

ZEBRA MACHINE

Exposing and reacting to the implicit
barriers experienced by the users of the
pavement in the public space of Rotterdam.



RESEARCH DOCUMENT

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1. INTRODUCTION

“Our bodies and movements are in constant interaction with the environment; the world and the self inform and redefine each other constantly”

- Juhani Pallasmaa (43)

The quote by the Finnish architect Juhani Pallasmaa indicates the constant dynamic between the individual and its environment that inspired the project's subject. The project strives to expose elements of this dynamic in the form of research and reaction. The aim of this research is to expose implicit barriers that are experienced by the users of the pavement in the public space of Rotterdam. The process of investigating the implicit barriers enables the participants and me to grow insight in what is influencing our experience of public space. This awareness opens up the opportunity to evaluate and react to what is known and developed as tacit routines and habits in this space. Subsequently, spatial design practices can potentially be supported in creating a more liveable city.

The definition of the implicit barrier is shaped by the definition of barrier according to various dictionaries and the explanation of how barriers are perceived: a barrier is a hinderance you encounter on the pavement that disrupts your way of moving or that you have to endure during. The term implicit emphasises the influence of individual experiences and learned behaviour in framing the perception of the barrier.

Integrating the impact of learned behaviour on our perception of public space makes it necessary to elaborate on the development of public space in Rotterdam. This shows that since the Second World War the emphasis was put on separating the

functions housing, working, traffic and recreating in the urban fabric (“Centrum”; Verkade 32). The role of the traffic engineer grew and resulted in a public space based on the concepts of flow, circulation, efficiency and speed. The habit of prioritizing fast mobility over the users of the pavement created a space in which the last group has to move in a space that is violent, stressful and causing health problems (Bot; Verkade 86; Culver 147).

On that account, this research focusses on the users of the pavement instead. The research explores the interaction with public space to learn from its potentiality, by investigating the implicit barriers, in order to formulate a critique on the current state of the public space.

The implicit barriers are researched by using the method of mental mapping. The method is best known for the work by Kevin Lynch “The Image of the City” (1960). The mental map indicates the experiences and behaviour of the user of public space (Lynch 5). It exposes the personal experience of a route beyond its geographical structure and therefore sheds light on the routines and habits that might be less obvious but do influence the perception of the route (Milgram 88). The experience of thirteen participants are illustrated by using this method and presented by the means of a chart. The chart is shaped by two axes and puts the implicit barrier on a scale from material to immaterial (x-axis) and constructed to fluid (y-axis).

The document is structured according to the sequence of sub-questions (see below). The first three chapters elaborate on fundamental elements to the main research question: implicit barriers, public space and users of the pavement.

Thereafter, the methodology of the research is explained. The results are presented in the subsequent chapter. Finally, the main research question will be answered in the last chapter.

RESEARCH QUESTION

How are the inhabitants of Rotterdam experiencing implicit barriers when moving on the pavement in public space and how can I react to these?

SUB-RESEARCH QUESTIONS

How can implicit barriers be defined and categorised?

How can the current appearance of the public space in Rotterdam be described and what is my personal view on this?

Who are the users of the pavement and what does moving on the pavement imply for the experience of public space?

2. IMPLICIT BARRIERS

definition barrier

In this chapter I elaborate on the definition of an implicit barrier. To do this, I split implicit and barrier to explain separately.

In literature studies, I did not come across a satisfactory definition of barrier that embodies the focus of this research. This is why I decided to integrate the definition of barrier according to various dictionaries and my personal experience and interpretation to expand and specify the definition. The outline of the definition is visualised in a chart with two axes.

The definitions of barriers according to the Dutch dictionary Van Dale and the English dictionary Merriam-Webster can be seen on the right.

These definitions indicate that barriers can be both material and immaterial elements: the y-axis of the chart. A barrier occurs as natural phenomenon and human operations that block or hinder movement or action. Thus:

BARRIER

A hindrance you encounter on the pavement that disrupts your way of moving or that you have to bear/endure during.

