PERCIEVED SAFETY AND PLEASANTNESS IN PARKS: INSIGHTS FROM ELDERLY CITIZENS IN ENSCHEDE

by

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Abstract

The elderly population in the Netherlands is increasing. Ageing is associated with poorer physical and mental health. Therefore, there is an increasing need for opportunities to promote good health and well-being. Parks are known to benefit the health of people of all ages, yet little is done in park design that facilitates the needs of elderly people. The frequency of park visitation is already low for elderly people and they are even less likely to visit a park if they do not feel safe, even more so than the younger population. The aim of this qualitative and quantitative study was to explore what characteristics make a park feel safe and pleasant for elderly people to encourage park visitation and improve future park design guidelines. Participants were interviewed in their homes as a pair or individually about their perceptions of safety and pleasantness relating to parks in general as well as the Volkspark in Enschede. They were asked to complete a park design assignment as well. All surveys and designs were translated from Dutch to English and analysed using excel, R-studio and QGIS. Participants primarily reported using parks for walking and enjoying their surroundings in a park. Park features valued highly for safety include good lighting, visibility and natural features. For pleasantness main themes such as natural features, park design and subjective experiences were valued highly. These findings are important for policy makers, urban planners, and park designers to ensure parks are designed to support elderly people to visit parks more often and increase their well-being and physical health.

Ageing Citizens and Park Visitation

Since the end of the nineteenth century parks have had a recreational function, people come there for tranquillity, sports, social callings and study. The creation of parks and green spaces is linked to sustainable, social and economic benefits (Byrne & Sipe, 2010). The function of a park in urban settings provide a wide range of benefits; human health and wellbeing, social cohesion, local economy (tourism), house prices in the surrounding areas, water management, and the cooling of urban areas (Konijnendijk et al., 2013). The health benefits and enhancement of wellbeing that comes with the opportunity to explore green spaces via parks is especially influential for elderly people (Veitch et al., 2021).

Research on the focus of urban planning in the past decade has shown that public spaces are more relevant than ever (Low, 2020). Cities grow larger and denser by the day. With this changing infrastructure, the functions of a park and the benefits it provides change as well. Furthermore, the design of public space influences how people use urban greenspaces. Everyone experiences these greenspaces in a different way. Factors like age, income, gender and physical ability all influence how people use parks and what they need from them. In order to achieve inclusive design for parks, research suggests that three factors are of importance in inclusive park design: safety, accessibility, and maintenance (Wu and Song, 2016). Many studies that focus urban design, exclusively use survey data to connect citizens to the design process (Guo et al., 2020; Kimic & Polko, 2022; Low, 2020; Scott, 2021; Veitch et al., 2021; Wen et al., 2018). Using only this quantitative method may not result in a complete connection to citizens and the design process, especially in the development phase of a design process and measuring subjective experiences.

The population in the Netherlands is steadily aging. The number of people over the age of 65 in 2024 was around 3.6 million, whereas in 2014 this was 2.9 million. This number is expected to rise even further (Statistics Netherlands, 2025). Rising levels of life expectancy is seen everywhere, and with this, threats to one's health, such as reduced physical and mental performance, a higher occurrence of diseases and injuries also appear (Gill et al., 2006). Urbanization and ageing are coming up fast and it is changing the environment as we know it. Cities are become larger and overcrowded, while lifestyles become more sedentary. Parks play a critical role in regulating the urban environment while these processes evolve (Kimic & Polko,

2022). Parks provide many opportunities to stay healthy. The findings of a study of park use by older individuals in Cleveland found that people who were active park users were less likely to be overweight, had less medical check-ups, lower blood pressure and even had lower medical costs (Godbey & Mowen, 2011). Having access to urban green spaces promotes the well-being and health of people of all ages (Guo et al., 2020).

Looking into park usage however, studies suggest that less than 10% of all park users are above the age of 60 (Evenson et al., 2019, Joseph and Maddock, 2016). While accessibility is a key issue as highlighted by Scott (2021) it is not the only factor. Loukaitou-Sideris et al. (2016) highlighted the feeling of unsafety as a major reason for elderly people not visiting parks. In psychology, safety is a subjective experience. More than the absence of danger, it is how a space is experienced. Not only is it a basic human need, it is also something that shapes how we feel and act in a space (Loukaitou-Sideris et al. 2016). One's individual perception and experience is key to understanding what safety is (Eller & Frey, 2019 p44). For elderly people, having that feeling of safety is essential for visiting and enjoying a park (Kimic & Polko, 2022). If a park feels unsafe, elderly people are less like to visit, no matter the accessibility or how close it is. This fear seems to limit elderly people more than younger people (Madge, 1997).

Even though there is an abundance of research on general park design based on accessibility and maintenance, there is still a noticeable gap when it comes to understanding what elderly people want and need from urban greenspaces in terms of safety and comfort (Wen et al., 2018). Most design guidelines are too general and not made with elderly users specifically in mind (Onose et al., 2020). Connecting the view of elderly citizens to research that may aid park design needs a method that is not just a survey, this is where citizen science comes into play. Citizen science is a way of connecting crowds outside of science to assist with observations and classifications. It is a way of democratizing science, as Kullenberg & Kasperowski (2016, p1) name it, “aiding concerned communities in creating data to influence policy and as a way of promoting political decision processes involving environment and health”. It is especially being used in environmental and ecological sciences, where it can be helpful in every stage of the practice, from design to evaluation (Fraisl et al., 2022). This approach will be used to answer the main research question:

“What are the characteristics that make elderly people feel safe and pleasant in a park?”.

This question will be answered through quantitative and qualitative data gathering and analyses. These findings can be used to inform general design-guidelines and rules that can be used to design safe and pleasant parks for the perspective of elderly people. This study focuses on elderly park users aged 60 and over in urban parks in the Netherlands, specifically the Volkspark in Enschede.

Methods

Participants

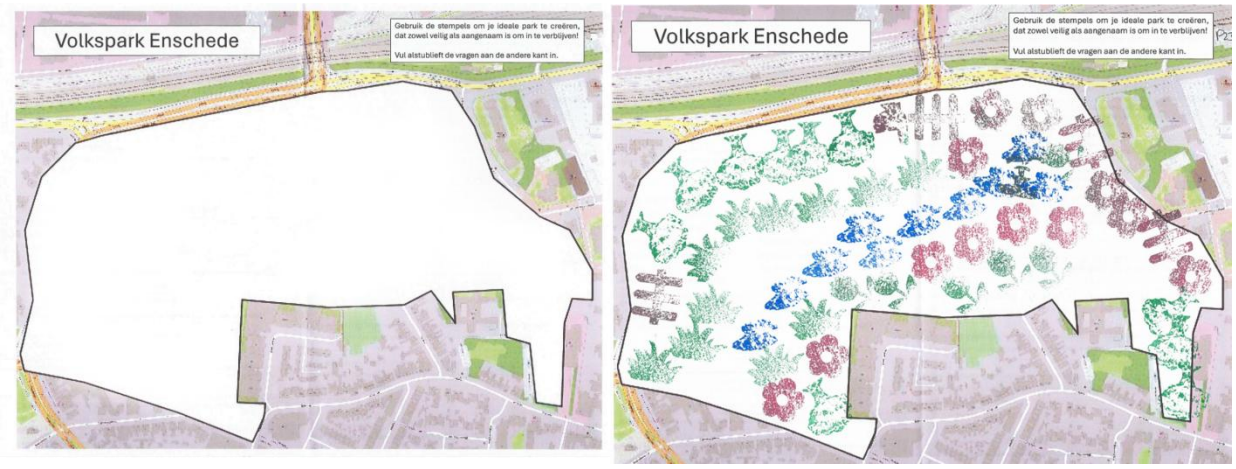
A total of 37 participants took part in the study, of which 19 were female (M_{age} = 72.37, SD = 6.08), 18 were male (M_{age} = 73.06, SD = 7.47). 13 (13.1%) of participants indicated to be hetero, while 24 (64.9 %) participants did not indicate anything regarding sexuality. All participants were Dutch. 18 (48.6%) of participants were pensioners, 6 identified themselves as housewife (16.2%) the remaining 8 (21.6%) participants had a different profession or preferred not to answer (n = 5, 13.5%). Participants were recruited via Scipio, a church app with a social media aspect, word of mouth, flyers and emails to nursing homes. Most participants were requited in Enschede (n = 31, 83.9%), while 6 were from places more than 150km away from the Volkspark in Enschede (16.2%). A participant was included in the final dataset when they fulfilled the following requirements; being at least 60 years of age and having sufficient knowledge of the English, German or Dutch language. Ethical approval for the study was granted by the University of Twente Ethics Committee with the number 250236.

Materials

The study was administered on a double-sided A3 piece of paper. All the information on the paper was in Dutch. On the front side of the paper was the outline of the Volkspark in Enschede on a background of a screenshot taken from Google Maps of the streets surrounding the park (see Figure 1). The outline was filled in with white leaving a blank space for participants to design their ideal park on. Above the outline were to textboxes, one with the name of the park and the other with instructions for the participants. On the back side of the paper was a questionnaire designed for the purpose of the study (see appendix B).

