



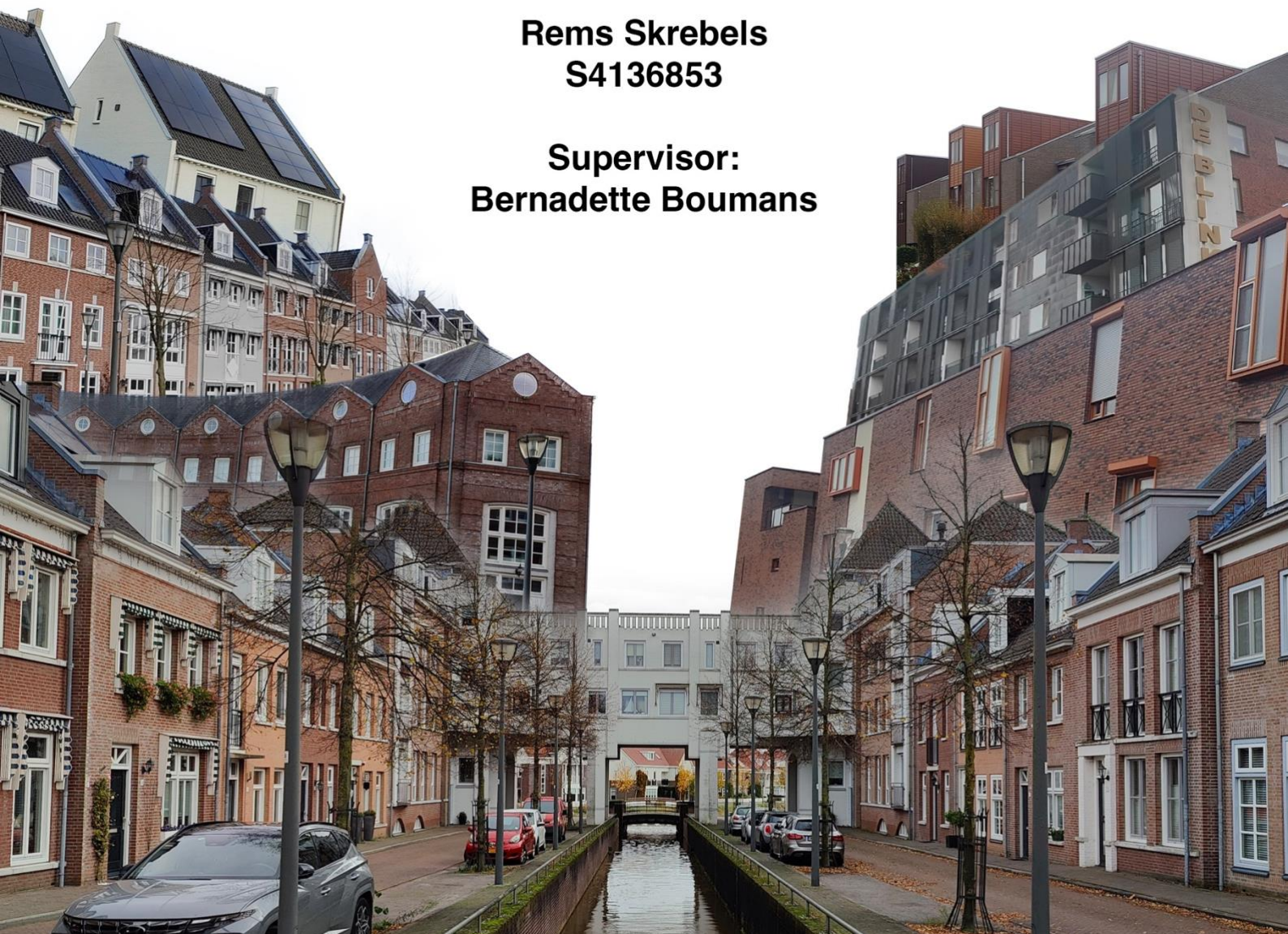
university of
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Bachelor's Thesis

“Neighborhood Design and Neighborhood Satisfaction”

**Rems Skrebels
S4136853**

**Supervisor:
Bernadette Boumans**



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Summary

20th century city planning was dominated by car-centric development and aesthetic minimalism, with a strong departure from traditional design of buildings and planning of cities. However, in recent decades a niche alternative perspective has gained ground. New urbanism, originating in the US, is a reaction to this previous path of city development and planning and a handful of neighborhoods and towns have appeared in different parts of the world.

While new urbanism promotes many aspects that contemporary architects and urban planners praise such as mixed-use development, walkable neighborhoods, sustainable transport options etc., the main point of disagreement is its neotraditional architecture, which some call exclusionary, pastiche and fake. While valid criticisms exist, the academic literature does not investigate the residents' attitude towards these neighborhoods.

This research explores neighborhood design and its relation to overall neighborhood satisfaction, with the central research question being "to what extent do the design principles of new urbanism influence residents' neighborhood satisfaction compared to residents of other neighborhoods?".

The research design employs a mix-methods approach of a comparative analysis between 2 selected cases of Brandevoort and Meerhoven-Grasrijk in the North Brabant province of the Netherlands and a mainly quantitative survey with qualitative and spatial components.

As a result, it became clear that there is a significant difference of overall neighborhood satisfaction in favor of the new urbanism neighborhood. Furthermore, a correlation analysis revealed that the new urbanism neighborhood residents showcased a strong link between valuing their surrounding built environment image and overall neighborhood satisfaction. With a regression analysis it was established that in the contemporary neighborhood a strong relationship exists between community interaction and neighborhood satisfaction, while in the new urbanism neighborhood there is a strong relationship between neighborhood satisfaction and liking the building style of the neighborhood.

Future research on the relationship between neighborhood design and neighborhood satisfaction could investigate the values and appreciation of the image of the surrounding environment of the residents.

Chapter 1: Introduction

1.1 New urbanism

After almost a century of modernist planning of cities and neighborhoods worldwide (Brown et al., 2009), in recent decades, a niche alternative perspective has formed on how cities should be planned and developed. New urbanism is a reaction to car-centric sprawl development, particularly present in the USA, emphasizing the need for neighborhoods to be mix-use, walkable, dense, centered around reliable public transport, sustainable, accessible (Trudeau, 2013), and perhaps most controversially, designed in accordance with the historical identity of the area, taking inspiration from vernacular architecture and using local materials (Forsyth & Crewe, 2009). The points mentioned initially are not controversial among contemporary planners, urban designers, and architects, but the latter has seen major backlash and criticism (Wainwright, 2016) and is often the focus point for the debate around new urbanism.

New urbanism has been criticized for promoting exclusionary politics (Dirsuweit, 2009) such as racially segregating communities, raising a certain aesthetic to be superior to others, being a fake recreation of the past rather than a reflection of the present, and being a playground for the rich (Gold, 2023), (Ruiz-Goirienna, 2013).

While valid criticisms exist, it is uncommon to see scientific articles thoroughly investigate the residents of these communities. Reasons for satisfaction with neighborhoods can be multifaceted, such as shorter commuting times to work, nearby education quality, access to amenities, etc. (Goodman Jr., 1979). However, the importance of aesthetics and design, impacting residents' neighborhood satisfaction has not been identified or established.

To further investigate the design of these neighborhoods, the research takes place in the Netherlands as for decades there have been overarching planning policies for cities in the country to meet goals of densification, good public transport connections and accessibility (Van der Cammen et al., 2012, pp.214), making it easier to isolate the visual character assuming good levels of walkability, public transport connections and mixed-use development.

1.2 Research problem and aim

From the information mentioned in the introduction comes the research question: **To what extent does the urban design of new urbanism influence residents' neighborhood satisfaction compared to residents of other neighborhoods?**

With sub questions being:

1. To what extent is there a difference in neighborhood satisfaction between new urbanism neighborhoods and other contemporary neighborhoods among their residents? If so, how large, or significant is the difference?

2. What are the urban design and planning differences between new urbanism neighborhoods and contemporary neighborhoods and how do municipalities ensure that these differences are maintained?

3. What are the demographic and socioeconomic characteristics of residents in new urbanism communities compared to those in other neighborhoods?

The aim of this research is to establish if and how the traditional and vernacular design elements of new urbanism contribute to residents' overall neighborhood satisfaction.

The structure of the thesis is as follows: Chapter two introduces theories to guide the research and interpret results. Chapter three explains the chosen research methodology and data analysis. Chapter 4 presents the results of the comparative analysis and outcomes of the statistical tests. Chapter 5 answers the research questions and discusses possible further research.

Chapter 2: Theoretical framework

2.1 Neighborhood design

Neighborhood design refers to the physical and spatial characteristics of a community, including its layout, architecture, building materials, and public spaces (Karuppappan & Sivam, 2011). In research conducted in Delhi doing comparative research between 3 distinctly designed neighborhoods, it was found that the urban form of a neighborhood plays an important role in creating a socially sustainable residential neighborhood (ibid).

Research by Rogers & Sukolratanamettee (2009) in the US found that neighborhoods designed to connect natural elements to the residents' environment showed higher levels of community engagement than typical suburban neighborhoods and positively enhanced a sense of community.

These findings highlight the significant role of neighborhood design in shaping residents' behaviors and perceptions. It suggests that the impact of design goes beyond mere aesthetics, influencing how people interact with their environment and each other.

For this research, the findings support the idea that thoughtful design can enhance community interaction and satisfaction. Therefore, it is important to examine how the spatial and aesthetic features of a neighborhood contribute not just to its physical appearance, but also to fostering community interaction and a strong sense of place. This will guide the research into how residents perceive and value their neighborhood's design in relation to their satisfaction and place attachment.

2.3 Place attachment and sense of place

Scannell & Gifford (2010) define place attachment as “the bonding that occurs between individuals and their meaningful environments” (pp.1). From their research they established a multi-dimensional approach to interpret place attachment. They propose a framework containing person, psychological process, and place dimensions. The person dimension contains aspects such as memorable events and experiences. The psychological dimension encompasses the form of how people relate to their environment and the place dimension can be divided into two subcategories of physical place and social place.

Often when discussing successful or lacking neighborhood developments, the term “sense of place” is used. This term has been difficult to define as Nelson et al. (2020) found in a literature review that scholars use the term in many ways and the term differs among different regions in the world. These findings go together well with the influential author's of new urbanism Christopher Alexander (1979), calling it the “quality without a name”.

Although the terms are similar, for the purposes of this research, a clear distinction needs to be made. Sense of place can be understood as a characteristic inherent to a location, shaped by its physical and spatial attributes, cultural context, and social dynamics. According to Lengen & Kistemann (2012) and Beidler & Morrison (2016), it involves the interplay of emotional, behavioral, and perceptual dimensions influenced by a place's design and setting. In this research a sense of place is seen as a precursor to place attachment as the design of a neighborhood will facilitate opportunities for both aesthetic appreciation through the built environment as well as possibilities for physical and social interaction, which in turn lead to a stronger place attachment of the residents.

Interestingly, research by Hidalgo & Hernández (2001) indicates that people have different levels of place attachment, depending on the spatial scale of the place. The findings indicated that higher place attachment was observed for respondents' homes and city than the neighborhood scale and that the social dimension of place attachment was stronger than the physical dimension. These findings provide an interesting reflection and gap for this research as it is centered specifically around neighborhoods.

2.4 Aesthetic perception

Forsyth & Crewe (2009) define architectural style as a series of rules. New urbanism emphasizes local context and history for aesthetics such as “design should grow from local climate, topography, history, and building practice” (pp.442). In terms of separate buildings, it places an emphasis on a sense of place and identifiable areas- distinctive civic buildings, buildings reflect the location, weather, and time (ibid).

Modernism itself, was a reaction to the historic and sometimes haphazard style of development of cities, where people lived in cramped conditions and were exposed to polluted environments (Komossa & Aarts, 2019). It proposed a new and rational approach of separating functions and introducing new aesthetic values such as visual minimalism (ibid).

Today, in the Netherlands, urban planning and architecture exists in synergy with the modernist ideals of CIAM (the International Congresses of Modern Architecture) and the integrated approach of mixed use, walkability, and accessibility (ibid). While aesthetic

minimalism, not based on historical styles, is the prevailing visual style for new developments, the planning aims are somewhat in line with the goals of new urbanism.

This exposes an interesting opportunity for research on new urbanism in the Netherlands as the focus of the research can be drawn to the visual style of the neighborhood and its relationship with satisfaction, without paying much attention to other planning considerations such as traffic planning and walkability as it would have to be done in other countries.

Academic interpretations and research about aesthetics mainly focus on reactions to places by people (Forsyth & Crewe, 2009). It is also important to recognize that neighborhood-scale developments are often designed in accordance with a predetermined style. Therefore, people rarely react to a single building but rather to their local environment and neighborhood. Similarly, people do not react to separate design elements, but to the entirety of a building or neighborhood (O'Brien & Wilson, 2011).

2.5 Community interaction

Community interaction refers to the formal and informal meetings as well as participation in physical and social activities of a neighborhood's residents. As discussed in the previous sections the possibility of community interaction can lead to stronger place attachment and an area possessing a distinct sense of place (Lengen & Kistemann, 2012), (Scannell & Gifford, 2010). From the 3 cases chosen in the research of Karuppanan & Sivam (2011), the highest results for frequency of meeting neighbors, participation in neighborhood activities, safety of the neighborhood, and opportunities for formal and informal social gathering were met by the contemporary neighborhood. In the study the contemporary neighborhood was identified as a post-WW2 development with semi-public space being enclosed with four-story modernist blocks. The prevailing materials were concrete with no specific facade ornamentation (ibid). The historic old town neighborhood scored higher only with the variable "pride of place and attachment to place". A critique of the research could also be that the category labeled "aesthetics" mainly focused on land use and mobility planning rather than clearly identifiable design elements, materials, and aesthetics.

This research presents an interesting reflection where contrary to the findings of Lengen & Kistemann (2012), place attachment was exhibited by a visually plain neighborhood, rather than the old historic neighborhood, which is dominated by detailed British colonial architecture. In this research, increased attention is devoted to analyzing the relationship between the design of buildings and place attachment and sense of place.

2.6 Neighborhood satisfaction

Research conducted by Neal (2021) found that objective neighborhood features (good education facilities, infrastructure, mobility, etc.) account only for about 16% of the variation in residents' neighborhood satisfaction and that most of the variation in satisfaction is driven by personal and psychological factors, such as respondents' individual characteristics and their perceptions of the neighborhood. This aids the position of the research as so far it indicates that an individual approach to examining individual resident satisfaction in relation to their aesthetic surroundings could reveal the subjective preference in comparing new urbanism neighborhoods with contemporary ones.

In research conducted by Lovejoy et al. (2010) it was found that traditional neighborhood scored higher than suburban neighborhoods, with traditional neighborhoods being defined as mixed-use, prewar (historic) and block-style development. Suburban neighborhoods were defined as recently constructed residentially zoned neighborhoods with curvilinear street patterns and not dense developments- mainly single-family homes. The research was done in the US and therefore the differences in satisfaction could be associated with traffic planning and zoning differences as suburban developments are

notoriously car-centric and traditional older neighborhoods have decent walkability and mixed-use development.

Working on the approach of the comparative analysis of traditional and contemporary neighborhoods of Lovejoy et al. (2010), this research will further try to isolate the effect of neighborhood design and aesthetics on satisfaction.

2.7 Conceptual model

Based on the theoretical framework, a conceptual model has been created. This model posits that the design of a neighborhood, including elements such as building materials, architectural aesthetics, street layout, and green spaces, influences residents' perceptions of aesthetics and the possibility community interaction. These factors, in turn, affect the sense of place of the neighborhood, which leads to place attachment and neighborhood satisfaction.

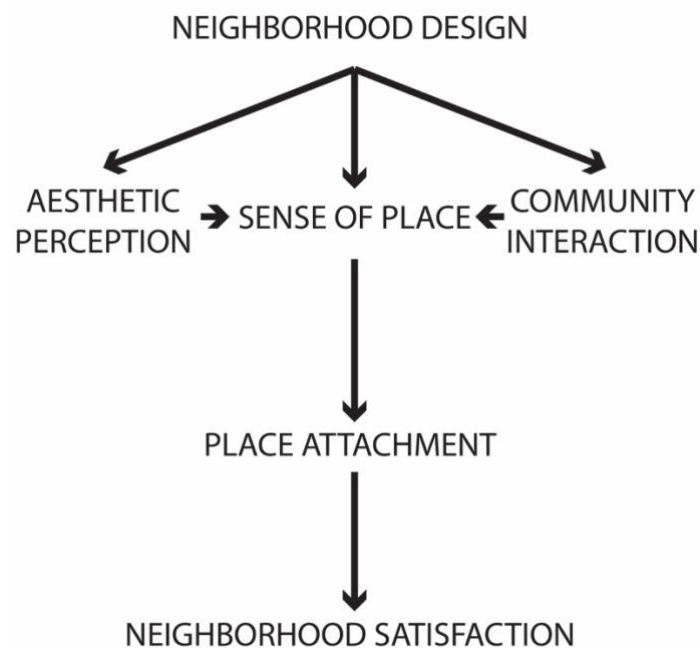


Figure 1: Conceptual model.