Betekenis 'barriere'

Je hebt gezocht op het woord: barriere.

bar·ri·è·re (de; v(m); meervoud: *barrières*)

1 hindernis (ook *figuurlijk*)

Figure 1: definition barrier in dictionary Van Dale (Van Dale and de Groot)

barrier noun

 Save Word

bar·ri·er | \ 'ber-ē-ər ⑩, 'ba-rē- \

Definition of *barrier*

- 1 a** : something material that blocks or is intended to block passage
// highway barriers
// a barrier contraceptive
- b** : a natural formation or structure that prevents or hinders movement or action
// geographic barriers to species dissemination
// barrier beaches
// drugs that cross the placental barrier
- 2** **barriers** or **Barriers** *plural* : a medieval [war game](#) in which combatants fight on foot with a fence or railing between them
- 3** : something immaterial that impedes or separates : [OBSTACLE](#)
// behavioral barriers
// trade barriers

Figure 2: definition barrier in dictionary Merriam Webster ("Dictionary by: Merriam-Webster")

ORGANISATION OF PERSONAL ARCHIVE

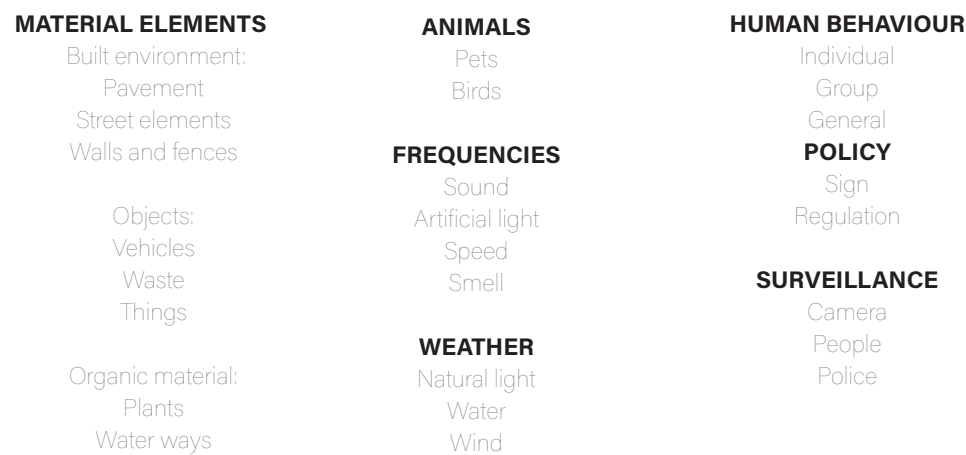


Figure 3 : Categorisation in my personal archive of implicit barriers

I implemented this description of the barrier to my personal experience while walking on the pavement. I created a collection with photos of all the different barriers that I encountered. This collection can be found in the appendix of this document and a few are presented on the next page. I recognised the following sections in my collection: material elements, frequencies, weather, surveillance, human behaviour, animals and policy. Within these sections I distinguished subgroups to create a more clear overview. The main section 'material elements' from my own archive is very broad. Therefore, I divided this section into the sections: built environment, objects and organic material. Above, you can read these sections. I experienced most implicit barriers in the field of the built environment,

relating to the condition of the pavement. Besides, the sections objects and frequencies have a broader collection of pictures compared to other sections. The section human behaviour is not extensive.

This process of archiving gave me insight in how to create a division in the chart's y-axis. The main sections can be placed on the scale of material to immaterial. The order of the sections begins with the built environment and ends with frequencies. The built environment, object, animals and organic materials are elements that are tangible and physically present. The built environment is most solid and static, the organic material is the least solid of these four elements.

MATERIAL ELEMENTS

PAVEMENT> (built environment)



Different tiles make you perceive routing of pavement: do you go straight, then left or do you cut the pattern of the pavement



When you are in a wheelchair, your options to enter the pavement are limited. Although you are not in a wheelchair it still feels like you are only allowed to walk here.



