Movement in the shopping mall

The different movement patterns of the shopping mall through time

Stephan Koeckhoven
Heritage Graduation Studio: Modern Malls
Research Mentor: Lidwine Spoormans
November 2023

date of defence: 11th of April 2024

awarding institute:
Delft University of Technology

T̃U Delft

Introduction

This research is about movement in the shopping mall. What are the movement patterns that we can recognize? And how did the movement patterns change through the existence of the mall.

In the Netherlands there is currently a lack of movement among adults (56%) and children (45%). This amount is growing every year and the government aims to turn this around. (Ministerie van Volksgezondheid, Welzijn en Sport, 2022)

The shopping mall used to be a place with a lot of movement. When visiting a 20th-century shopping mall, one thing will stand out: it is quiet, empty, and devoid of the bustling activity that once characterized these spaces. This transformation has had a profound effect on the perception of shopping malls, with visitors often regarding them as uninviting or even depressing. In contrast to the vibrant scenes of the 1980s and 1990s when the elderly socialized, entire families shopped, and children played, in other words: a lot of exercise! Today's malls are dominated by vacant storefronts and long, deserted corridors.

The questions that arise: How did these movement patterns change and why? Another interesting thing that is covered in this research is the question: what *does* and what *doesn't* stimulate movement in the shopping mall?

The layout of this research is in most parts chronological. First the original concept of the shopping mall will be looked at, and how the visitors were guided through these malls in the 70s. Then the current situation will be analyzed. What are the current movement patterns and how is this different from the original concept? And finally there the research dives into several options for future scenarios. How can physical movement be more stimulated in the shopping mall?

Theoretical Framework

The concept of movement in the shopping mall

In the book "Regional Shopping Centers: Their Location Planning and Design," Jones explores the evolution of shopping malls as commercial entities in the United States. The necessity for shopping malls arose from the inconvenience faced by residents living in the outskirts of low-density areas, who had to visit different delivery companies to obtain their goods. Consolidating all stores in one location proved advantageous for both customers and store owners. Post-World War II, the United States experienced a surge in shopping center development, increasing from 1,800 to 2,600 within a decade. The success of shopping malls was attributed to their accessibility by car, excellent parking facilities, and an efficient layout that minimized walking distances, transforming malls from a convenience for low-density areas to a profitable concept applicable to various settings. (Jones, 1969)

The shopping mall model introduced in the United States influenced the development of shopping malls in the Netherlands and Belgium. Despite the lower significance of shopping malls in Dutch cities due to their compact nature, numerous malls were constructed in the 1970s as part of city expansions, emphasizing convenience. Design guidelines were outlined in the book "Bouwen van Grotere Winkelcentra" by the "Raad voor het Grootwinkelbedrijf." These guidelines addressed aspects such as accessibility, parking regulation, and, crucially, the layout to stimulate optimal movement among visitors.

The chapters "Layout" and "Positioning Stores" from the mentioned book provide specific design recommendations. In the "Layout" chapter, the emphasis is on two-sided shopping as a pivotal point, discouraging blind walls, especially near entrances. Supply areas should remain invisible to visitors, and shops should be concentrated to minimize walking distance, with passages having a recommended width between 8 and 12 meters. The mall is advised to start with a single layer of shopping.

In the "Positioning Stores" chapter, the Raad voor het Grootwinkelbedrijf (1970) recommends the even distribution of large and popular stores (anchor stores) throughout the mall to create a field of tension. In the absence of prominent names, supermarkets are suggested to be positioned near the mall's borders, with smaller establishments filling gaps between larger stores.

With these two chapters focusing on stimulating movement the concept of the Dutch shopping mall was born. (Amsterdam: Raad voor het Grootwinkelbedrijf, 1970)

Movement in the city

In the context of understanding urban movement, this research explores various strategies and concepts associated with active design, a design approach aimed at promoting physical activity at both the building and urban scales.

The book titled "The Active City" by De Bont emphasizes the importance of segmenting the target audience when approaching active design. Given the diversity of people within a city, including individuals of varying ages and activity levels, there exists a wide range of perspectives on physical activities. The book proposes design strategies categorized into four distinct groups: Cycling and walking, play, sports, and leisure. Cycling and walking are

considered broadly applicable, accommodating various visitors, while play is oriented towards children. Sports caters to the larger middle group, and leisure is more tailored to the elderly demographic. (De Bont et al., 2017)

In the "Active Design Guidelines" by Burney, the significance of creating visually appealing routes that are easily discernible to all is highlighted. The intention is to entice individuals to traverse these routes actively. Additionally, the guidelines underscore the importance of incorporating inviting stairs and outdoor spaces with greenery, elements known to stimulate movement among people. (Burney et al., 2010)

Moving Behaviour
To have a better understanding on moving behavior in general this research uses the report 'Beweeggedrag in 2021' by the Dutch Ministry of Health, wellbeing and sports. The report shows that in 2021, 47 percent of the Dutch population aged 4 and older adhered to the Physical Activity Guidelines. Children aged 4 to 11 were the group most likely to meet these guidelines (62 percent). Groups less likely to comply included youth aged 12 to 17, individuals with lower educational levels, those with lower household incomes, individuals with non-Western migration backgrounds, residents of highly urbanized areas, individuals with both chronic conditions and physical disabilities, and those with severe obesity. Different population groups exhibit diverse preferences for types of physical activities. For instance, women and individuals with higher educational backgrounds tend to engage more in walking, while children are more likely to participate in soccer.

In general, leisure-time walking, sports, and leisure-time cycling are the primary activities contributing to compliance with the Physical Activity Guidelines. However, there are variations for specific population groups. For children, outdoor play at school and during leisure time, as well as sports, are crucial. Youngsters prioritize sports, cycling to school or work, and school gym classes. (Ministerie van Volksgezondheid, Welzijn en Sport, 2022)

In a separate report titled "Bewoners in aandachtswijken sporten minder" (Residents in Focus Districts Engage in Less Sports), the issue of reduced physical activity and sports participation among individuals with lower household incomes and non-Western migration backgrounds is further addressed. The report specifically focuses on neighborhoods characterized as "aandachtswijken" or attention districts, often referred to as problematic areas. The two case studies in this research, Schalkwijk and Bogaard, both aslo identified as problematic neighborhoods.

The report explicates that residents in these areas frequently struggle with financial stability. This instability often diverts attention and resources away from engaging in physical activities and sports. Additionally, the report highlights a prevalent lack of knowledge regarding healthy lifestyles within these communities. (Stuij & Pulles, 2023)

Bill Hillier's legacy: Space Syntax
In this research, various experiments will be conducted to analyze movement patterns. The book "Bill Hillier's Legacy: Space Syntax" elucidates the methodology for analyzing spatial relations at multiple scales and in various ways, both elementary and on maps. The emphasis in this research lies in the utilization of spatial relations on a map. The book explains the process of transforming spaces and locations within an area or building into

nodes. These nodes serve as points to which various data, such as information pertaining to visitor movement, can be attached. Another method explained in the book involves the application of axis maps. This approach involves the translation of open spaces or the routing of a building into an axis map. The illustration below provides a visual representation of how a morphology map can be transformed into an axial map. (Yamu et al., 2021)
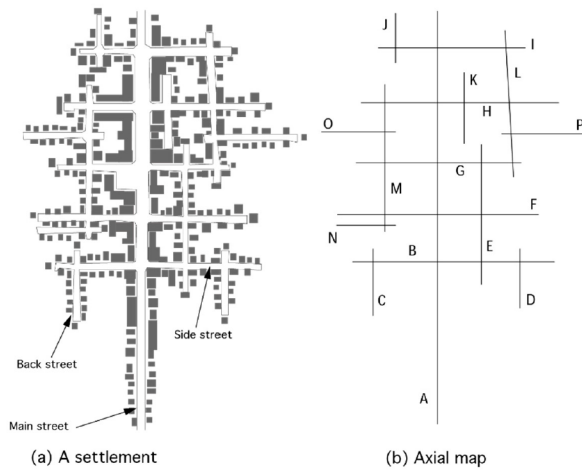

(a) A settlement   (b) Axial map

Fig. 1.1 Settlement map left, axis map right, spyce syntax method (Yamu et al., 2021)

methodology

Introduction
This chapter describes the diverse research methodologies employed in this research, focusing on both quantitative and qualitative approaches. Quantitative methods are utilized to gain more general data related to movement of all the visitors in malls, while qualitative methods are adopted to delve deeper into the personal movement behaviors of shopping mall visitors.

