

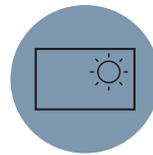
# Taking care of the human wellbeing by architectural interventions in the shopping mall



Nature



Air



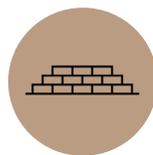
Light and  
sight



Sound



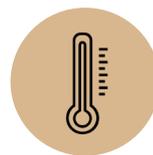
Smell



Materials



Dimensions



Temperature

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“A few years ago, I was in one of those big indoor shopping malls in England. Together with a friend, we left in good spirits. Without really having a good plan of action, we started wandering around the huge complex. We went in and out of shops. Occasionally we bought something and of course we consumed the necessary food and drink to get through the day. But as the day progressed, we noticed that our good mood gave way to fatigue and headaches and by late afternoon, we decided that enough was enough for today. As we waited outside for our transport, we noticed that we became more and more alive and not much later it was as if we were not bothered by anything.”

# Introduction

# 1.

In everyday life, you may not realise that the built environment affects you and your wellbeing. However, extended periods spent indoors may lead to feelings of discomfort without obvious explanation. Feeling unwell is related to one's health and wellbeing. Health is defined as "the condition of the body and the degree to which it is free from illness, or the state of being well" (Cambridge University Press, n.d.). The World Health Organisation (WHO) defines health as "a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity" (Crimson & Martino, 2017). Wellbeing is defined as "the state of feeling healthy and happy" (Cambridge University Press, n.d.-b).

Sick Building Syndrome (SBS) is one reason for the declining health of users of built architecture. Various definitions of SBS are employed; nevertheless, for this study, Sick Building Syndrome is defined as a condition in which the building occupant experiences acute non-specific health complaints that appear when spending time within the building, but once leaving the building the complaints start to disappear (Redlich et al., 1997; Passarelli, 2009; United States Environmental Protection Agency, 1991). Occupants may experience various discomforts when occupying a building, including upper respiratory symptoms such as eye, nose, and throat irritation, headaches, fatigue, skin rash, and sensitivity to smell.

Sick building syndrome is diagnosed when at least 20% of occupants report such health and comfort issues (Passarelli, 2009). Sick Building Syndrome is a pervasive issue that could afflict any building, however, it is more commonly found in post-war constructions from the 1970s with mechanical ventilation, unsuitable layouts, insufficient maintenance arrangements, as well as substandard building fabric and furnishing (Passarelli, 2009; Kubba, 2016).

The research focuses on what can counteract these symptoms of SBS and how the environment of a building can be improved. It will be focused on the case of shopping malls. While most research focuses on offices and hospitals, shopping malls can also be part of people's lives. Visitors may not be spending their everyday life here, but even for a day, it would be pleasant to occupy a space where one feels comfortable and unburdened by headaches or fatigue resulting from the building. Moreover, those employed within the mall spend a significant amount of time on the premises and thus should have the right to work in an environment that is healthy for them. To create a healthy environment for visitors, workers and other users, this paper provides recommendations for (re)designing healthy shopping malls using the physical elements of the building. These suggestions will be presented towards the end of the paper.

# Problem

## 2.

Several articles have been published on the significance of a healthy building. However, the research is primarily conducted in offices, primary schools, homes and health centres (Kubba, 2016; Wong et al., 2009; Korsavi et al., 2020; Boubekri et al., 2014). Evidence-Based Design has even been developed for enhancing hospitals and not for other building categories (Wagenaar, 2006).

People spend between 85-90% of their time indoors, with approximately 70% of that time being spent at home (RIVM, 2008). Those working full-time in an office spend around 20% of their time inside (Norbäck, 2009). It is therefore crucial to ensure that the indoor environment is of high quality and does not cause any health issues. The same standard should apply to indoor malls, as the time spent in these environments is in addition to the hours spent indoors.

Whilst numerous studies have analysed the impact of a building on its occupants in various contexts, the effects of shopping mall environments remain underexplored. Conducting research into this area will yield valuable insights pertaining to specific aspects of mall design and their effects on shoppers. Whilst numerous studies have analysed the impact of a building on its occupants in various contexts, the effects of shopping mall environments remain underexplored. Ultimately, a better understanding of the physical elements at play within a mall setting can be established.

Furthermore, there is also a matter of personal interest. My experience in a large shopping centre was not positive, and I know many others who have had similar complaints about headaches in such environments. A research study would be nice to find out what causes it and if there are ways to change it.

# 3. Theoretical framework

To conduct the research, three theories regarding the health effects of a building on the wellbeing of its occupants were used. Each theory is accompanied by a definition and an explanation of its various elements. The three theories are Sick Building Syndrome, Indoor Environmental Quality and Evidence Based Design.

## **Sick Building Syndrome (SBS)**

Firstly, Sick Building Syndrome, as defined in the introduction, is a condition where the building occupant experiences acute non-specific health concerns that appear when spending time within the building, but subside once outside (Redlich et al., 1997; Passarelli, 2009; United States Environmental Protection Agency, 1991).

There are several elements that affect the health of building users, although no direct cause has been identified. Poor ventilation seems to be the main cause. Inadequate ventilation can result in poor Indoor Air Quality (IAQ) (Passarelli, 2009). Following the guidelines, building occupants should not suffer from SBS, but if the HVAC systems are not properly maintained, designed or distribute air effectively, proper ventilation is out of the question (Passarelli, 2009; United States Environmental Protection Agency, 1991; Rostron, 2008).

Contaminants and pollution are frequently encountered sources of biological effects in buildings. Pollution is a type of contamination that can cause biological effects in buildings. Contaminants are substances that are in areas where they shouldn't be. Related are Volatile Organic Compounds (VOCs), compounds with high vapour pressure and low water solubility. They evaporate at ambient

temperatures in a building (Passarelli, 2009). Sources include building materials, human emissions and consumer products (Norbäck, 2009). The higher the humidity, the more VOCs get emitted.

However, various elements can also affect the building, the most common being: temperature and humidity; noise; and lightning (Norbäck, 2009; Passarelli, 2009; Rostron, 2008). Dry air can cause occupants to experience physical effects, such as sore throats and dehydration, which can lead to mental effects (Passarelli, 2009). Noise, no matter if it is low, high, consistent or interrupted, can cause stress. (Passarelli, 2009). In naturally ventilated buildings, external noise can cause more problems than in mechanical or enclosed buildings. Symptoms can arise from insufficient exposure to natural light, as well as exposure to mechanical light that is overly bright, too dim, or flickers. The constant adjustment of pupil dilation and contraction can lead to eye irritation (Rostron, 2008).

## **Environmental Indoor Quality (IEQ)**

Secondly, the theory of Indoor Environmental Quality (IEQ) examines the relationship between the indoor condition of buildings and the health of their users. The building industry is becoming aware of the health

hazards associated with poor building conditions (Kubba, 2016). Since the end of the last century, there has been a realisation that creating a healthy environment leads to happier and healthier individuals. Within educational and workplace settings, inadequate IEQ can impede learning, diminish productivity, and result in health concerns.