I noticed that I try to avoid to stand on these tiles with names to remember people that were deported from their houses in WWII.



Tram rails, sometimes especially with heels trying to avoid.

STREET ELEMENTS> (built environment)



Roundabout blocks the way to the Heemraadsingel, a popular place for users of the pedestrian, you need to take a detour

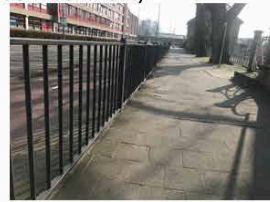


The street is elevated alongside the tramline. Only there where the zebra crossing is and the street low enough, you can go to the tram stop.

WALLS AND FENCES> (built environment)



Basketball field, fence create a limiting access to the field, however necessary for not losing the ball on the streets.



No idea why this fence is here. Crossing the street is impossible for 40 meters.

VEHICLES> (objects)



Pavement is invisible, not easy to see where the best access is to the pavement, cars are blocking view



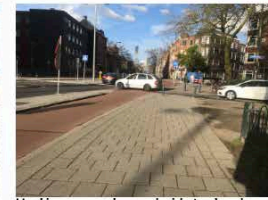
Pavement fully blocked by car, had to go make a manoeuvre on the doorstep or go to the road

FREQUENCIES

SOUND>

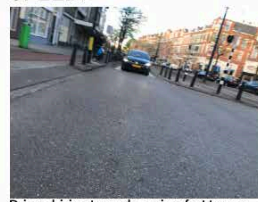


This guy was making a lot of noise with his engine.



Honking cars make me decide to already go right instead of later.

SPEED>



Driver driving towards me in a fast tempo. I'm not on a zebra, so I accelerate my walking pace.



Car driver driving close and fast.



Car driver driving fast towards the zebra, makes me feel uncomfortable so I feel myself sometimes accelerating, or actually slowing down to annoy the car driver.

SMELL>



Personally not a fan of the smell of energy drink



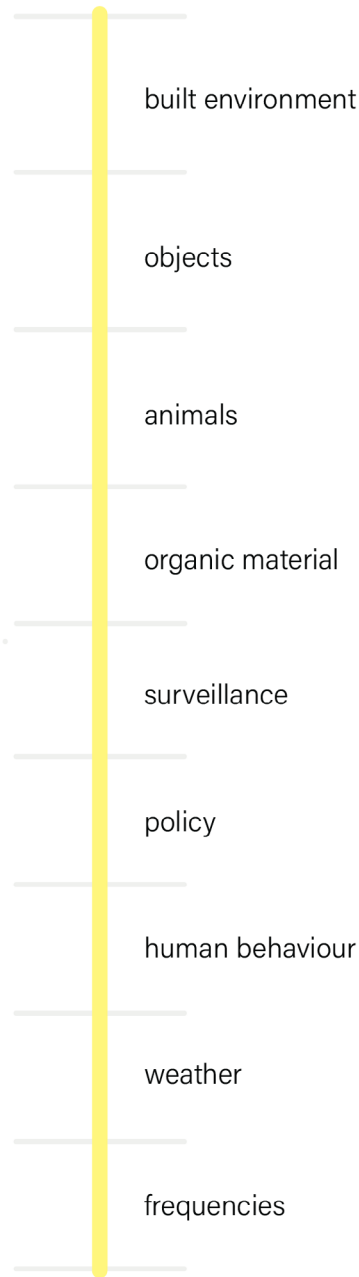
Bad smell from dog shit, especially on warm days.



Exhaust emitting smelly gas.