Figure 1

a. A3 Park Design Blank *b. A3 Park Design filled in*



Note. These figures illustrates the A3 page given to participants. They were given the instructions to stamp and draw in the white space.

Questionnaire

The questionnaire consisted of three distinct sections; informed consent form, questions regarding participants' demographics, park usage, and questions about safety and pleasantness in parks (see Appendix A & B). The questionnaire contained a total of twenty-three questions. Three of them were ranking questions and the others were either closed or open questions, requiring participants to write out their answers. For the demographic questions age, gender, sexuality, and other background questions such as employment and education were asked. Park usage questions ranged from the participants proximity to a park, as well as their visitation preferences and reasons. Questions about the perception of safety and pleasantness in parks were asked by ranking questions gathering an overall feeling of safety in parks as well as asking participants to rank park features in order of most to least importance for both safety and pleasantness separately.

Park Design

Participants were provided with stamps made from cork and a pen to design their parks. The stamps were made by cutting outlines of various park features (e.g., trees, benches, water fountains, streetlights) into cork with a laser cutter and then gluing the various shapes onto small cork squares (3.5cm ×3.5cm/3.5cm ×4cm) (see Figure 2). These cork pieces were painted on the sides because the laser cutter darkened the cork, and participants would have gotten their hands dirty. The pens and stamp pad colours used in the study were green, blue, and red.

Figure 2

a. Cork Stamps *b. Cork Stamps Stamped*

Note. These figures illustrates all the stamps given to participants. From top to bottom, left to right; Tulip, Generic flower, Trashcan, Bench, Picnic Bench, Tree, Café/Restaurant/Shop, Playground, Medical aid, Police, Camera, Grass, Bush, Toilet, Streetlight, Fire, Fountain, Lake, Signpost, Fence.

Design & Procedure

All participants were explained the questionnaire and park design concerned people's perception of safety and pleasantness of parks. They were informed about the study's design and procedure, asked if they had any questions and assured confidentiality. After participants gave informed consent, they answered questions about their demographics. The demographic questionnaire was followed by questions relating to participants' park usage, habits, proximity to parks, questions of their perception of safety and pleasantness of parks and raking questions to relate safety and pleasantness to park features (see Appendix B). Once participants completed the questionnaire, they flipped the A3 paper and were given stamps, stamp pads and a pen to create their ideal park. Participants were reminded the park should be their ideal park that they find both safe and pleasant to be in. Furthermore, they were told they could use any of the stamps but did not have to use all of them and were free to draw additional elements with a pen. Participants could ask questions about any aspect of the stamps and their designs and were given no time limit to finish their park design.

Data Analysis

The data was gathered on paper and needed to be digitalised before analysing it. All responses were translated from Dutch to English. Excel was used to digitalise the quantitative data, while the qualitative data was digitalised with Word. The park designs were scanned. The quantitative dataset was exported to and analysed in RStudio. Demographic data was analysed and summarised using descriptive statistics (means, standard deviations and frequencies) to get a general view of the participants. Quantitative data regarding park usage and the feeling of safety was also analysed using descriptive statistics, the ranking questions could not be analysed using Wilcoxon signed-rank tests as responses were inconsistent. The qualitative data was analysed by creating tables per question in Word. Each table entailed the direct quote per participant, from which initial codes were derived, similar codes were grouped into overarching themes relating to safety and pleasantness. To analyse the park designs, heat density maps were created in QGIS. The heat maps were created by selecting and grouping the same shapes manually. Based on these groups the programme automatically created heat maps. The heatmaps were generated to visualise common placement patterns and park feature concentrations within the ideal park

layouts. This spatial analysis helped identify which features participants prioritised for creating a safe and pleasant park environment and where they preferred to locate these features. Only significant heatmaps where the density is clearly focussed and heatmaps where safety features mentioned in the ranking or qualitative data were gathered in one heatmap are shown.

Results

Of the 37 participants who participated in the study, 1 was excluded for not meeting study criteria, as they did not fill in the questionnaire completely, and refused to use the stamps. It is to be noted that many participants were shocked or angry when confronted with the question ‘gender’ and ‘sexuality’. Most (n=23, 63,9%) did not fill in the question ‘sexuality’ but were not excluded from the data. All responses were in Dutch, for the readability of this report English translations were used.

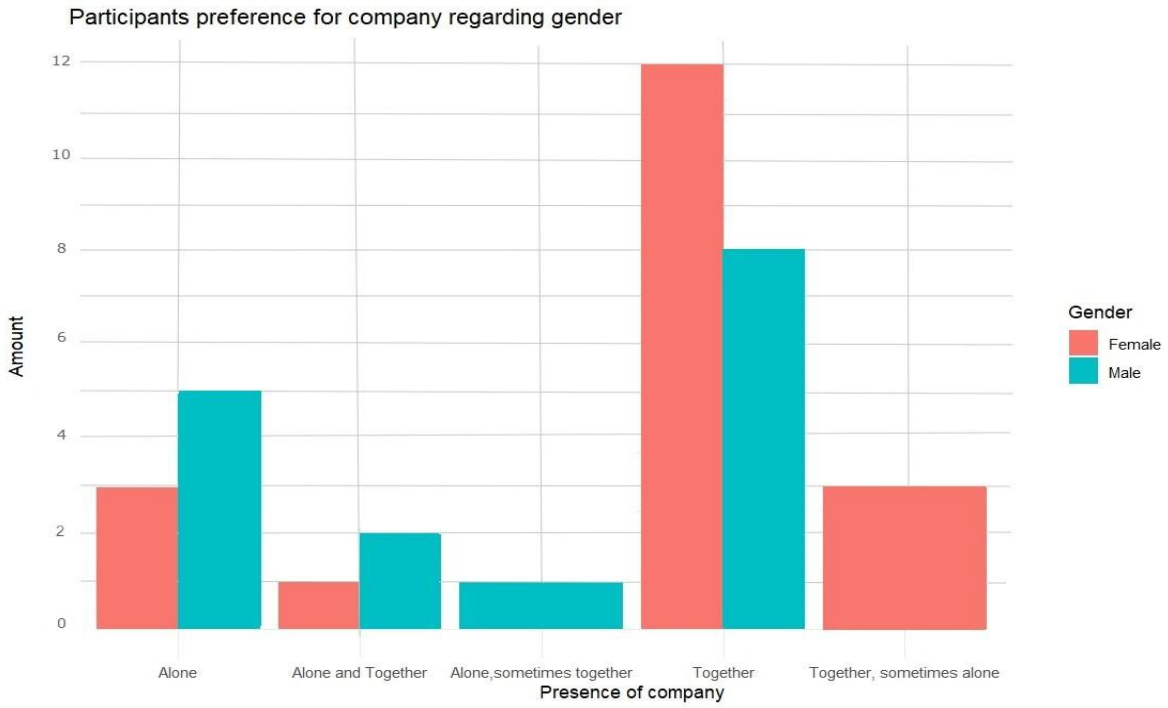
User Behaviour

To understand who the participants were and how this knowledge might affect the results, this section revolves around the background of participants; their knowledge and proximity of the Volkspark, preference for visitation and what activities they do in a park. Of the 36 participants, 31 (83,8%) stated that they know the Volkspark in Enschede, of those who know the Volkspark, live relatively close to the Volkspark (n=27, mean = 3,37 kilometres).

Participants reported their preference for visiting a park alone or together. These responses were analysed and formatted in the categories; Alone (n=8), Alone and Together (n=3), Alone, sometimes together (n=1), Together (n=20), Together and sometimes alone (n=3). These responses were then analysed by gender and age. The results indicated that men typically visit the park alone more often than women and women visit a park together more often than men (see Figure 3). For age, people who are nearing 80 years old are more likely to visit the park together than people nearing 60 years old (m=72, versus m=71).