Case studies
The analysis was grounded in case studies of two shopping malls: 'Winkelcentrum Schalkwijk' in Haarlem and 'Winkelcentrum de Bogaard' in Rijswijk. These malls were selected based on their similarities: both were established in the 1970s, house approximately 100 stores, and were initially designed as central hubs for new city expansions. Identical research methods were applied to both locations to ensure a comparative analysis of the findings.

Original Concept
The research begins with an examination of the malls' original concepts. Archival research provided access to the initial floor plans from around 1970. Utilizing guidelines from 'Raad voor het Grootwinkelbedrijf' (1970), various layout elements were analyzed to give an indication on the intended movement patterns within the malls. The intended distribution of visitors in the original concept of the shopping mall are put in a node map, a concept derived from Bill Hillier's 'space syntax' theory (described in the theoretical framework). The nodes are placed on apparent intersections in the mall and in the middle of the shopping streets. According to the distribution principles by 'Raad voor Grootwinkelbedrijf' (1970), the nodes are categorized in visitor density.
The nodes were then translated into axes on the floor plans, with variations in color and width indicating the expected distribution of visitors, correlating to the density outlined in the node maps.

Current movement patterns
To contrast with historical data, the current patterns could be measured more precisely, since it can be measured. For the current movement patterns, floor plans of the existing situation are used. The visitor distribution in the mall is again put in a node map by the concept of Bill Hillier. The nodes are similar to the original concept, placed on apparent intersections and in the middle of shopping streets.
The measurement of the visitor density is done by counting per node. On the location of every node on the map is every passerby or stationary person counted within a one-minute interval. In both shopping malls the counting took place on a regular Thursday between 16.00 and 16.30. If on one of the nodes the counting became complicated because of the large number of visitors, a recount was done, in the end an average of both counts was taken for these nodes. The results are put into the node maps indicated with different colors for high and low visitor density.
For the current situation the node map is also translated to an axis map. The axis are simply all the straight lines that can be drawn over the routing area of the mall. The average of counted visitors per node on the axis determines the color and width of the line in the diagram.
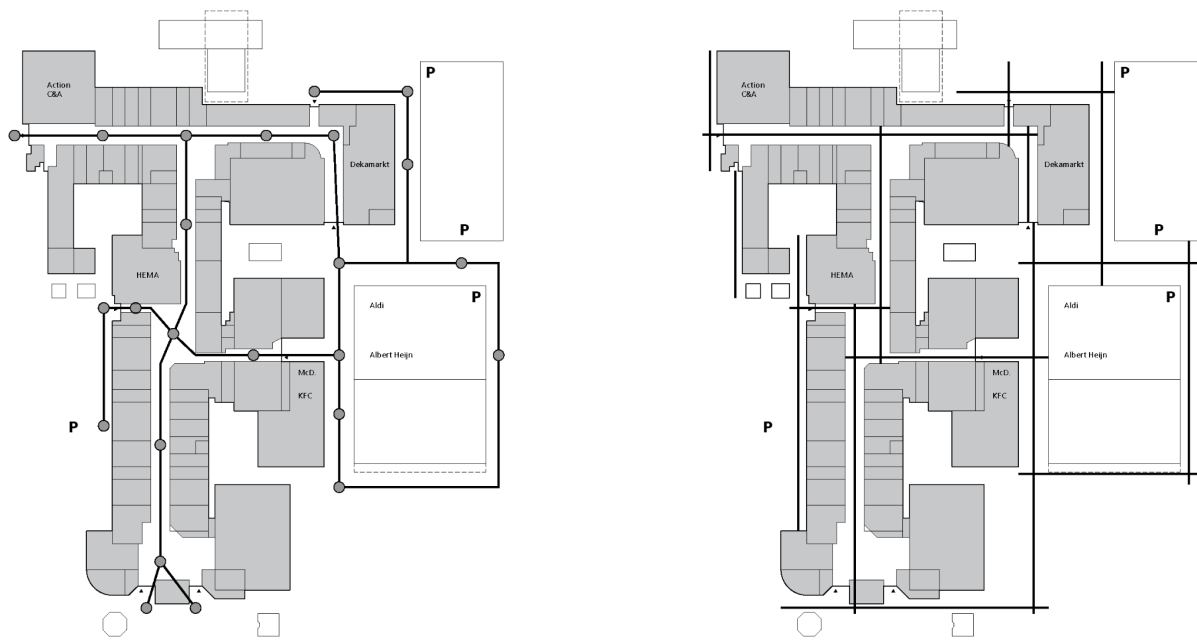
Fig. 2.1 Nodes and axis in Winkelcentrum Schalkwijk, current situation (own illustration)

Fig. 2.2 Nodes and axis in Winkelcentrum de Bogaard, current situation (own illustration)

Personal routings

Approximately 10 in-depth interviews conducted in both malls offered insights into individual movement patterns. Participants were asked to sketch their shopping routes on mall maps,

either what they already walked or the route they expected to walk. Accompanying surveys gathered data on age, gender, mode of transport, and athleticism. These routes were compiled into a collective map, with distinct color coding for different age groups, allowing for comparative analysis.

What stimulates movement
A key aspect of the research was understanding the divergence between the original design intentions and current usage patterns. That is why the final part of the research consisted of questioning the movement of the visitors. Why do they avoid certain areas in the mall? And what would stimulate them to move to certain areas? To gain answers to these questions, the participants were also asked to give their reasons why they are not visiting certain areas on the map where they did not draw their route. Then they were asked to give ideas on what new functions or activities would stimulate them to move to certain areas in the shopping mall.
The results of why certain areas are being avoided can be put in pie charts since the answers are often very similar. The results of what new functions would stimulate movement are put into keywords since the answers vary a lot, also are the answers divided in two groups, aged above 50 and under.

Results

Original Concept

The diagrams presented show the spatial distribution strategy for visitors within a shopping mall, as conceptualized by the 'Raad voor Grootwinkelbedrijf' in 1970. The node maps serve as a visual representation of this strategy. The first map, illustrating Schalkwijk, demonstrates a well thought placement of the three primary anchor stores – C&A, Hema, and V&D – across the mall. This strategic positioning, with considerable spacing between each store, is designed to facilitate an even distribution of visitors throughout the mall. The importance of these anchor stores, as well as the additional four anchor stores located on the east side of Schalkwijk, is highlighted by the red coloring of their respective nodes. Stating that on these locations the highest number of visitors was expected. These stores served as focal points intended to attract the majority of visitors. The nodes in between the anchor stores, depicted in orange, represent areas where visitors are naturally guided, aligning with the original design concept.

In contrast, the second diagram, illustrating the node map of de Bogaard, reveals a slightly different layout. Here, one anchor store (V&D) is situated at the northern side of the mall, while two other anchor stores are together located at the mall's center. Additionally, the parking lot on the southern side can be considered an anchor point. Similar to the Schalkwijk map, anchor stores are marked with red nodes, while the connecting routes are indicated in orange. This variation in layout underscores a tailored approach to visitor distribution, while having the same strategy in mind.

Fig. 3.1 Nodes indicating intended visitor distribution in Winkelcentrum Schalkwijk (left) and Winkelcentrum de Bogaard (right), original concept. Red = Very high density, Orange = High density, Yellow = Medium density, Green = Low density. (own illustration)

The presented diagrams translate the node maps of Schalkwijk and de Bogaard shopping malls into axis maps, offering a nuanced understanding of visitor flow and density within these commercial spaces. The axis map of Schalkwijk, depicted in the first diagram, employs a color-coded scheme where all axes are marked in either orange or red. This coloration suggests a uniform distribution of visitors throughout the mall, with no area left unvisited. Notably, two axes are highlighted in red, indicating areas of heightened activity. These particularly busy corridors are strategically located: they adjoin two major anchor stores and provide direct access between the mall and its parking lot, underscoring their significance in facilitating visitor movement and concentration.