2.8 Hypotheses

It is expected that residents' satisfaction with their neighborhoods is positively correlated with the presence of aesthetically pleasing and traditional built environment characteristics. Specifically, neighborhoods with well-designed streets, traditional architectural elements, green spaces, and possibilities for community interaction are expected to show higher levels of neighborhood satisfaction among their residents. Furthermore, it is expected that the new urbanism neighborhood will showcase a higher level of aesthetic pleasure and community interaction and overall neighborhood satisfaction.

Chapter 3: Methodology

3.1 Case selection for comparison

Due to the tight time schedule as well as the scope of this research only 2 cases were chosen for the comparative analysis and survey responses. Both neighborhoods are VINEX neighborhoods built after the year 2000, with clearly established design motifs (Boeijenga et al., 2008, pp.258-260) with Meerhoven incorporating natural elements like a stream, aiming to achieve a forest atmosphere (OKRA Landscape Architects & Ontwerpbureau Teun Koolhaas, 2001), while Brandevoort aims to achieve a traditional Brabant town look (Gemeente Helmond, 2009). With clearly established and different neighborhood design goals, it is possible to further analyze their differences and impact on satisfaction.

Although Brandevoort is not the only new urbanism neighborhood in the Netherlands, it is the largest and is the only one to be built in an area with no prior development (Gemeente Helmond, 2014). It has been developed over more than 2 decades with construction beginning in the 2000s (Brandevoort- 88.5% of buildings built 2000-2009 (Gemeente Helmond, 2014). The buildings are built in the style of Brabant classicism of the surrounding area with the use of traditional building elements and materials.

Meerhoven-Grasrijk is a recently developed neighborhood to the North-West of the center of Eindhoven (Boeijenga et al., 2008, pp.258). It is comparable to Brandevoort as it is roughly in the same region as Brandevoort has a comparable population size of 6k inhabitants (Allecijfers.nl, 2023), is the same distance from its closest urban center (7.7km from Eindhoven Centrum), and most buildings were constructed after 2000 (Paralel, 2023). For more detailed analysis of demographic data see Figure 6.

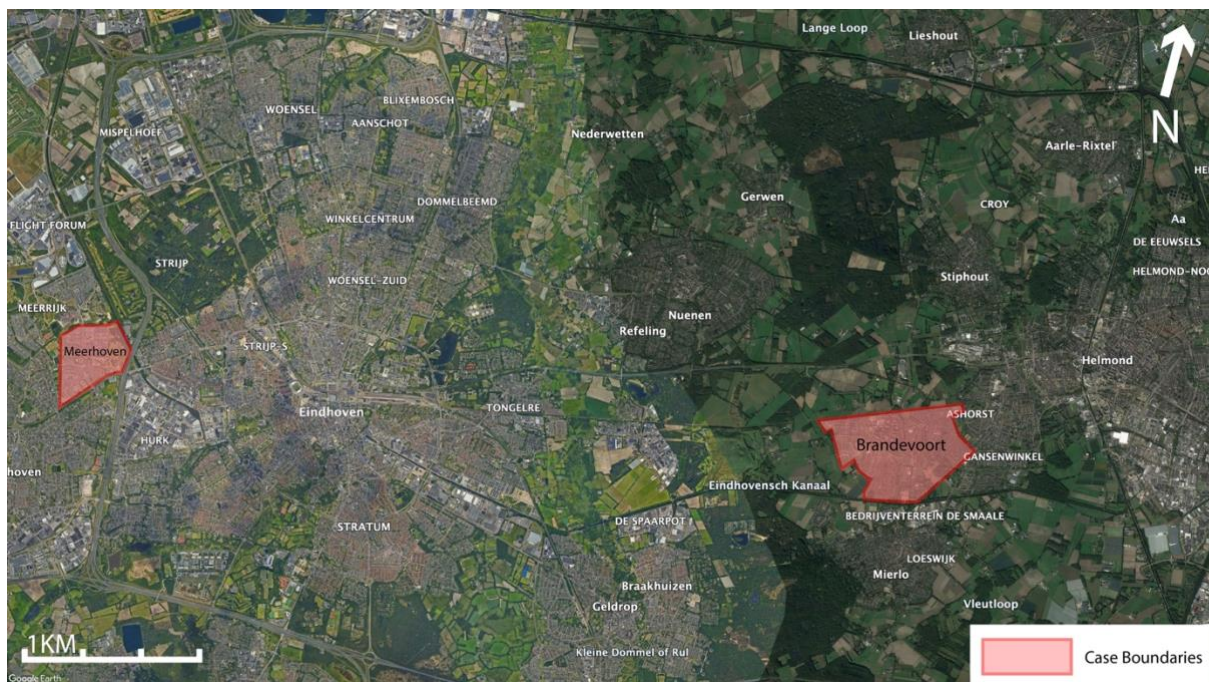


Figure 2: Map showing location of both selected cases (Meerhoven and Brandevoort).

3.2 Research design

The study employs a mixed methods approach in investigating neighborhood design and neighborhood satisfaction. Quantitative insights from a survey (Appendix Figures 41 & 42) are combined with a comparative analysis between two contrasting neighborhood cases in terms of design, but similar in terms of period of construction, geographic location (see Figure 2), and population size. The survey also contains a qualitative element as well as a spatial component. Combining both quantitative and qualitative elements allows for a complementary and more comprehensive approach of analyzing the neighborhoods and their inhabitants. The quantitative data offers measurable trends and patterns of the responses while qualitative data offers depth and context revealing specific characteristics which the residents value in their neighborhoods.

The survey can be broken up into 4 parts: Demographic information, Likert scale questions, qualitative questions, and a mapping question.

3 demographic questions are formulated to check if the sample is representative of the population of each neighborhood. These include gender, age, and housing situation.

The Likert scale questions are formulated to be in line with the conceptual model. Questions 4-9 are linked to neighborhood design and neighborhood satisfaction, measuring respondents' satisfaction with the design of their neighborhood and preference of styles. A variation of 10-point and 5-point scales are used for the answer to questions. The 10-point scale is used for questions where a neutral answer is undesirable as the research focuses on finding differences in design preferences and the relationship between satisfaction. A 5 point-scale allows for less of a nuanced score for these important variables as well as a neutral response, which is acceptable for some questions, but not all.

Questions 7 and 8 are included to test aesthetic perception and aesthetic preference of the respondents. Questions 11 and 12 are linked to the community interaction part of the conceptual model and questions 10, 13 and 14 are related to sense of place and place attachment. Questions 13 and 14 include a qualitative element to them as respondents can briefly expand on their opinion about their neighborhood. The answers to these questions are coded and sorted into code groups (see code trees: Figures 3 and 4) from the conceptual model as well as positive reflections and negative reflections on their neighborhood (see Appendix Figures 37, 38, 39, 40).

Lastly, the final mapping question provides a spatial component to the research as the respondents' answers will illustrate the residents' place attachment, identifying the favorite location (sector) in the neighborhood.

3.3 Neighborhood comparison

For the neighborhood design analysis, site visits were conducted and design guideline documents (beeldskwaliteitsplannen) for each neighborhood were analyzed to describe distinct differences in overall neighborhood design as well as separate building uses and design elements. These documents also contain detailed information about use of materials, colors, and zoning.

From the survey, the last 3 questions are aimed at comparing distinct characteristics of each neighborhood. The short answer questions were coded and analyzed in accordance with the conceptual model (see Figures 3 and 4 for code trees) as well as with terms appear most and what aspects of each neighborhood draw attention of the residents both positive and negative.

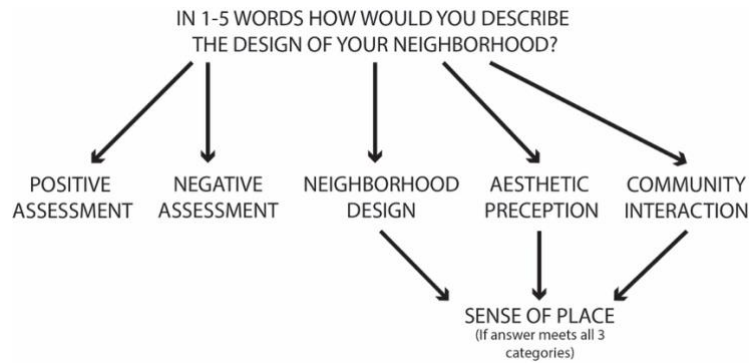


Figure 3: Code tree for thematic coding of Q13

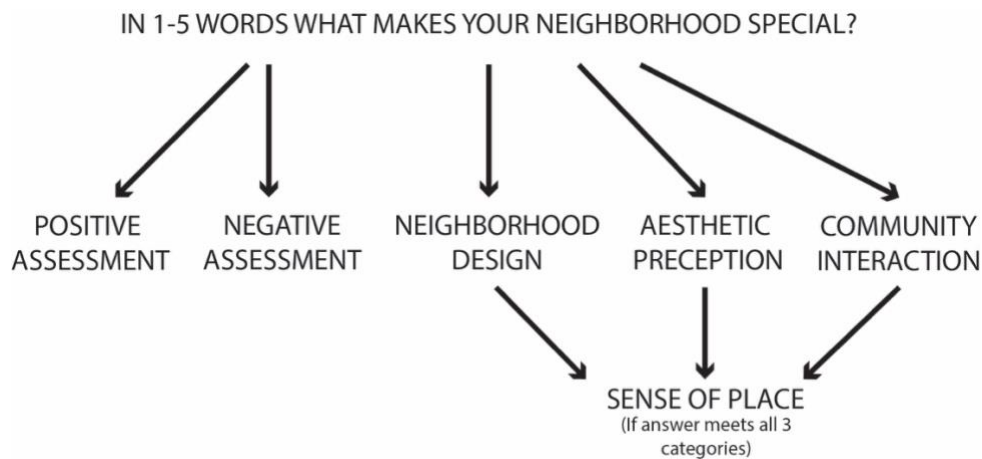


Figure 4: Code tree for thematic coding of Q14

The mapping question was formatted to display which parts of each neighborhood the locals prefer (Figures 26 and 27). These preferred areas are described with a focus on design characteristics, gathering places and amenities.

3.4 Sampling

The sampling strategy of this research is convenience sampling. The physical surveys were handed out near the busiest areas of each neighborhood. For Brandevoort the location of handing out surveys was de Plaatsse, which is the central square/street in the De Veste part of the neighborhood. The sampling period which lasted 2-3 hours yielded 46 responses. The surveys were filled out by the respondents by hand for the in-person responses and the online surveys were filled out in google forms.

As Meerhoven does not have a central square, the locations with the most people were bus stops and a school in the neighborhood. The sampling lasted 4-5h and yielded 56 responses. Limitations of this sampling strategy are discussed in the limitations section of the thesis (pp.29-31).

After reflecting on the preliminary results and to get more responses, online surveys were submitted to Facebook groups of each neighborhood. The post of the survey for Meerhoven yielded only 6 responses while the Brandevoort survey yielded 20 responses. However, shortly after posting the surveys were removed by group admins for violating post guidelines.

Convenience sampling presented practical benefits such as gathering the data quickly, ensuring enough cases for statistical analysis of the data (at least 30 cases per neighborhood, thus the central limit theorem could be applied). Other sampling methods made gathering the necessary number of responses unpredictable and late answer

submissions could have altered the results and/or jeopardized the timely completion of the research.

3.5 Data analysis

NR	QUESTION	DATA TYPE	TEST / ANALYSIS	RELEVANCE (RELATION TO CONCEPTUAL MODEL)
1	WHAT IS YOUR GENDER	BINARY NOMINAL CHOICE	Chi-Square Test	Establish representativeness
2	WHAT IS YOUR AGE	NOMINAL	Chi-Square Test	Establish representativeness
3	WHAT IS YOUR HOUSING SITUATION	BINARY NOMINAL CHOICE	Chi-Square Test	Establish representativeness
4	I AM SATISFIED WITH THE LIVING CONDITIONS IN MY NEIGHBORHOOD	ORDINAL 10-POINT SCALE / INTERVAL (see explanation for use as interval data in results chapter pp.20-21)	Independent samples t-test / Mann-Whitney U test	Measure difference in overall neighborhood satisfaction (NEIGHBORHOOD SATISFACTION)
5	I AM SATISFIED WITH THE DESIGN OF BUILDINGS IN MY NEIGHBORHOOD.	ORDINAL 10-POINT SCALE / INTERVAL	Independent samples t-test / Mann-Whitney U test	Measure differences in satisfaction of buildings (NEIGHBORHOOD DESIGN / AESTHETIC PERCEPTION)
6	I AM SATISFIED WITH THE DESIGN OF PUBLIC SPACES IN MY NEIGHBORHOOD (PARKS, STREETS, SQUARES).	ORDINAL 10-POINT SCALE / INTERVAL	Independent samples t-test / Mann-Whitney U test	Measure differences in satisfaction of design of public spaces (NEIGHBORHOOD DESIGN)
7	I LIKE THE BUILDING STYLE IN MY NEIGHBORHOOD.	ORDINAL 5-POINT SCALE / INTERVAL	Independent samples t-test	Establish fondness of local built environment (AESTHETIC PERCEPTION / SENSE OF PLACE / NEIGHBORHOOD DESIGN)
8	WHAT STYLE OF BUILDINGS ARE IN YOUR NEIGHBORHOOD?	BINARY NOMINAL CHOICE	Bar chart	Establish whether inhabitants correctly identify the style of their neighborhood (AESTHETIC PERCEPTION)
9	WHAT STYLE OF BUILDINGS DO YOU PREFER?	BINARY NOMINAL CHOICE	Bar chart	Establish preference of architectural styles of the residents (AESTHETIC PERCEPTION)
10	MY NEIGHBORHOOD IS UNIQUE AND SPECIAL.	ORDINAL 5-POINT SCALE / INTERVAL	Independent samples t-test	Measure differences of residents considering if their neighborhood is special (SENSE OF PLACE/ PLACE ATTACHMENT)

11	I REGULARLY MEET AND INTERACT WITH MY NEIGHBORS IN MY NEIGHBORHOOD.	ORDINAL 5-POINT SCALE / INTERVAL	Independent samples t-test	Measure differences in means of residents meeting with neighbors (COMMUNITY INTERACTION)
12	IN MY NEIGHBORHOOD, THERE ARE MANY PUBLIC PLACES TO MEET FRIENDS AND FAMILY.	ORDINAL 5-POINT SCALE / INTERVAL	Independent samples t-test	Measure differences of residents' perception of places to gather and interact with family (COMMUNITY INTERACTION)
13	IN 1-5 WORDS HOW WOULD YOU DESCRIBE THE DESIGN OF YOUR NEIGHBORHOOD?	TEXT	Thematic coding	Identify themes and characteristics of residents' reflection on their neighborhoods (ANY TOPIC)
14	IN 1-5 WORDS WHAT MAKES YOUR NEIGHBORHOOD SPECIAL?	TEXT	Thematic coding	Identify themes and characteristics that residents think make their neighborhood unique (SENSE OF PLACE/ PLACE ATTACHMENT)
15	INDICATE YOUR FAVOURITE LOCATION IN THE NEIGHBORHOOD	IDENTIFIED SECTORS	Sector heat map	Identify residents' favorite place in their neighborhood (SENSE OF PLACE/ PLACE ATTACHMENT)

Figure 5: Summary of data and data analysis process and relevance.

The figure above (Figure 5) summarizes the questions of the survey, type of data, data analysis method and relevance as well as relation of each question to the conceptual model.

Chapter 4: Neighborhood comparative analysis

	MEERHOVEN GRASRIJK	BRANDEVOORT
POPULATION (inhabitants)	5980	11 560
SIZE (ha)	128	190 (developed area)
AVERAGE HOUSE PRICE	418K	430K
HOUSING STOCK BUILT AFTER 2000	98%	100%
HOME OWNERSHIP	76% private	78% private
SINGLE FAMILY HOMES	81% of housing stock	84% of housing stock
HOUSING OCCUPANCY	98%	98%
AVERAGE INCOME (Euros)	35 200	34 300
CRIME RATE (Crimes per 1000 inhabitants)	10,21	10,70
NATIVE INHABITANTS (Dutch)	81,57%	49,7%
AGE 0-15	24%	21%
AGE 16-25	10%	15%
AGE 26-45	34%	25%
AGE 46-65	23%	31%
AGE 66+	9%	10%

Figure 6: Demographic data table for the neighborhoods of Meerhoven and Brandevoort (Allecijfers.nl, 2023).