Figure 3

Bar Chart Participants Preference for Company Regarding Gender



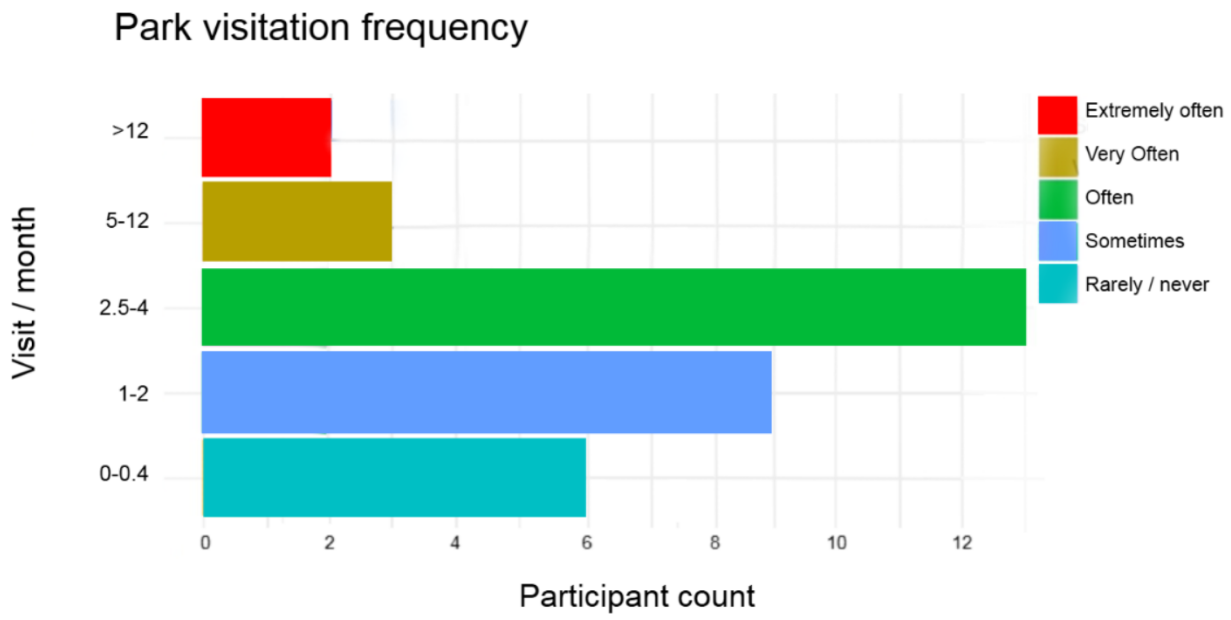
Note. N=35. Responses from the question: 'When you go to the park, do you usually go alone or are you accompanied by somebody?' formatted in a bar chart using Rstudio. Preferences divided by gender.

No participants indicated taking a pet with them when visiting a park.

Participants reported the number of times they visited parks in general per month in both numeric and textual formats. To allow for quantitative analysis, all responses were categorized into five frequency groups; Never / Rarely (e.g., 0, 0.08, 0.3, 0.4), sometimes (1–2 times per month, or responses like "sometimes," or "in other cities on holiday"), Often (2.5–4 times per month, or "sometimes"), Very Often (5–12 times per month) and Extremely Often (>12 times per month, or "we live next to it"). The most common answer given (n=13, 38,2%) was that participants sometimes visited a park (see Figure 4).

Figure 4

Park Visitation Frequency



Note. N=34. This Figure illustrates the responses to the question: ”How often do you visit a park per month?”.

To analyse the preference of visitation, the results from the question: ‘Does the time-of-day matter with regards to your experience in the park? If so, why?’ were put in a coding scheme. Of the 35 answers, 26 explicitly mention ‘when there is daylight’ or ‘during the day’. For most of these answers a reason was given (n=21), these were inductively analysed to extract themes and create codes. For 7 people the time of day did not matter, and two did not mention a specific time of day but rather a motivation (‘yes, a café with coffee’ and ‘a special visiting point’). The first the main themes were gathered; Motivation: practicality (e.g., ‘In the morning or early noon, as it is not crowded then; or ‘Afternoon, fits in life schedule’), Motivation: safety (e.g. ‘During the day, it feels safer'; or ‘During the day, because of safety with grandchildren or family/friends’), Motivation: enjoyment (e.g. ‘During the day, better enjoyment of nature’; or ‘Afternoon, nice moment to take a walk’), and Motivation: visibility (e.g. ‘During the day, because you see more and it feels safer’; or ‘When there is light, in the dark you cant see anything and sometimes the paths are not good’) (see Table 1).

Table 1

Motivation Time of Day

Motivation	Codes	
	N=21	%
Safety	7	33,3
Enjoyment	7	33,3
Visibility	4	19,0
Practicality	3	14,3

Note. Subcodes not included in analysis, as most answers related well to the main codes. Replies were very short.

Participants were also asked what kind of activities they typically engage in when visiting a park. These answers were gathered and put in a coding scheme. The main codes and subcodes can be found the table below (Table 2). 40 reasons were gathered from 29 participants. The most prominent reason for visiting a park was for walking (n=23, 79,3%).

Table 2

Coding Scheme Activities in Park

Main codes	Subcodes	N= 40	137,9% (N=29)
Physical activities		**26**	
	Walking	23	79,3
	Cycling	3	10,3
Observation		**5**	
	Enjoying nature	2	6,9
	Birdwatching	1	3,4
	Photography	1	3,4
	Observing	1	3,4
Relaxation		**4**	
	Sitting	3	10,3
	Unwinding	1	3,4
Social interaction		**4**	
	Activities with grandchildren	3	10,3
	Socializing	1	3,4
Individual recreation		**1**	
	Reading	1	3,4

Safety

Quantitative Results

The feeling of overall safety in public parks was measured using a 5-point Likert scale ranging from 1 (Totally unsafe) to 5 (Totally safe). The mean score across all participants was 4.41 (n=34), indicating a generally high level of agreement with the statement presented. The most frequently selected response was 5, further suggesting a strong tendency towards feeling ‘totally safe’. A slight difference was found between the results of men and women, women (n=18) reported on average a safety rating of 4.17, men (n=16) however reported a higher mean of 4.69. In total, 88% of participants rated their safety at 4 or 5, reinforcing the conclusion that park environment was perceived as safe by most of the participants.

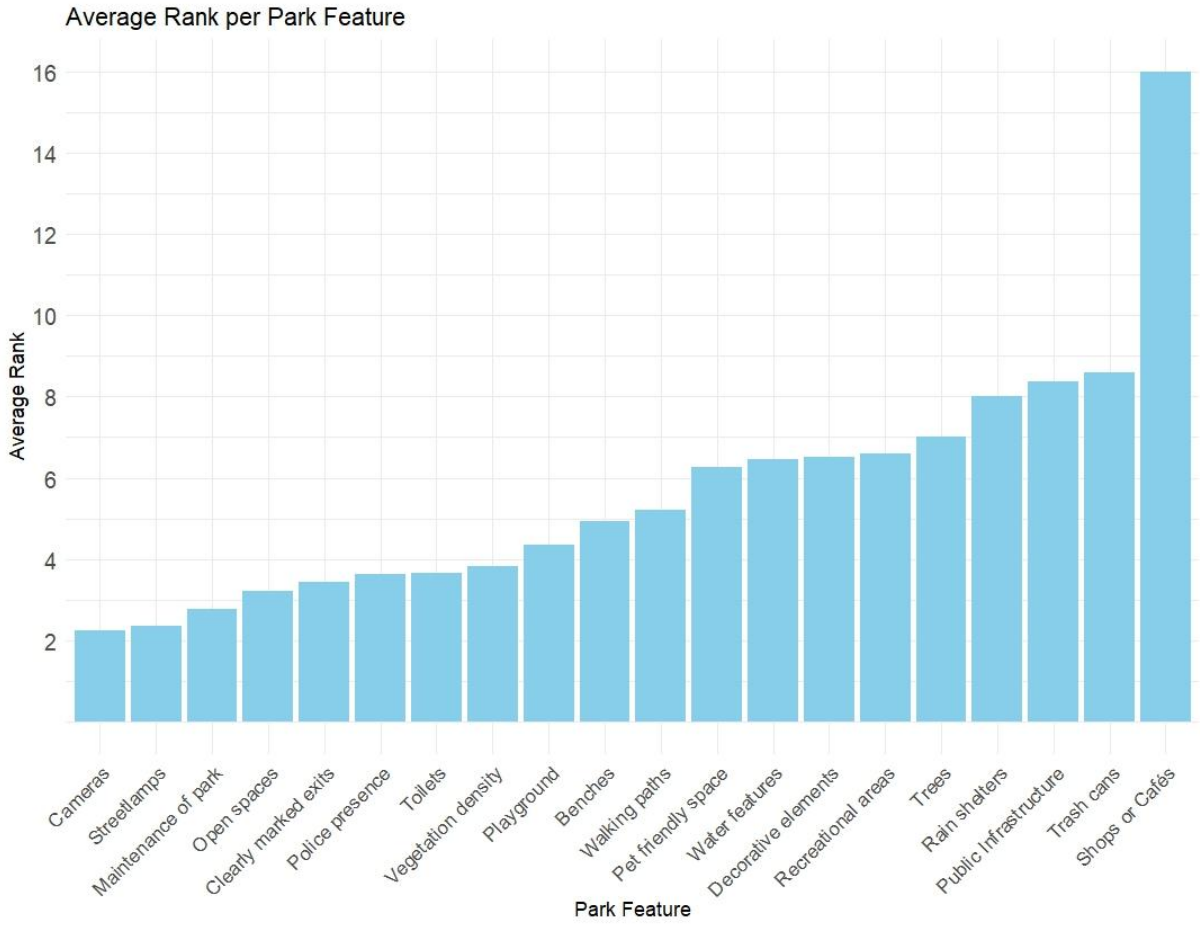
To find out what features contribute the most to the feelings of safety, participants were given a ranking task of 20 park related features. These included: 1. Inclusive public bathrooms 2.