Similarly, the second diagram, illustrating de Bogaard's axis map, continues the theme of uniform visitor distribution with all axes again represented in orange and red. This uniformity suggests effective spatial planning, ensuring that all areas of the mall receive substantial foot traffic. In de Bogaard, one of the two prominently red axes is situated centrally, in front of two key anchor stores, highlighting its role as a major thoroughfare and a focal point for shoppers. The other intensely frequented axis, also marked in red, is located in front of the V&D store, which is positioned near an entrance of the mall.
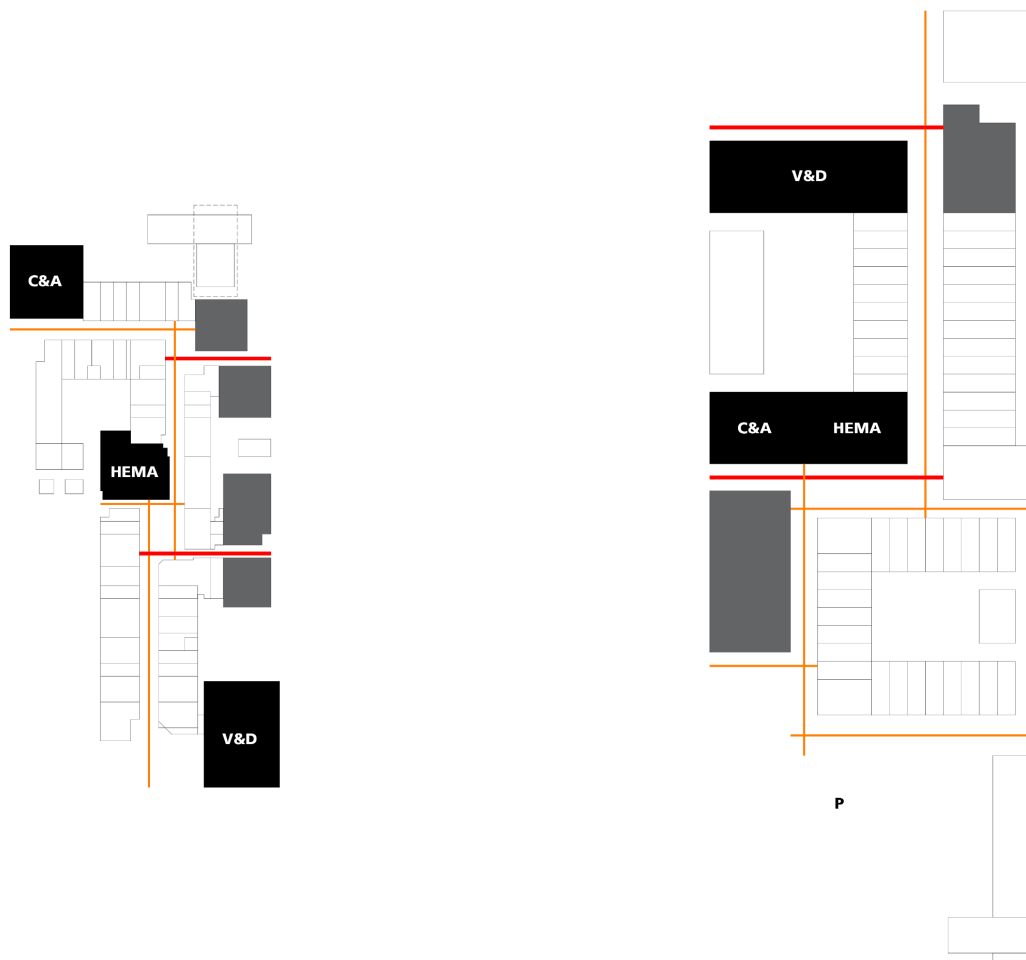
Fig. 3.2 Axis indicating intended visitor distribution in Winkelcentrum Schalkwijk (left) and Winkelcentrum de Bogaard (right), original concept. Red = Very high density, Orange = High density, Yellow = Medium density, Green = Low density. (own illustration)

Current Movement Patterns

for the general insight of which nodes are crowded and which areas are less visited is visible in the map below. The first map is Schalkwijk, where its most crowded node is outside next to the fast food restaurants and the supermarket. The second most crowded node is the entrance to the center square of the mall. What stands out is that the south side is the least crowded.

In the second map, is shopping mall the Bogaard. Here the most crowded nodes are in front of the fast food restaurants and the supermarkets as well. The more you go north the more deserted the mall appears.

The illustration below presents the spatial dynamics within Schalkwijk and the Bogaard shopping mall, offering insight into the distribution of visitors over crowded nodes and less-visited areas. In Schalkwijk, heightened human presence is observed outside fast-food establishments and the supermarket (marked in red), with the entrance to the central square also marked as a densely populated node. Notably, the southern side of Schalkwijk shows a lower degree of crowding.

Similarly, the Bogaard shopping mall shows more dense nodes proximate to fast-food restaurants and supermarkets. Notable is that the further one moves north within the mall, the more human activity decreases.
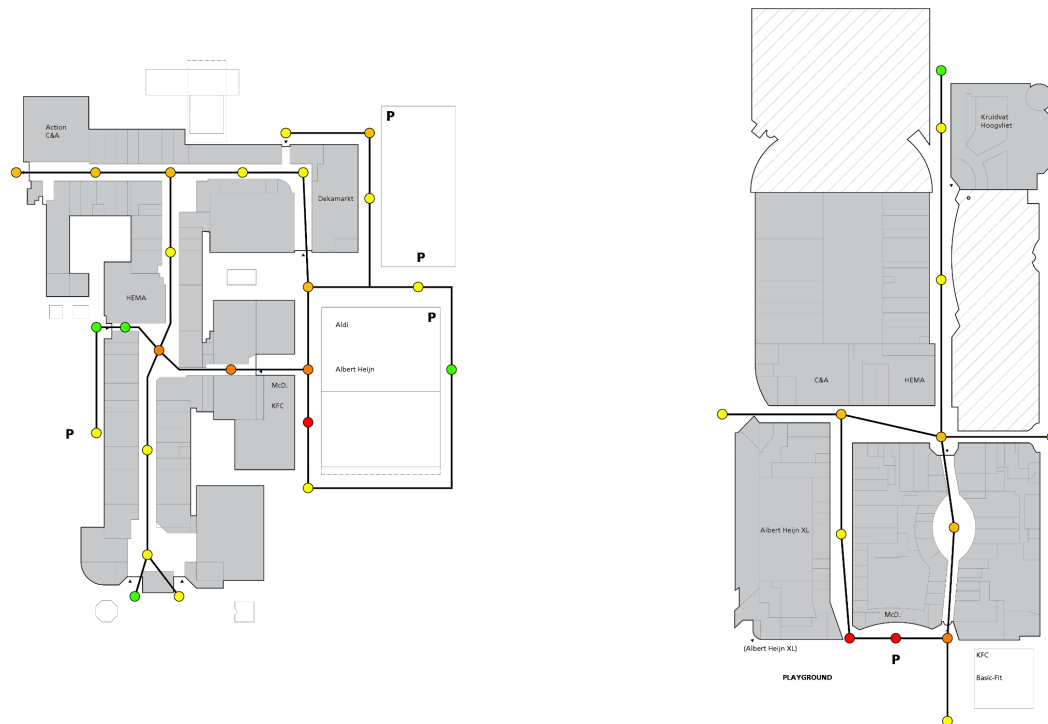

Fig. 1.1 Nodes indicating measured visitor distribution in Winkelcentrum Schalkwijk (left) and Winkelcentrum de Bogaard (right), original concept. Red = Very high density, Orange = High density, Yellow = Medium density, Green = Low density. (own illustration)

Upon transposing the node map into an axis map, the Schalkwijk diagram distinctly reveals that the axes experiencing the highest density are situated along the street next to the fast-food restaurants and the entrance leading to the central square. Furthermore, a notable observation in this map is the high visitation on the west side in the outdoor expanse. Contrarily, the entirety of the interior space within the shopping mall emerges as the least visited area.