The table above (Figure 6) shows the main demographic information of each Neighborhood. Brandevoort has a substantially larger population and higher percentage of native Dutch inhabitants, but it is still close to the average native population of the Netherlands of 77% (Allecijfers.nl, 2023), but in other categories, the neighborhoods are equal or very similar. Research conducted by Langella and Manning (2019) found that diversity does affect overall neighborhood satisfaction and the fear of crime (although not actual crime). In Meerhoven, the population is much more diverse, and the findings suggest that this might influence reported satisfaction, although crime levels are almost equal. The comparably low number of native Dutch inhabitants in Meerhoven can be attributed to Eindhoven being a more diverse city than Helmond as a whole (Allecijfers.nl, 2023) and Eindhoven being a major hub for international migration to the Netherlands. The similarities for most demographic data categories allow for an isolated approach focusing on the neighborhood's design impact on satisfaction assuming little effect of demographic differences affecting the results.

4.1 Neighborhood design comparison

Brandevoort is the largest new urbanism neighborhood in the Netherlands. It has been developed over more than 2 decades with construction beginning in the 2000s (Brandevoort- 88.5% of buildings built 2000-2009 (Gemeente Helmond, 2014)). The buildings are built in the style of traditional architecture of the surrounding area called Brabant classism using traditional building elements and materials. Examples of this can be found in Heusden, the old center of Oirschot, and in rural villages such as Hilvarenbeek or Eersel (Gemeente Helmond, 2009). This main style of architecture creates a common visual image for the neighborhood described in the "Handhaving Beeldkwaliteit Brandevoort" (Gemeente Helmond, 2009) and "De architectuur van Brandevoort" (Gemeente Helmond, dienst Stadsontwikkeling & Beheer, 2009).

According to the beeldkwaliteitsplan, the design of Meerhoven (particularly the area of Grasrijk) was developed to be balanced between sleek and rational aligning with the

modernist principles of CIAM (Komossa & Aarts, 2019), but also use historical landscape data and historical habitation relics (OKRA Landscape Architects & Ontwerpbureau Teun Koolhaas, 2001). The neighborhood has a grid-like street network, with the main traffic roads cutting through the center with one going East to West and the other going North to South. The streets are wider than Brandevoort and roads and streets are mainly made from asphalt. Notably, the neighborhood is predominantly residential, with grocery stores being outside the administrative limits of the Grasrijk area.

4.2 Street network

The neighborhoods have vastly different street networks and layouts each guided by their design ideologies. Brandevoort's inner core's (De Veste's) street network is circular or hexagonal with radiating streets from the center. The area is built in the likeness of a former star fort with a green moat acting as its enclosing parkland. The streets out of De Veste are also irregular and curved.



Figure 7: Satellite image with area boundaries.

Meerhoven has a grid street network, with major traffic routes going North to South and East to West. This network is line with the rational and functional approach of modernist planning, ensuring a clear separation of traffic flow and ensuring smooth flow. However, the grid is in parts broken up to allow for accommodation of natural elements such as a stream and pre-existing paths.



Figure 8: Meerhoven-Grasrijk satellite image with boundaries.

4.3 Typologies

Both neighborhoods have clearly identifiable centers, with higher density housing and typologies in the middle. Both Meerhoven and Brandevoort have dense multi-story apartment blocks with courtyards which are used as private gardens and/or parking lots. The scale of these central apartment blocks is somewhat different. In Meerhoven, the facade of these buildings does not change for the whole block, while in Brandevoort there are variations in the facade design of each separate house.



Figure 9: Apartment buildings on the central square/street De Plaatsse in De Veste.



Figure 10: Apartment building in the center of Meerhoven-Grasrijk.

Moving further away from the center of each neighborhood, the typologies change similarly. The periphery of the center is dominated by terraced homes and twin homes with front and back gardens. Same as the center, in Brandevoort the buildings facades are similar, but each facade has an identifiable boundary, where a new house starts. In Meerhoven each street has a different building theme, but the boundaries of each unit are not easy identifiable. This gives each block a horizontal appearance while in Brandevoort the block is broken up vertically with distinguishable homes, making use of traditional elements such as paned windows, cornices, and lintels. This creates visual order and commonalities between buildings, with each one being slightly different.



Figure 11: Terraced homes in the North of De Veste.



Figure 12: Terraced homes in the North of De Veste.

Lastly, there are free standing single-family homes with front and back gardens. This typology is most similar between the neighborhoods as some of the homes in Meerhoven are more traditional in their design, although there are variations in roof shape and building mass that are not traditional.



Figure 13: Single family homes in Brandevoort.



Figure 14: Single family homes in Meerhoven.

4.4 Materials and specifics

Brandevoort's beeldkwaliteitsplan (Gemeente Helmond, 2009) emphasizes the need for architects and developers to work in a strictly developed visual framework, incorporating specific design elements (plinths, cornices, ornamentation) and using materials that are common for traditional materials such as brick and stone and colors found in neighboring towns, building on the heritage of the region. For a detailed summary of the beeldkwaliteitsplan see Appendix pp.36-37.

Meerhoven's beeldkwaliteitsplan (OKRA Landscape Architects & Ontwerpbureau Teun Koolhaas, 2001) pays little attention to separate building elements suggestions. It is more concerned with the buildings contributing to a forest atmosphere with building design left to the creative freedom of architects and developers. However, they do mandate that the color palette should be complementary earthy colors such as green, brown, black. Also, materials such as brick, wood and stone are encouraged to contribute to the design theme (ibid).

Chapter 5: Results

5.1 Representativeness

The survey yielded 125 responses. 59 (53 on-site, 6 online) Surveys were filled out by residents of Meerhoven and 66 (46 on-site, 20 online) were filled out by Brandevoort residents. The respondents are relatively equally distributed among genders, close to a 50/50 split and both samples are representative of their populations in gender (see Appendix pp.37-39). This split was an intentional consideration when approaching potential respondents.

In Meerhoven the housing situation is 76% of private ownership and the sample has 61%, which means there is a 15% difference between the sample and population. Likewise, there is a difference of around 15% between the Brandevoort sample and population. These samples are not representative of the populations (see Appendix pp.40-42).

Having conducted a Chi-square test for both neighborhoods separately, comparing the samples to the age groups statistics (allecijfers.nl, 2023), it resulted in the Meerhoven sample not being representative and Brandevoort sample being representative (Figures 15 and 16). This limits the conclusions that can be made about Meerhoven and the neighborhoods in comparison. As the age categories are more detailed than the binary questions of gender and housing situation, this method of establishing, if the sample is representative, is considered the guiding one. With the sample from Meerhoven not being representative, conclusions will only be drawn about the sample while conclusions from the sample of Brandevoort will be applied to the population of the neighborhood.

Null hypothesis	Chi Square test result	Result
There is no significant difference between age group distribution in the sample and those of the known population of Meerhoven (Allecijfers.nl, 2023).	0.001	Significant difference

Figure 15: Chi Square test results for Q2 for Meerhoven in SPSS (for detailed results see Appendix pp.39).

Null hypothesis	Chi Square test result	Result
There is no significant difference between age group distribution in the sample and those of the known population of Brandevoort (Allecijfers.nl, 2023).	0.096	Not significant difference

Figure 16: Chi Square test results for Q2 for Brandevoort in SPSS (for detailed results see Appendix pp.40).

5.2 Differences in means and medians for satisfaction

Having assessed the representativeness of the sample, the next step was to establish whether there is a significant difference in overall neighborhood satisfaction, satisfaction of the design of buildings and design of public spaces (Q4, Q5, Q6 of the survey). Although the data for Q4, Q5 and Q6 are not normally distributed (see Appendix pp.42-43), but the samples are independent of each other, Levene's tests for equality of variances are not significant, there are sufficient cases (above 30, applying the central limit theorem is acceptable), equidistance between scores is assumed, the data in this case is

considered as interval so an independent samples t-test was conducted. It became clear that there is a significant difference in the means of all 3 questions.

	Neighborhood	N	Mean
I am satisfied with the living conditions in my neighborhood	MEERHOVEN	59	7,08
	BRANDEVOORT	66	7,73
I am satisfied with the design of buildings in my neighborhood	MEERHOVEN	59	6,76
	BRANDEVOORT	66	7,98
I am satisfied with the design of public spaces in my neighborhood	MEERHOVEN	59	7,39
	BRANDEVOORT	66	7,95

Figure 17: Group statistics for Q4, Q5, Q6 in SPSS.

	T-test for equality of means (significance)	Result
I am satisfied with the living conditions in my neighborhood	0.022	Significant difference
I am satisfied with the design of buildings in my neighborhood	<0.001	Significant difference
I am satisfied with the design of public spaces in my neighborhood	0.025	Significant difference

Figure 18: Independent samples t-test results for Q4, Q5, Q6 in SPSS (for detailed results: see Appendix pp.44).

There exists a mean difference in overall neighborhood satisfaction of 0,643 points between neighborhood samples, with Brandevoort showing a slightly higher level of satisfaction. This difference increases regarding satisfaction in design of buildings with a difference of 1,222 and the difference in satisfaction of public space is slightly lower at 0,565. This difference could be present due to sampling bias (see limitations pp.29-31), but also due to a possible difference in neighborhood conditions.

To provide a comprehensive analysis, provide an alternative perspective on the data and cross validate the findings, due to the data not being normally distributed and potentially interpretable as ordinal data, a further Mann-Whitney U tests was conducted. After conducting the tests, a significant difference in medians was established for all questions (see Appendix pp.44-50). This further supports the notion that satisfaction scores are different between the neighborhoods, with Brandevoort showing higher satisfaction scores in all 3 categories.

The Independent-Samples Median Test Summary table (Figure 19) shows results for a non-parametric test comparing the medians between two groups from a sample size of 125. The median test statistic is 8,000 with a significant p-value (Asymptotic Sig. (2-sided)) of .012, indicating that there is a statistically significant difference in the medians of the two groups. Additionally, after applying Yates's Continuity Correction, the chi-square value is reported as 5,213 with a p-value of .022, which also indicates a significant difference. This suggests that the central tendency of the two groups differs significantly. Similar results were present for the other 2 questions (see Appendix pp.47& 49).

Independent-Samples Median Test Summary

Total N		125
Median		8,000
Test Statistic		6,254 ^a
Degree Of Freedom		1
Asymptotic Sig.(2-sided test)		,012
Yates's Continuity Correction	Chi-Square	5,213
	Degree Of Freedom	1
	Asymptotic Sig.(2-sided test)	,022

a. Multiple comparisons are not performed because there are less than three test fields.

Figure 19: Mann-Whitney U test summary for Q4 in SPSS.

For questions containing a 5-point Likert scale, differences in means were also established except for the questions regarding places to meet family and friends (Q12). This indicates that residents of both neighborhoods have identified places where to meet friends and family. For the rest of the questions, the largest difference in the means was for the question about their neighborhood being unique and special. This aligns with the research of Karuppappan & Sivam (2011), as they also found the residents of historical (historical looking) neighborhoods scored higher with the variable “pride of place and attachment to place”. Also, the findings corroborate the research of Lovejoy et al. (2009) with the traditional neighborhood scoring higher in satisfaction.

The data shows that the respondents of Meerhoven find their neighborhood less special than the residents of Brandevoort. This makes sense as Brandevoort is the only large-scale new urbanism neighborhood in the Netherlands and partly attracts new residents for that reason (Krier, 2006, pp 50.), while Meerhoven’s design is not uniform and thus leads to different streets having vastly different visual styles with little identifiable consistency, leading Meerhoven to be perceived as similar to other places and not that special.

	Neighborhood	N	Mean
I like the building style in my neighborhood	MEERHOVEN	59	3,15
	BRANDEVOORT	66	3,85
My neighborhood is unique and special	MEERHOVEN	59	2,64
	BRANDEVOORT	66	4,14
I regularly meet and interact with my neighbors in my neighborhood	MEERHOVEN	59	3,02
	BRANDEVOORT	66	2,45
In my neighborhood, there are many public places to meet friends and family	MEERHOVEN	59	3,42
	BRANDEVOORT	66	3,38

Figure 20: Group statistics for Q7, Q10, Q11, Q12 in SPSS.

	T-test for equality of means (significance)	Result
I like the building style in my neighborhood	0.003	Significant difference
My neighborhood is unique and special	<0.001	Significant difference
I regularly meet and interact with my neighbors in my neighborhood	0.005	Significant difference

In my neighborhood, there are many public places to meet friends and family	0.826	Not significant difference
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Figure 21: Independent samples t-test results for Q7, Q10, Q11, Q12 between neighborhoods in SPSS (for detailed results: see Appendix pp.51).

5.3 Correlations between variables

Correlations^a

		I am satisfied with the living conditions in my neighborhood	I am satisfied with the design of buildings in my neighborhood	I am satisfied with the design of public spaces in my neighborhood	I like the building style in my neighborhood	My neighborhood is unique and special	I regularly meet and interact with my neighbors in my neighborhood	In my neighborhood, there are many public places to meet friends and family
I am satisfied with the living conditions in my neighborhood	Pearson Correlation		,126	,222	-,080	,428**	,549**	,407**
	Sig. (2-tailed)		,343	,091	,548	<,001	<,001	,001
	N		59	59	59	59	59	59
I am satisfied with the design of buildings in my neighborhood	Pearson Correlation	,126		,525**	,518**	,170	,315*	,028
	Sig. (2-tailed)	,343		<,001	<,001	,198	,015	,831
	N	59		59	59	59	59	59
I am satisfied with the design of public spaces in my neighborhood	Pearson Correlation	,222	,525**		,468**	,118	,351**	,204
	Sig. (2-tailed)	,091	<,001		<,001	,373	,006	,121
	N	59	59		59	59	59	59
I like the building style in my neighborhood	Pearson Correlation	-,080	,518**	,468**		,096	,214	-,168
	Sig. (2-tailed)	,548	<,001	<,001		,470	,103	,202
	N	59	59	59		59	59	59
My neighborhood is unique and special	Pearson Correlation	,428**	,170	,118	,096		,658**	,133
	Sig. (2-tailed)	<,001	,198	,373	,470		<,001	,316
	N	59	59	59	59		59	59
I regularly meet and interact with my neighbors in my neighborhood	Pearson Correlation	,549**	,315*	,351**	,214	,658**		,395**
	Sig. (2-tailed)	<,001	,015	,006	,103	<,001		,002
	N	59	59	59	59	59		59
In my neighborhood, there are many public places to meet friends and family	Pearson Correlation	,407**	,028	,204	-,168	,133	,395**	
	Sig. (2-tailed)	,001	,831	,121	,202	,316	,002	
	N	59	59	59	59	59	59	

** . Correlation is significant at the 0.01 level (2-tailed). Not statistically significant correlation
* . Correlation is significant at the 0.05 level (2-tailed). Self Correlation
a. Neighborhood = MEERHOVEN

2-2.99 (Weak Correlation Coefficient)	6-6.99 (Strong Correlation Coefficient)
3-3.99 (Weak Correlation Coefficient)	7-7.99 (Strong Correlation Coefficient)
4-4.99 (Moderate Correlation Coefficient)	8>(Very Strong Correlation Coefficient)
5-5.99 (Moderate Correlation Coefficient)	

Figure 22: Color-coded correlation analysis between questions Q4, Q5, Q6, Q7, Q8, Q10, Q11, Q12 from Meerhoven in SPSS

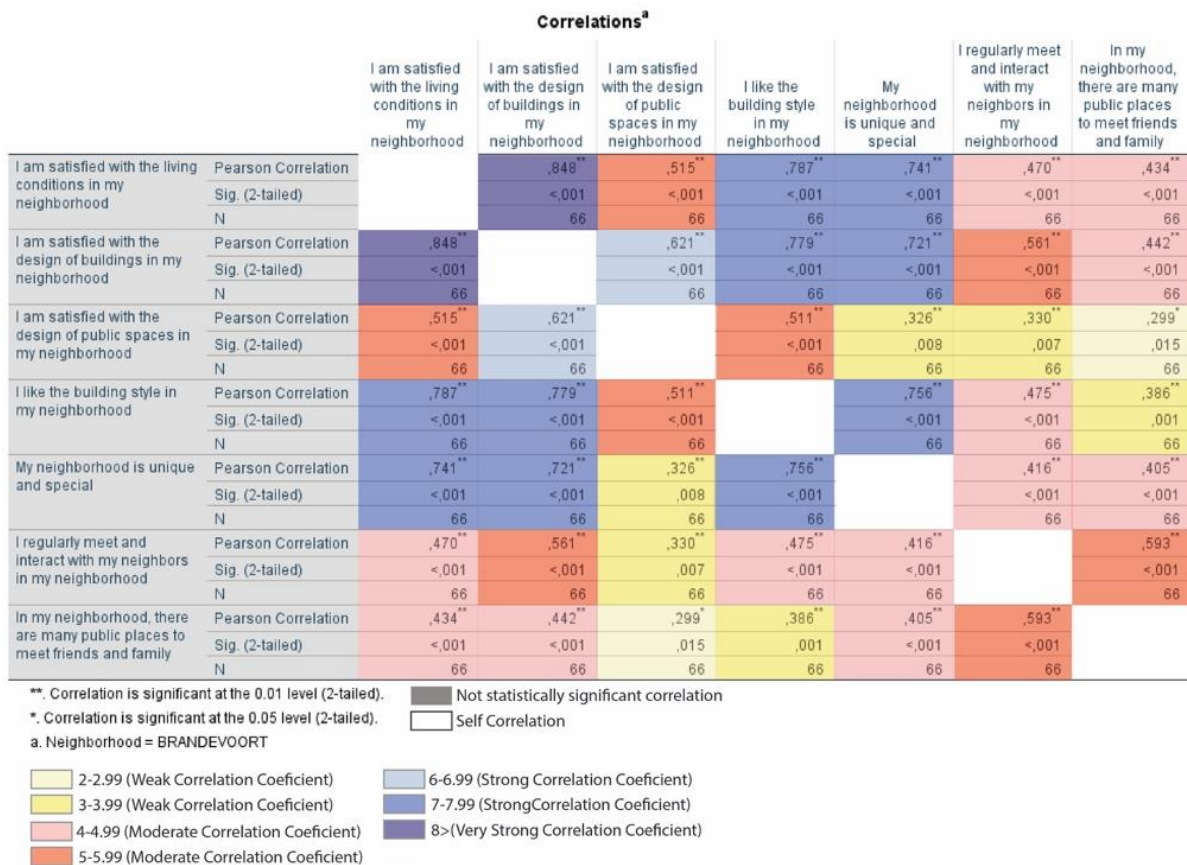


Figure 23: Color-Coded Correlation analysis between questions Q4, Q5, Q6, Q7, Q8, Q10, Q11, Q12 from Brandevoort in SPSS.