Camera surveillance 3. Maintenance of park infrastructure 4. Presence of security or police 5. Street lamps 6. Clearly marked exits 7. Vegetation density 8. Open spaces 9. Playground for children and families 10. Recreational areas (e.g., outdoor gym or football pitch) 11. Benches and communal seating areas (e.g., also incl. BBQ spots) 12. Pet friendly places 13. Decorative elements (e.g., flower gardens & insect hotels) 14. Water features (e.g., lakes, fountains, small rivers) 15. Forests and Trees 16. Accessible and clearly-marked walking paths (e.g., also passable for wheelchairs or strollers) 17. Trash cans 18. Shops or Cafés 19. Rain shelters 20. Public Infrastructure (e.g., parking for bikes or cars, public transportation access). Participants were asked to order them in a manner of most to least importance.

Comparing average ranks across safety a should help identify items that are ranked as safer than others. As shown in figure 5, this analysis resulted in a partially linear pattern. Not one participant completed the full ranking (n=34, 100%). On average, participants listed approximately 6 items (n = 34, mean = 6.24, median = 5, mode = 4 and 5, minimum = 2, maximum = 17), indicating a considerable variation in the number of responses. To still use the data, the number of rankings were gathered and analysed to see how often the participants mentioned a certain feature in their 'ranking' (see figure 6). Streetlights (n=23 67,6%), Open spaces (n=24 70,6%) and Accessible and clearly-marked walking paths (e.g., also passable for wheelchairs or strollers) (n=19 55,9%) were mentioned the most by most.

Figure 5

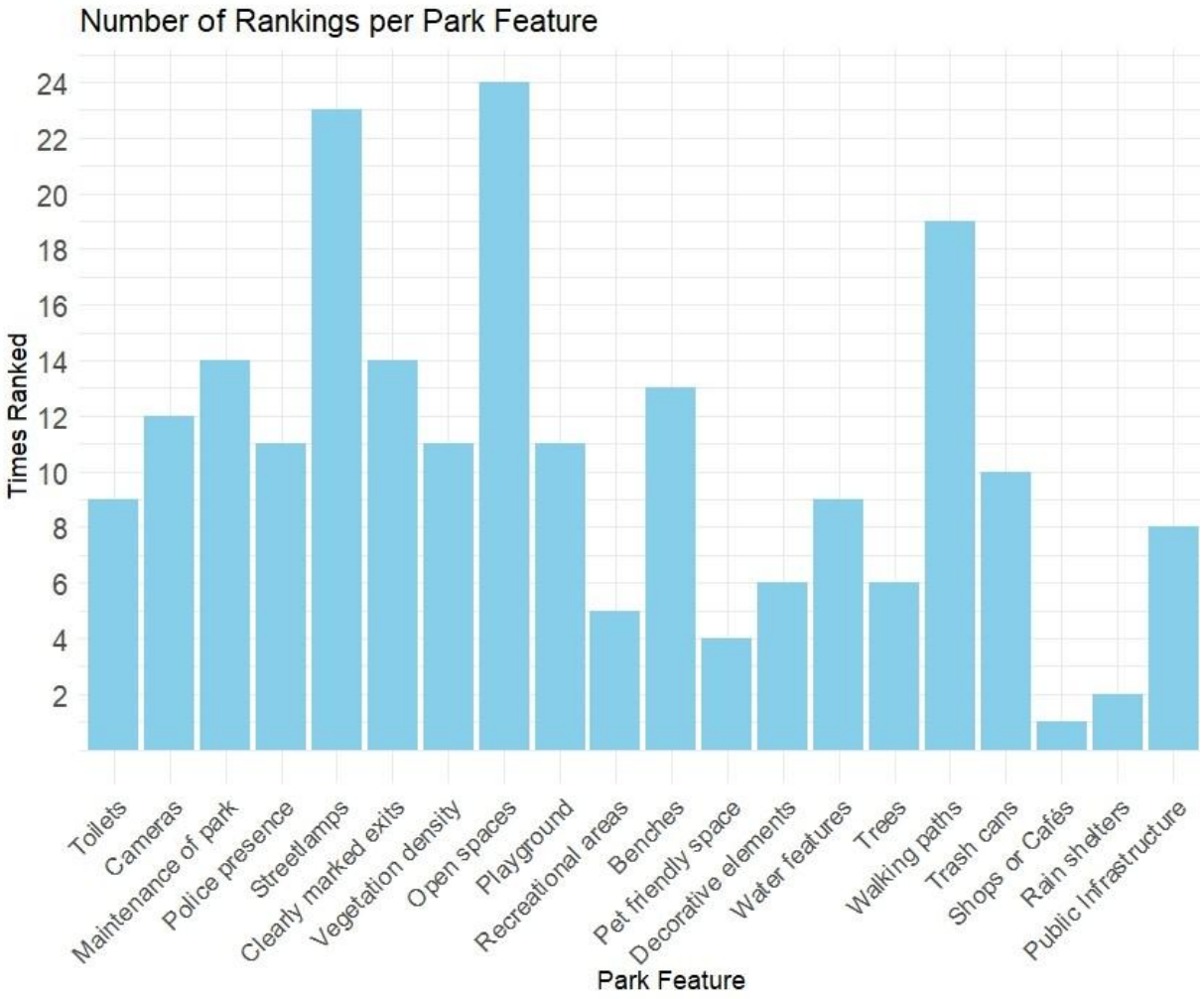
Average Rank in Ranking per Park Feature for Safety



Note. Average rank per item number. The higher a bar of an item number per dimension, the less important it is in the rank. Items with low average rank were considered more important to safety.

Figure 6

Number of Rankings per Park Feature for Safety



Note. N=34. The number of times each park feature was mentioned in a ranking for safety.

Qualitative Results

Open responses to the question ‘When do you feel safe in a park? What makes a park feel safe?’ were inductively analysed through a coding scheme. 80 relevant themes (out of 34 answers) were extracted from each answer which resulted in 5 main codes but also shown in the word cloud below (see figure 7). The word cloud reveals a consistent pattern: Lighting, Openness, Pathways and the Company and Presence of other people were perceived as belonging to safety and mentioned the most. However, the presence of other people was also associated with feelings of unsafety, for example ‘no loitering youth, no provocative public, not crowded’ were mentioned.

Figure 7

Word Cloud Safety

Note. Word cloud made in Rstudio from themes derived from answers pertaining to the question ‘When do you feel safe in a park? What makes a park feel safe?’. The answers were reduced to themes which answers the question, ‘I feel safe in a park when there is …’

For the coding scheme, the 80 themes were categorized into 5 main codes and 24 subcodes (see table 3). The most frequently mentioned code was Maintenance (n = 22, 27,5%), reflecting the importance of good lighting and cleanliness in how participants perceive safety in parks. This was closely followed by Visibility (n=21, 26,25%), indicating the significance of open spaces, clear views, and unobstructed sightlines. Social Presence (n=15, 18,75%) and Park design (n=13, 16,25%) was also referenced quite often, again one can see that the presence of other people plays an important role (although opinions were divided if social presence was positive (n=9) or negative (n=6)). In Park design, pathways and how they are constructed are mentioned often (n=8, 10%). Safety Measures such as police presence and surveillance were mentioned least often (n = 5, 6,25%), though still present in the data. Only 5 participants (6,25%) mentioned that they always felt safe in a park, 3 with additional remarks about why they felt so, such as ‘always, at most when there is a bunch of shady characters walking around, but I hardly ever encounter that’. These findings suggest that participants prioritize environmental features that support light, visibility and openness over formal or institutional safety interventions.

Table 3

Coding Scheme Safety

Main Code	Subcodes	Mentions (n=80)
Maintenance		**22**
	Light	11
	Daylight	5
	Lighting at night	3
	Clean and maintained appearance	3
Visibility		**21**
	Open spaces	13
	Overview of surroundings	3
	Clear pathways	2
	Transparency	2
	No big bushes	1
Social Presence		**15**
	People present	6
	Accompanied by someone	3
	No groups of youth	3
	No provocative public	2
	Not too many people	1
Park Design		**13**
	Broad pathways	5
	Fits well in living area	3
	nature features	2
	Space around paths	2
	Bike-friendly	1
Safety Measures		**4**
	Regular enforcement	2
	Cameras	1
	No unleashed dogs	1
	Always safe	**5**

Note. Most subcodes are the themes of the answers provided. Only some subcodes are different themes lumped together, such as ‘nature features’ which consist of ‘high trees’ and ‘water features’.