In the context of the Bogaard's axis map, the earlier observation of the node map is accentuated. The axes exhibit a gradual transition from red to yellow as one progresses northward. This gradient in coloration on the axis map shows again the increased amount of visitors proximate to fast-food establishments and supermarkets and a gradual diminution in crowd density as one traverses northward within the Bogaard shopping mall.
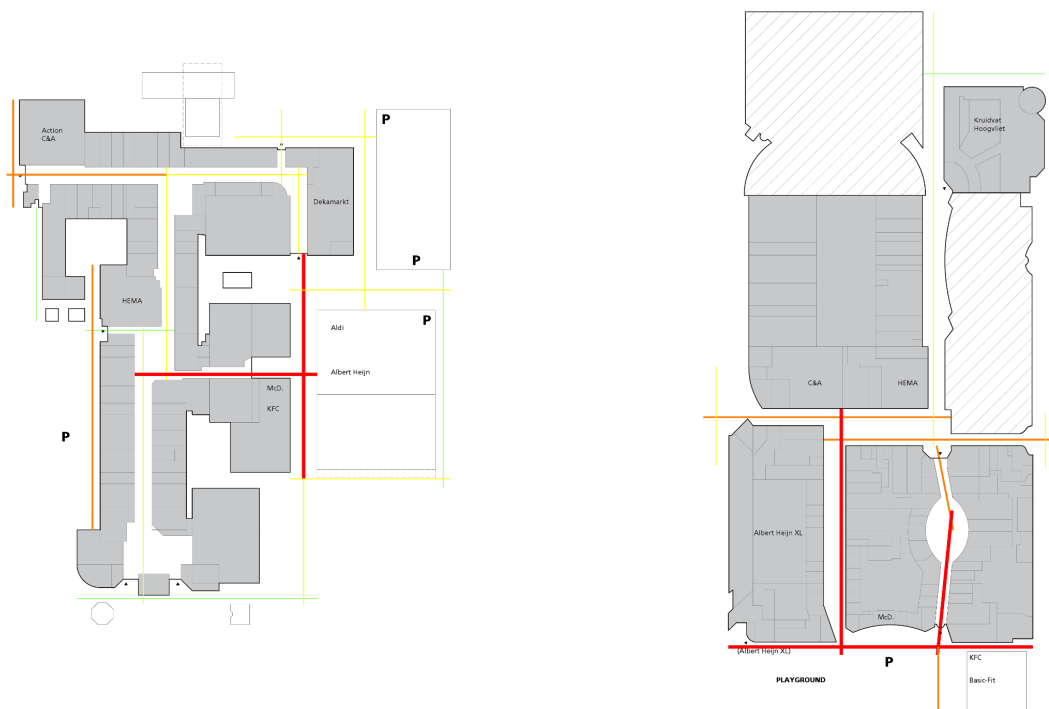
Fig. 3.3 Axis indicating measured visitor distribution in Winkelcentrum Schalkwijk (left) and Winkelcentrum de Bogaard (right), original concept. Red = Very high density, Orange = High density, Yellow = Medium density, Green = Low density. (own illustration)

Personal routings

The picture below illustrates how people in our interviews move around Schalkwijk shopping mall. What stands out is that when we split participants into two groups by age, younger visitors mostly stay outside and quickly visit one or two stores. Older visitors spend more time inside the mall, exploring and visiting more stores.

This trend is not unique to Schalkwijk; we see a similar pattern at Bogaard. Younger visitors there take short, quick routes, while the older ones stay longer, checking out the entire mall.
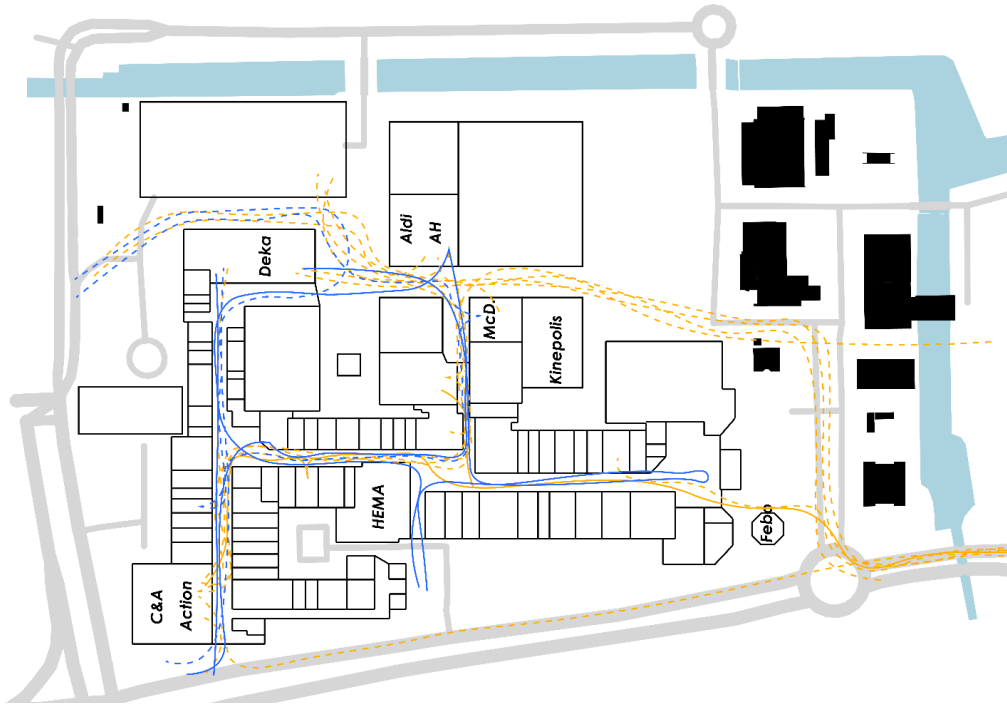
Fig. 3.4 Individual routing of the participants in a collective map of Winkelcentrum Schalkwijk. Yellow = age 0-50, Blue = age 50-100. (map is rotated 90°)(own illustration)
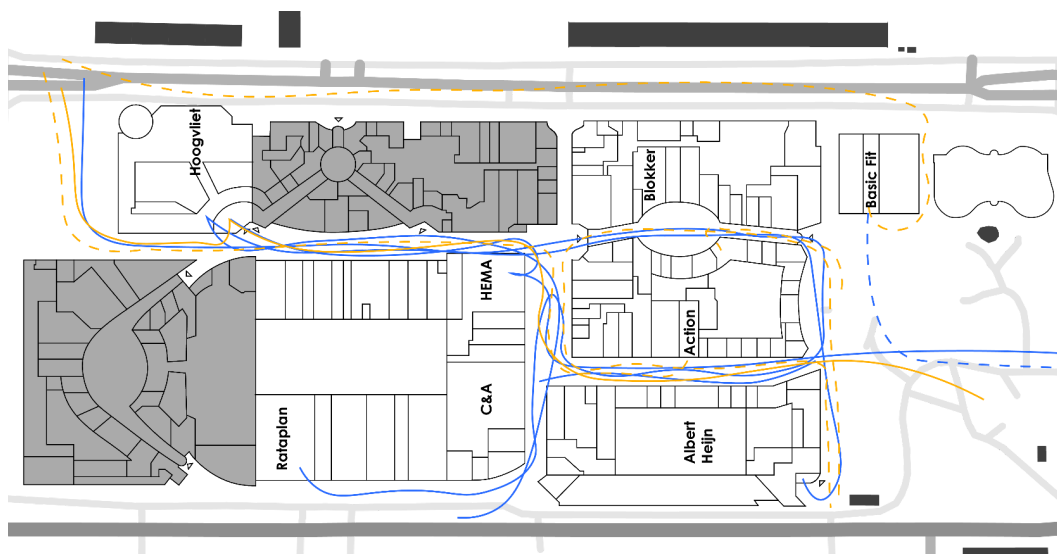

Fig. 3.5 Individual routing of the participants in a collective map of Winkelcentrum de Bogaard. Yellow = age 0-50, Blue = age 50-100. (map is rotated 90°)(own illustration)

What does not stimulate movement

After participants drew their routes on the map, they were asked why they avoided certain parts of the mall. Their answers fell into four main reasons. In Schalkwijk, most people said they avoided areas because they didn't like the atmosphere or the stores didn't interest them. A smaller group mentioned that the walking distances were too long. Others simply visited one store and didn't need to go to the rest of the mall.