IAQ and air pollution are the most important factors, influencing how the space is experienced and how comfortable it is for the occupants (Kubba, 2016). Good air quality is free of pollutants, keeping at least 80% of occupants satisfied (Frontczak & Wargocki, 2011). Discomfort and dissatisfaction among occupants indicate poor indoor air quality.

Thermal comfort is an important factor to consider in the overall air quality. It is defined as the level of satisfaction with the thermal environment, which includes temperature, humidity, and airflow/ventilation (Abdulaali et al., 2020; Frontczak & Wargocki, 2011; Kubba, 2016;). A satisfaction rate of 80% among building occupants indicates a comfortable thermal environment (Kubba, 2016).

In addition, acoustic and visual comfort are both considered in this context. Acoustic comfort is focused on preventing discomfort rather than achieving a perfect acoustic condition and refers to the degree of satisfaction with the acoustic environment (Frontczak & Wargocki, 2011). Visual comfort is a subjective phenomenon that relates to the visual surroundings and involves various physical factors (Frontczak & Wargocki,

2011). The incorporation of windows to introduce natural daylight into indoor spaces can considerably enhance the well-being of occupants (Kubba, 2016).

### **Evidence Based Design (EBD)**

Lastly, Evidence Based Design (EBD) is the knowledge of scientific data about the physical and psychological health impacts on the users, used for the design of spaces in hospital architecture (Alfonsi et al., 2014). It links the research of the influence the spatial elements on the wellbeing of the user of the building (Gelder, 2016). When designing in accordance with EBD, healing environments or healing architecture can be created, where the environment improves the physical and psychological wellbeing of building users (Wagenaar, 2006). Healing architecture focuses on how the perception and design of architectural spaces can influence the recovery of patients (Nickl-Weller & Nickl, 2013).

An example of a hospital where the Evidence Based Design principles have been implemented is the Bronson Methodist Hospital located in Kalamazoo, Michigan (figure 01). The hospital introduced private rooms, a garden with a pond in the main lobby, and intuitive wayfinding throughout the building, resulting in improved patient sleep quality and a reduction in nursing vacancies by half (Wagenaar, 2006).

When employing Evidence Based Design, various physical elements are used to create a healthy environment. Roger Ulrich, a

distinguished researcher in healthcare design, has conducted multiple studies investigating the impact of surroundings on the wellbeing of patients (Ulrich, 1984). In 1984, Ulrich discovered that individuals with a view of greenery had a more favourable recovery outcome compared with those with a view of a brick wall.

However, this is related to the elements of light and sight. Daylight is preferred over artificial light by people due to being more enjoyable and also having perceived health benefits (Van den Berg, 2005). This preference for daylight is due to its brighter illumination and more uniform colour spectrum when compared with artificial lighting. Several studies have demonstrated that patients in rooms with increased levels of direct sunlight have shorter stays and experience less stress and pain, as compared to those in dimly-lit rooms (Van den Berg, 2005). On the other hand, patients in rooms with no windows are more likely to have anxiety, depression, and delirium than those in rooms with windows (Ulrich, 2003).

Other factors that contribute to building design include smell; acoustic; indoor thermal climate; material and colour; and spatial quality (Gelder, 2016; Hagerman et al., 2005; Van den Berg, 2005).



Figure 01: The Bronson Methodist Hospital with an indoor garden at the center of the building (HFM Staff, 2017)

### Comparison SBS, IEQ and EBD

All three theories examine both causes and solutions but concentrate on different areas. Sick Building Syndrome concentrates primarily on the origins of health problems within a building. It concerns the causation of discomfort within a building, its impact, and the complaints people experience and their origins. Whereas Evidence Based Design explores research-based solutions to create healing spaces. It uses research to determine the best approach to creating a healthy environment that promotes wellbeing. Indoor Environmental Quality considers the causes

but focuses on constructing comfortable spaces and utilizing various elements effectively. It prioritises user satisfaction and aims to create a pleasing environment for the majority of users.

Literature regarding the physical health aspects of a building and their impact on the occupant's wellbeing have been analysed. Each theory identified several physical elements which have been collated in a table shown in Figure 02. The interrelated elements from each theory are colour-coded to signify their function.

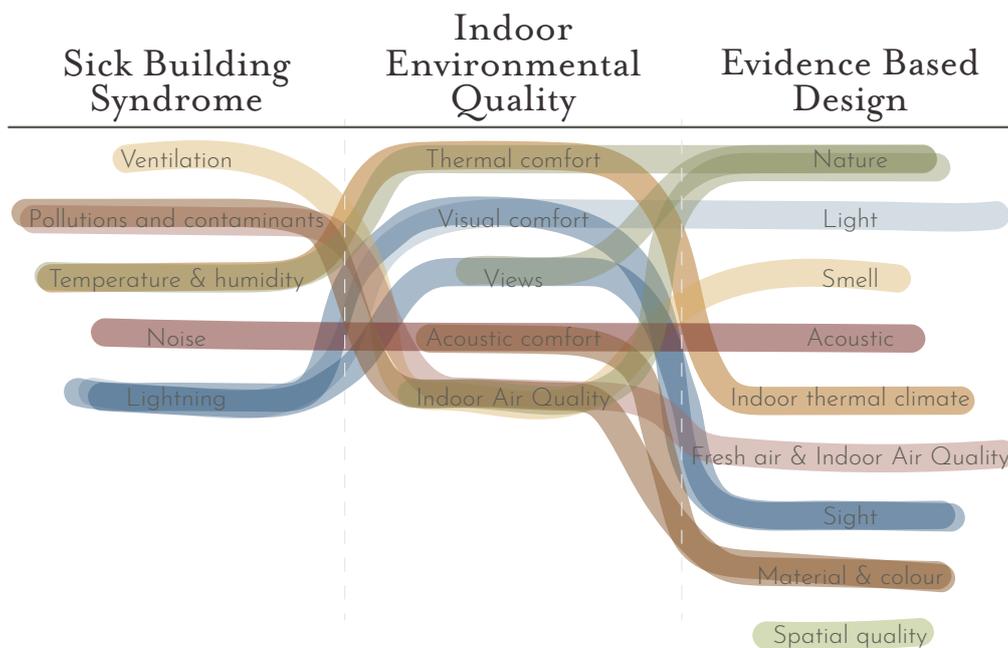


Figure 02: The connection between physical elements of three different theories that address the influence of the elements on the health of the occupant.

Examining Figure 02 reveals numerous interrelations between SBS, IEQ, and EBD. While some elements exemplify equivalent concepts, such as light, air, and sound, others are distinct but interconnected as they impact one another.