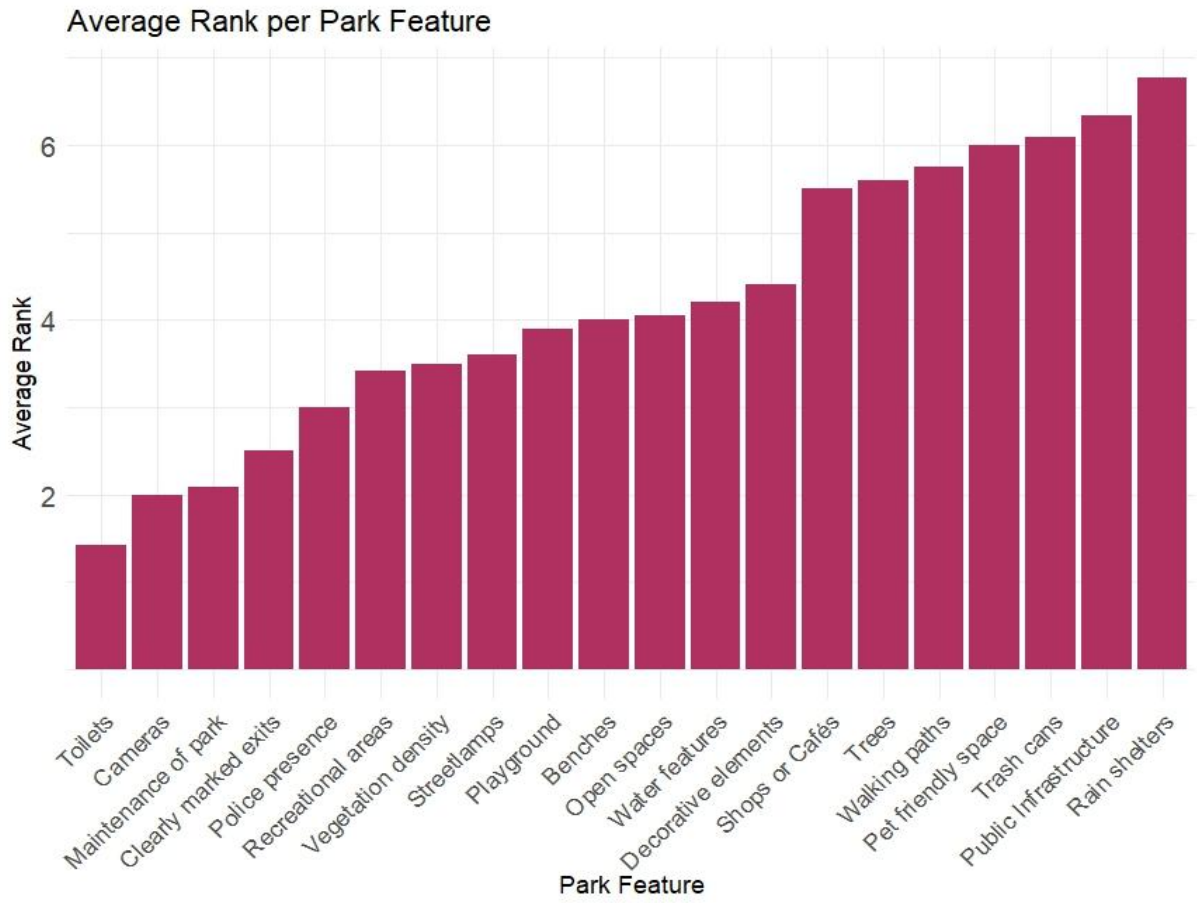
Pleasantness

Quantitative Results

To find out what features contribute the most to the feelings of pleasantness, participants were given the same ranking task of 20 park related features as the safety question and tasked to order them in a manner that is most important to them. Just like the safety ranking, the analysis was inconclusive due to missing data. Participants did not rank all features from most to least important, and only listed a few that were personally most relevant, often using the order in which the features were presented. As shown in Figure 8, this resulted in a partially linear pattern. Additionally, not all participants completed the full ranking. On average, participants (n=36) listed approximately 7 items (n = 36, mean = 6.72, median = 6.5, mode = 5, minimum = 2, maximum = 17), indicating a considerable variation in the number of responses. To still use the data, the number of rankings were gathered and analysed (see Figure 9) to see how often the participants mentioned a certain feature in their 'ranking'. Benches and communal seating areas (n=28, 77,8%), Water features (n=24, 66,7%), Trash cans (n=21, 58,3%), Decorative elements (n=20, 55,6%) and Forests and Trees (n=20 55,6%) were mentioned the most by most.

Figure 8

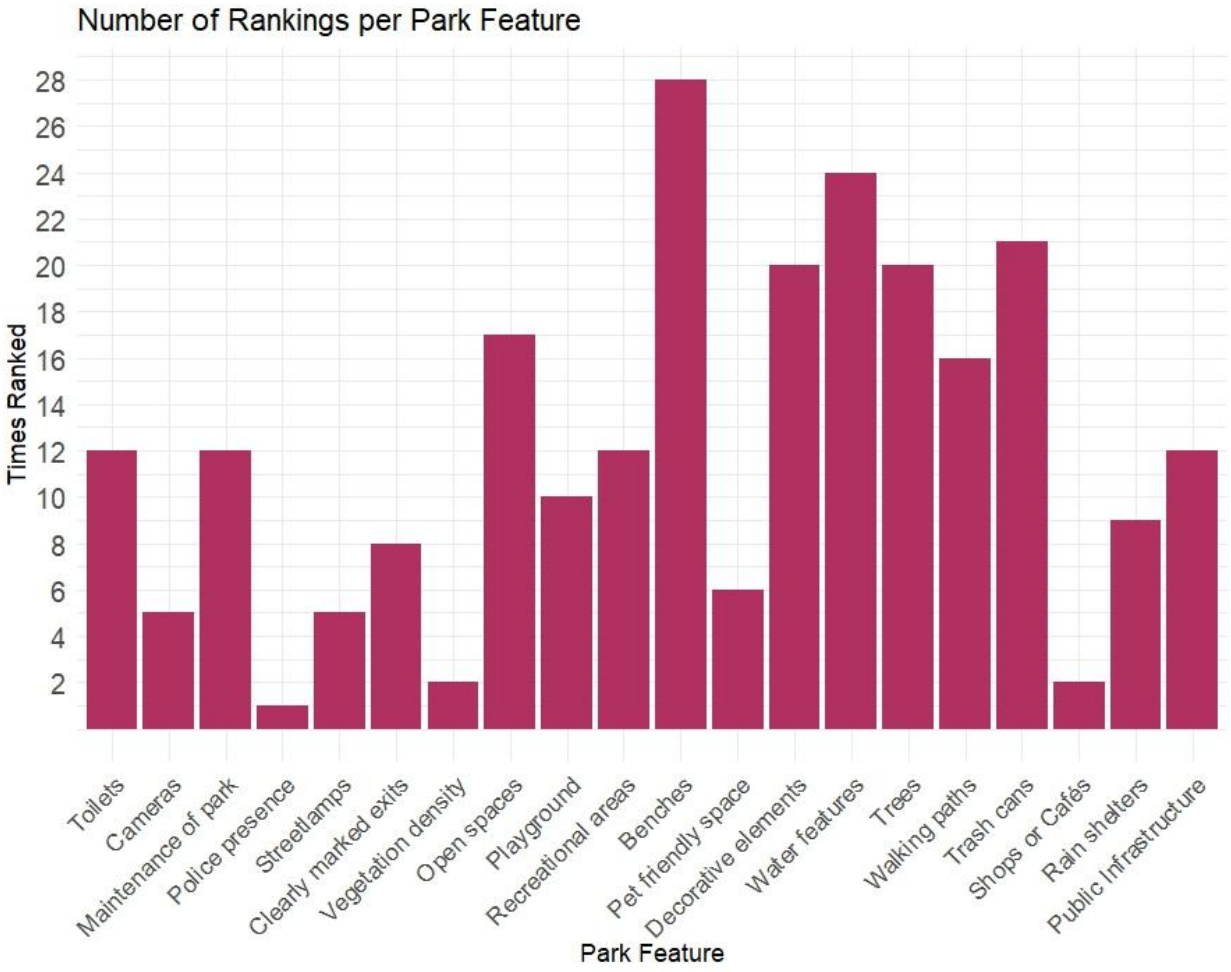
Average Rank in Ranking per Park Feature for Pleasantness



Note. Average rank per item number. The higher a bar of an item number per dimension, the less important it is in the rank. Items with low average rank were considered more important to pleasantness.