Figure 4 : selection of my personal archive of implicit barriers

MATERIAL



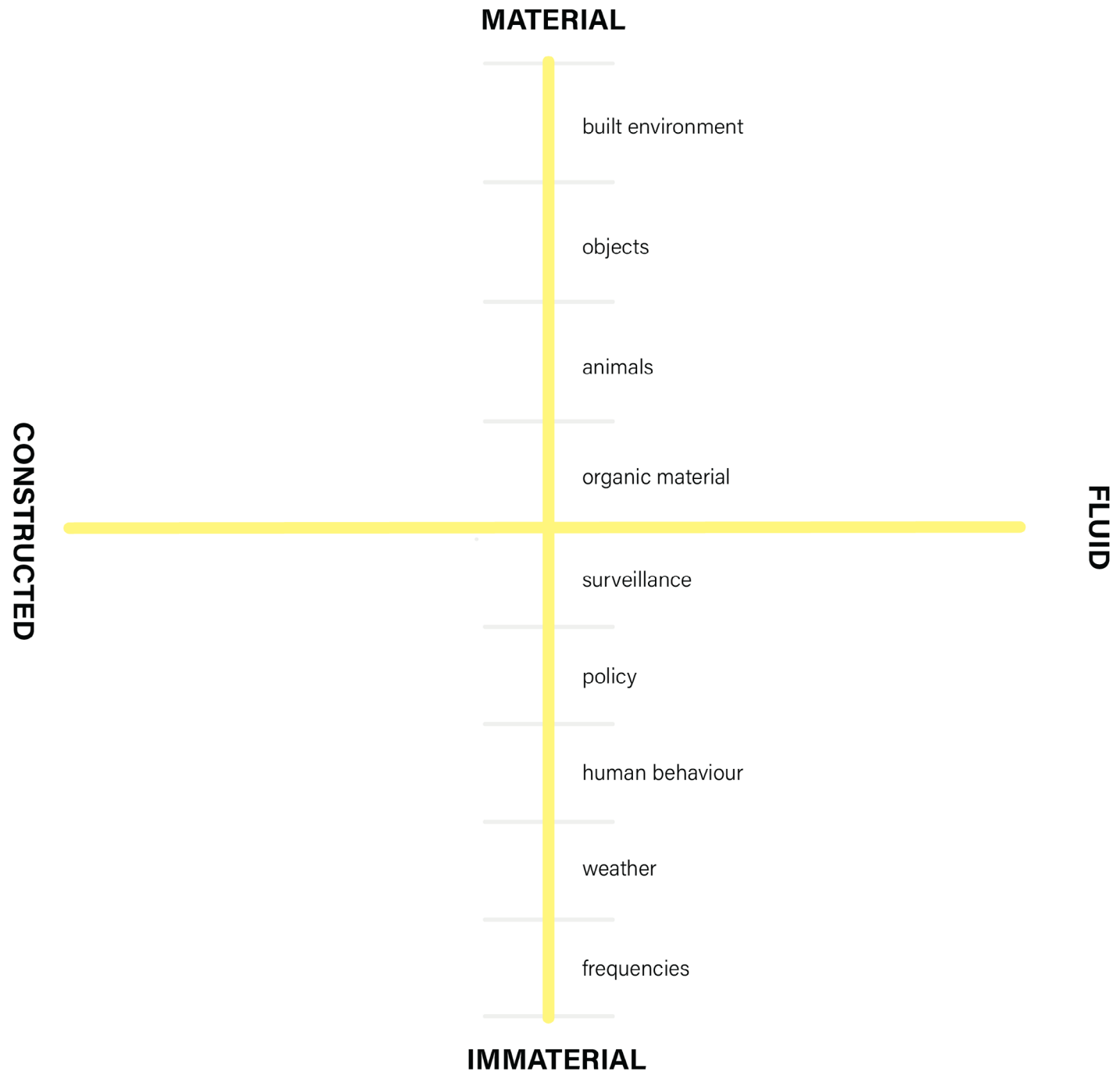
IMMATERIAL

The elements surveillance, policy and human behaviour are related to the physical being in the form of bodies, cameras or written text. However, their impact on the city is less tangible since they are shaped by social and political dynamics and therefore placed in the immaterial field. Weather conditions are not always visible to the eye, and therefore less tangible, like in the case of the wind. Weather is therefore placed in the immaterial field of the chart. The cause or instrument of frequencies might be visible, like the honk for honking. But the sound in itself is not tangible and therefore placed as the most immaterial group. The scale is visualised on the left.