Two factors that are specifically associated with EBD, yet are interrelated with other elements of SBS and IEQ, are nature and building materials. Suitable choices of materials and colours can also lead to optimal conditions for temperature control, acoustics, and air quality. The impact of nature on temperature and air quality is evident, and the presence of scenic views is often conducive to a calming atmosphere.

Suitable choices of materials and colours can also lead to optimal conditions for temperature control, acoustics, and air quality. Moreover, the visual impact of these choices can have a bearing on the overall quality of the surrounding scenery.

SBS, IEQ, and EBD identify temperature, air, smell, sound, light and sight, materials, dimensions, and nature as the most significant elements impacting human wellbeing (figure 03). Air is the most common element and is also associated with pollution, smell and ventilation. Furthermore, materials and colour, nature, and light and sight are significant factors that are commonly encountered.

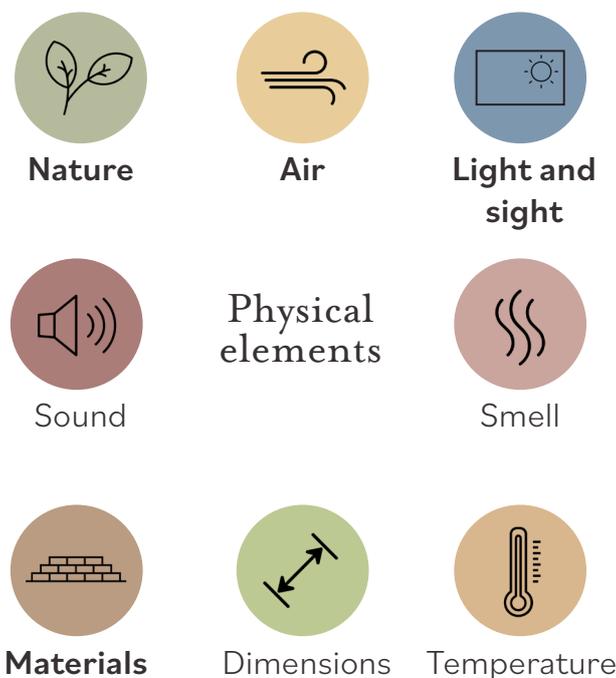


Figure 03: The eight physical elements found in the literature.

# 4.

# Method

The research will investigate the user's experience inside the shopping mall, focusing on the effect of the building on the user's wellbeing. The study's research question is as follows:

*How to improve the experience of human wellbeing in a shopping mall by architectural interventions?*

From the theoretical framework, eight distinct building elements that affect occupant health were identified. These physical elements were incorporated into questions asked of the occupants of two different shopping malls that serve as case studies. Physical elements were included in surveys of occupants of two different shopping malls that served as case studies: Oranjerie in Apeldoorn and Westfield Mall of the Netherlands in Leidschendam. When collecting feedback on the experience of shopping centre users, interviewees' privacy and preferences will be considered and sought accordingly prior. Furthermore, the elements from both case studies have been observed and recorded where possible. Subsequently, the collected data will be analysed and compared in the discussion and conclusion section, that may culminate in a recommendation.

The choice of both malls was based on their similarities and differences. Both malls are climate-controlled, which provides a controlled environment for study and manipulation of the elements therein. Furthermore, both malls are predominantly used for shopping, facilitating prolonged

stays. At the Mall of the Netherlands, dining amenities are also provided. This has not been the case at the Oranjerie since its refurbishment a few years ago. Consequently, visitors spend less time in the shopping centre. This implies that individuals will spend less time in de Oranjerie.

The Oranjerie is located in the heart of Apeldoorn. It was constructed between 1992 and 1994 and integrated into the preexisting urban structure. The complex was designed by Niek van Vugt and has undergone multiple renovations. However, since its inception, the mall has suffered from high vacancy rates. During the designing phase, the architect expressed reservations about the mall's size and feared it might be too large. He was correct; approximately 60% of the 60 stores in total are vacant.

Westfield Mall of the Netherlands, formerly known as Leidsenhage, is located in the town of Leidschendam. It was constructed in 1969 and refurbished into a new Westfield Mall by MVSA Architects several years ago. The mall currently houses 220 stores (Westfield, n.d.). However, in addition to the stores, the complex comprises restaurants located on the first floor, whereas the stores are situated on the ground floor.

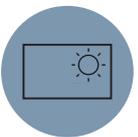
In general, Westfield Mall is quite popular, while the Oranjerie is not. During this research, an investigation will be conducted to determine whether the elements have any influence.



Nature



Air



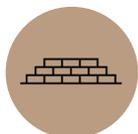
Light and sight



Sound



Smell



Materials



Dimensions

# De Oranjerie



Figure 04: De Oranjerie

# Westfield Mall



Figure 05: Westfield Mall of the Netherlands (Redactie, 2021)

# 5.

# Results

At both the Oranjerie and the Westfield Mall, people were asked about the elements in the building. The findings have been incorporated into this chapter of the paper.

## De Oranjerie

During the mall visit, a group of eleven participants were interviewed regarding their perceptual experience of eight physical elements identified in the initial research. During the mall visit, a group of eleven participants were interviewed regarding their perceptual experience of eight physical elements identified in the initial research. Supplementary to that, several other inquiries were made, encompassing their visit purpose, any dissatisfactions, and other miscellaneous concerns. The appended section includes all the questions asked. The outcome of the participants' responses was depicted graphically (graph 01).

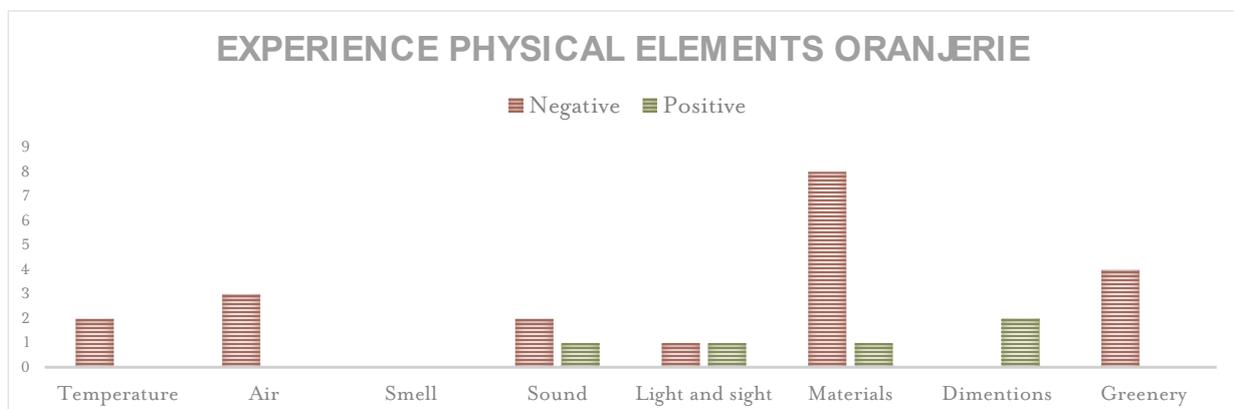
The removal of neutral comments enables better identification of preferences. The most notable aspects are the materials and the absence of greenery. The materials inside the mall were largely disliked by most

respondents, so perhaps a closer look at this could shed more light on why people don't feel more positive about it (Table 01).