Figure 9

Number of Rankings per Park Feature for Pleasantness



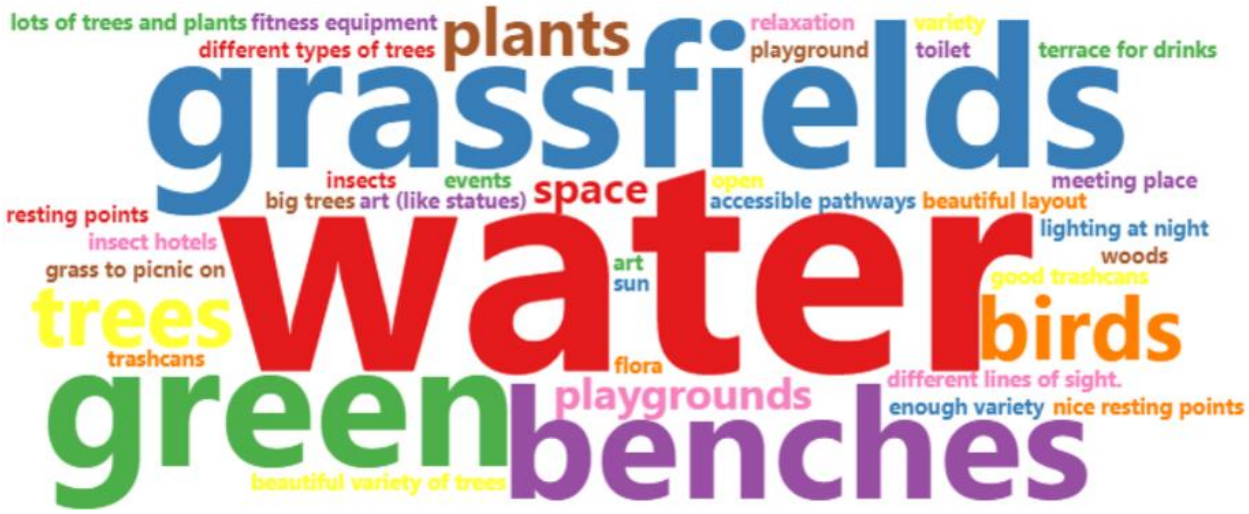
Note. N=36. The number of times each item was mentioned in a ranking for pleasantness.

Qualitative Results

Open responses to the question ‘What aspects make you like a park/what do you enjoy about parks?’ were inductively analysed through a coding scheme. 122 relevant themes (out of 36 answers) were extracted from each answer which resulted in 3 main codes but also shown in the word cloud in Figure 10. The word cloud reveals a consistent pattern: Water, Grass fields, Greenery, and Benches were mentioned the most as belonging to pleasantness.

Figure 10

Word Cloud Pleasantness



Note. Word cloud made in Rstudio from themes derived from answers pertaining to the question ‘What aspects make you like a park/what do you enjoy about parks?’. The answers were reduced to themes which answers the question, ‘I feel pleasant in a park when there is …’.

For the coding scheme, 122 themes were categorized into 3 main codes and 16 subcodes (see table 4). The most frequently mentioned code was Natural Features (n = 75, 61,5%), reflecting the importance of nature and water elements in how participants perceive pleasantness in parks. Park design also plays a role, although significantly less of a role than natural features (n=41, 33,6%) , notably benches (n=12), pathways (n=6) and openness (n=5) are mentioned more than others. For the main code subjective experience, only 5 themes were coded in this category. Although peace was mentioned on its own a lot (n=5), beauty was mentioned in

relation to nature more often than alone, if categorized in beauty this code would have 6 themes. In reality, beauty was only mentioned once as a theme on its own. Across all main codes variety was mentioned a lot as well (n=9, 7,4%). These findings suggest that participants prioritize environmental features that support greenery, water elements and flowers above park design or certain amenities such as a toilet or trashcan.

Table 4

Coding Scheme Pleasantness

Main Codes	Subcodes	Mentions n=122
Natural Features		**75**
	Greenery	18
	Water elements	14
	Flowers	12
	Animals	10
	Grass	10
	Trees	6
	Variety	5
Park design		**41**
	Benches	12
	Recreation opportunities	7
	Pathways	6
	Openness	5
	Decorative elements	4
	Variety	4
	Amenities*	3
Subjective experience		**6**
	Peace	5
	Beauty**	1

*Amenities such as toilet, trashcans.

**Beauty was mentioned many times in relation to nature (n=5) these answers contribute to natural features.

QGIS

To visualize the frequency of certain park features stamped, all stamped maps were digitized and georeferenced in QGIS. Point data from the stamps were aggregated and analysed to produce kernel density heatmaps reflecting object density (see Appendix C). Table 5 illustrates the number of objects placed on the maps in total. Trees (m=9.57, n=354) flowers (m=7, n=259), grass (m=5,59, n=207), and streetlights (m=5,46, n=202) were placed the most.

Heatmaps were created from all park features individually. Notably, trees were placed around the border of the park (figure 11a) and water structures were placed in the middle of the park (figure 11b). To create a heatmap about safety, the stamps ‘camera’, ‘streetlights’, and ‘police’ were analysed together. The heatmaps showed high concentrations of "safe" stamps around park entrances (see figure 12).

Table 5

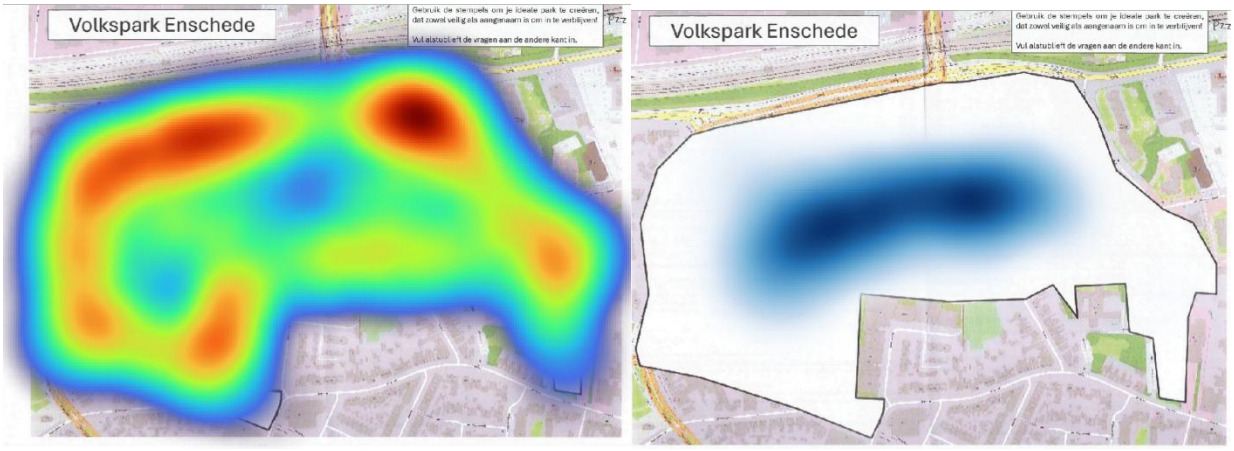
Object Distribution and Average Amount on Maps

Object	Amount of objects	Average amount of Objects found on maps (amount of objects/total map)
Trees	354	9,57
Flowers	259	7
Grass	207	5,59
Streetlights	202	5,46
Bench	168	4,54
Water	121	3,27
Bush	82	2,22
Exit	71	1,92
Trashcan	54	1,46
Fence	50	1,35
Signage	40	1,08
Playground	40	1,08
Fountain	39	1,05
Camera	36	0,97
Toilet	25	0,68
Fire	15	0,41
Cafe	15	0,41
Medical aid	7	0,19
Parking	6	0,16
Police	4	0,11
Animals	3	0,08
Bridge	2	0,05
Festival	1	0,03
Dog park	0	0
Path	15	0,41

Note. Points appointed by hand on QGIS, average calculated in Excel. Total map = 36. Amount of paths placed on a map is equal to one path design for each map. Meaning 15 people placed a path on their design.

Figure 11

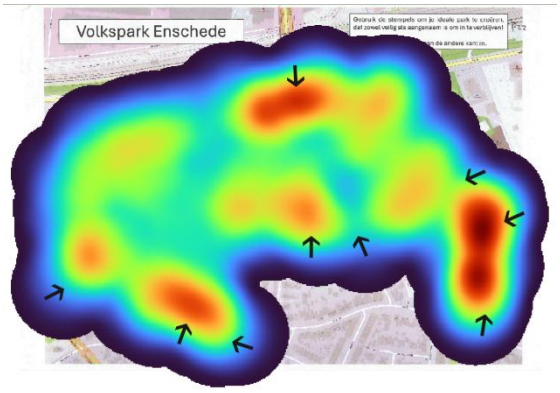
a. Heatmap Trees *b. Heatmap Water Structures*



Note. (A) Legenda 0 – 25.38. This means that nearing high density spots there are ~25 trees in the radius of 270 meters (of ~2148 meters, radius =1,5 stamp). (B) Legenda 0 – 26.87. This means that nearing high density spots there are ~27 water structures in the radius of 270 meters (of ~2148 meters, radius =1,5 stamp).

Figure 12

Heatmap Safety



Note. Heatmap from point data Camera, police, streetlights. Legenda 0 – 16.66. This means that nearing high density spots there are ~17 safety features in the radius of 270 meters (of ~2148 meters, radius =1,5 stamp). Arrows indicate where entrances/exits are located.