The x-axis implies another characterisation of the barrier. As mentioned earlier, barriers can be constructed by human operations. The traffic engineer and the urbanist are constructing public space. In short: the traffic engineer develops guidelines that promote flow, road safety and traffic networks; whereas the urbanist promotes liveability and is the glue between architecture and the street (Van Berkel). However, these constructions can not grab the complexity of a city as a whole. More fluid phenomena are influencing the appearance of the public space. The existence of these phenomena are initially not intended to shape public space, but are nonetheless found to be influencing the experience of this space. The opposing manifestation of the constructed and fluid phenomena form the base of the x-as.

Altogether, the chart on the next page is created as a tool to categorise and represent and barriers in this research.

Figure 5: Division of sections on y-axis



2. IMPLICIT BARRIERS

definition implicit

"At every instant, there is more than the eye can see, more than the ear can hear, a setting or a view waiting to be explored. Nothing is experienced by itself, but always in relation to its surroundings, the sequences of events leading up to it, the memory of past experiences"

- Kevin Lynch (1)

This quote by Lynch (1) illustrates that our experience of public space is always connected to our own past. The individual response to the barrier originates in how we are learned to respond. The human reflex is to follow the option that feels safe compared to the option that doesn't feel safe. That what feels safe is that what is known, what is learned. The conditioning of what is known, makes it feel like there are other options. Especially, in growing up from child to adult the person develops learned behaviour: the routine. This behaviour is rather tacit as it is something a person does without awareness (Sennet 176). When the person starts to broaden its surroundings and finds other options and choices, the behaviour can be put into another perspective. Awareness of the learned behaviour develops and routines can be broken. That what felt safe, can, in retrospect, turn out not to be the safer option (Van Der Meer).

Therefore, the experience of the barrier is always an interaction between the person who encounters and the element itself. The person can be aware of the barrier, of its own response to the barrier and whether that response is learned behaviour. And the person can also not be aware of any of these. Taking into account these personal handling of learned behaviour, the experience of the barrier is not explicit, but rather tacit and implicit.

Consequently, I use the term implicit barrier to expose the influence of learned behaviour and individual experience in framing the perception of the barrier.

IMPLICIT BARRIER

A hindrance you encounter on the pavement that disrupts your way of moving or that you have to endure during and of which the individual experiences and learned behaviour are framing the perception of this hindrance.

history of Rotterdam

The history of public space in the relation to the understanding of housing gives us insight in the various functions public space has known. Housing is understood as the functioning of the house in which social, economic, political and cultural developments in society are reflected. The origin of the rooted house, the stable and permanent place, created the community of inhabitants that defines the city (Vittorio Aureli & Giudici 4).

Rotterdam developed from the 12th century onwards as a fishing village along the river the Rotte (McKenna) (see picture 1). Public space in this time was closely interconnected with the house. To own private property was to have citizenship and this private property embodied both the house and the workshop. The workshop opened the household to the public space spatially and opened the private property to the commercial, political and social apparatus of the city (Vittorio Aureli & Giudici 5). Not much is left in Rotterdam from this time, apart from some churches like the Saint Lawrence Church or Hillegonda Church in Hillegersberg (Vocke).