The ambiance created by the materials used in the area was predominantly discussed in a negative light. The absence of warmth, coupled with the abundance of white attributes, has left the space feeling empty, stark, and similar to a factory. Two reviews were neutral in tone, while one individual found it nice.

Green was not included in the questionnaire, but it was specifically mentioned by the interviewees. This indicates that the lack of greenery is a negative aspect of the shopping centre.

Figure 06 displays the most common or striking statements made by respondents. It highlights that, in addition to the minimal aesthetics and absence of vegetation, the



Graph 01: The results of the questions about the way people experience the Oranjerie

building's components are not highly valued. Generally, responses often started with the functionality of the building. "I don't mind how it is, I mean, what can you expect in a shopping mall", "It's fine, it just has what I need" and "It's empty, where are the shops?" are a few examples of the comments made

about it. This functionality is something people care about and because it is not good, this is what they have the most to say about. This lack caused distraction resulting in the elements being relegated to secondary importance.

Negative	Neutral	Positive
Bare and empty (Kaal en leeg)	fine (Prima)	Nice (Fijn)
Bare, modern and white (Kaal, modern en wit)	Fine (Prima)	
Bare and bleak (Kaal en kil)		
No plants (Geen planten)		
Tight, not pretty and neat (Strak, niet mooi en netjes)		
Bare (Kaal)		
Now cold and factory like, not before renovation (Nu koud en fabriekachtig, hiervoor niet)		
Not pleasant, aluminium (Niet gezellig, aluminium)		

Table 01: The reasons why people don't enjoy the current used materials inside the Oranjerie during the interviews

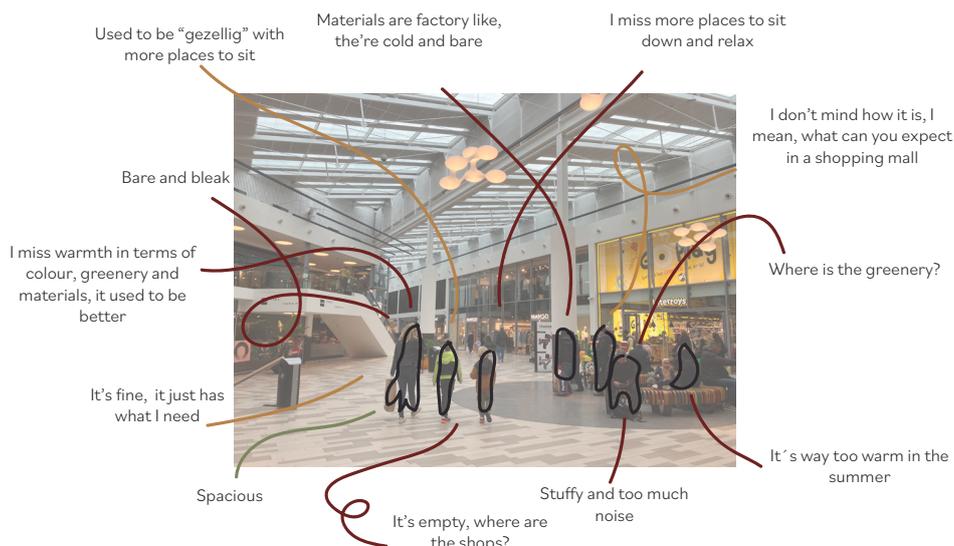


Figure 06: Quotes of the people being interviewed

### Westfield Mall of the Netherlands

During the study conducted at Westfield Mall, twelve individuals were interviewed. The neutral responses were excluded from the analysis in graph 02. The people gave noteworthy positive feedback regarding the materials used and light and visibility levels. More than half of the participants appreciated either the light and visibility or the materials.

The responses of the interviewees about the materials have been sorted into negative, neutral, or positive categories and presented in table 02. This survey indicates that the majority of people found the mall to be pleasing or attractive. A small number of respondents held a neutral stance, but no individuals expressed negative sentiment towards the amenities. The mall’s ambience is welcoming and provides a comfortable experience for visitors. Overall, the general consensus is that the mall is satisfactory and visitors are content with their experience.

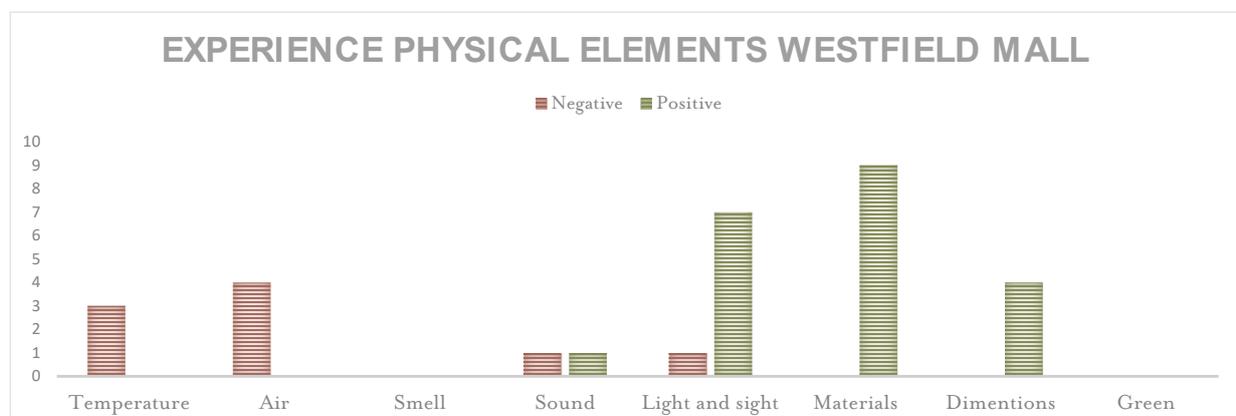
With exception to some broken items, there

were minimal criticisms about the mall. Most of the answers focused on the elements, and the public did not express any dissatisfaction with the shopping mall.

Figure 07 presents selected interview quotes. These remarks suggest a harmonious integration of elements. Feedback was predominantly favourable with visitors expressing satisfaction with the mall’s design and style. One individual remarked, “It’s all well fitted,” while another stated, “They made it stylish.” Furthermore, the absence of vacant shop space within the mall of the Netherlands minimises distractions, enabling people to swiftly appreciate their surroundings. As they perceive everything to be satisfactory, they hold a more favourable sentiment towards the amenities and are content with the shopping mall.