Discussion

The Dutch population is ageing. Parks provide opportunities for the betterment of health and well-being. Finding out what characteristics of a park in terms of safety and pleasantness are important for elderly people is a way of taking this population shift into account. This study also provides a new way of analysing park feature placement which brings the opinion of citizens as close as possible to future design guidelines. In this study, 37 participants were surveyed through a questionnaire and park design assignment about their thoughts on safety and pleasantness. The results showed that natural features, lighting, and visibility were associated the most with safety, and natural features, park design features namely benches, as well as subjective experiences were associated with pleasantness.

Implications for Safe Park Design

Overall people indicated that they felt safe in a park, 88% rated their safety between somewhat safe and totally safe with a slight difference between men and women (men indicating more often that they felt totally safe than women) and women visited a park more often together than alone than men. Natural features, lighting, and visibility were associated the most with safety rather than formal safety infrastructure such as police presence or cameras. This coincides with Doğrusoy and Zengel (2017) their research on perceived safety that concluded that wayfinding and environmental satisfaction appear to be significant parameters of safety instead of fear of crime. When cameras were used in participants their park design, they were placed near entrances and exits (see Figure 12). For concrete park features, participants noted that streetlights, open spaces, and accessible and clearly-marked walking paths were necessary to achieve a safe park. These chosen park features also coincide with previous research where elderly individuals are less likely to visit a park when park conditions such as poor lighting, signs of vandalism, traffic, loitering youth are present (Buffel, et al., 2012). In contrast, park conditions with clear sightlines, friendly atmospheres, accessible walking paths, sufficient sitting areas and natural elements are indicators that make elderly people stay longer in a park and visit more often (Kimic & Polko, 2022; Van Puyvelde et al., 2023). This implies that if a park feels safe, elderly people will visit a park more often. Spatial analysis also revealed that tree density was the highest at the border of the park (see Figure 11a), enclosing the park with trees yet spacing them out within the park. Relating this to safety, studies on tree and vegetation density

reveal that overly open park spaces lead to feelings of insecurity while enclosed spaces also lead to a reduction in the perception of security. semi-open spaces with a balance between openness and closeness are desirable for perceived safety (Sezavar et al., 2023).

Implications for Pleasant Park Design

The main themes associated with pleasant park design are natural features, park design features and subjective experiences. Of the natural features grass fields, greenery, water and flowers were most commonly mentioned as well as placed in the park designs. Especially semi-large bodies of water (see Figure 11b) placed in the centre of the park were popular placements. This is consistent with previous literature suggesting that exposure to nature improves both physical and mental well-being among elderly people (Sugiyama et al., 2008; Roe et al., 2013). The most common activity people performed in parks is walking, followed by other forms of leisure such as observation or relaxation activities. This reinforces the value of peaceful and accessible environments. Benches, accessible and clearly marked pathways, and recreational builds were also valued highly by participants. These features and activities address physical mobility and comfort, which are also highlighted in both quantitative and qualitative research as essential for park-design (Cooper Marcus, & Sachs, 2014; Orsega-Smith et al., 2004). When these features are in place in an accessible and sensory pleasant way, elderly people are more likely to visit a park (Zhang, et al. 2025).

Furthermore, elderly people their accessibility to pleasant and well-designed parks is increasingly recognised as an environmental justice issue as already flagged by Talbot & Kaplan in 1991 but also mentioned in recent studies on park design issues (Onose, et al., 2020). The concepts of emotional attachment, leisure engagement, and social inclusivity in natural settings are seen more and more often in urban design research next to safety and health concepts (Besenyi et al., 2013). The methods used to gather the results and their findings support this expansion in research, although primarily focussed on safety and pleasantness, the findings correlate to these concepts found as well. Integrating these insights into park design guidelines or municipality plans might entice elderly people to visit parks more often, thereby potentially increasing their well-being and health as well as more frequent and meaningful engagement amongst each other, as suggested as well by Sugiyama & Ward Thompson (2007).

Implications for Enschede

The results also have direct implications for the Volkspark in Enschede. The placement of certain park features coincided with the current placement of these features in the Volkspark (such as water and exits), yet some features differ from the current design. On average 7 flower fields with the circumference of 50 meters per field were placed per park design, which differs from Volkspark drastically, as Volkspark only has two flower park placements. Another difference is that The Volkspark has 35000 meters of Sport fields, which none of the Elderly participants realized in their park design (Geschiedenis | Het Volkspark, n.d.). This could imply that the current placement of sport fields does not contribute to the safety or pleasantness for elderly people in Enschede. What was further noted in the interviews was that people that did visit a park, did not visit the Volkspark in Enschede, even if they lived within 2 kilometres of said park. Being in the city centre some mentioned feeling less relaxed or being in nature and would rather drive to a larger park or a nature reserve to walk and enjoy nature. They felt the Volkspark was a good place for events and picnics and whatnot, just not for them. To combat this, it is interesting to note that a playground was stamped on average more than once for every park. This implies that the elderly citizens would come to the Volkspark if there are amenities to bring their grandchildren, this is also implied by some mentioning 'grass field to play on' or grass in general and benches. Some also mentioned this as their usual activity in a park. A central park like the Volkspark or other urban parks in Twente area would benefit if the focus was less on it being a tranquil piece of nature, but more for grandparents to come with their grandchildren, as people visit different nature parks to experience peace and enjoy walks.

Limitations

Sample Composition

The generalizability of the results is limited by its sampling pool. With 37 participants gathered solely from one institution (church) the generalizability may be weakened.

Methodology

For the methods, using cork stamps is an affordable, quick way to gather data and during the data gathering process participants found the activity engaging. The problem with cork

stamps however is that it takes more strength to wield than for example rubber stamps. This resulted in some participants discontinuing their park design by reasons of fatigue. One can also see how by using these stamps a park can become muddled and make it more difficult to analyse (see appendix C). When looking at the park design, many have similar feature placement to the volkspark in reality. The question arises for what reasons participants placed them that way, and if they created their ideal park, or if they did not care about or understand the assignment correctly.

Data Gathering

Furthermore, the questionnaire addressed park visitation asking only about how often someone visited the park turned out to be ambiguous. The park design assignment is also limited due to the formulation of the assignment, designing an ‘ideal park with safety and pleasantness in mind’ (see Appendix B) limits the analysis in which park features relate to safety or pleasantness.

Data Analysis

The analysis of the ranking questions was somewhat inconclusive as well as the average ranking of each park feature shows a linear pattern (see figure 7). This means that some participants did not create their own ranking but wrote down some numbers in the order of the item numbers they were given (eg. '3,5,8,15,17' or '5,8,11,12,13,17,20'). If this data was removed, only 61,8% (n=21) of the data remains, this is without the assumption that people agree that the order of the items are ranked from most to least important. Because of this, no further analysis had been done for this set of data. Participants also only filled in a few park features per question (6 or 7 on average). It is speculated that participants interpreted this question as what is most important to them in terms of safety and pleasantness. If we take this into account, how often a feature is mentioned becomes a relevant statistic (figure 8). The reliability of this data is severely impacted by using this method however, as it assumes that participants responded a certain way based on a question that wasn't asked in the first place.

Theoretical Concepts

All the data gathering and interviews were held in Dutch. The translations were done by native Dutch speakers, yet it still impacts the understanding of the concepts safety and pleasantness, as they have a slightly different meaning in Dutch. This affects the validity of the findings on the concepts. Another limitation is restricting the concepts of this research to safety and pleasantness. To gather what elderly people find important in a park, constraining the question to the terms of safety and pleasantness might limit the answers given. The method of conducting this study lends itself well to unearthing broader concepts relating to what could bring elderly people to a park.

Future Research

Sample Composition

Gathering a diverse and substantial sample is essential for a broader applicability and validity of this study. More time and a different approach to contacting nursing homes would likely yield a better sampling composition.

Methodology

To address the strength needed for handing the cork stamps, a switch of material or adding a better handle for grip and strength distribution could alleviate fatigue and make a park design complete. For the park design assignment, a better option would be to ask people to design an ideal safe park, and an ideal pleasant park, or one of the two. This way park feature placement can be analysed between safety and pleasantness.

Data Gathering and Analysis

An additional question to address park visitation could be ‘how long do you usually stay in a park?’ to understand if it is a necessity to pass through the park or if they come to the park with the purpose of being in the park, both of which might influence the results. The ranking questions are too long and difficult to understand as interpreted from the results. To combat this problem, shortening the questions to ‘what park features are most important to you in terms of

pleasantness/safety? (write down at least 5)' would be an option. The same analysis can be done with more reliable results as an outcome.

Theoretical concepts

The methodology of using quantitative and qualitative data gathering lends itself well to broader concepts, as the subjective experiences can be easily gathered through the survey and see the practical implications these could have in the design of a park. Examples of concepts that are important to analyse for urban park design which could be analysed this way are accessibility, soundscape perception, or thermal perceptions (Guo et al., 2019; Li et al., 2025; Ma et al., 2021).