In the 16th century the house was increasingly seen as the basis for economic productivity of the city. Earlier, housing was perceived as an organic response to individual necessities and activities, but now it finds its basis in organisation of structures in society. The co-existence of housing and public space was controlled by

the organisation between private property and state-controlled infrastructure (Vittorio Aureli & Giudici 5). The aristocrats and new middle class of merchants in Rotterdam thrived on the trading and colonisation overseas (McKenna). They rejected the lack of division in spaces of the medieval houses. More attention was put on the house, following the reasoning that the improvement of life conditions improves economic productivity: think of hygiene practices and separation of functions within the house, like bedrooms and kitchens. The house was portrayed as a sanctuary from the hectic city and rough public space (see picture 2). (Vittorio Aureli & Giudici 9). A distance was created between the space of the private and public domain. This line of thoughts is visible in the current perception of housing and public space. The design of the corridor is a good example that shows how domestic life needs a space between the public and private domain (Vittorio Aureli & Giudici 6). The impact of this development is visible in the current appearance of the public space in Rotterdam. There is clear distinction between public and private property and the public space is dominated by state-controlled infrastructure ("Voetganger"; Verkade 80).

The 20th century elaborated on this notion of distribution when functionalism marks the way of living and movement of inhabitants in architectural and urban proposals and designs. The Basisplan voor Wederopbouw (The Base



Picture 1: dam in the river the Rotte, 1270 ("Hoe Rotterdam ontstond")



Picture 2: Haringvliet in 1611 ("Hoe Rotterdam ontstond")



Picture 3: Bombardement 1940 ("Hoe Rotterdam ontstond")



Picture 4: Lijnbaan 1955 (Oud)



Picture 5: Hofplein 1955 (Oud)

Plan for the Reconstruction) illustrates this approach very well. This plan was developed by urbanists Witteveen, and later, van Traa after the bombardement in the Second World War (1940). It focused on the renewal and modernisation of the city (see picture3). According to the thought of the 4th meeting of the Congrès Internationaux d'Architecture Moderne (CIAM) in 1933, functions are separated in the urban fabric: shops around the Coolsingel (see picture 4), culture around Museum Boijmans van Beuningen, companies around the Goudsesingel and separate neighbourhoods for houses. Next to that, mobility had a big priority ("Centrum"). The reasoning of the American Marshall Plan was implemented. Traffic engineering became a separate technical discipline in which the concepts flow, circulation, efficiency and speed are key (see picture 5) (Bot; Verkade 86). Many canals and waterways of the old city were changed into roads to provide this rhetoric ("Centrum").

Since the end of the 20th century, this strict distribution of space and function is increasingly questioned (Bot) as it is not flexible and able to adapt to current economic, political, social (Vittorio Aureli & Giudici 7) and ecological conditions. The space of social, political and economic interaction is taking place in either domestic and public places. Work is easily brought inside the house by the development of the internet. In other words, architecture and urbanism needs to adapt to a fluid system that is open for new social, political and economic developments (Rieniets).

3. PUBLIC SPACE

personal view

Public space covers a great deal of square meters of the urban fabric and most city's inhabitants encounter this space on a daily basis. This brings a great potential to the space to enrich our lives. As human beings we experience the need for social interaction and sense of community in our direct surroundings. The emphasis on the distribution of functions in the city, pushes the practice of these social interactions to the private domain and out of the public domain (Polikhun). This limits people to see opportunities, take possession or move around and make public space part of their living space ("Building and dwelling"; "Reclaiming the city"). Now, public space is much more perceived as a commodity; as an investment or as infrastructure to enable economic activity ("Building and dwelling"). The realm of mobility, efficiency and speed is dominating outdoors ("Aflevering 72"; Te Brommelstroet 1) and characterized by the hegemony of the private automobile (Culver 147). Considering the noise, space, accidents and its emotional toll that come with this realm of mobility, the public space can be described as the highest level of direct exposure to violence in most of our lives. However, the systemic violence is created by us and we seem to have collectively

accepted it as a tolerable price (Culver 148). To me, this interpretation and realization of public space is not acceptable. The body interacts with its surroundings and influences our being (Pallasmaa 43). Consequently, currently, public space brings stress and higher risk for health problems (Knöl).