### Comparison malls

When comparing the two malls, it is noteworthy that the element of materials



Graph 02: The results of the questions about the way people experience the Westfield Mall

generates the most reactions in both. However, for the Oranjerie, the reactions were mostly negative, in contrast to Westfield Mall, where they were primarily positive. One disparity in responses was related to lighting. At the Oranjerie, few individuals expressed a clear opinion on the matter, whereas those interviewed at Westfield Mall were content

with the lighting. Although not included in the questionnaire, greenery was later mentioned by visitors as lacking at the Oranjerie, which prompted its addition. The air quality at Westfield Mall was not discussed. However, around one-third of respondents at both malls expressed dissatisfaction with the air quality, finding it somewhat stuffy.

Negative	Neutral	Positive
	Fitting (Kloppend)	Stylish and right (Stijlvol en kloppend)
	Fitting and neat (Passend en netjes)	Beautiful (Mooi)
	Good, shame about the broken parts (Goed, zonde van de kapotte delen)	Good (Goed)
		Good (Goed)
		Beautiful (Mooi)
		Pleasant (Gezellig)
		Beautiful (Mooi)
		Nice (Nice)
		Good and fascinating (Goed en fascinerend)

Table 02: The reasons why people don't enjoy the current used materials inside the Westfield Mall during the interviews

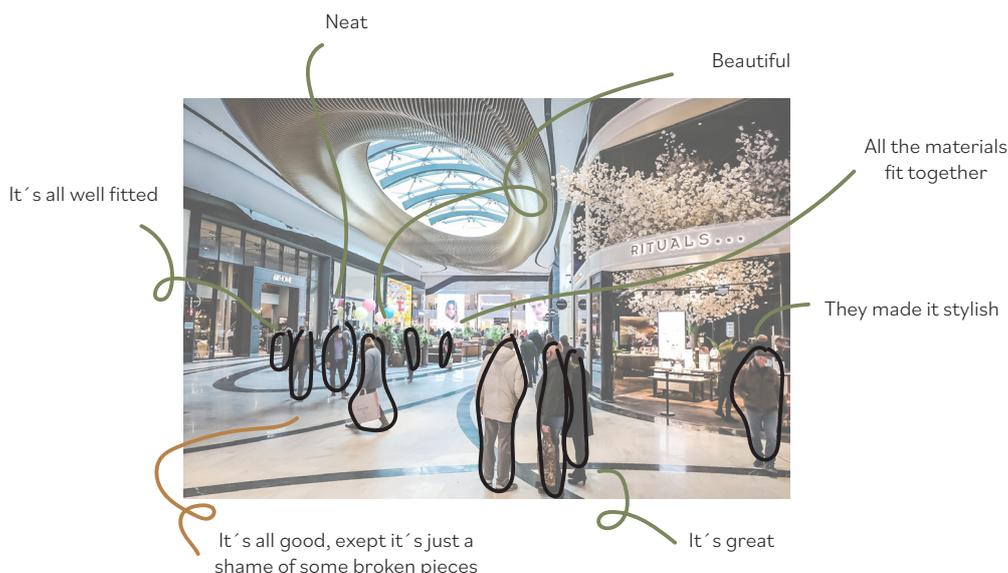


Figure 07: Quotes of the people being interviewed (Redactie, 2021; own additions)

## 6.

# Discussion

The findings of this study confirm the findings in the existing literature. According to the literature, air has been identified as one of the most crucial factors. However, when this factor is examined in the results, it is evident that it is mostly rated as poor. Nonetheless, it is still relatively frequently named in comparison to other factors, such as smell. Nonetheless, identifying the root cause of this and how it could be improved remains a challenge. As a result, almost two-thirds of individuals surveyed were not able to identify it. Ultimately, given that it is not immediately apparent, this is a plausible outcome.

While not explicitly discussed during interviews, the lack of greenery was noted by several participants. This is a visually apparent element. In contrast, greenery is more prominently featured in the spaces of the Mall of the Netherlands. The Orangery, on the other hand, has a few pots containing plants but lacks integration with the overall design, as indicated by respondent feedback. The absence of greenery was noted by visitors, particularly given that the mall's name references a the orangery, a green space. The inclusion of plants would positively impact visitors' experiences and may also aid in stress reduction, as indicated in the existing literature. Both the research and literature concur on this point.

People rated the light in the Oranjerie as fairly neutral, but the materials were perceived as cold and white. Conversely, people rated the

light much more positively in the Westfield Mall. It is possible that the positive perception of materials in the Westfield Mall is being reinforced by the light. The light enters both locations through the roof from the same source. It is possible that the positive perception of materials in the Mall is being reinforced by the light. It is possible that the positive perception of materials in the Mall is being reinforced by the light. However, the Oranjerie receives a higher percentage of light compared to the Westfield Mall. When examining aspects of a building that impact the wellbeing of its occupants, it is important not only to look at each element individually, but also to consider the relationship between the elements. Literature demonstrates that these elements are closely linked, as illustrated in Figure 02.

The literature implies that the users of a building encounter the elements mentioned in the literature more often. This observation may be due to the greater impact of these elements or as a result of being more noticeable. The visibility of materials and nature allows for easier evaluations to be made by individuals. Figure 08 illustrates that nature and materials have the greatest impact, but also affect other elements. Of course, this is merely a selection of factors that can impact the wellbeing of building occupants. Nevertheless, these are the most prevalent interconnections and components that affect their health and comfort.

