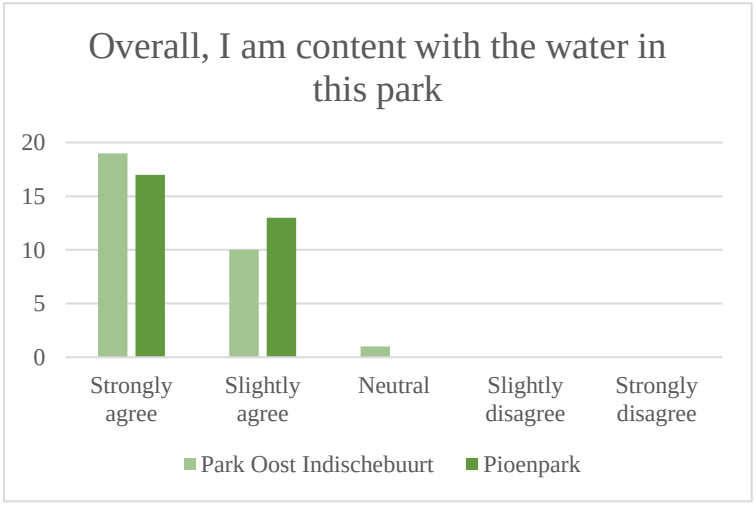


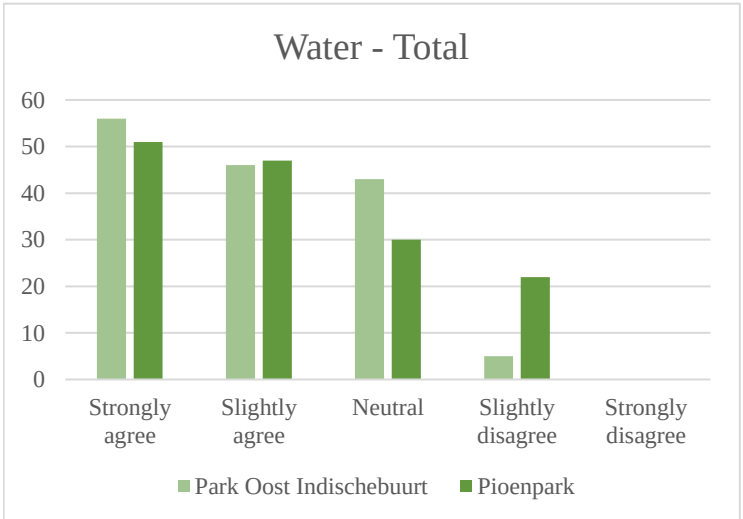

The presence of water in this park helps me relax
16
14
12
10
8
6
4
2
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark

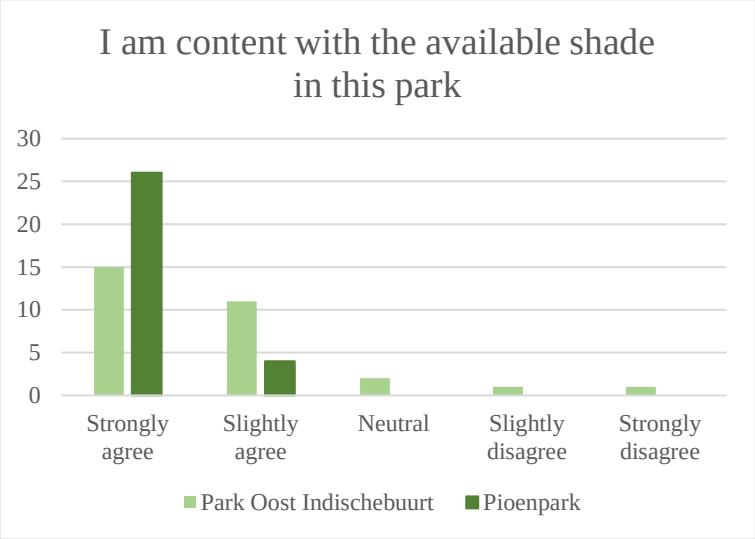

The presence of water in this park makes me feel happy
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark

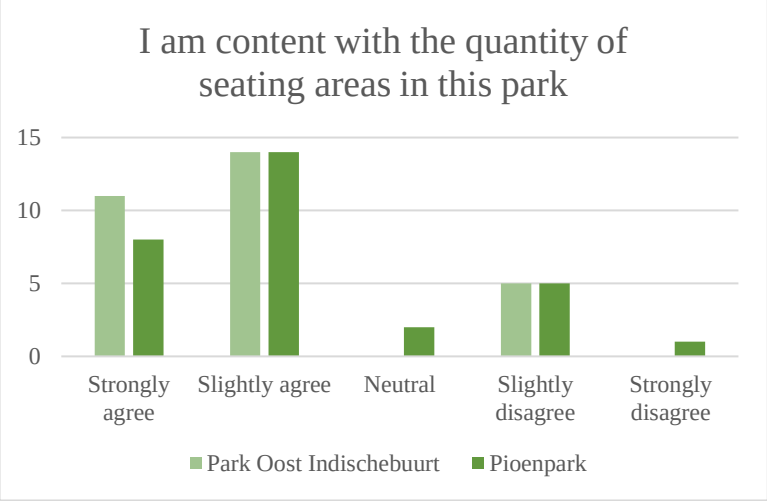

The presence of water in this park makes me feel safe
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark

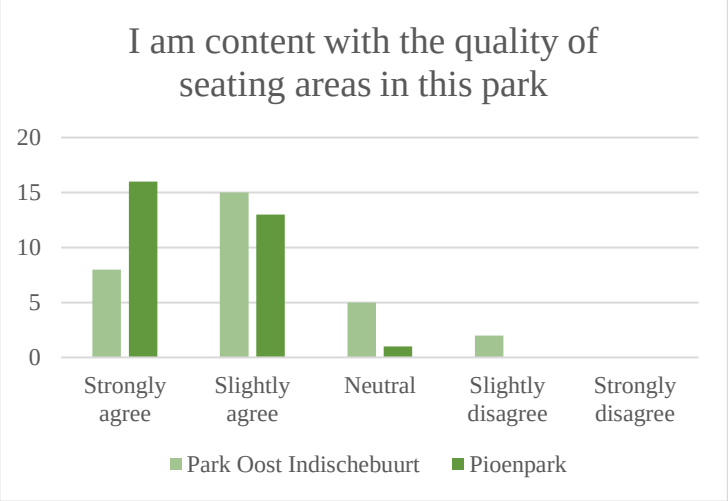

The water in this park is well maintained
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark


Overall, I am content with the water in this park
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark

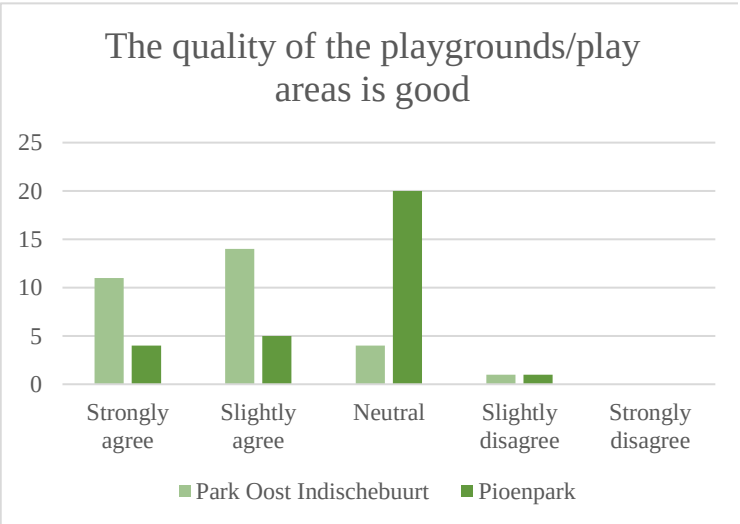

Water - Total
60
50
40
30
20
10
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark


I am content with the available shade in this park
30
25
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark

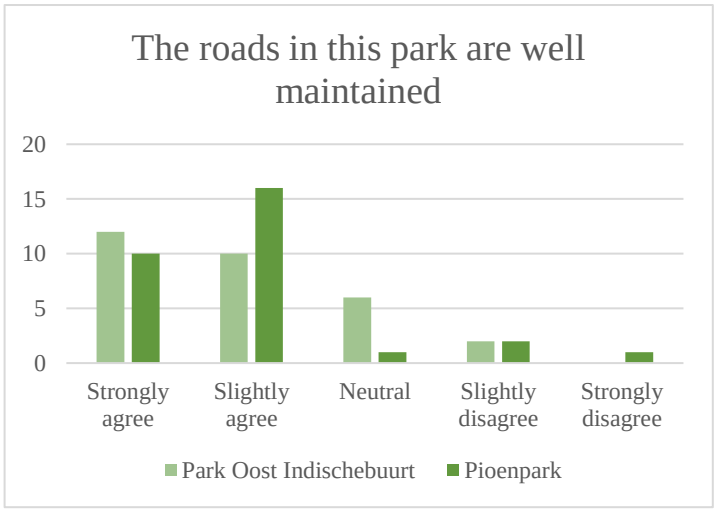

I am content with the quantity of seating areas in this park
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark


I am content with the quality of seating areas in this park
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark


This park has a proper amount of space for children/teens to play
16
14
12
10
8
6
4
2
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark


The quality of the playgrounds/play areas is good
25
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark


This park is easy to access
30
25
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark


The roads in this park are well maintained
20
15
10
5
0
Strongly agree
Slightly agree
Neutral
Slightly disagree
Strongly disagree
Park Oost Indischebuurt
Pioenpark

H – Rank data Mann-Whitney test Groningen

Note: because of the coding of the data, a lower rank means that more people agree with the statement than a higher rank. This is because 'strongly agree' is coded with a '1' and 'strongly disagree' is coded with a '5'.

Ranks

	Pioenpark or Oost Indischebuurt?	N	Mean Rank	Sum of Ranks
Vegetation - relaxation	Pioenpark	30	27,02	810,50
	Park Oost Indischebuurt	30	33,98	1019,50
	Total	60		
Vegetation - happiness	Pioenpark	30	27,40	822,00
	Park Oost Indischebuurt	30	33,60	1008,00
	Total	60		
Vegetation - safety	Pioenpark	30	31,37	941,00
	Park Oost Indischebuurt	30	29,63	889,00
	Total	60		
Vegetation - maintenance	Pioenpark	30	30,55	916,50
	Park Oost Indischebuurt	30	30,45	913,50
	Total	60		
Vegetation - general	Pioenpark	30	23,80	714,00
	Park Oost Indischebuurt	30	37,20	1116,00
	Total	60		
Water - relaxation	Pioenpark	30	30,83	925,00
	Park Oost Indischebuurt	30	30,17	905,00
	Total	60		
Water - happiness	Pioenpark	30	29,77	893,00
	Park Oost Indischebuurt	30	31,23	937,00
	Total	60		
Water - safety	Pioenpark	30	32,38	971,50
	Park Oost Indischebuurt	30	28,62	858,50
	Total	60		
Water - maintenance	Pioenpark	30	35,33	1060,00
	Park Oost Indischebuurt	30	25,67	770,00
	Total	60		
Water - general	Pioenpark	30	31,27	938,00
	Park Oost Indischebuurt	30	29,73	892,00
	Total	60		

Ranks

	Pioenpark or Oost Indischebuurt?	N	Mean Rank	Sum of Ranks
Content with shade	Pioenpark	30	24,80	744,00
	Park Oost Indischebuurt	30	36,20	1086,00
	Total	60		
Content with quantity of seating areas	Pioenpark	30	33,37	1001,00
	Park Oost Indischebuurt	30	27,63	829,00
	Total	60		
Content with quality of seating areas	Pioenpark	30	24,72	741,50
	Park Oost Indischebuurt	30	36,28	1088,50
	Total	60		
Quantity of playgrounds is good	Pioenpark	30	36,53	1096,00
	Park Oost Indischebuurt	30	24,47	734,00
	Total	60		
Quality of playgrounds is good	Pioenpark	30	38,22	1146,50
	Park Oost Indischebuurt	30	22,78	683,50
	Total	60		
Easily accessible	Pioenpark	30	29,00	870,00
	Park Oost Indischebuurt	30	32,00	960,00
	Total	60		
Paths - well maintained	Pioenpark	30	29,87	896,00
	Park Oost Indischebuurt	30	31,13	934,00
	Total	60		