As seen in the figures above (Figures 22 and 23), there are clear differences in correlation coefficients for multiple questions between neighborhoods. The large difference in correlation coefficients between Q4 and Q5 can be explained by the sample of Meerhoven not being representative or the possibility that many residents have moved to Brandevoort largely due to its design (Krier, 2006, pp.50) and valuing their surrounding environment's image while the Meerhoven sample does not. Therefore, there exists a strong correlation between the design of the neighborhood and overall satisfaction, while in the Meerhoven sample there is not a significant correlation, and they possibly have moved to the neighborhood with other considerations than design as a motivation.

In the Meerhoven sample, there was no significant correlation between neighborhood satisfaction and respondents liking the building style in their neighborhood, while in Brandevoort there was a strong correlation. This furthermore substantiates the notion that visual character and satisfaction is strongly linked in Brandevoort, while it is not in the sample from Meerhoven.

The sample from Meerhoven indicates a strong correlation between considering their neighborhood special and regularly meeting and interacting with their neighbors, which is in line with the research of Beidler & Morrison (2016) which posits that community interaction contributes to neighborhoods being considered special.

Also, for Brandevoort the correlation between respondents considering their neighborhood special, overall satisfaction, satisfaction of buildings and public was higher than Meerhoven, with the latter three not showing a significant correlation. This could mean that Brandevoort's uniqueness, according to the respondents, can be strongly attributed to its built image and character. In Brandevoort's case, the high correlation with overall satisfaction can also be explained by citizens not only look for housing but want to be a part of the process of creating and inhabiting a new traditional Brabant city (Krier, 2006, pp.50). This also aligns with the research of Neal (2021) as the results indicate that satisfaction for

the residents is subjective and in Brandevoort's case being correlated with the characteristics of the built environment of their neighborhood.

Building on the research of Karuppanan & Sivam (2011) there was no difference in means for the respondents indicating places for community interaction, but in the Meerhoven sample, there was a higher correlation of community interaction and overall satisfaction, while in Brandevoort there was a higher correlation between satisfaction of buildings and community interaction. This indicates that in the Meerhoven sample, respondents find the opportunity to meet in formal gathering places such as the many playgrounds across the neighborhood, while in Brandevoort respondents meet more informally close to their homes making a connection between buildings and community interaction.

The few statistically significant and weak correlations of the Meerhoven sample and the stronger and significant correlations between variables in Brandevoort suggest a difference in values between samples. It is clear there is a strong link between the design of Brandevoort and satisfaction, while there are similar levels of community interaction and correlations among the design of the neighborhood and satisfaction with them.

5.4 Regressions

To further understand the relationship between neighborhood satisfaction and characteristics of the neighborhoods, regression analyses were conducted for each neighborhood (see Appendix pp.51-54). In the Meerhoven sample, the model predicted 32% of variance of satisfaction with living conditions. However, the only predictor for satisfaction with living conditions is "I regularly meet and interact with my neighbors in my neighborhood," with a coefficient of 0.507 which is in line with research of Beidler & Morrison (2016) positing the possibility of community interaction determining satisfactory neighborhoods. The results are also in line with the findings of (Hidalgo & Hernández, 2001) that the social dimension of place attachment (community interaction in this case) was stronger than the physical dimension, with community interaction being the only predictor for satisfaction. The relationship of satisfaction with the design of buildings, public spaces, the neighborhood's uniqueness, and public places to meet, were not statistically significant. This suggests that while aspects like building design and available public spaces are considered, they are not as strongly associated with overall living condition satisfaction as social interaction. In the sample, satisfaction with the neighborhood could be tied to the findings of Neal (2021), with access to facilities, mobility and infrastructure playing a more important, with the visual character not playing such an important role as in Brandevoort.

In Brandevoort, the regression model predicted 77.5% of the variance in residents' satisfaction, which is a substantial proportion, suggesting a good fit. The two variables that significantly predict satisfaction with living conditions are "I am satisfied with the design of buildings in my neighborhood" and "I like the traditional building style in my neighborhood". These findings suggest that architectural design and aesthetic preference are important factors in residents' overall satisfaction. Other variables did not show a significant predictive value.

The large difference in the predictability for the model could be down to sampling bias, Brandevoort having characteristics that directly influence satisfaction, a difference in values of residents of each neighborhood, with Brandevoort's residents linking their surrounding built environment and image to satisfaction. The findings for Brandevoort contradict the findings of Beidler & Morrison (2016) as there was not a significant predictive relationship between community interaction and satisfaction of the neighborhood.

5.5 Building style preference

Questions 8 and 9 deal with aesthetic perception. Both Neighborhoods entirely correctly identified the building styles of their neighborhoods (Q8). This indicates that the

residents understand the style of the built environment in their neighborhoods. However, question 9 presents an interesting reflection.

There exists a large preference for traditional looking buildings in the Meerhoven sample with 47,5% of respondents indicating that they still prefer traditional looking buildings even though they might live in a contemporary neighborhood. The opposite was also the case in Brandevoort (although to a lesser extent), with some respondents preferring contemporary architecture to neo-traditional architecture (25,4% preferred contemporary buildings).

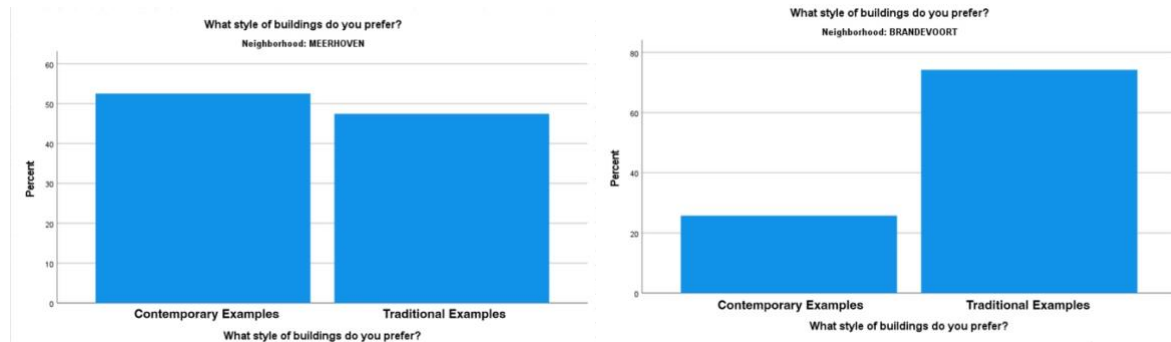


Figure 24: Answers for Q9 from Meerhoven in SPSS. Figure 25: Answers for Q9 from Brandevoort in SPSS (for traditional and contemporary examples see survey: Appendix Figures 41 and 42).

5.6 Qualitative Survey Question Answers

After coding the responses of Q13 (Appendix Figures 37 and 38), several themes emerged from the answers. For the neighborhood design and aesthetic perception respondents from Meerhoven indicated a complimentary set of observations, they stated that the neighborhood was “clean”, “safe” and “modern”, which was used both in a positive and negative light. On one hand the “modern” and “clean” label was used in the relation of the state of the condition and design of buildings but was also used negatively as the buildings and neighborhood being “boring” and “ugly”. The label of “ugly” could be used in relation to the simple or unorthodox design of facades and lack of ornamentation. Furthermore, the label “boring” in the category “community interaction” indicates a lack of amenities such as stores and cafes, where people could gather and interact. As research by Alexander (1979) and Lengen & Kistemann (2012) points the difficulty of defining sense of place, these responses of lacking possibility of community interaction and visual dissatisfaction point to a lack of sense of place (Beidler & Morrison, 2016).

Brandevoort residents identified the overarching nature of the plan of Brandevoort with labels “one big plan” and “vision” in the “neighborhood design” and in the “aesthetic appreciation” category they were more positive towards the design of buildings with responses such as “new but old”, “good old style”. However, there were a few responses highlighting the inauthentic nature of the design of buildings with labels such as “fake”, “copy” and “imitation” corroborating the critiques of Gold (2023) and Ruiz-Goiriena (2013).

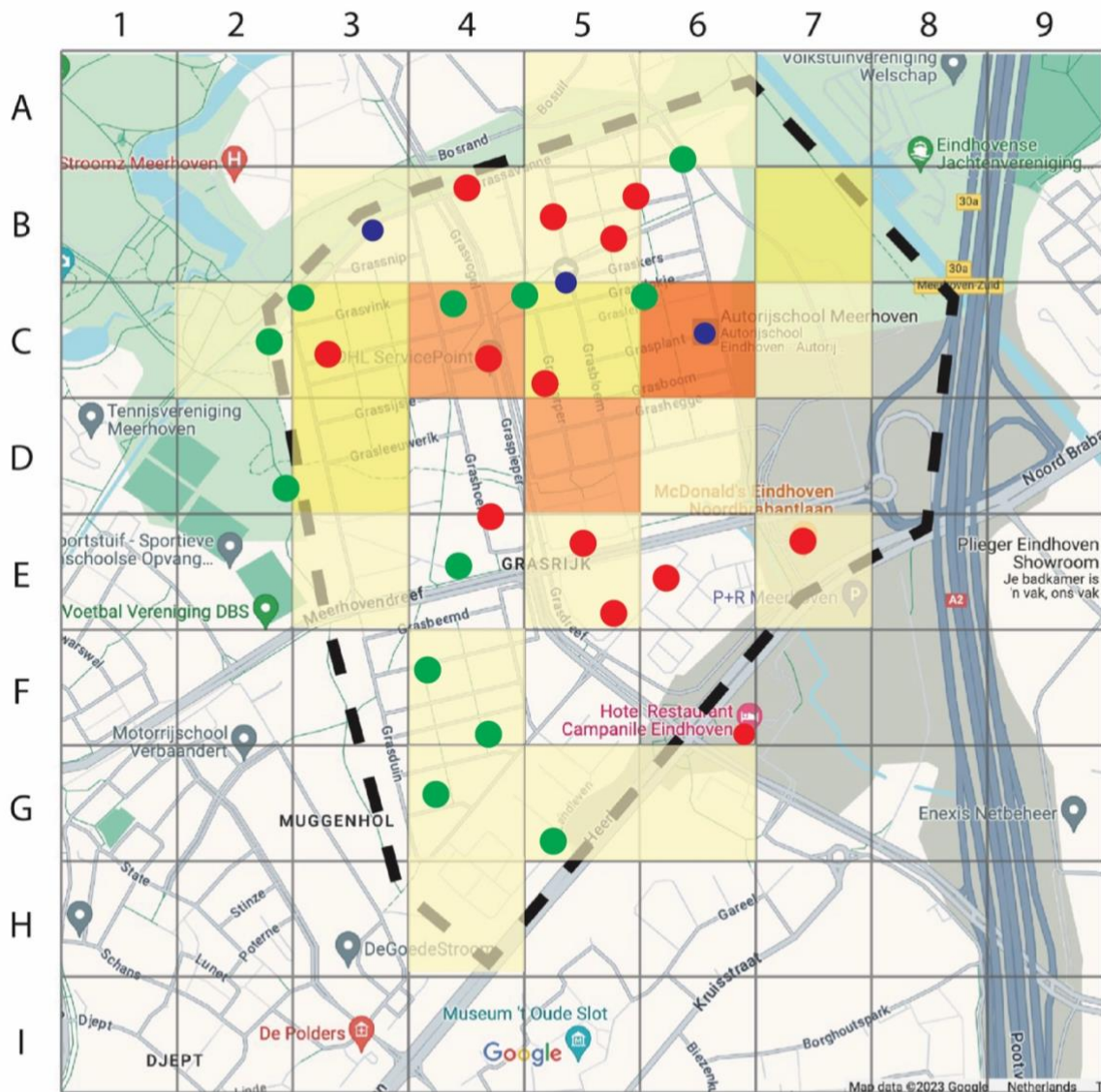
For Brandevoort, there were also more responses in relation to “sense of place” with labels such as “respecting history”, “Maintaining heritage” and “Comfortably quiet and friendly” in line with the research of Lengen & Kistemann (2012) and Forsyth & Crewe (2009) highlighting the importance of memory, culture, historical context, and overarching style.

For Q14 having analyzed the responses (Appendix Figures 39 and 40), both neighborhood samples value aesthetic and social factors. For the Meerhoven sample phrases like “clean”, “quiet and calm” and “good for families” suggest a modern and peaceful environment is appreciated, but also the lack of particularly specific answers and negative labels such as “nothing to do” and “everything is the same” show a wanting for more amenities, uniqueness, and possible activities.

In Brandevoort, labels such as “tradition”, “special idea and plan” and “history” indicate an affinity to their neighborhood having a set, recognizable identity which is achieved through the design of their neighborhood which is in line with the research of Lengen & Kistemann (2012), placing importance on perception memory and culture. Negative comments however, such as “not authentic” and “feels like Disneyland” suggest a critique of the neighborhood not being genuine or not convincingly designed in line with the critiques of Gold (2023) and Ruiz-Goiriena (2013).

5.7 Mapping responses

The responses for the mapping question (Q15) were compiled and color coded to achieve an easy overview of number of responses and preferred locations in the respective neighborhoods (Figures 26 and 27). In both cases, most responses are grouped in the geographic center of the neighborhoods. This can be attributed that most amenities and facilities are present there. The same is visible in Brandevoort. Most responses indicated the preferred location being the De Veste, and particularly De Plaatse (the central square of the neighborhood). This location has multiple supermarkets, cafes, and local businesses. Multiple community events are also organized there. The more grouped and centralized nature of the responses of Brandevoort and presence of social venues indicate that this area holds more significance for its residents than the central area of Meerhoven. Brandevoort has a much higher density and number of facilities in the boundaries of the neighborhood than Meerhoven. The higher number of meeting places and facilities could partly explain the higher satisfaction scores. These findings build on the research of (Beidler & Morrison, 2016), (Scannell & Gifford, 2010) and (Lengen & Kistemann, 2012) as these areas have a more pronounced sense of place due to the concentrations of meeting places and local businesses. Furthermore, there is high correlation and overlap of preferred locations and presence of local businesses.



Google Maps. (2023) Map of Meerhoven, Grasrijk with neighborhood boundaries. Retrieved from <https://www.google.com/maps/@51.4368456,5.413777,15.44z?entry=ttu>



- | | |
|--|---|
| <ul style="list-style-type: none"> 1-2 Responses 3-5 Responses 6-8 Responses 9-11 Responses 12> Responses | <p>FACILITIES</p> <ul style="list-style-type: none"> Businesses Playground / Park Education facility |
|--|---|

Figure 26: Heat map of mapping question (Q15) responses for Meerhoven with added facilities.