To build on the results of the study, further research with similar methods could be done on the details of what it means to create an 'open space' or accessible walking paths. This inductive research could help form design guidelines even more through citizen science, connecting a municipality to its inhabitants, a park to its visitors. Another suggestion would be to involve city or park planners with elderly people through a discussion group. When the data was gathered, what participants said was sometimes more interesting for park design than what they could write, conducting an interview could be beneficial to gather these valuable thoughts. Based on the theoretical framework and the findings of this research additional work can be directed more in urban design processes as well as the evaluation of parks based on these guidelines as further research is recommended to verify the accuracy of the design strategies. Taking the design participants made and having them experience their design through VR, 3d models or other technology might contribute even more to finding what safety and pleasantness means through their eyes.

Conclusion

This research aimed to identify what characteristics of a park make it safe and pleasant for elderly people to be in. Based on a quantitative and qualitative analysis of park design and experiences, it can be concluded that natural features, lighting, and visibility are important factors for safety and pleasantness to consider when designing a park. While the small sample pool limits the generalizability of the results, this approach provides a new and personal insight into elderly people who live in Enschede. The results support the main findings of other studies

conducted about elderly people in parks yet go beyond the standard survey. Involving the park design assignment revealed the placement of lights at park entrances, which may not have been found if the survey was the only data gathering device. To better understand the relationship between the park design and the concepts of safety and pleasantness, future studies could address only using one concept to design a park. Based on these conclusions, policy makers or park designers could consider adding more benches, open spaces, and lights to address the needs of elderly people. This work shows how citizen science methods can guide more inclusive park design planning in aging societies such as the Netherlands.

Appendix

During the preparation of this work, I used ChatGPT to help solve problems in my R script for the data analysis and to review my grammar structures in the discussion. I also used Scribbr to organise my reference list. After using these tools, I thoroughly reviewed and edited the content as needed, taking full responsibility for the final outcome.

Appendix A

Consent form

Please tick the appropriate boxes

- ❑ I understand the study information read to me. I have been able to ask questions about the study and my questions have been answered to my satisfaction.
- ❑ I consent voluntarily to be a participant in this study and understand that I can refuse to answer questions and withdraw from the study at any time, without having to give a reason.
- ❑ I understand that taking part in the study involves filling in a survey questionnaire and that the information I provide will be used for research purposes and a report to the municipality of Enschede.

Please give written consent (yes or no): **Date**

_____ _____

If you have any other questions or remarks, feel free to reach out to me or my fellow researchers:

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Appendix B

B1 Questionnaire – English version

Profile

- Age:
- Gender:
- Highest Education:
- Nationality/Nationalities:
- Sexual Orientation:
- Job:
- Time lived in Europe:

Park, Safety & Habits

- When do you feel safe in a park? What makes a park feel safe?
- What aspects make you like a park/what do you enjoy about parks?
- When you go to the park, do you usually go alone or are you accompanied by somebody?
- Do you have a pet you like to take to the park with you?
- How often do you visit, on average, a park in general in a month?
- Does the time-of-day matter with regards to your experience in the park? If so, why?
- What kind of activities do you typically engage in when in a park? What do you do?
- Do you live in the proximity to any park?

Volkspark

- Do you know the Volkspark in Enschede?
- How often do you visit the Volkspark in Enschede in a month?
- How close do you live to the Volkspark in Enschede?

Feelings of Safety in Parks

In general, how safe do you feel in public parks?

Totally unsafe (1) somewhat unsafe (2) Undecided (3) somewhat safe (4) Totally safe (5)

Perception of safety and quality of life

- Rank from most to least important. What features of a park contribute the most to your perception of safety and security?
- Rank from most to least important. What features of a park contribute the most to your perception of the quality of life?

(1) Inclusive public bathrooms
(2) Camera surveillance
(12) Pet friendly places

(3) Maintenance of park infrastructure
(4) Presence of security or police
(5) Streetlamps
(6) Clearly marked exits
(7) Vegetation density
(8) Open spaces
(9) Playground for children and families
(10) Recreational areas (e.g., outdoor gym or football pitch)
(11) Benches and communal seating areas (e.g., also incl. BBQ spots)
(13) Decorative elements (e.g., flower gardens & insect hotels)
(14) Water features (e.g., lakes, fountains, small rivers)
(15) Forests and Trees
(16) Accessible and clearly marked walking paths (e.g., also passable for wheelchairs or strollers)
(17) Trash cans
(18) Shops or Cafés
(19) Rain shelters
(20) Public Infrastructure (e.g., parking for bikes or cars, public transportation access)

Additional Questions

- Do you have any comments regarding the study or your park design?
- Were there any stamps you would have liked to have in addition to the ones we gave you?

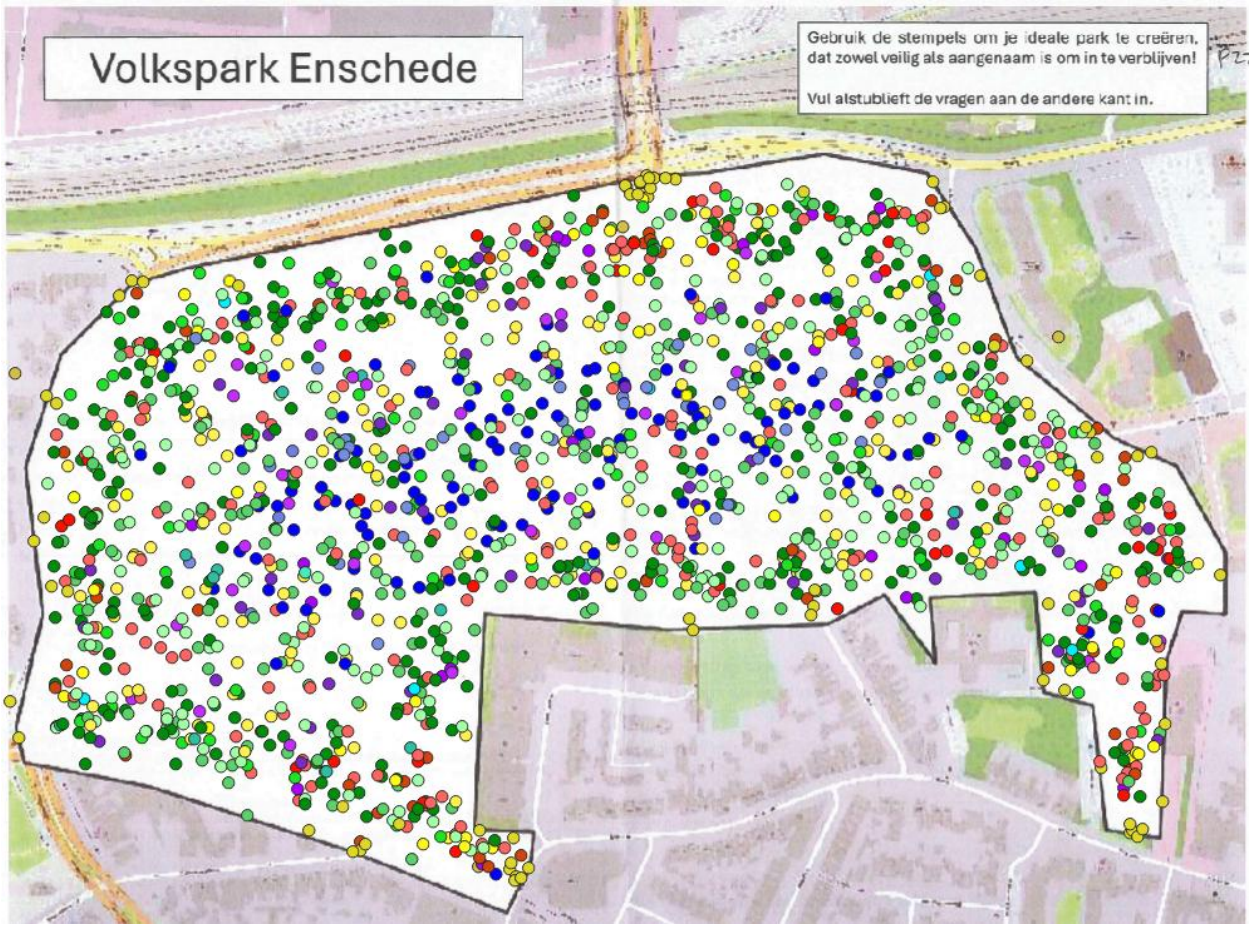
B2 Park design assignment

Use the stamps provided to create your ideal park that is both safe and pleasant to be in!

Appendix C

Figure C1

All Points in QGIS



Note. This figure illustrates all the stamps plotted in points in Qgis. Blue being water related stamps (water, fountain, bridge), green being nature related stamps (trees, bushes, grass, flowers), red being safety related stamps (cameras, police, streetlights), yellow being other structures (playground, benches, cafés, trashcans, ect.).

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