In Bogaard, half of the participants said they avoided areas because they didn't like the stores available. The second most common reason was that the atmosphere wasn't inviting. Like in Schalkwijk, some participants had specific stores in mind, so they didn't explore the rest of the mall.
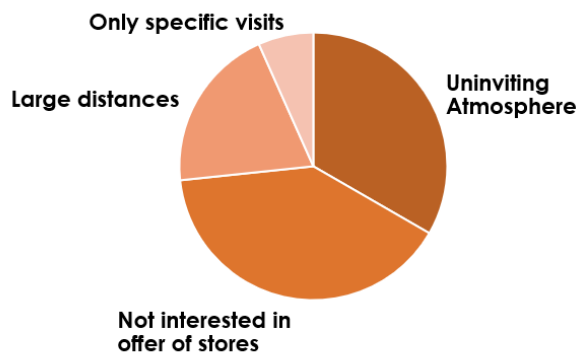
Fig. 3.6 What does not stimulate movement in Winkelcentrum Schalkwijk (own illustration)
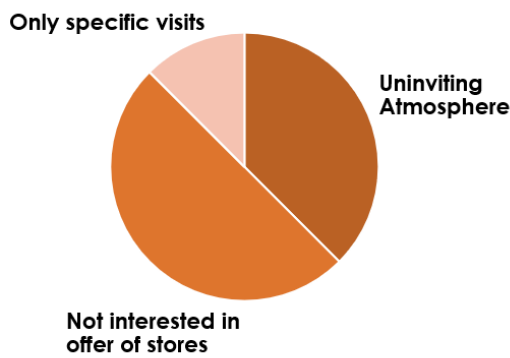
Fig. 3.7 What does not stimulate movement in Winkelcentrum Bogaard (own illustration)

What stimulates movement

The analysis of survey responses pertaining to the question, "What functions would stimulate visitors to move around the mall?" reveals distinct patterns based on age and mall location. Notably, older visitors in both malls express a desire for increased social activities, while younger visitors exhibit a preference for the presence of high-end stores and youth-oriented entertainment, such as game halls or playgrounds.

An surprising finding arises from respondents at Schalkwijk, where a substantial number of young participants express a preference for more health-oriented dining options.

Age 15 -50

Playground   Beach   Youth entertainment

Social activities   Terrace   Fitness

Boxing   High-end Stores   Watersports

Fresh Vegatables   Healthy food place

Sport facilities   Gamehall

Cinema

Cafe   Gamehall

High-end Stores

Youth entertainment   Restaurant

Age 50+

Terrace   Tea house

Social Activities

Look out point   Sitting area

Terrace

Social Activities

Cinema   Restaurant

Schalkwijk   Bogaard

Fig. 3.8 Suggestions on what new functions would stimulate movement in Schalkwijk and Bogaard, divided by age (own illustration)

16

Discussion

Upon examining the original designs for both Schalkwijk and Bogaard, it becomes evident that these shopping malls were designed in accordance with the strict design guidelines mentioned by the 'Raad voor Grootwinkelbedrijf' (1970). These guidelines emphasized a layout intended to guide visitors seamlessly through the entirety of the shopping mall. In the results section, an assumption is posited that both shopping malls experienced substantial foot traffic, with high visitor volumes distributed throughout every section of the malls. However, it is acknowledged that a more nuanced understanding of the malls' functionality in 1970 could be achieved through further investigation. Future research endeavors might involve delving into archival data pertaining to visitor numbers at specific stores within Schalkwijk and Bogaard, offering a more realistic depiction of how visitors were genuinely distributed across the malls during that period.

The results for the current movement patterns are in fact more evident than the assumption made in the original concept. To enhance the reliability of these results, it is advisable to replicate the measurement of visitor counts per node at various time intervals. Nevertheless, the existing results provide a sufficiently clear indication that the distribution of visitors across the mall has undergone a pronounced shift compared to the original concept. Notably, a substantial concentration of visitors is observed in proximity to fast-food establishments and supermarkets in both malls. This phenomenon suggests the possibility that these entities have taken over the role of the anchor stores. Furthermore, the observation of certain original anchor stores being vacant could contribute to the lower visitor activity in specific areas of the mall.

Upon examination of the individual routes traced by participants, a notable distinction emerges between older and younger visitors. The four maps presented below depict various routes, showcasing typical routes for both age groups. Evidently, younger individuals exhibit a pattern so called "fast shopping," signifying their tendency to visit only one or two specific stores and promptly exit the mall upon obtaining their desired items. Conversely, older visitors align more with "slow shopping," treating the mall visit as an activity in itself. These people spend an extended duration in the mall, exploring multiple stores throughout their visit.

This observed divergence in shopping behavior among age groups resonates with principles outlined in the book 'Active City,' wherein strategies for stimulating movement underscore the importance of tailoring approaches to different age demographics. The findings affirm the designation of the elderly as a target group for leisure and social activities, aligning with the recognition that older visitors prefer a more leisurely and extensive shopping experience within the mall environment. (De Bont et al., 2017)
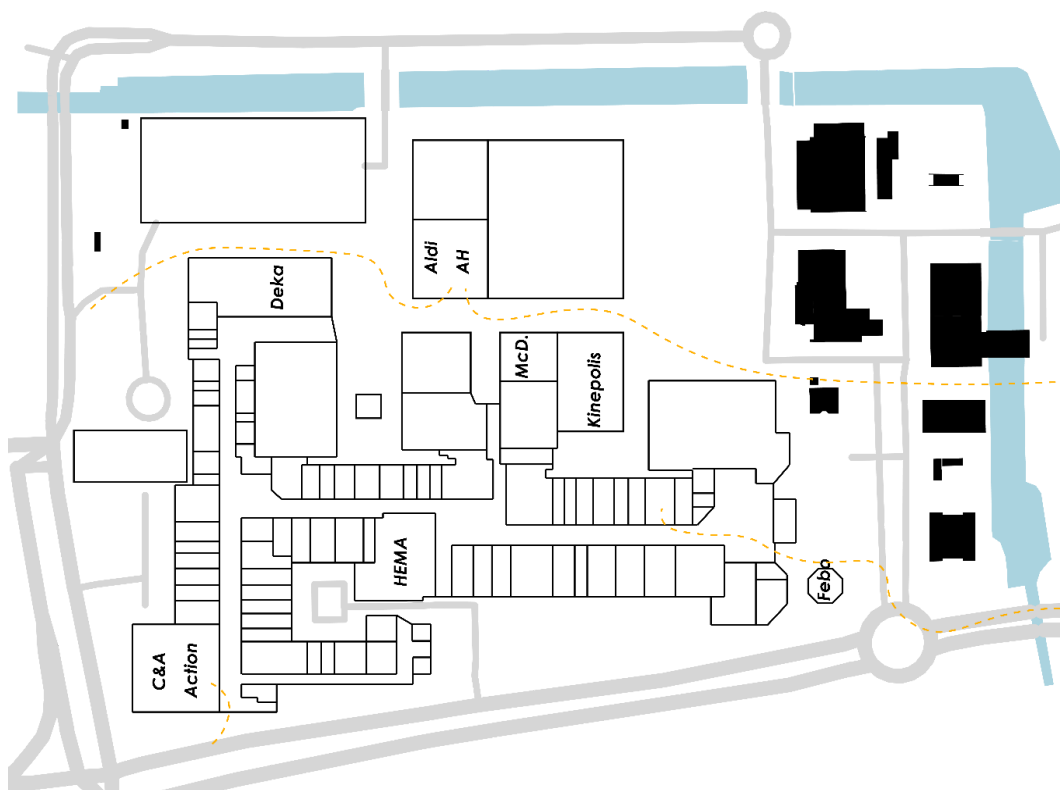
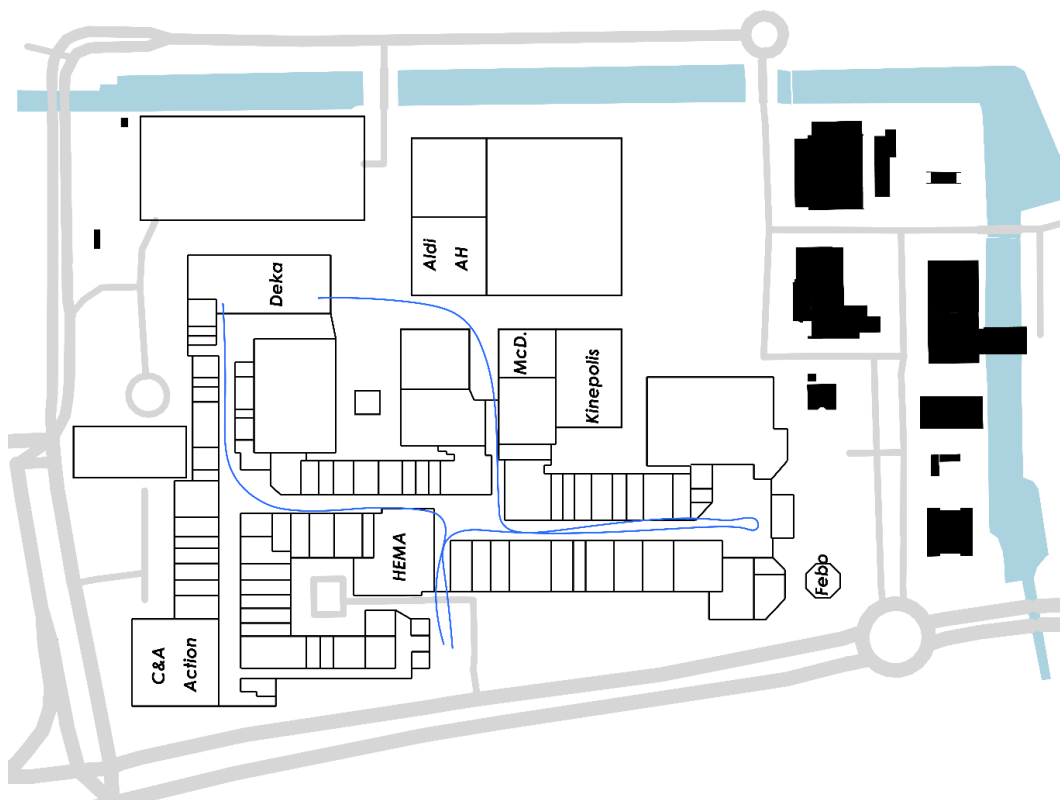**Fig. 4.1** Example of typical routing age 0-50, Schalkwijk (map is rotated 90°)(own illustration)