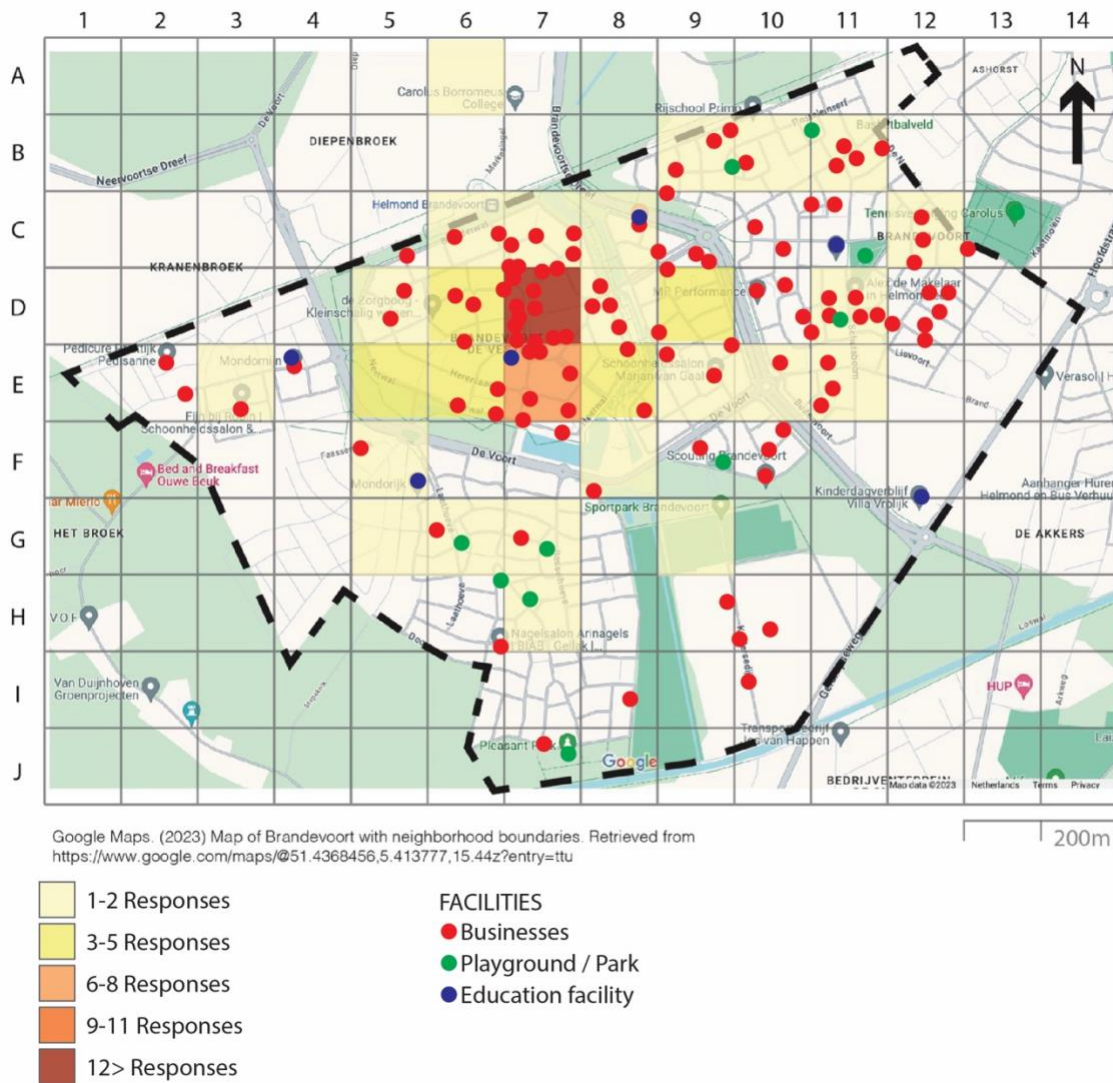


Figure 27: Heat map of mapping question (Q15) responses for Brandevoort with added facilities.

Chapter 6: Limitations and conclusions

6.1 Limitations

Firstly, the largest limitation of the research is one neighborhood sample not being representative of the population in terms of age group makeup. This limits the conclusions that can be made about the neighborhood of Meerhoven in comparison to Brandevoort. Furthermore, although efforts were made to increase the sample size for both neighborhoods, ultimately, they still were relatively small. This limits the possible ways of dividing up and analyzing data. For example, if there were at least 30 cases per age group, there could have been a deeper examination and statistical tests of if and how different age groups answer the survey questions.

Both samples contain a higher number of younger (15-25) and older (66+) respondents. It is likely the case that due to the sampling taking place during working hours, the middle age categories were at work, leaving younger and older people more likely to be

interviewed. Upon running descriptive analytics of sample age groups, it became clear that the 66+ age group answers were heavily more positive than the lower age groups so an overrepresentation of this group lead to higher means for both neighborhoods.

Descriptive Statistics^a

	N	Minimum	Maximum	Mean
I am satisfied with the living conditions in my neighborhood	11	6	10	8,36
I am satisfied with the design of buildings in my neighborhood	11	5	10	8,64
I am satisfied with the design of public spaces in my neighborhood	11	7	10	8,64
I like the building style in my neighborhood	11	1	5	4,18
My neighborhood is unique and special	11	2	5	4,45
I regularly meet and interact with my neighbors in my neighborhood	11	1	4	2,73
In my neighborhood, there are many public places to meet friends and family	11	2	5	3,45
Valid N (listwise)	11			

a. What is your age? = 66+, Neighborhood = BRANDEVOORT

Figure 28: Descriptive statistics for answers Q4, Q5, Q6, Q7, Q10, Q11 and Q12 in SPSS from Brandevoort for age category 66+.

Descriptive Statistics^a

	N	Minimum	Maximum	Mean
I am satisfied with the living conditions in my neighborhood	11	7	10	8,18
I am satisfied with the design of buildings in my neighborhood	11	4	8	6,09
I am satisfied with the design of public spaces in my neighborhood	11	5	10	7,64
I like the building style in my neighborhood	11	1	5	2,73
My neighborhood is unique and special	11	1	3	2,55
I regularly meet and interact with my neighbors in my neighborhood	11	1	5	3,55
In my neighborhood, there are many public places to meet friends and family	11	3	5	4,18
Valid N (listwise)	11			

a. What is your age? = 66+, Neighborhood = MEERHOVEN

Figure 29: Descriptive statistics for answers Q4, Q5, Q6, Q7, Q10, Q11 and Q12 in SPSS from Meerhoven for age category 66+.

The overrepresentation of younger age groups in Brandevoort presents the opposite case. The means for most variables are lower than the average, noticeably with the first 3 questions. In Meerhoven, the younger age group reported a higher mean on all questions.

Descriptive Statistics^a

	N	Minimum	Maximum	Mean
I am satisfied with the living conditions in my neighborhood	17	3	8	6,00
I am satisfied with the design of buildings in my neighborhood	17	5	8	6,82
I am satisfied with the design of public spaces in my neighborhood	17	5	9	7,29
I like the building style in my neighborhood	17	1	5	3,47
My neighborhood is unique and special	17	1	5	2,59
I regularly meet and interact with my neighbors in my neighborhood	17	1	4	2,76
In my neighborhood, there are many public places to meet friends and family	17	1	5	2,76
Valid N (listwise)	17			

a. What is your age? = 15-25, Neighborhood = MEERHOVEN

Figure 30: Descriptive statistics for answers Q4, Q5, Q6, Q7, Q10, Q11 and Q12 in SPSS from Brandevoort for age category 15-25.

Descriptive Statistics^a

	N	Minimum	Maximum	Mean
I am satisfied with the living conditions in my neighborhood	18	3	10	7,44
I am satisfied with the design of buildings in my neighborhood	18	1	10	7,33
I am satisfied with the design of public spaces in my neighborhood	18	4	9	7,72
I like the building style in my neighborhood	18	1	5	3,89
My neighborhood is unique and special	18	1	5	4,00
I regularly meet and interact with my neighbors in my neighborhood	18	1	5	2,44
In my neighborhood, there are many public places to meet friends and family	18	1	5	3,44
Valid N (listwise)	18			

a. What is your age? = 15-25, Neighborhood = BRANDEVOORT

Figure 31: Descriptive statistics for answers Q4, Q5, Q6, Q7, Q10, Q11 and Q12 in SPSS from Brandevoort for age category 15-25.

In the Meerhoven sample both overrepresented age groups influence the mean in a positive direction, thus it is safe to assume the satisfaction level would be lower in a representative sample. In Brandevoort, the older age group influences the means positively, while the younger age group roughly aligns with the group mean.

Focusing on 2 neighborhoods limits the conclusions that can be drawn about new urbanism neighborhoods in general and limits the findings to the particular case of Brandevoort and Meerhoven. In addition, Brandevoort is not fully developed yet. There is a possibility the answers for the survey could be different when the neighborhood fully developed.

External factors such as economic events, major events and policy changes could also have an impact on respondents' answers for the survey.

Lastly, it is important to note that people who responded might not represent the views of the population, as voluntary participation is likely to attract people who hold a strong opinion about the matter. This was seen in the online survey responses, with them being stronger in both negative and positive directions.

6.1 Further research

The findings are satisfactory for a surface level investigation of neighborhood design and overall neighborhood satisfaction. The massive difference in correlation coefficients and regression analysis outcomes between the two neighborhoods, concerning neighborhood satisfaction and neighborhood design questions, indicate the importance of values of residents who decide to move to different neighborhoods. Looking back, it would have been useful to include a question "The look/image of the surrounding built environment is important to me". This could explain the difference in correlation coefficients between the neighborhoods especially overall satisfaction and buildings design satisfaction (Q4 and Q5).

The chosen research method limited the possibility of an in-depth examination of residents' perspectives of their neighborhoods. Qualitative research with interviews with the residents about what makes their neighborhood special and how it relates to neighborhood design and satisfaction could reveal more than the current chosen method.

Focusing entirely on two cases in the Netherlands limits the scope of the research geographically to the Netherlands. Further research could focus on examining other pairs of contemporary and new urbanism neighborhoods in other places of the world, with some locations being Poundbury in the UK, Cayala in Guatemala, and Seaside in the USA. The increased number of cases would allow to further isolate design characteristics of the neighborhoods and establish a clearer connection between neighborhood design and satisfaction as well as make conclusions about new urbanism neighborhoods in general and not just one case in the Netherlands.

6.2 Conclusions

The research seeks to find an answer to what extent does the urban design of new urbanism influence residents' neighborhood satisfaction compared to residents of other neighborhoods? Among the 2 chosen cases there exist significant differences in overall neighborhood satisfaction as well as differences in satisfaction of buildings and public space. From the correlation analysis, it can be concluded that the design of Brandevoort appeals to its residents' aesthetic perception more than Meerhoven's sample. These factors lead to a more solidified sense of place and thus overall satisfaction scores are higher for Brandevoort than Meerhoven. Furthermore, the distinct goal of creating a visually coherent neighborhood which relies on regionally recognizable architecture as well as urban form seems to have better results in creating a neighborhood which its residents value and are satisfied with.

The research found that there exists a difference in average overall satisfaction scores of around 0.6 marks (out of 10) between the two neighborhood samples. In Brandevoort the surrounding built environment had a strong relationship with overall satisfaction and the regression model predicted around 77% of the variability of responses, while in the Meerhoven sample, the only predictive relationship was with community interaction.

After examining municipality documents for maintaining the built environment quality, clear rules and guidelines were identified to preserve the distinct style of each neighborhood, with Brandevoort's being more specific regarding rules for use of certain facade elements and Meerhoven emphasizing the need for buildings to be tied to the landscape rather than presenting strict rules for the form and elements of buildings. Brandevoort aims to be like surrounding historic towns, enforcing strict architectural elements, historic typologies, and scales while Meerhoven tries to achieve a forest atmosphere, by integrating landscape elements and earthy colors and natural materials.

Major demographic differences were not identified as both neighborhoods had similar income levels, property prices, crime levels, housing occupancy with the only major difference being the native population percentage.

The hypotheses only partly were confirmed as the new urbanism neighborhood did indeed have a higher overall satisfaction than the contemporary neighborhood sample, but

this could have been due to sampling bias (with the sample not being representative). However, the satisfaction was influenced by different factors. In Brandevoort there was a strong correlation and relationship with the built image of the environment and overall satisfaction. This is not the case in in the sample from Meerhoven.

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Appendix

Summary of beeldskwaliteit plan of Brandevoort

	Rules	Material / Color / Dimensions	Specifics
Building mass	Chimneys, spouts, and shoulders are characteristic. No bay windows are allowed on the front facade. Balconies are not appropriate		
Facades	Horizontal layout - plinth - middle part - cap		Maximum 80 cm extrusion from the outer wall.
Roofs	No roof overhang on gable end is allowed. Pierced through gables allowed. No hip roofs allowed. Owl boards are allowed. Dormer windows in vertical axes with facade openings are allowed.	Orange-red ceramic OVH pan. Front: max. 1.4m wide. Rear: max. 2.5m wide.	The roof slope is 50 degrees.
Outbuildings	A flat roof for subordinate buildings. Detached outbuildings and large extensions (garages) have a roof; A pitched roof is also possible for extensions.		The roof slope is 50 degrees.
Property Boundaries	Regional hedges	For corner houses, a green hedge of approximately 1.5 meters in height.	
Material Use On Facades Frames Property boundaries	Base material Added material Frame thickness depends on negge Gates	Brick (hand mold, molded container, waal format). Natural stone (not polished or honed), concrete, wood. 90mm; deepened 67 mm. Native hedge, steel.	Special details. Sills, sometimes frames and decorations.

Use Of Color			
Facades	Base material Frames	Dark red-brown brick. Brickwork in a light gray color is sometimes permitted Orange red	
Plinth			
Roof surfaces	Ceramic OVH pan		
Side-wall dormer windows	Gray		
Property boundaries	Regional hedge Gates	Green (or brown) Anthracite or dark green	

Appendix Figure 1: Summary of beeldkwaliteit plan of Brandevoort (Gemeente Helmond, 2009).

Tests of representativeness for Q1, Q2, Q3:

Null hypothesis for Chi-square test for Q1: There is no significant difference between gender distribution in the sample and those of the known population of Meerhoven.

To not exclude the response of respondent who indicated “do not wish to answer” for gender an expected value of 1 was assigned to the Chi-square test. As the research assumes a binary choice for gender, this respondent could have been either male or female and thus does not affect the results.

What is your gender?^a

	Observed N	Expected N	Residual
MALE	27	29,0	-2,0
FEMALE	31	29,0	2,0
DO NOT WISH TO SAY	1	1,0	,0
Total	59		

a. Neighborhood = MEERHOVEN

Appendix Figure 2: Observed and expected number of responses for Q1 from Meerhoven in SPSS.

Test Statistics^a

What is your gender?	
Chi-Square	,276 ^b
df	2
Asymp. Sig.	,871

a. Neighborhood = MEERHOVEN

b. 1 cells (33,3%) have expected frequencies less than 5. The minimum expected cell frequency is 1,0.

Appendix Figure 3: Results of Chi-square test for Q1 from Meerhoven in SPSS.

Conclusion: The gender distribution of the sample from Meerhoven is not significantly different from the true population of Meerhoven as significance is above 0.05. Sample is representative in terms of gender.

Null hypothesis for Chi-square test for Q1: There is no significant difference between gender distribution in the sample and those of the known population of Brandevoort.

What is your gender?^a

	Observed N	Expected N	Residual
MALE	36	33,0	3,0
FEMALE	30	33,0	-3,0
Total	66		

a. Neighborhood = BRANDEVOORT

Appendix Figure 4: Observed and expected number of responses for Q1 from Brandevoort in SPSS.

Test Statistics^a

What is your gender?	
Chi-Square	,545 ^b
df	1
Asymp. Sig.	,460

a. Neighborhood =
BRANDEVOORT

b. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 33,0.

Appendix Figure 5: Results of Chi-square test for Q1 from Brandevoort in SPSS.

Conclusion: The gender distribution of the sample from Brandevoort is not significantly different from the true population of Brandevoort. Sample is representative in terms of gender.

Null hypothesis for Chi-square test for Q3: There is no significant difference between housing age distribution in the sample and those of the known population of Meerhoven.

What is your age?

	Observed N	Expected N	Residual
15-25	17	8,0	9,0
26-45	18	26,0	-8,0
46-65	13	18,0	-5,0
66+	11	7,0	4,0
Total	59		

Appendix Figure 6: Observed and expected number of responses for Q2 from Meerhoven in SPSS.

Test Statistics

What is your age?	
Chi-Square	16,261 ^a
df	3
Asymp. Sig.	,001

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 7,0.