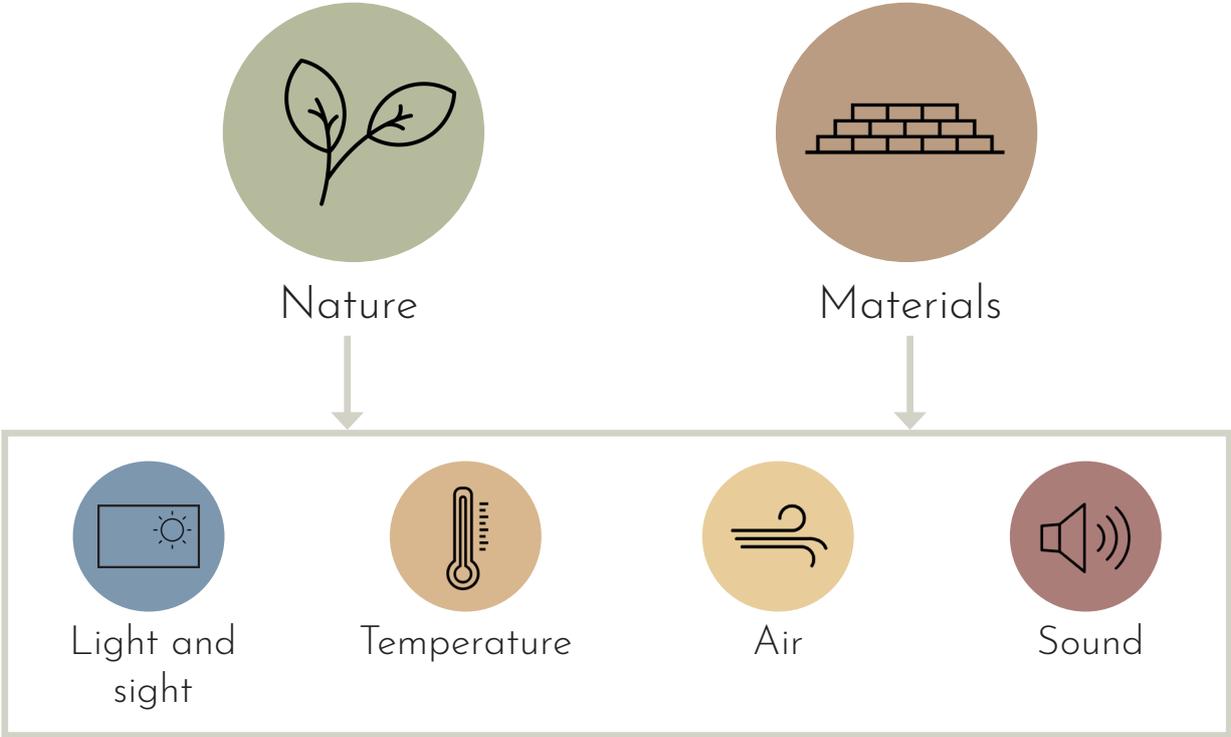


Figure 08: The elements with the most impact and what other elements they affect

# 7.

This research focused on how a building affects the health of its occupants. The main question was:

*How can the experience of human well-being in a shopping centre be improved through architectural interventions?*

In the theoretical framework, three theories emerged from the literature, each containing different elements that influence occupant health. The three theories were Sick Building Syndrome, Indoor Environmental Quality and Evidence Based Design. They identified temperature, air, smell, sound, light and sight, materials, dimensions and nature as the most important factors affecting human wellbeing. The research consisted of interviews on the eight elements from the theoretical framework and was conducted in two different shopping centres, the Oranjerie and the Westfield Mall. The study found that materials make the biggest impression on people. In addition, the lack of use of greenery is also a shortcoming of the building. On the other hand, the correct use of light creates a more pleasant experience. Comparing theory and research, it is clear that materials are important in both cases, as they are visually visible to the user. Light also plays a role here. But there is also air, which

To answer the main question, the use of pleasant materials that do not create a cold atmosphere and the use of plants can improve the experience. By incorporating these elements into the shopping mall, it is possible

# Conclusion

to create a more pleasant environment for shoppers.

## **Recommendations**

Further research is necessary to investigate the influence of various materials on human wellbeing. Since materials may contain contaminants and pollutants, biobased alternatives could offer a solution. Implementing biobased materials can enhance the air quality of a space, while the use of warmer materials, such as wood, may also improve the shopping experience in a mall. At the Oranjerie, visitors described their experience as bare, bleak and factory like, among other similar terms. The addition of warmth would greatly enhance both the atmosphere and overall experience. The Mall of the Netherlands has already accomplished this, utilising various materials, including wood, which have been positively received.

Additionally, investigating air quality would be beneficial. Although participants expressed dissatisfaction during the interviews, this study did not reveal what would be considered satisfactory or how to best measure it. Further research would be recommended.

Introducing plants can also have a positive effect on the room. Plants not only provide aesthetic relief but also have beneficial effects on air quality, room acoustics, and temperature. A further investigation could analyse which types of plants are optimal for specific elements.

# 8.

# Reflection

## The research

One of the first things for this project was finding a topic for the research that will be incorporated into the design. The topic came quite quickly, health. This is something I have always been interested in and it would be interesting to see how you can combine the topic health with architecture. A list of several questions came up related to this topic:

- What is health?
- What makes someone healthy?
- What are parts of being unhealthy?
- How can health be influenced?
- How does a building influence the human health?
- What is a spatial experience?
- Does the spatial experience have an influence on someone's wellbeing?
- Why do people feel less fit after being indoors for a longer period of time?
- How long should people be inside?
- Why do people feel less fit after visiting a mall?
- How do the five senses play a role in the human well-being?
- How do people move through a mall?
- When do people go to the mall?
- What are the factors of a building that influences the human health?
- How to create a healthy public space?

And out of this, the first research question was formed:

*How does spatial experience influence human health in a shopping mall?*

Several theories about the relation between

health and architecture came up and after a while and multiple talks with the research tutor, I came to the following research question:

*How to improve the experience of human wellbeing in a shopping mall by architectural interventions?*

*1) What physical elements affect the human wellbeing the most by literature?*

*2) How do visitors of the shopping mall experience the physical elements of the mall?*

*3) What element(s) has the most impact on the experience of the mall?*

In the first quarter, we only had to make a research plan about how to construct the research in the following months. However, I noticed that I found it quite difficult to not start with the research already. I was already looking into the data and answering the questions while formulating them. Instead, what I needed to do was creating a plan to construct the research. Because when I was starting the research, it was quite vague of what I wanted to do and how to proceed.

Midway the process, the research tutor changed and we had a couple of months off. With a fresh perspective, the subquestion were erased and only the research question was answered in the conclusion. The reason for this was that the first question was about literature and that had been moved up to the theoretical framework. The second and third subquestions were very similar and were already integrated in the research question.

The final research question is:

*How to improve the experience of human wellbeing in a shopping mall by architectural interventions?*

### **The research to design**

This design falls under the Heritage and Architecture studio. In the studio, conducting research will explore how the mall came to its current state, determining the values present, investigating interventions and what the mall will look like in the future. The role of a shopping mall is changing due to the advent of online shopping. So during the studio, the importance of the mall will be investigated, including the creation of a comfortable space within it (Heritage & Architecture, n.d.). Together with the outcomes of this research about the influence of the building on the wellbeing of a person, a mall will be redesigned into a building fit for the next generations.

More and more shopping centres are becoming empty, with the rise in popularity of online shopping. For the design, shopping mall the Oranjerie in Apeldoorn is chosen to be redesigned. It is located in the city centre of Apeldoorn and completely closed off from the surroundings and weather. The Oranjerie is also over 50 per cent vacant. Despite several renovation attempts in the past, it has struggled to attract new shops after reopening. Presently, the mall is utilized for leisure shopping, comprised mainly of clothing stores and a few food delis.