Fig. 4.2 Example of typical routing age 50-100, Schalkwijk (map is rotated 90°)(own illustration)
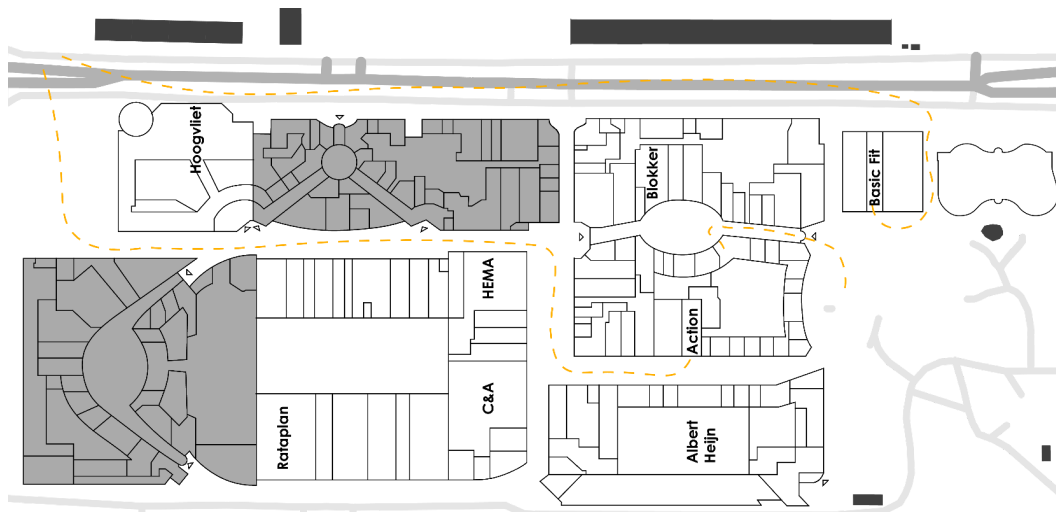
Fig. 4.3 Example of typical routing age 0-50, Bogaard (map is rotated 90°)(own illustration)
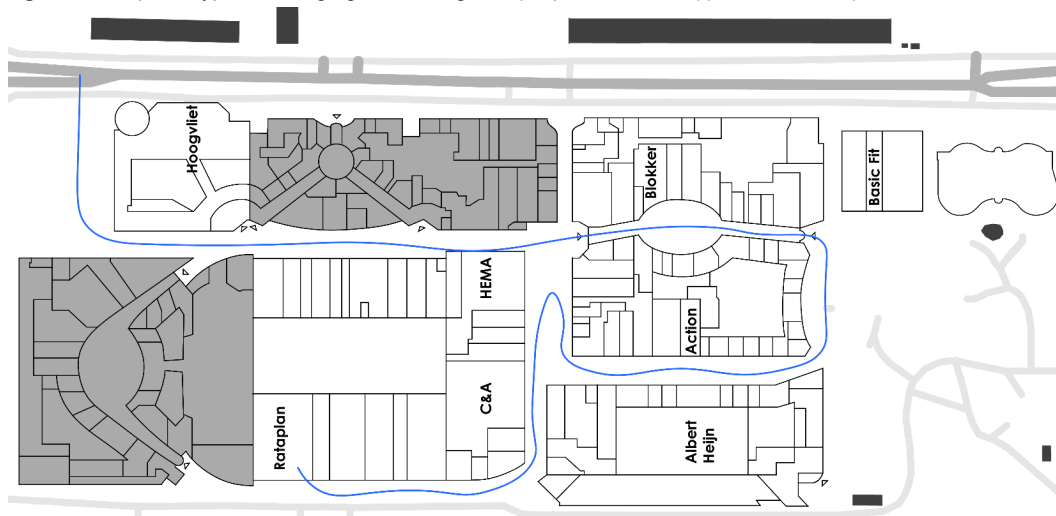

Fig. 4.4 Example of typical routing age 50-100, Bogaard (map is rotated 90°)(own illustration)

Both older and younger visitors exhibit a notable tendency to avoid significant sections of the malls. The results indicate that this avoidance is primarily attributed to the uninteresting store offering and an uninviting atmosphere within these areas. The presence of numerous vacancies in these sections contributes to the uninviting appearance, fostering a limited diversity of available stores. The link between vacancy and the reluctance of visitors to engage with these areas requires further investigation, although it seems a plausible explanation.