Appendix Figure 7: Results of Chi-square test for Q2 from Meerhoven in SPSS.

Conclusion: The age distribution of the sample from Meerhoven is significantly different from the true population of Meerhoven. Sample is representative in terms of age groups.

Null hypothesis for Chi-square test for Q3: There is no significant difference between housing age distribution in the sample and those of the known population of Brandevoort.

What is your age?

	Observed N	Expected N	Residual
15-25	18	13,0	5,0
26-45	21	20,0	1,0
46-65	16	25,0	-9,0
66+	11	8,0	3,0
Total	66		

Appendix Figure 8: Observed and expected number of responses for Q2 from Brandevoort in SPSS.

Test Statistics

What is your age?

Chi-Square	6,338 ^a
df	3
Asymp. Sig.	,096

a. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 8,0.

Appendix Figure 9: Results of Chi-square test for Q2 from Meerhoven in SPSS.

Conclusion: The age distribution of the sample from Brandevoort is significantly different from the true population of Brandevoort. Sample is representative in terms of age groups.

Null hypothesis for Chi-square test for Q3: There is no significant difference between housing situation distribution in the sample and those of the known population of Meerhoven.

What is your housing situation?^a

	Observed N	Expected N	Residual
Private	36	46,0	-10,0
Rental	23	13,0	10,0
Total	59		

a. Neighborhood = MEERHOVEN

Appendix Figure 10: Observed and expected number of responses for Q3 from Meerhoven in SPSS.

Test Statistics^a

What is your housing situation?

Chi-Square	9,866 ^b
df	1
Asymp. Sig.	,002

a. Neighborhood = MEERHOVEN

b. 0 cells (0,0%) have expected frequencies less than 5. The minimum expected cell frequency is 13,0.

Appendix Figure 11: Results of Chi-square test for Q3 from Meerhoven in SPSS.

Conclusion: The housing situation distribution of the sample from Meerhoven is significantly different from the true population of Meerhoven as significance is below 0.05. Sample is not representative in terms of housing situation.

Null hypothesis for Chi-square test for Q3: There is no significant difference between housing situation distribution in the sample and those of the known population of Brandevoort.

What is your housing situation?^a

	Observed N	Expected N	Residual
Private	42	50,0	-8,0
Rental	24	16,0	8,0
Total	66		

a. Neighborhood = BRANDEVOORT

Appendix Figure 12: Observed and expected number of responses for Q3 from Brandevoort in SPSS.

Test Statistics^a

What is your
housing
situation?

Chi-Square	5,280 ^b
df	1
Asymp. Sig.	,022

a. Neighborhood =
BRANDEVOORT

b. 0 cells (0,0%) have
expected frequencies
less than 5. The
minimum expected cell
frequency is 16,0.

Appendix Figure 13: Results of Chi-square test for Q3 from Brandevoort in SPSS.

Conclusion: The housing situation distribution of the sample from Brandevoort is significantly different from the true population of Brandevoort as significance is below 0.05. Sample is not representative in terms of housing situation.

Tests of normality for Q4, Q5, Q6:

Null hypothesis for test of Normality for Q4 for Meerhoven: The distribution of satisfaction scores regarding living conditions in Meerhoven is normally distributed.

Null hypothesis for test of Normality for Q5 for Meerhoven: The distribution of satisfaction scores regarding the design of buildings in Meerhoven is normally distributed.

Null hypothesis for test of Normality for Q6 for Meerhoven: The distribution of satisfaction scores regarding the design of public spaces in Meerhoven is normally distributed.

Tests of Normality^a

	Kolmogorov-Smirnov ^b			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
I am satisfied with the living conditions in my neighborhood	,207	59	<,001	,934	59	,003
I am satisfied with the design of buildings in my neighborhood	,169	59	<,001	,939	59	,005
I am satisfied with the design of public spaces in my neighborhood	,185	59	<,001	,933	59	,003

a. Neighborhood = MEERHOVEN

b. Lilliefors Significance Correction

Appendix Figure 14: Test of normality output for Q4, Q5, Q6 in SPSS for Meerhoven.

Conclusion: the responses for Q4, Q5, Q6 in Meerhoven are not normally distributed as the significance for all tests are bellow 0.05.

Null hypothesis for test of Normality for Q4 Brandevoort: The distribution of satisfaction scores regarding living conditions in Brandevoort is normally distributed.

Null hypothesis for test of Normality for Q5 Brandevoort: The distribution of satisfaction scores regarding the design of buildings in Brandevoort is normally distributed.

Null hypothesis for test of Normality for Q6 Brandevoort: The distribution of satisfaction scores regarding the design of public spaces in Brandevoort is normally distributed.

Tests of Normality^a

	Kolmogorov-Smirnov ^b			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
I am satisfied with the living conditions in my neighborhood	,190	66	<,001	,913	66	<,001
I am satisfied with the design of buildings in my neighborhood	,200	66	<,001	,855	66	<,001
I am satisfied with the design of public spaces in my neighborhood	,255	66	<,001	,868	66	<,001

a. Neighborhood = BRANDEVOORT

b. Lilliefors Significance Correction

Appendix Figure 15: Test of normality output for Q4, Q5, Q6 in SPSS for Brandevoort.

Conclusion: the responses for Q4, Q5, Q6 in Meerhoven are not normally distributed as the significance for all tests are bellow 0.05.

Independent samples t-test for Q4, Q5, Q6:

Group Statistics					
	Neighborhood	N	Mean	Std. Deviation	Std. Error Mean
I am satisfied with the living conditions in my neighborhood	MEERHOVEN	59	7,08	1,523	,198
	BRANDEVOORT	66	7,73	1,564	,193
I am satisfied with the design of buildings in my neighborhood	MEERHOVEN	59	6,76	1,369	,178
	BRANDEVOORT	66	7,98	1,933	,238
I am satisfied with the design of public spaces in my neighborhood	MEERHOVEN	59	7,39	1,377	,179
	BRANDEVOORT	66	7,95	1,397	,172

Figure 16: Group statistics for Q4, Q5, Q6 in SPSS.

Null hypothesis for independent samples t-test for Q4: There is no difference in the means for satisfaction with living conditions between Meerhoven and Brandevoort.

Null hypothesis for independent samples t-test for Q5: There is no difference in the means for satisfaction with the design of buildings between Meerhoven and Brandevoort.

Null hypothesis for independent samples t-test for Q6: There is no difference in the means for satisfaction with the design of public spaces (parks, streets, squares) between Meerhoven and Brandevoort.

Independent Samples Test											
		Levene's Test for Equality of Variances				t-test for Equality of Means					
		F	Sig.	t	df	Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
						One-Sided p	Two-Sided p			Lower	Upper
I am satisfied with the living conditions in my neighborhood	Equal variances assumed	,147	,702	-2,321	123	,011	,022	-,643	,277	-1,191	-,095
	Equal variances not assumed			-2,324	122,089	,011	,022	-,643	,276	-1,190	-,095
I am satisfied with the design of buildings in my neighborhood	Equal variances assumed	2,046	,155	-4,034	123	<,001	<,001	-1,222	,303	-1,822	-,622
	Equal variances not assumed			-4,111	117,077	<,001	<,001	-1,222	,297	-1,811	-,633
I am satisfied with the design of public spaces in my neighborhood	Equal variances assumed	,171	,680	-2,271	123	,012	,025	-,565	,248	-1,057	-,073
	Equal variances not assumed			-2,273	121,808	,012	,025	-,565	,248	-1,057	-,073

Figure 17: Independent samples t-test results for Q4, Q5, Q6 in SPSS.

Mann-Whitney U test for Q4, Q5, Q6:

Null hypothesis for Mann-Whitney U test for Q4: The medians of answers for Q4 are the same between the two neighborhoods (Meerhoven and Brandevoort).

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig. ^{a,b}	Decision
1	The medians of I am satisfied with the living conditions in my neighborhood are the same across categories of Neighborhood.	Independent-Samples Median Test	,022 ^c	Reject the null hypothesis.
2	The distribution of I am satisfied with the living conditions in my neighborhood is the same across categories of Neighborhood.	Independent-Samples Mann-Whitney U Test	,010	Reject the null hypothesis.

a. The significance level is ,050.

b. Asymptotic significance is displayed.

c. Yates's Continuity Corrected Asymptotic Sig.

Appendix Figure 18: Mann-Whitney U test output for Q4 in SPSS.

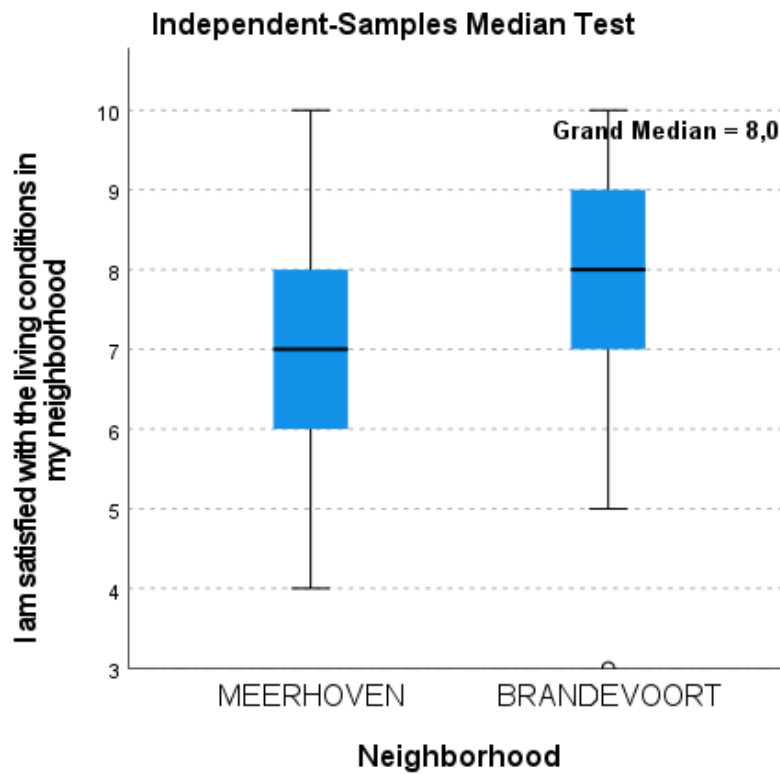
Independent-Samples Median Test Summary

Total N		125
Median		8,000
Test Statistic		6,254 ^a
Degree Of Freedom		1
Asymptotic Sig.(2-sided test)		,012
Yates's Continuity Correction	Chi-Square	5,213
	Degree Of Freedom	1
	Asymptotic Sig.(2-sided test)	,022

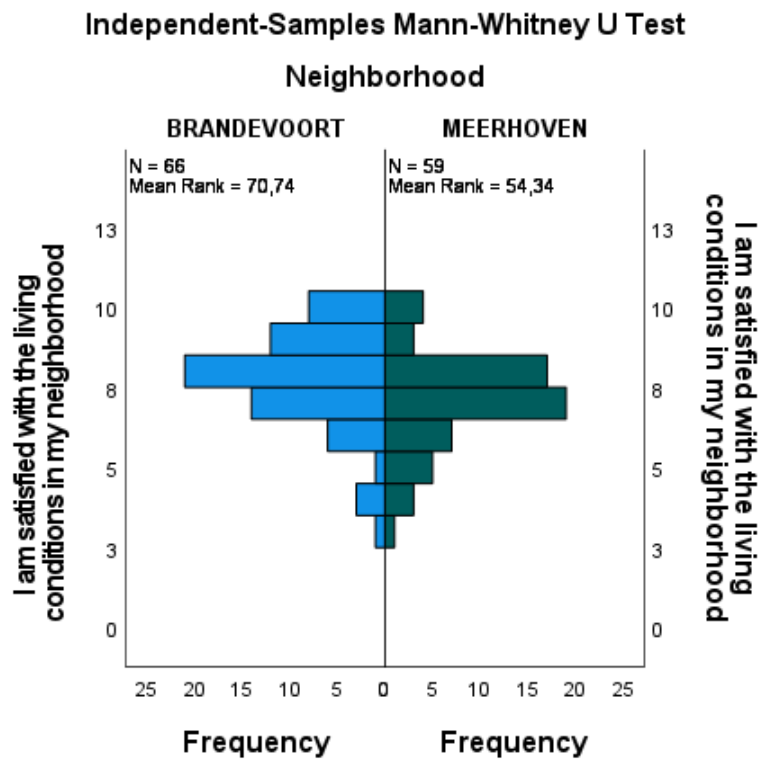
a. Multiple comparisons are not performed because there are less than three test fields.

Appendix Figure 19: Mann-Whitney U test summary for Q4 in SPSS.

The Independent-Samples Median Test Summary table shows results for a non-parametric test comparing the medians between two groups from a sample size of 125. The median test statistic is 8,000 with a significant p-value (Asymptotic Sig. (2-sided)) of .012, indicating that there is a statistically significant difference in the medians of the two groups. Additionally, after applying Yates's Continuity Correction, the chi-square value is reported as 5,213 with a p-value of .022, which also indicates a significant difference. This suggests that the central tendency of the two groups differs significantly.



Appendix Figure 20: Mann-Whitney U test boxplot for Q4 in SPSS.



Appendix Figure 21: Mann-Whitney U test bar chart comparison for Q4 in SPSS.

Null hypothesis for Man Whitney U test for Q5: The medians of answers for Q5 are the same for Meerhoven and Brandevoort neighborhoods.

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig. ^{a,b}	Decision
1	The medians of I am satisfied with the design of buildings in my neighborhood are the same across categories of Neighborhood.	Independent-Samples Median Test	<,001 ^c	Reject the null hypothesis.
2	The distribution of I am satisfied with the design of buildings in my neighborhood is the same across categories of Neighborhood.	Independent-Samples Mann-Whitney U Test	<,001	Reject the null hypothesis.

a. The significance level is ,050.

b. Asymptotic significance is displayed.

c. Yates's Continuity Corrected Asymptotic Sig.

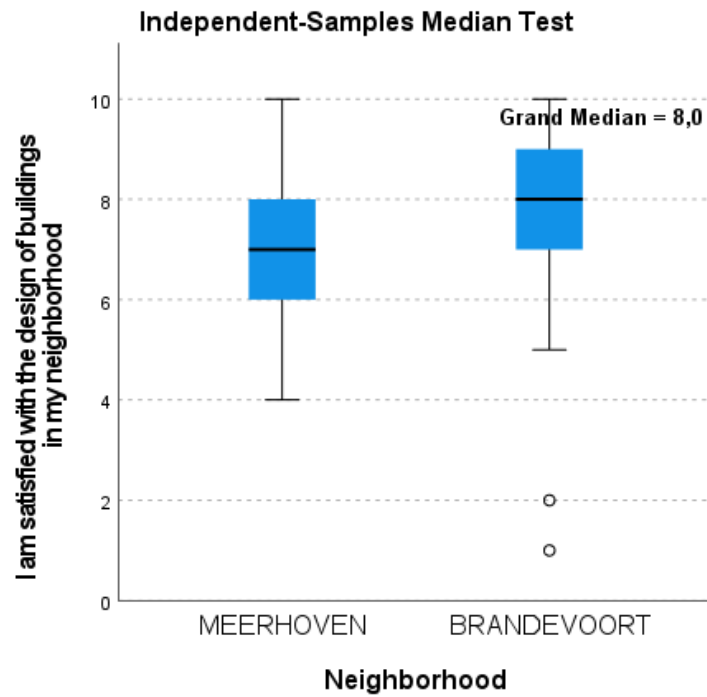
Appendix Figure 22: Mann-Whitney U test output for Q5 in SPSS.

Independent-Samples Median Test Summary		
Total N	125	
Median	8,000	
Test Statistic	24,959 ^a	
Degree Of Freedom	1	
Asymptotic Sig.(2-sided test)	<,001	
Yates's Continuity Correction	Chi-Square	23,006
	Degree Of Freedom	1
	Asymptotic Sig.(2-sided test)	<,001

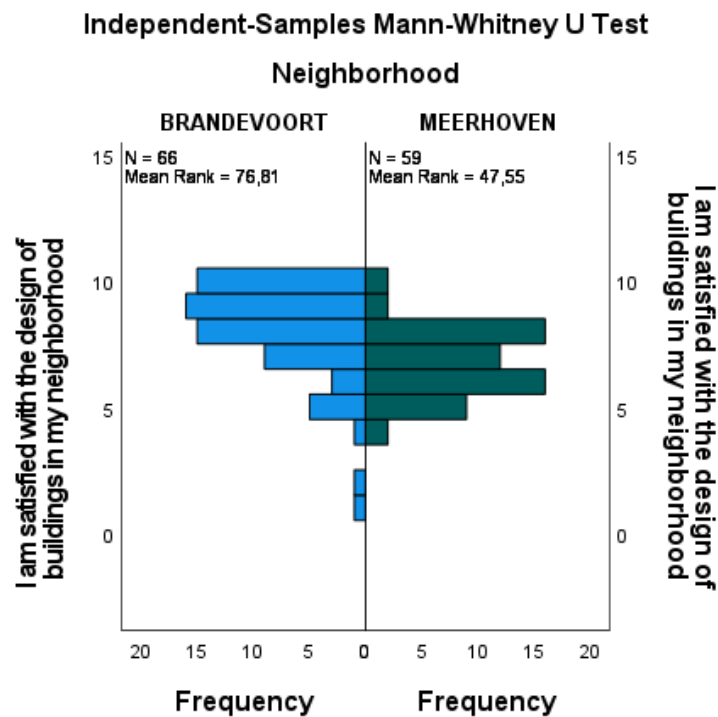
a. Multiple comparisons are not performed because there are less than three test fields.