Guidelines have been established for the design based on multiple factors. Firstly,

conclusions were derived from the research, which will be tested to evaluate the design. Furthermore, the theme health that comes back throughout the whole design. Also, due to the climate change, buildings have to be adaptable for more extreme weather conditions. Therefore sustainability is an important key factor when designing. Lastly, the vision of Apeldoorn was also taken into account in drawing up the guidelines. Together with a value assessment on the building the following guidelines were created:

- Social & physical health
- Recycling
- Adding warmer materials
- Biobased
- Adding different types of green
- Connection outside inside
- Multiple types of meeting spaces

After a feedback session from one of the presentations, it was pointed out that these guidelines were kind of vague and that there is a step missing between the guidelines and the design. So the guidelines were formulated in a different way and when presented also elaborated with some examples or explanation about the guideline. The new guidelines are:

- Adding nature – having a view on nature from every p.o.v.;
- Using healthy materials - biobased;
- Reusing/Recycling materials;
- Connection inside outside;
- Several meeting spaces;

- Diversity of functions.

Originally, restaurants were present but disappeared during the last renovation, which some users consider a drawback in the mall. I believe that, in line with Apeldoorn's vision, which seeks to create a more diverse centre, it is time for shopping centres to take the next step. The proposed design offers a mixed-use space which includes shops as well as opportunities to meet for a drink or socialize, alongside increased housing. This changes the use of the building and thus broadens it. As time passes, it is possible that more shops will disappear and other functions will take their place. The design considers preserving the space for the current established shops, but it is possible to convert it to housing or a similar function in the future. I believe the concept of a conventional shopping mall, where individuals shop primarily, will evolve into a central hub where diverse activities coexist and people can socialise.

### **The design**

Over time, shopping centres have become more condensed due to the addition of roofs. However, it seems wasteful to keep them closed on pleasant weather days. By installing windows in the roof that can be opened, a more adaptable climate can be created to better align with the needs of shoppers.

With this design, I aimed to explore the feasibility of creating a healthy environment within an already established structure. Please note that this is solely a hypothetical concept and has not been executed yet. Therefore, it

is challenging to gauge the effectiveness of the interventions implied. The study's issue was the feeling of discomfort experienced by individuals after a day of shopping in a mall. However, it is worth noting that this issue was not observed in the specific building in question. It's difficult to assess whether the design improves health. Nonetheless, it's worth noting that noise and air quality were among the concerns raised by people during the study. Efforts to enhance conditions for users involved introducing more greenery and opening up the mall. Additionally, an employee reported high temperatures during summer, prompting the installation of greenery, a waterfall, and blinds to create a more comfortable climate.

To create a more healthful building, multiple modifications were implemented. These included expanding the enclosed mall to allow for more open space on the sides and roof. Sick Building Syndrome indicates that prolonged periods indoors may result in various health issues. By opening up the space, fresh air circulation is enhanced, which can diminish or entirely alleviate complaints. When the roof is opened, it was designed to consider various weather conditions, enabling it to remain closed, thus keeping people who move around the building dry. Additionally, new greenery has been incorporated, through the use of green roofs and the placement of trees. The green roof on top of the existing black roofing diminishes temperatures during summer. As for the orangery, tree placement was already

taken into account in the initial design, they were therefore carefully integrated into the floor of the design. Additionally, it is feasible to install planters. Suspended from the structure, hanging plants contribute to the elevated greenery. Moreover, to promote social well-being, some of the shops have been converted into hospitality/sitting areas, creating more opportunities for socializing. This is on different scales, there are some smaller spots for a few people, but there is also a stage and a large flexible space for meeting or similar occasions. By breaking open the building in a few places, sightlines have been created. More windows have also been placed, creating connections with the outside. Combined with views of greenery, this improves the health of the user.

The principles outlined at the outset are evident in the design in various ways. The layout provides multiple meeting places. However, these spaces are all on a larger scale, with no enclosed areas for meetings. Given that the mall is a public space, frequented by many, I also doubt that such an enclosed space would be practical. Furthermore, community areas are provided for the residents both within the building and the surrounding areas, including a vegetable garden where they can collaborate. For biobased materials, they have been used, but the main focus has been on reusing existing materials in the design process. Another guideline, recycling and reusing, has been applied and proved beneficial. This is in line with the current experience. When new

materials are added, warm materials, such as wood, are used to create a more welcoming environment. The areas have been opened up to create a clear connection between the interior and exterior spaces.

### **The proces**

During the design process, many ideas come up and are quickly sketched out. As a result, it quickly becomes a bit chaotic, as there are many individual “puzzle pieces”. Putting the different elements together is a continuous process. Drawing a 1:100 cross-section is already more coherent, and also making floor plans creates more unity. This really helped to get a better understanding of what I was doing. Many items are connected or have multiple purposes in the design on different scale levels, but this is not always visible and easy to present on paper. Following the tip of full circle diagrams, I have tried to make the more intangible ideas understandable.

However, while it can be a bit much sometimes, I do prefer working this way. So first getting a lot of information and then later find a structure in it, because this means that in the beginning I don't feel limited while designing. Later in the process, parts can always be re-evaluated to see if it can really be done and if there are no other options.

At the beginning of designing, I did do a value assessment, but didn't really look back at it when designing. After the midterm and during the building technology and also architecture guidance, this came up more often. It is good to really look at what is already working in

the building and whether the interventions I am doing are really needed, or whether I can already do a lot with the current situation. It would have been beneficial for myself to have taken a bit more time in the beginning to really get to know the building. With the research the same thing happened to, I wanted to start the research already, while the assignment was to make a plan, instead of writing the research. This meant that when I actually started the research, it wasn't really clear what I wanted to do. The methodology I wrote was kind of rushed and not thought through. So if I have to do this project again, I need to remind myself to not skip the first phase of analysing. It is important to look at the plan of what to do and what information I have and I am going to need further on in the process.

To conclude I generated recommendations for promoting healthier buildings, including malls:

- Adopt a hybrid climate for traffic spaces, ensuring they are more connected to the outside to allow for a fresh flow of air;
- Create mixed-use spaces with varying levels of activity to encourage positive social interactions;
- Establish sightlines that incorporate views of greenery for improved wayfinding and connectivity;
- Enhance greenery by including plant benches, hanging plants, and green roofs;
- Adding a water feature like a fountain or

waterfall to your outdoor space can increase the cooling effect on hot days.

Of course, before implementing any of these recommendations, it would be beneficial to first have a proper look at the current state and functioning of the building. It might be that some of these recommendations are already included in the design, or maybe users don't feel the need for certain interventions.

All and all, I pleased with the final design and the incorporation of the research in the design. There are always things that you want to change, and if time allowed it I would go more in detail and explanation of choices that are made for the design. But I do think that I am proposing design that creates a healthier space for people. There are several places for people to meet and green elements, such as grass, trees and green walls, are added to create a better environment. Also looking at the climate change, the green elements should influence the climate of the space in a positive way by cooling down on hot summer days and blocking some wind on cold winter days. With all the interventions done, the question raises if the building is still a shopping mall. I am not completely sure about the answer. There are still shops included in the design, however, they slowly disappear and it is unknown how many shops will be present in the building. I think people will not refer at it as a mall anymore, but as the Oranjerie, a green space with mixed functions where they can meet up with friends and family.