Moreover, in general there is a lack of physical activity, particularly in the neighborhoods associated with the two case studies. Consequently, it raises the possibility that the act of visiting the mall itself may be perceived as a substantial exertion, thereby movement within the mall a too big of a challenge. Establishing a correlation between the overall low movement levels among residents in these areas and their brief routes and visits to the mall requires additional research. This additional research would provide a deeper understanding of the complex relation between external factors, such as neighborhood activity levels, and individual behaviors within the shopping mall environment. (Ministerie van Volksgezondheid, Welzijn en Sport, 2022)

The answers suggesting that certain areas in the malls lack appeal connect with the idea of the book 'active design guidelines'. These guidelines suggest that pathways and stairs should be well visible and inviting. Similarly, for outdoor spaces, having green paths is crucial to guide people effectively. Unfortunately, both malls currently do not follow these guidelines, confirming the survey results. The fact that the malls don't have well-defined and inviting pathways and stairs contributes could be another strong reason why large areas of the mall are avoided. (Burney et al., 2010)

In the answers on "what would stimulate movement in the mall" it is again strongly visible that segmenting the visitors in different age groups works best. It is again strongly visible that the older visitors are coming up with more leisure ideas to generate movement and younger people come with more play and active ideas. Therefore, in the recommendations it would be useful to work with different strategies for children, middle group, elderly and combined, in order to stimulate the most movement in the mall. (De Bont et al., 2017)

Conclusion

This research highlights a significant disparity between the intended movement patterns in the current shopping malls and their original conceptualization. The initial concept envisioned an even distribution of visitors throughout the mall, following designated routes, guided toward anchor stores, and exploring numerous shops along the way. Presently, both case studies reveal a clustering of anchor stores, with visitors predominantly gravitating toward fast-food establishments and popular supermarkets. This concentration results in one densely populated area, while other sections of the mall receive comparatively fewer visitors. Analysis of individual routes indicates that the shift in distribution is primarily caused by younger visitors (aged 0-50), who tend to remain on one side of the mall and visit only one or two stores. In contrast, older visitors still often do explore the entire mall.

The reluctance of people to explore large portions of the mall is attributed to an uninviting atmosphere and a limited variety of stores—a consequence of high vacancy rates. Overall, inadequate physical activity is noted, particularly in the Schalkwijk and Bogaard areas. According to the 'active design guidelines,' both malls could benefit from incorporating inviting routes and stairs to encourage movement. Although numerous solutions exist for stimulating movement, the optimal approach can be identified through research by design, as demonstrated in the design case presented in this master's thesis. Additionally, the segmentation of target groups based on age and level of activity emerges as a crucial consideration in formulating strategies to stimulate movement within the mall.

Recommendations

In the matrix below are different strategies on how to stimulate movement divided in 4 segments. These strategies came from the literature on active design and are tailored to the mall.

ACTIVE DESIGN

Design strategies to stimulate movement in the shopping mall

Cycling and Walking	**Play**	**Sports**	**Leisure**
all visitors	children	youth-middle aged	elderly
• Combination of functions	• Challenging play environments	• Smaller sports areas	• Multipurpose areas
• Public transport interchanges	• Play areas without borders	• Visible sports facilities	• Unused pieces of land and temporary use
• Good access route to public transport	• Playing around the corner	• Shared sports facilities	• Varied streetscape
• Bike parking stations linked to public transport	• Low traffic network	• Unprogrammed public space	• Wide sidewalks
• Direct cycle routes	• Child supervision	• Accessible swimming water	• Climate adaption and heat stress
• Regional bike network		• Aaccessible water sports	• Parks with plenty of space
• Human Scale		• Sports in parks	• Green routes
• Low traffic (autoluw)			• The park as route
• Pick up points			
• Shared streets			
• Smooth streets and spaces			

References

's-Gravenhage: Sociaal-Economische Raad, Commissie Opvoering Produktiviteit, & Studiegroep Detailhandel. (1962). *Moderne winkelcentra*.

Amsterdam: Raad voor het Grootwinkelbedrijf. (1970). *Bouw van grotere winkelcentra*.

Burney, D., Farley, T., Sadik-Khan, J., & Burden, A. (2010). *Active Design Guidelines: Promoting Physical Activity and Health in Design*. https://www.nyc.gov/assets/planning/download/pdf/plans-studies/active-design-guidelines/adguidelines.pdf

De Bont, A., Distelbrink, A., & Van Kessel, W. (2017). *The Active City*.

Devos, T., Van Acker, M., Vandevoorde, J., & Rybels, S. (2023). Towards a movement-friendly city: lessons from activity scans of five neighbourhoods in Antwerp, Belgium. *Journal of Urban Design*, 1–22. https://doi.org/10.1080/13574809.2023.2180351

Jones, C. S. (1969). *Regional shopping centres: their location, planning and design*. Business Books.

Ministerie van Volksgezondheid, Welzijn en Sport. (n.d.-a). *overgewicht (obesitas) gemeente, wijk en buurt*. Ministerie Van Volksgezondheid, Welzijn En Sport. https://www.rivm.nl/media/smap/obesitas.html?gemeente=Haarlem

Ministerie van Volksgezondheid, Welzijn en Sport. (n.d.-b). *Sporten en bewegen voor kinderen*. Rijksoverheid. https://www.rijksoverheid.nl/onderwerpen/sport-en-bewegen/sporten-en-bewegen-voor-kinderen

Ministerie van Volksgezondheid, Welzijn en Sport. (2022). *Beweeggedrag in 2021*. Rijksinstituut voor Volksgezondheid en Milieu.

NOC-NSF. (n.d.). *Sport en gezondheid*. https://nocnsf.nl/we-winnen-veel-met-sport/sport-en-gezondheid#:~:text=Sport%20zorgt%20voor%20een%20betere,%2C%20obesitas%2C%20osteoporose%2C%20beroertes.

Stuij, M., & Pulles, I. (2023). *Bewoners in aandachtswijken sporten minder*.

Yamu, C., Van Nes, A., & Garau, C. (2021). Bill Hillier's Legacy: Space Syntax—A Synopsis of Basic Concepts, Measures, and Empirical Application. *Sustainability*, *13*(6), 3394. https://doi.org/10.3390/su13063394

Appendix

VRAGENLIJST WINKELCENTRUM SCHALKWIJK

Wat is uw gender?

Man ☐   Vrouw ☐   Anders ☐

Wat is uw leeftijd?

<-15 ☐   15-20 ☐   20-25 ☐   25-35 ☐   35-45 ☐   45-55 ☐   55-65 ☐   65-> ☐

Hoe bent u naar het winkelcentrum gekomen?

Te voet ☐   Fiets ☐   Auto ☐   Openbaar vervoer ☐   Anders ☐

Hoeveel minuten heeft u gereisd?

0-5 ☐   5-10 ☐   10-15 ☐   15-20 ☐   20-30 ☐   30-> ☐

Waarom kiest u voor Winkelcentrum Schalkwijk?

Dicht bij ☐   Parkeer mogelijkheden ☐   Winkelaanbod ☐   Fijne sfeer ☐   Anders ☐

Welke winkels heeft u bezocht en bent u van plan nog te gaan bezoeken?

Aldi	☐	Gall&Gall	☐	Hunkemöller	☐
C&A	☐	McDonalds	☐	Xenos	☐
Van Haren	☐	Albert Heijn	☐	Zeeman	☐
Action	☐	Etos	☐	Blokker	☐
Hema	☐	Kruidvat	☐	Dekamarkt	☐

Anders:

_____ ☐   _____ ☐   _____ ☐

Waarom bezoekt u dit Winkelcentrum?

Uitstapje ☐   Om te bewegen ☐   Boodschappen ☐   Ontmoeten ☐   Anders ☐

Hoe vaak sport u per week?

niet ☐   1 keer ☐   2 keer ☐   3 keer ☐   4 keer ☐   professioneel ☐

Ik zie een bezoek aan het winkelcentrum als een sportieve activiteit?

Eens 1. ☐   2. ☐   3. ☐   4. ☐   Oneens 5. ☐

Een bezoek aan het winkelcentrum zou sportiever mogen zijn?

Eens 1. ☐   2. ☐   3. ☐   4. ☐   Oneens 5. ☐

TUDelft

Geef uw route aan naar Winkelcentrum Schalkwijk?

Geef waar in de buurt u graag beweegt (wandelen, fietsen, rennen, gym)?

C&A
Action

Deka

HEMA

Aldi
AH

McD.