Appendix Figure 23: Mann-Whitney U test summary for Q5 in SPSS.

The Independent-Samples Median Test Summary indicates that there is a statistically significant difference in the medians of the two groups being compared ($p < .001$). The total number of observations is 125, and the median of the test statistic is 8,000. With a chi-square value of 23,006 and 1 degree of freedom, the result is highly significant. This suggests a strong difference between the groups' central tendencies.



Appendix Figure 24: Mann-Whitney U test boxplot for Q5 in SPSS.



Appendix Figure 25: Mann-Whitney U test bar chart comparison for Q5 in SPSS.

Null hypothesis for Man Whitney U test for Q6: The medians of answers for Q6 are the same for Meerhoven and Brandevoort neighborhoods.

Hypothesis Test Summary				
	Null Hypothesis	Test	Sig. ^{a,b}	Decision
1	The medians of I am satisfied with the design of public spaces in my neighborhood are the same across categories of Neighborhood.	Independent-Samples Median Test	,019 ^c	Reject the null hypothesis.
2	The distribution of I am satisfied with the design of public spaces in my neighborhood is the same across categories of Neighborhood.	Independent-Samples Mann-Whitney U Test	,006	Reject the null hypothesis.

a. The significance level is ,050.

b. Asymptotic significance is displayed.

c. Yates's Continuity Corrected Asymptotic Sig.

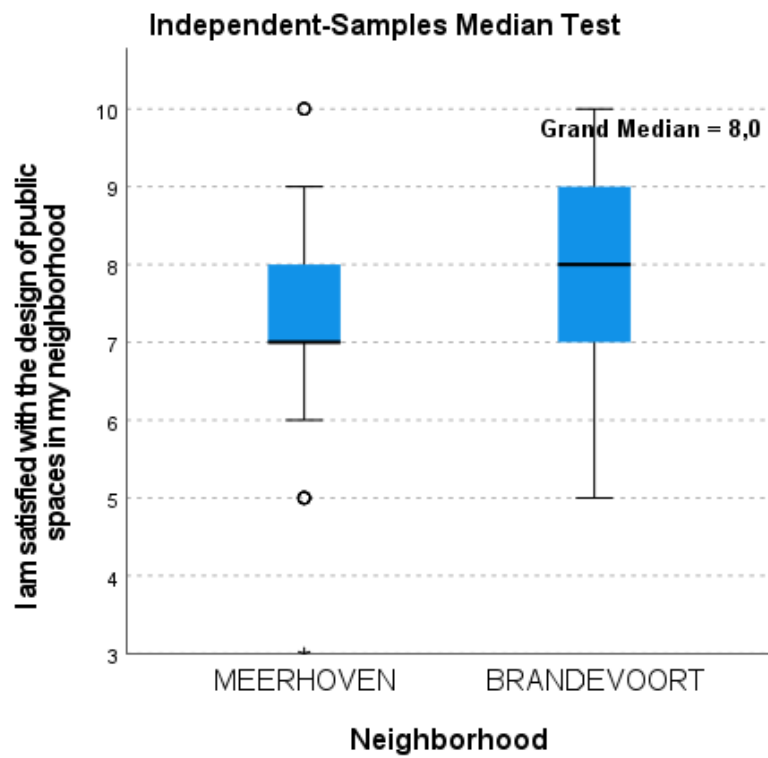
Appendix Figure 26: Mann-Whitney U test output for Q6 in SPSS.

Independent-Samples Median Test Summary

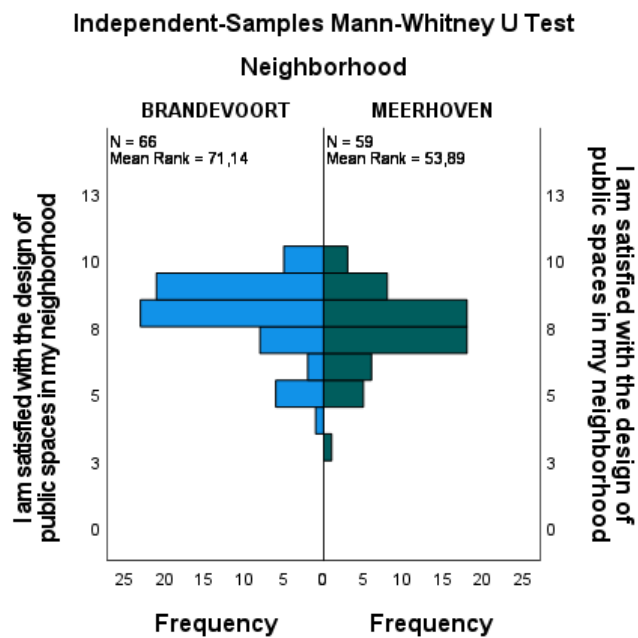
Total N		125
Median		8,000
Test Statistic		6,437 ^a
Degree Of Freedom		1
Asymptotic Sig.(2-sided test)		,011
Yates's Continuity Correction	Chi-Square	5,479
	Degree Of Freedom	1
	Asymptotic Sig.(2-sided test)	,019

a. Multiple comparisons are not performed because there are less than three test fields.

Appendix Figure 27: Mann-Whitney U test summary for Q6 in SPSS.



Appendix Figure 28: Mann-Whitney U test boxplot for Q5 in SPSS.



Appendix Figure 29: Mann-Whitney U test bar chart comparison for Q5 in SPSS.

Independent samples t-test for Q7, Q10, Q11, Q12

Null hypothesis for independent samples t-test for Q7: There is no significant difference in the mean satisfaction with the building style between the samples of Brandevoort and Meerhoven.

Null hypothesis for independent samples t-test for Q10: There is no significant difference in the mean perception of the neighborhood's uniqueness and specialty between the samples of Brandevoort and Meerhoven.

Null hypothesis for independent samples t-test for Q11: There is no significant difference in the mean frequency of meeting and interacting with neighbors between the samples of Brandevoort and Meerhoven.

Null hypothesis for independent samples t-test for Q12: There is no significant difference in the mean number of public places to meet friends and family between the samples of Brandevoort and Meerhoven.

		Independent Samples Test				t-test for Equality of Means					
		Levene's Test for Equality of Variances				Significance		Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
		F	Sig.	t	df	One-Sided p	Two-Sided p			Lower	Upper
I like the building style in my neighborhood	Equal variances assumed	,096	,757	-3,015	123	,002	,003	-,696	,231	-1,153	-,239
	Equal variances not assumed			-3,026	122,722	,002	,003	-,696	,230	-1,151	-,241
My neighborhood is unique and special	Equal variances assumed	1,477	,227	-7,319	123	<,001	<,001	-1,492	,204	-1,896	-1,089
	Equal variances not assumed			-7,286	118,584	<,001	<,001	-1,492	,205	-1,898	-1,087
I regularly meet and interact with my neighbors in my neighborhood	Equal variances assumed	1,102	,296	2,849	123	,003	,005	,562	,197	,172	,953
	Equal variances not assumed			2,852	121,929	,003	,005	,562	,197	,172	,953
In my neighborhood, there are many public places to meet friends and family	Equal variances assumed	17,094	<,001	,224	123	,411	,823	,045	,200	-,352	,442
	Equal variances not assumed			,220	103,291	,413	,826	,045	,204	-,360	,450

Appendix Figure 30: Independent samples t-test results for Q7, Q10, Q11, Q12 between neighborhoods in SPSS.

Conclusion: The significance for Q7, Q10, Q11 is below 0.05 therefore there is a significant difference between the means of the samples. The significance of Q12 is above 0.05, therefore the means are not significantly different between the samples.

Regression analysis

Null hypothesis for regression analysis for Meerhoven: There is no linear relationship between the combined predictors (satisfaction with the design of buildings, satisfaction with public spaces, personal preference for building style, perception of neighborhood uniqueness and specialty, frequency of meeting with neighbors, and availability of public places to meet friends and family) and the residents' satisfaction with the living conditions in the neighborhood Meerhoven.

Model Summary ^{a,c}				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,626 ^b	,392	,322	1,255

a. Neighborhood = MEERHOVEN

b. Predictors: (Constant), In my neighborhood, there are many public places to meet friends and family, I am satisfied with the design of buildings in my neighborhood, My neighborhood is unique and special, I like the building style in my neighborhood, I am satisfied with the design of public spaces in my neighborhood, I regularly meet and interact with my neighbors in my neighborhood

c. Dependent Variable: I am satisfied with the living conditions in my neighborhood

Appendix Figure 31: Model summary of regression analysis for Meerhoven.

The model summary indicates that the set of variables entered into the regression model for the neighborhood of Meerhoven explains 39.2% of the variance in residents' satisfaction with living conditions. After adjustment for the number of predictors, the explanatory power is slightly lower at 32.2%. The standard error of the estimate is 1.255, which gives us an idea of the typical distance between the predicted satisfaction levels and the actual answers given by the residents.

ANOVA^{a,b}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	52,715	6	8,786	5,581	<,001 ^c
	Residual	81,862	52	1,574		
	Total	134,576	58			

a. Neighborhood = MEERHOVEN

b. Dependent Variable: I am satisfied with the living conditions in my neighborhood

c. Predictors: (Constant), In my neighborhood, there are many public places to meet friends and family, I am satisfied with the design of buildings in my neighborhood, My neighborhood is unique and special, I like the building style in my neighborhood, I am satisfied with the design of public spaces in my neighborhood, I regularly meet and interact with my neighbors in my neighborhood

Appendix Figure 32: Anova table for regression analysis for Meerhoven.

The ANOVA table for the regression model with Meerhoven as the neighborhood shows that the model significantly predicts the satisfaction with living conditions ($p < .001$).

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	3,894	1,066		3,653	<,001
	I am satisfied with the design of buildings in my neighborhood	,025	,154	,022	,161	,873
	I am satisfied with the design of public spaces in my neighborhood	,141	,155	,127	,910	,367
	I like the building style in my neighborhood	-,263	,170	-,215	-1,548	,128
	My neighborhood is unique and special	,214	,190	,167	1,125	,266
	I regularly meet and interact with my neighbors in my neighborhood	,507	,238	,363	2,133	,038
	In my neighborhood, there are many public places to meet friends and family	,209	,150	,179	1,395	,169

a. Neighborhood = MEERHOVEN

b. Dependent Variable: I am satisfied with the living conditions in my neighborhood

Appendix Figure 33: Coefficients table for regression analysis for Meerhoven.

The coefficients table for the Meerhoven neighborhood regression model shows that the most significant predictor for satisfaction with living conditions is "I regularly meet and interact with my neighbors in my neighborhood," with a coefficient of 0.507 and a

significance level of 0.038. Satisfaction with the design of buildings, public spaces, the neighborhood's uniqueness, and public places to meet, were not statistically significant. This suggests that while aspects like building design and available public spaces are considered, they are not as strongly associated with overall living condition satisfaction as social interaction.

Null hypothesis for regression analysis for Brandevoort: There is no linear relationship between the combined predictors (satisfaction with the design of buildings, satisfaction with public spaces, personal preference for building style, perception of neighborhood uniqueness and specialty, frequency of meeting with neighbors, and availability of public places to meet friends and family) and the residents' satisfaction with the living conditions in the neighborhood Brandevoort.

Model Summary^{a,c}

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,880 ^b	,775	,752	,779

a. Neighborhood = BRANDEVOORT

b. Predictors: (Constant), In my neighborhood, there are many public places to meet friends and family, I am satisfied with the design of public spaces in my neighborhood, My neighborhood is unique and special, I regularly meet and interact with my neighbors in my neighborhood, I like the building style in my neighborhood, I am satisfied with the design of buildings in my neighborhood

c. Dependent Variable: I am satisfied with the living conditions in my neighborhood

Appendix Figure 34: Model summary of regression analysis for Brandevoort.

The regression model summary for the Brandevoort neighborhood shows a strong predictive relationship between the variables and residents' satisfaction with living conditions. The R Square value of .775 indicates that about 77.5% of the variance in residents' satisfaction can be explained by the model, which is a substantial proportion, suggesting a good fit. The Adjusted R Square of .752 accounts for the number of predictors in the model, confirming that the fit remains strong even after adjustment. The standard error of the estimate is .779, which is relatively low, indicating that the predicted values are, on average, close to the actual values.

ANOVA^{a,b}

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	123,330	6	20,555	33,913	<,001 ^c
	Residual	35,761	59	,606		
	Total	159,091	65			

a. Neighborhood = BRANDEVOORT

b. Dependent Variable: I am satisfied with the living conditions in my neighborhood

c. Predictors: (Constant), In my neighborhood, there are many public places to meet friends and family, I am satisfied with the design of public spaces in my neighborhood, My neighborhood is unique and special, I regularly meet and interact with my neighbors in my neighborhood, I like the building style in my neighborhood, I am satisfied with the design of buildings in my neighborhood

Appendix Figure 35: Anova table for regression analysis for Brandevoort.

The ANOVA table for the Brandevoort neighborhood's regression model shows that the variables significantly predict satisfaction with living conditions ($p < .001$).

Coefficients^{a,b}

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	1,966	,650		3,022	,004
	I am satisfied with the design of buildings in my neighborhood	,443	,101	,547	4,402	<,001
	I am satisfied with the design of public spaces in my neighborhood	-,002	,092	-,002	-,022	,982
	I like the building style in my neighborhood	,285	,132	,242	2,157	,035
	My neighborhood is unique and special	,230	,150	,161	1,527	,132
	I regularly meet and interact with my neighbors in my neighborhood	-,084	,119	-,059	-,701	,486
	In my neighborhood, there are many public places to meet friends and family	,118	,134	,069	,880	,382

a. Neighborhood = BRANDEVOORT

b. Dependent Variable: I am satisfied with the living conditions in my neighborhood

Appendix Figure 36: Coefficients table for regression analysis for Brandevoort.

The coefficients table for the Brandevoort neighborhood shows that two variables significantly predict satisfaction with living conditions: "I am satisfied with the design of buildings in my neighborhood" ($B = .443$, $p < .001$) and "I like the building style in my neighborhood" ($B = .285$, $p = .035$). These findings suggest that architectural design and aesthetic preference are important factors in residents' overall satisfaction. Other variables did not show a significant predictive value.

Coded qualitative answers for Q13 and Q14:

Neighborhood Design	Sense of Place	Community Interaction	Aesthetic Perception	Positive Assessment	Negative Assessment
green	New, modern, interesting	very boring	minimalism	clean	very boring
modern	new, safe, clean, quiet	boring	New, modern, interesting	new and nice	ugly buildings
modern	safe	nothing interesting	modern	green	ugly
modern	No parks	boring	ugly buildings	very nice	unoriginal
modern			unoriginal	good and clean	Very same
unoriginal			good and clean	modern	boring
Good and modern			Very same	good	average
minimal			Good and modern	new	Not enough
modern and minimal			clean	modern	No parks
modern			modern and minimal	modern	bad
No parks			modern	modern	fun
new				modern	new
Very same				Good and modern	boring
many same buildings				new	
not imaginative				clean	nothing special
metal and plastic				new	average
uniform				decent	not imaginative
				Good ideas	nothing interesting
				modern and minimal	boring
				nice	boring
				modern	fantastic
				new	
				new	
				ok	
				good	
				ok	
				good	

Appendix Figure 37: Coded Answers for Q13 (Meerhoven).