Luckily, the notion of reclaiming public space to create a more liveable city receives more and more recognition ("Reclaiming the city"). Placemaking practices are increasingly adapted to enhance neighbourhoods and reclaim public space (Grundman). However, I see a tendency in the design of new spaces on top of the existing structures in public space. In my view, these practices are coming short in being disruptive by mainly focussing on temporary local solutions and not advancing the potentiality of public space. I think that simultaneously with creating attractive places by placemaking practices, we need to investigate the inconvenient and aggravating in order to disrupt current social, political and economic structures and be able to fulfill the potential of public space to enrich our lives.

4. USERS OF PAVEMENT

As human beings we are moving agents. We have the capacity to be mobile, by ourselves or with technological help. In moving we understand our surroundings (Lynch 3). We structure and identify the environment through sensory stimuli on shape, distance, nearness, smell, sound, colour and more (Lynch 3; Pallasmaa 44).

The biological system of the human body became the synonym for mobility matters and inspired traffic engineers and urbanists from the '60 and '70 onwards. Our blood circulation (figure 7) became the metaphor for free-flowing traffic. The street patterns are laid out as arteries and veins (picutre 6). Freedom of movement started to be equalled with the speed of movement. In this rhetoric, the pace of walking lost its value and the pavement became less important than the roads that facilitate higher speed (Sennet 182-183; Te Bommelstroet 2; Verkade 71).

The privileging of a certain mobility in the city creates spatial, social and economic separation (Jacobs). Traffic vehicles and pedestrians are separated from each other. The pedestrian, bicyclist and car have their own street. And separation generates inferiority (Jacobs). When you are not able to buy a car, a lot of square meters in public space are not accessible to you and become a space for the privileged people who are able to buy a car (Sennet 183). Therefore, in my view, there is a need to prioritise the users of the pavement in the image of the city.

Blood Flow in Human Circulatory System

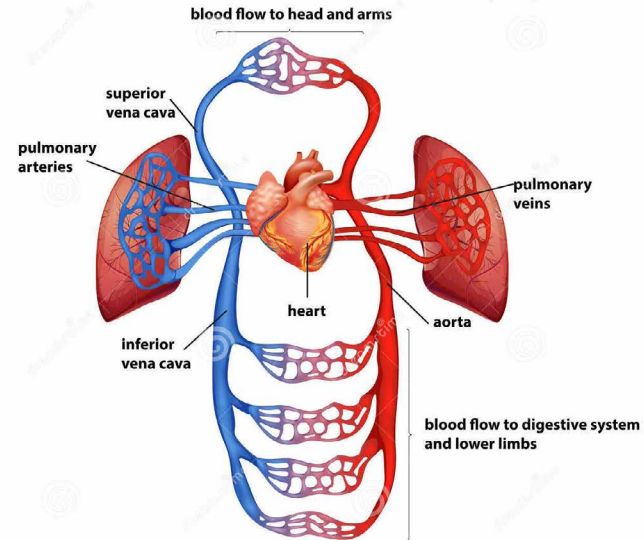


Figure 7: blood circulation (Pati,)



Picture 6: circulation of traffic ("Verdict Media Limited")

Next to this, a city that addresses the senses of movement creates an ambience of domesticity and welcome (Pallasmaa 72). Movement is an act of approaching and leaving (Sennet 188). Movement can be indicated by the action of our legs, or by the changing contact between the instrument that enables movement and the ground, but also by the changes in the soundscape around us, or by the touch of the wind. The eye alone cannot comprehend the entire bodily existence of moving in public space (Pallasmaa 43). The distance between the person and elements of public space is connected to certain specification of the sensory stimuli that enter the body: the closer, the more detailed (Sennet 187). Movement cultivates a collection of data on the environment. The user of the pavement is less isolated from public space compared to the car driver. The user of the pavement is able to receive more sensory stimuli next to the vision. Therefore, the moving agents on the pavement generate a more direct understanding of the environment and give insight in developing a space that supplements the bodily existence in the city.