# 9.

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## Oranjerie, Apeldoorn

De vragen zijn voorbereid en bedoeld voor een afstudeerproject aan faculteit Bouwkunde in de richting architectuur aan de TU Delft. De antwoorden op de vragen worden anoniem gehouden en worden verder niet doorgegeven of gebruikt in andere projecten zonder toestemming. Het onderzoek gaat over het effect van het gebouw op een persoons gezondheid, waarbij er specifiek naoorlogse winkelcentra worden onderzocht. Naast vragen over het winkelcentrum waar de questionaire plaatsvindt, worden er ook vragen gesteld over gewenste ruimten. Het 16 vragen binnen het winkelcentrum en 4 vragen buiten het winkelcentrum. Het invullen kost ongeveer 5-10 minuten.

### Questionnaire de Oranjerie, Apeldoorn:

- Komt u uit Apeldoorn?
  - Ja
  - Nee, anders: .....
- Hoe bent u hier gekomen?
  - Lopen
  - Fietsend
  - Auto
  - OV
  - Anders: .....
- Wat is de reden dat u de Oranjerie bezoekt?
- Wat vindt u van de temperatuur binnen het gebouw? (Als u hier vaker komt, hoe is het in de zomer en winter maanden?)
  - Tevreden
  - Te warm
  - Te koud
  - Anders: .....
  - Zomermaanden: .....
  - Wintermaanden: .....
- Komt u uit Apeldoorn?
  - Ja
  - Nee, anders: .....
- Hoe bent u hier gekomen?
  - Lopen
  - Fietsend
  - Auto
  - OV
  - Anders: .....
- Wat is de reden dat u de Oranjerie bezoekt?
- Wat vindt u van de temperatuur binnen het gebouw? (Als u hier vaker komt, hoe is het in de zomer en winter maanden?)
  - Tevreden
  - Te warm
  - Te koud
  - Anders: .....
  - Zomermaanden: .....
  - Wintermaanden: .....
- Wat vindt u van de kwaliteit van de lucht?
  - Benauwd
  - Droog
  - Tevreden
  - Anders: .....
- Wat vindt u van de geur in het gebouw?
  - Aangenaam
  - Stinken
  - Neutraal
  - Anders: .....
- Wat vindt u van het geluid binnen de Oranjerie? (komen de geluiden vandaan (mensen, verkeer, machines, anders)
  - Aangenaam
  - Te hard
  - Anders: .....
- Wat vindt u van het licht en zicht binnen de Oranjerie?

9. Wat vindt u van de gekozen materialen binnen de Oranjerie?

- Kaal
- Gezellig
- Mooi
- Lelijk
- Anders: .....

**Algemene vragen:**

13. Zijn er dingen in het winkelcentrum die veranderd zouden moeten worden en wat denkt u dat een verbetering zou zijn?

14. Wat vindt u van de verbinding tussen het winkelcentrum en de stad Apeldoorn, en dan met name de binnenstad?

10. Hoe voelt de ruimte qua grootte?

- Aangenaam
- Te groot
- Te leeg
- Te druk
- Claustrofobisch
- Open
- Gesloten
- Anders: .....

15. Wat zijn ruimtes waarin u zich prettig en comfortabel voelt en waarom?

16. Als u gaat shoppen, wat vindt u een leuke plek om heen te gaan?

11. Wordt de lengte van uw bezoek aan het winkelcentrum beïnvloedt door het gebouw?

- Ja
- Nee

17. Zou u het jammer vinden wanneer de Oranjerie zou verdwijnen?

12. Voelt u zich anders dan voordat u het gebouw binnenkwam?

- Nee
- Drogere ogen
- Hoofdpijn
- Prikkende neus
- Vermoeider
- Anders: .....

**Vragen voor buiten:**

18. Gaat u wel eens naar het winkelcentrum de Oranjerie, en zo ja waarom?

# Westfield Mall of the Netherlands, Leidschendam

De vragen zijn voorbereid en bedoeld voor een afstudeerproject aan faculteit Bouwkunde in de richting architectuur aan de TU Delft. De antwoorden op de vragen worden anoniem gehouden en worden verder niet doorgegeven of gebruikt in andere projecten zonder toestemming. Het onderzoek gaat over het effect van het gebouw op een persoons gezondheid, waarbij er specifiek naorlogse winkelcentra worden onderzocht. Naast vragen over het winkelcentrum waar de questionaire plaatsvind, worden er ook vragen gesteld over gewenste ruimten. Het 12 vragen binnen het winkelcentrum en 4 vragen buiten het winkelcentrum. Het invullen kost ongeveer 5-10 minuten.

## Questionnaire de Westfield Mall of the Netherlands, Leidschendam:

1. Komt u uit de buurt?  
 Ja  
 Nee, anders: .....
2. Hoe bent u hier gekomen?  
 Lopend  
 Fietsend  
 Auto  
 OV  
 Anders: .....
3. Wat is de reden dat u de mall bezoekt?
4. Wat vindt u van de temperatuur binnen het gebouw? (Als u hier vaker komt, hoe is het in de zomer en winter maanden?)  
 Tevreden  
 Te warm  
 Te koud  
 Anders: .....
5. Wat vindt u van de kwaliteit van de lucht?  
 Benauwd  
 Droog  
 Tevreden  
 Anders: .....
6. Wat vindt u van de geur in het gebouw?  
 Aangenaam  
 Stinken  
 Neutraal  
 Anders: .....
7. Wat vindt u van het geluid binnen de mall? (komen de geluiden vandaan (mensen, verkeer, machines, anders)  
 Aangenaam  
 Te hard  
 Anders: .....
8. Wat vindt u van het licht en zicht binnen de mall?  
 Zomermaanden: .....
- Wintermaanden: .....

9. Wat vindt u van de gekozen materialen binnen de mall?

- Kaal
- Gezellig
- Mooi
- Lelijk
- Anders: .....

**Algemene vragen:**

13. Zijn er dingen in het winkelcentrum die veranderd zouden moeten worden en wat denkt u dat een verbetering zou zijn?

14. Wat vindt u van de verbinding naar het winkelcentrum?

10. Hoe voelt de ruimte qua grootte?

- Aangenaam
- Te groot
- Te leeg
- Te druk
- Claustrofobisch
- Open
- Gesloten
- Anders: .....

15. Wat zijn ruimtes waarin u zich prettig en comfortabel voelt en waarom?

16. Als u gaat shoppen, wat vindt u een leuke plek om heen te gaan?

11. Wordt de lengte van uw bezoek aan het winkelcentrum beïnvloedt door het gebouw?

- Ja
- Nee

12. Voelt u zich anders dan voordat u het gebouw binnenkwam?

- Nee
- Drogere ogen
- Hoofdpijn
- Prikkende neus
- Vermoeider
- Anders: .....