Neighborhood Design:	Sense of Place:	Community Interaction:	Aesthetic Perception:	Positive Assessment:	Negative Assessment:
clean new buildings	clean safe place	nothing to do here	something different	clean safe place	not much
Different streets different buildings	quiet and calm	parks	all buildings the same	good average location	it is very average for Netherlands
new architecture	good for families	not good for young people	everything is the same	near the city but calm	all buildings the same
parks	many trees	many families	Different streets different buildings	clean new buildings	nothing
new houses	many families	not many young people	Many interesting modern houses	good infrastructure	everything is the same
Many interesting modern houses	very good homes	good place to live	Interesting houses	quiet and calm	boring
buildings	Good connection to city	many families	own style	good for families	nothing to do here
Interesting houses	not much crime	good place for family	unique homes	Many interesting modern houses	not good for young people
own style	many families	many things to do	different streets	many trees	not many young people
modern buildings	good place for family	boring city	boring houses	good place to live	not good, ugly
homes	good place		buildings together	very good homes	not old and boring
buildings together				Good connection to city	not good
different streets				not much crime	boring city
new and modern				interesting buildings	boring houses
unique homes				good building	nothing
streets, buildings, trees				good place for family	
				it is good place to live	
				Good location	
				modern buildings	
				good place	
				Interesting houses	
				unique homes	

Appendix Figure 38: Coded Answers for Q14 (Meerhoven).

Neighborhood Design:	Sense of Place:	Community Interaction:	Aesthetic Perception:	Positive Assessment:	Negative Assessment:
one big plan	traditional	feels like home	New and old	good and different	fake
new buildings in old style	history	Comfortably quiet and friendly	old	very good	Not real but nice
one big idea for the city	respecting history		fake	good place	a bit fake
a big plan	maintaining heritage		Not real but nice	feels like home	not authentic
good design	calm and history		affordable history	good	sometimes not convincing, but ok
No skyscrapers and glass	feels like home		like old city	fantastic idea	imitation
vision	Comfortably quiet and friendly		a bit fake	i like it	copy
ambitious	unique, rustic, pleasant		traditional homes	good imitation	Niet goed
Traditional			good imitation	traditional homes	Saaï
It is new in old style			parody	good design	not modern
traditional homes			oud	Comfortably quiet and friendly	
			oude stijl	unique, rustic, pleasant	
			It is new in old style	GOOD!	
			New old	Different to rest	
			Good old style	Good old style	
			Traditional	Nice	
				good	
				calm	
				quiet near city	
				there should be more like it	
				Different to rest	
				no problems	

Appendix Figure 39 : Coded Answers for Q13 (Brandevoort).

Neighborhood Design:	Sense of Place:	Community Interaction:	Aesthetic Perception:	Positive Assessment:	Negative Assessment:
new old building style	plan for city	good place for family	unique	good plan	tries to be something not authentic
everything in 1 style	good future project	some places good some bad	not boring boxes	unique	homes don't look conving old
building styles	Feels cozy	home	traditional	there is nothing like it	feels like disneyland
no glass and metal house	good quiet place	my family and friends live here	tries to be different	Feels cozy	not real
homes are old but new	good place for family	this is my home	unique idea	good tradition and plan	Namaak
unique area	home		good tradition and plan	i like the old buildings	Niets
old-style buildings	Safe and quiet		special idea and plan	good quiet place	
Traditional but new	Safe and quiet		looks like the old cities	special idea and plan	
plan for city	unique area		Overall design	i feel good here	
good future project	not boring boxes		Everything close together	unique area	
The location as it's situated next to a park	respect to history		Old buildings	good example for other places	
like old city but new	one of a kind		buildings	respect to history	
				I like the design	
				old-style buildings	
				one of a kind	
				more development	

Appendix Figure 40: Coded Answers for Q14 (Brandevoort).

Digital and physical surveys:

Skrebels, R. (2023). Neighborhood Design and Neighborhood Satisfaction (Brandevoort). [Online survey]. <https://forms.gle/SCUei1q1qEeSMYmf7>

Skrebels, R. (2023). Neighborhood Design and Neighborhood Satisfaction (Meerhoven). [Online survey]. <https://forms.gle/7UhpqU6EjQwX6oAd6>

Appendix Figure 41 (Below): Physical scan of "Neighborhood Design and Neighborhood Satisfaction (Brandevoort).

NEIGHBORHOOD DESIGN AND NEIGHBORHOOD SATISFACTION

INFORMED CONSENT FOR SURVEY PARTICIPATION

Title: Neighborhood Design and Neighborhood Satisfaction.

Dear Participant,

You are invited to participate in a research study titled "Understanding Neighborhood Design and Neighborhood Satisfaction." This study is conducted by me, Rems Skrebels, as part of my Bachelor's thesis at the University of Groningen in the program Spatial Planning and Design. By filling out this survey you will help me with finalizing my studies.

Purpose of the Study:

The purpose of this study is to explore the relationship between the built environment's characteristics and residents' satisfaction with their neighborhoods. Your insights will contribute to a better understanding of how urban design influences the quality of life in different neighborhoods.

Procedure:

If you agree to participate, you will be asked to complete a survey. The survey will include questions about your perceptions of the neighborhood's built environment, your level of satisfaction, and some demographic information. The survey will take approximately [estimated time] to complete.

Confidentiality:

Your responses will be kept strictly confidential and the questionnaire does not ask any questions by which you can be personally identified. No information will be shared with outside parties, and your responses will be reported in an aggregated and anonymous manner. Your responses will be stored in a password-protect Google Drive folder for a period of 5 months after all responses are gathered. The data will be deleted after March 1st, 2024.

Voluntary Participation:

Participation in this study is entirely voluntary. You have the right to withdraw at any time without any consequences.

Contact Information:

If you have any questions about this study, you may contact r.skrebels@student.rug.nl.

By participating in this survey, you acknowledge that you have read and understood this informed consent form and voluntarily agree to take part in the study.

Rems Skrebels
r.skrebels@student.rug.nl +371 26699662
06.10.2023

NEIGHBORHOOD DESIGN AND NEIGHBORHOOD SATISFACTION

9. WHAT STYLE OF BUILDINGS DO YOU PREFER?



A

B

10. MY NEIGHBORHOOD IS UNIQUE AND SPECIAL.

1
Strongly disagree

2
Disagree

3
Neutral

4
Agree

5
Strongly agree

11. I REGULARLY MEET AND INTERACT WITH MY NEIGHBORS IN MY NEIGHBORHOOD.

1
Strongly disagree

2
Disagree

3
Neutral

4
Agree

5
Strongly agree

12. IN MY NEIGHBORHOOD, THERE ARE MANY PUBLIC PLACES TO MEET FRIENDS AND FAMILY.

1
Strongly disagree

2
Disagree

3
Neutral

4
Agree

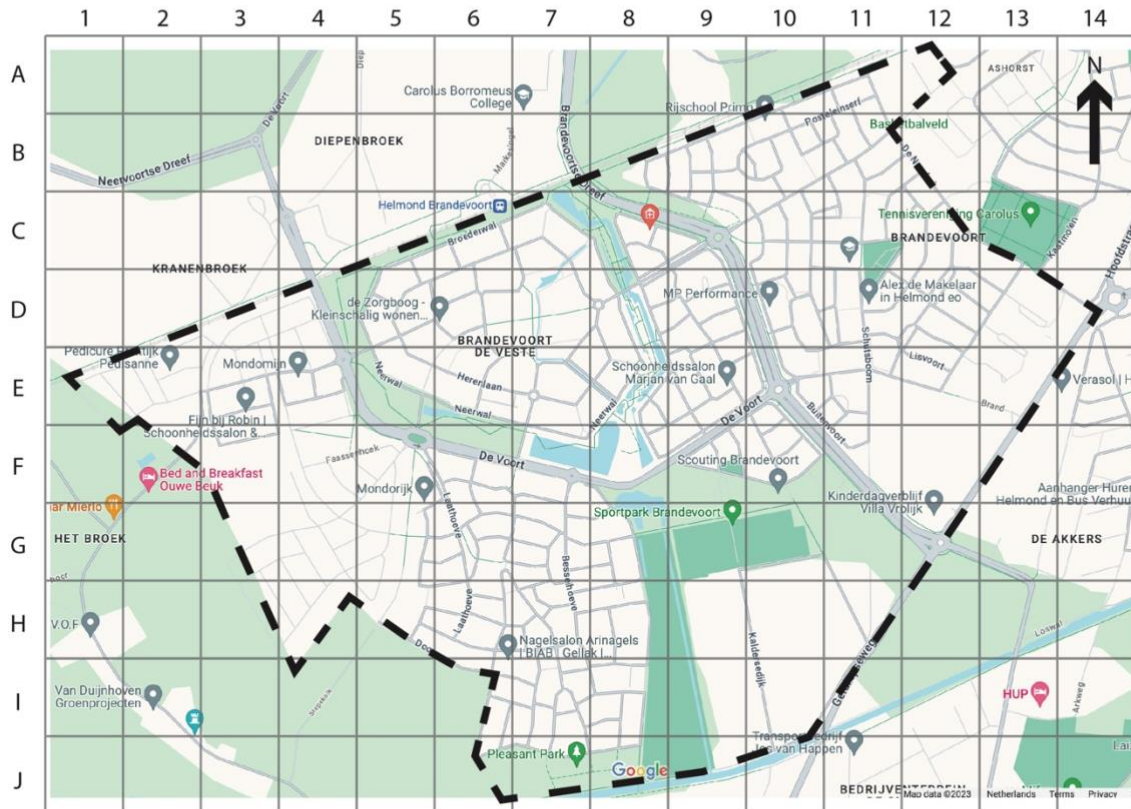
5
Strongly agree

13. IN 1-5 WORDS HOW WOULD YOU DESCRIBE THE DESIGN OF YOUR NEIGHBORHOOD?

14. IN 1-5 WORDS WHAT MAKES YOUR NEIGHBORHOOD SPECIAL?

BRANDEVOORT

If you are a resident of Brandevoort, place a dot indicating your favourite place in the neighborhood you enjoy visiting or spending time. This location cannot be your home.



Google Maps. (2023) Map of Brandevoort with neighborhood boundaries. Retrieved from <https://www.google.com/maps/@51.4368456,5.413777,15.44z?entry=ttu>

200m

- Images used:
- Google Maps. (2023) Tonny van Leeuwenlaan. Retrieved from <https://maps.app.goo.gl/SbGRBMQof3e6iVsG9>
 - Google Maps. (2023) Parkzijde. Retrieved from <https://maps.app.goo.gl/Cjs5mRy8eb59rnsE8>
 - Google Maps. (2023) Leeuwarderstraat. Retrieved from <https://maps.app.goo.gl/RL8BMLXZUzkw9EVdA>
 - Google Maps. (2023) Joachim Altinghstraat. Retrieved from <https://maps.app.goo.gl/DqBobhj33eN1gMhTA>
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 - Google Maps. (2023) Schuitendiep. Retrieved from <https://maps.app.goo.gl/p1FYoi84Qso5WAdBA>

Appendix Figure 42 (Below): Physical scan of “Neighborhood Design and Neighborhood Satisfaction (Meerhoven).

NEIGHBORHOOD DESIGN AND NEIGHBORHOOD SATISFACTION

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The purpose of this study is to explore the relationship between the built environment's characteristics and residents' satisfaction with their neighborhoods. Your insights will contribute to a better understanding of how urban design influences the quality of life in different neighborhoods.

Procedure:

If you agree to participate, you will be asked to complete a survey. The survey will include questions about your perceptions of the neighborhood's built environment, your level of satisfaction, and some demographic information. The survey will take approximately 10 minutes to complete.

Confidentiality:

Your responses will be kept strictly confidential and the questionnaire does not ask any questions by which you can be personally identified. No information will be shared with outside parties, and your responses will be reported in an aggregated and anonymous manner. Your responses will be stored in a password-protect Google Drive folder for a period of 5 months after all responses are gathered. The data will be deleted after March 1st, 2024.

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Rems Skrebels
r.skrebels@student.rug.nl +371 26699662
06.10.2023

NEIGHBORHOOD DESIGN AND NEIGHBORHOOD SATISFACTION

9. WHAT STYLE OF BUILDINGS DO YOU PREFER?



A

B

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1
Strongly disagree

2
Disagree

3
Neutral

4
Agree

5
Strongly agree

11. I REGULARLY MEET AND INTERACT WITH MY NEIGHBORS IN MY NEIGHBORHOOD.

1
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2
Disagree

3
Neutral

4
Agree

5
Strongly agree

12. IN MY NEIGHBORHOOD, THERE ARE MANY PUBLIC PLACES TO MEET FRIENDS AND FAMILY.

1
Strongly disagree

2
Disagree

3
Neutral

4
Agree

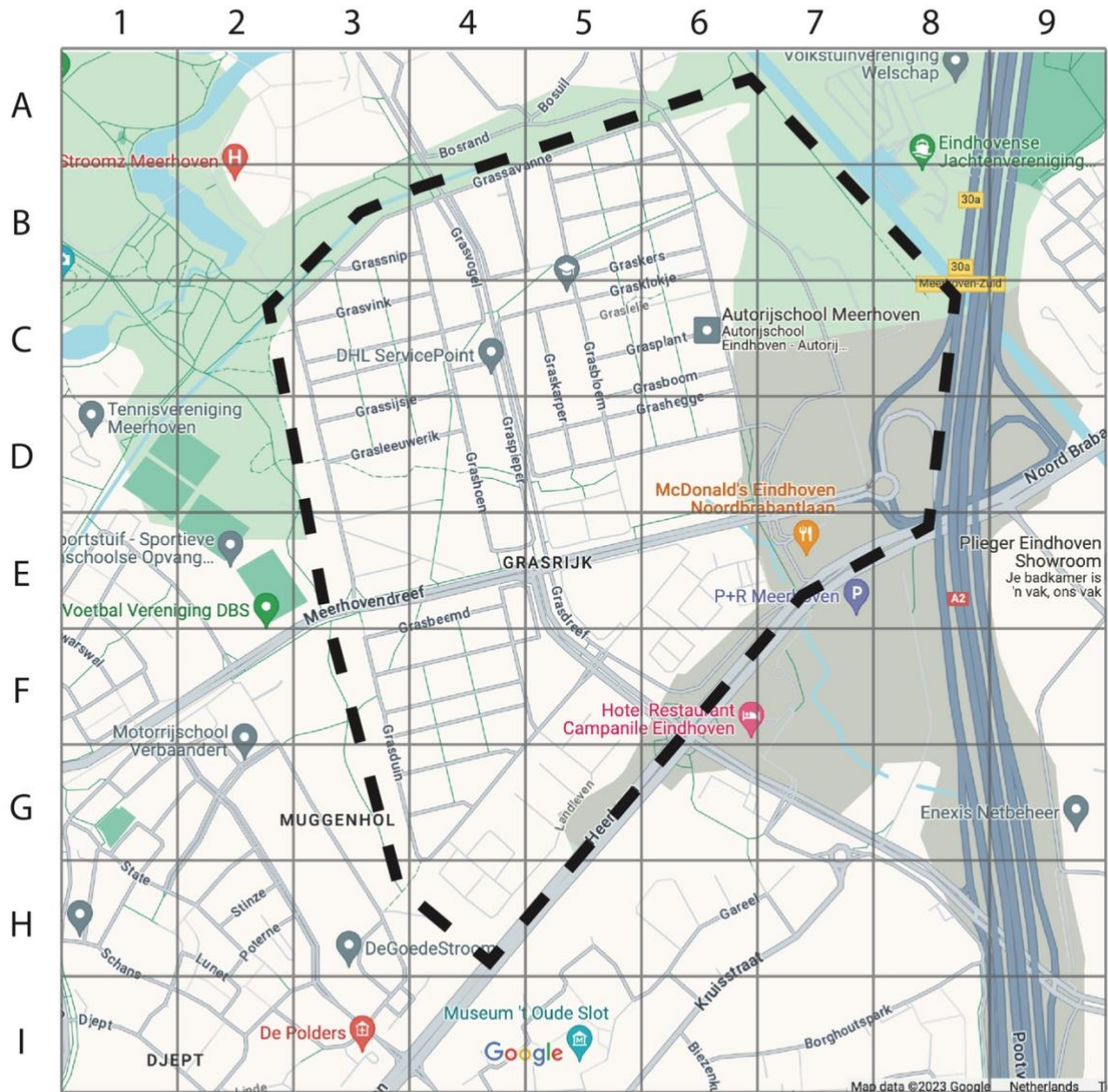
5
Strongly agree

13. IN 1-5 WORDS HOW WOULD YOU DESCRIBE THE DESIGN OF YOUR NEIGHBORHOOD?

14. IN 1-5 WORDS WHAT MAKES YOUR NEIGHBORHOOD SPECIAL?

MEERHOVEN

If you are a resident of Meerhoven, place a dot indicating your favourite place in the neighborhood you enjoy visiting or spending time. This location cannot be your home,



Google Maps. (2023) Map of Meerhoven,Grasrijk with neighborhood boundaries. Retrieved from <https://www.google.com/maps/@51.4368456,5.413777,15.44z?entry=ttu>



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