Kinepolis

Febo
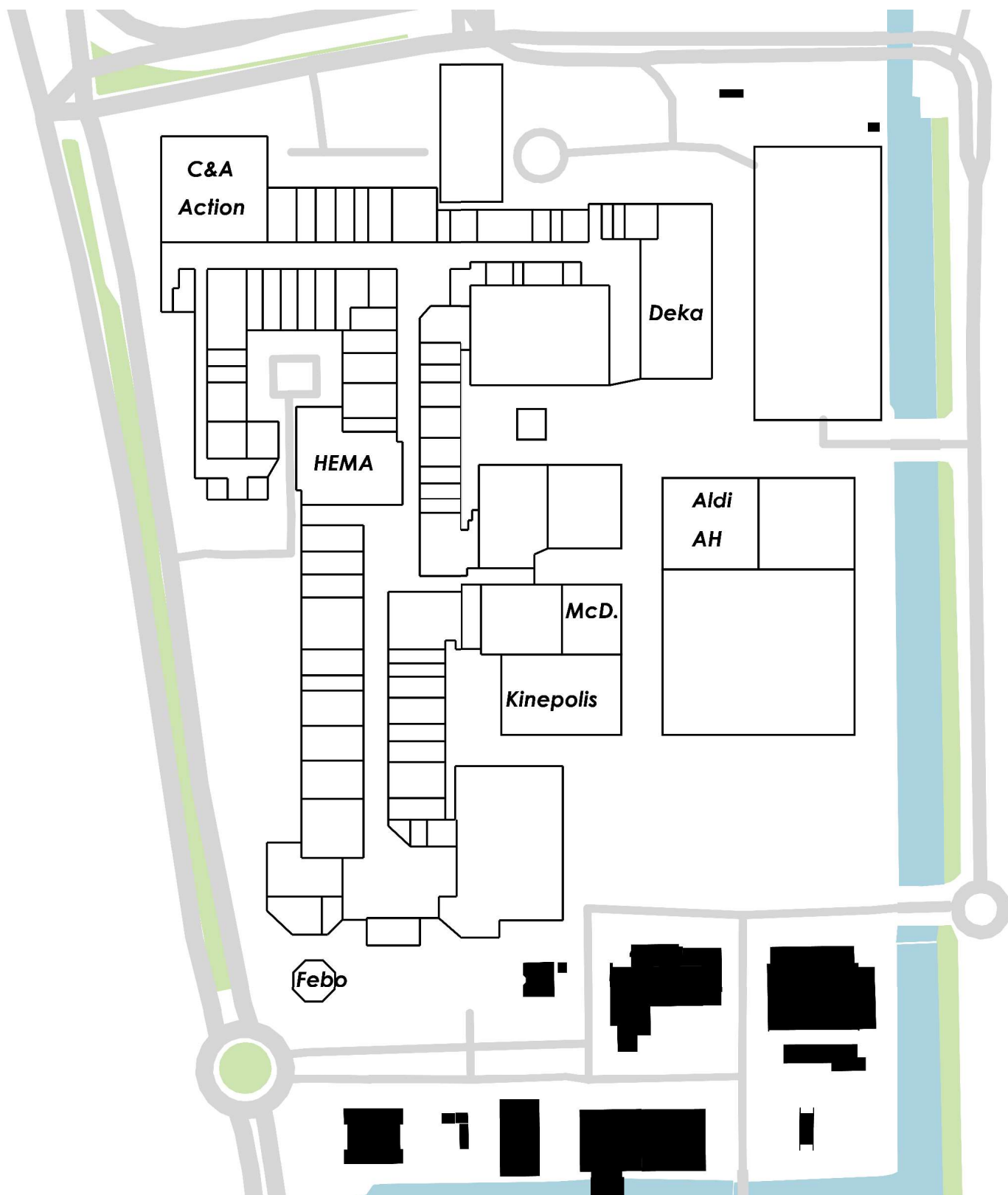
Geef uw gelopen(en nog te lopen) route aan door Winkelcentrum Schalkwijk?

Waarom vermijdt u bepaalde plekken in het winkelcentrum?

N.v.t. ☐ Oninteressant aanbod ☐ Te grote afstand ☐ Slechte sfeer ☐ Anders ☐

Welke functies zouden u wel aantrekken? (bijv.: cafe, speelplek, rustplek, sportparkje)

Schalkwijk

Int. Nr.	Gender	Age	Group Size	Transport	Traveltime	Choice for Schalkwijk	Reason for visit	Stores Visited			Reasons to avoid areas	Suggestions for functions			amount of exercise a week	The mall is physical exercise	The mall could be more physical exercise
1	Female	55-65	2	Bicycle	5-10	Nearby	Daily needs Day out	C&A Action	Etos Zeeman	mr Focker Mode	Not interested in stores	Terrace Fashion			0	5	2
2	Female	15-20		Bus Scooter	30->	Work	Work	Action			Large distance	Terrace Comfortable seating			0	5	2
3	Male	55-65		Walk	10-15	Nearby	Daily needs					Teahouse Meeting Area			0	4	5
4	Male	45-55		Walk Bicycle	0-5	Nearby	Daily needs	Albert Heijn Cheese sore	Kinepolis Bike repair		Not interested in stores Uninviting atmosphere	Terrace Fresh Vegetables	Healthy Foodplace Watersports	Local food High-end Shops	2	5	5
5	Female	25-35		Car	0-5	Nearby Parking	Daily needs	Albert Heijn Kruidvat			Not interested in stores Uninviting atmosphere	High-end Shops Healthy Foodplace	Entertainment for youth Sports for youth		3	3	5
6	Female	65->	2	Taxi	30->	Offer of stores Wheelchair friendly	Daily needs	McDonalds Vreedeman			Large distance				0	5	5
7	Female	65->		Car	20-30	Offer of stores	Daily needs	Deka			Large distance	Lookout point Comfortable seating			0	5	2
8	Female	20-25		Car	15-20	Parking	Meeting people	Specsavers			Not interested in stores Uninviting atmosphere	Terrace Meeting Area			4	5	2
9	Female	25-35		Walk	0-5	Nearby Good atmosphere (outside)	Daily needs	Action Deka			Not interested in stores Uninviting atmosphere	Burgerking			0	5	4
10	Male	<-15	3	Bicycle Bus	10-15	Nearby	Day out Meeting people	McDonalds Albert Heijn			Not interested in stores Uninviting atmosphere	Boxing Gamehall	Entertainment for youth		3	4	4
11	Male	25-35		Walk Bicycle	0-5 5-10	Nearby	Daily needs	Dekamarkt Subway			Not interested in stores Uninviting atmosphere	High-end Shops			1	5	5
12	Female	20-25		Walk	5-10	Nearby	Daily needs Day out	C&A Action	Albert Heijn Kruidvat	Xenos Dekamarkt	Not interested in stores	Fresh Vegetables High-end Shops	Green		4	5	4

Bogaard

Int. Nr.	Gender	Age	Group Size	Transport	Traveltime	Choice for Schalkwijk	Reason for visit	Stores Visited			Reasons to avoid areas	Suggestions for functions			amount of exercise a week	The mall is physical exercise	The mall could be more physical exercise
1	Female	15-20		Bicycle	10-15	Nearby	Day out Daily needs	Action Hema	McDonalds Kruidvat	Zeeman	Not interested in stores Uninviting atmosphere	Cafe/Restaurant			0	5	5
2	Female	45-55 55-65	2	Walk Bicycle	5-10 10-15	Nearby Offer of stores	Day out Meeting people	C&A Hoogvliet	Albert Heijn Zeeman	Kruidvat					0	3	5
3	Male	15-20	2	Scooter	10-15	Offer of stores	Daily needs	Mediamarkt			Not interested in stores	High-end Shops Entertainment for youth			4	5	2
4	Male	25-35		Walk	0-5	Nearby	Daily needs Day out	Basic Fit Hoogvliet	McDonalds Action	KFC	Not interested in stores	Gamehall Cinema			3	5	5
5	Female	55-65		Walk	5-10	Nearby	Day out Daily needs	Hoogvliet C&A	Action Hema	Kruidvat Zeeman	Not interested in stores	Cinema			0	4	4
6	Female	20-25		Bicycle	0-5	Nearby	Daily needs	Action Hoogvliet	Albert Heijn Zeeman		Uninviting atmosphere	Primark			0	5	2
7	Male	45-55		Walk	15-20	Nearby	Daily needs Physical activity	C&A Van Haren	Albert Heijn Hoogvliet		Not interested in stores	Cafe/Restaurant High-end Shops			3	2	2