The above states why I focus on the users of the pavement. Now, I will elaborate on who these users of the pavement are.

The CROW, the Dutch knowledge platform that develops guidelines for traffic regulations, defines slow traffic as all traffic that is not using the motorway. Among others, it includes

pedestrains, cyclists and horses ("Voetganger"). The pedestrain includes all users of the pavement, namely persons who move on foot, with a skateboard, step, wheelchair and more things alike ("O. Voor Laten Gaan"). Nonetheless, I prefer to use the term users of the pavement instead of pedestrains. The term pedestrian connotes only with the person moving on foot, and not with all other users of the pavement. In this research I aim not to exclude certain type of users of the pavement and to minimise reason for confusion, I will use the term users of pavement.



Figure 8: pedestrian sign ("Voetganger")

research steps

Both desk and field research is combined to collect data and understanding. The research process contains various steps: the first step covers literature studies, references and my personal experiences; the second step investigates the experiences of other inhabitants of Rotterdam. The findings are categorised, analysed and interpreted in the final steps.

STEP 1.

Initially my own experiences are used to create an overview of the potential barriers that could be encountered. I made pictures of elements in the city during walks. This first step is mainly about creating a collection of potential barriers that help later steps, create a definition of implicit barriers and a categorisation method that I explained in chapter 1.

Simultaneously, I did literature studies within the disciplines of urbanism, architecture and geography, traffic engineering, spatial senses and the body and mental mapping.

STEP 2.

In the second research step I collect the experiences of the inhabitants of Rotterdam. I want to collect a diverse range of input, therefore the group of participants covers different ages and backgrounds: (former) homeless persons, dog owners, migrants, skateboarders, etc... Step 2 is split into different parts:



Picture 7: Andrea walk

A >

At first, I invite people to take a walk in their own neighbourhood. I ask them to pick a destination they often walk to, like their supermarket. This I do because it helps the research if they know the area. Being in their own neighbourhood makes people start to follow routines and habits. By following the next parts of this research step, the habit and routines, will come to the surface. When I would do the walk in unfamiliar areas, they would be driven by surprise that distracts the discovery of less obvious implicit barriers. I will be walking about seven meters behind the participant. In this way, I am not distracting, but I am able to see what the person encounters. During the trip, I film the back of the person and its surroundings and put on the app Komoot on my mobile phone that records the route, speed and time.

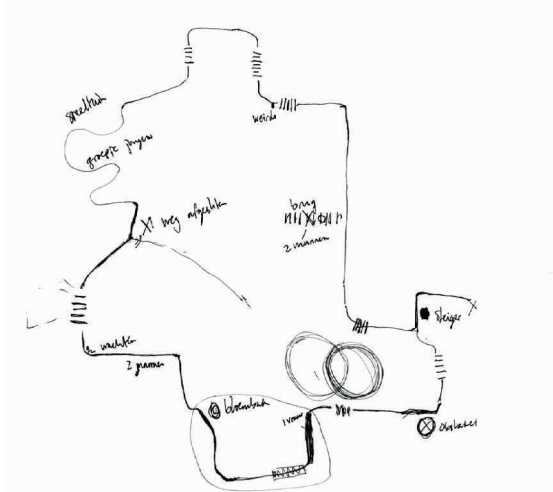


Figure 9: Mental map Andrea

B >

In the following part I invite the participant to draw a mental map of the route we just walked. An explanation of the mental map is described at the end of this chapter. I explain the aim of the mental map to the participants as a way to put down the experience of the walk in which they can point out the elements that drew their attention and influenced their way of walking. They are free to use text and drawings in 2D and 3D. In order to create a clear visual language, I will give all participants a black pen. I like the paper to be square, so that the shape of the paper is not influencing the drawing.

C >

The next part gives time to recapitulate the walk. The participant has time to explain their mental map to me. During the walk I usually come with questions and observations that I share with the persons. I record our conversation. I ask

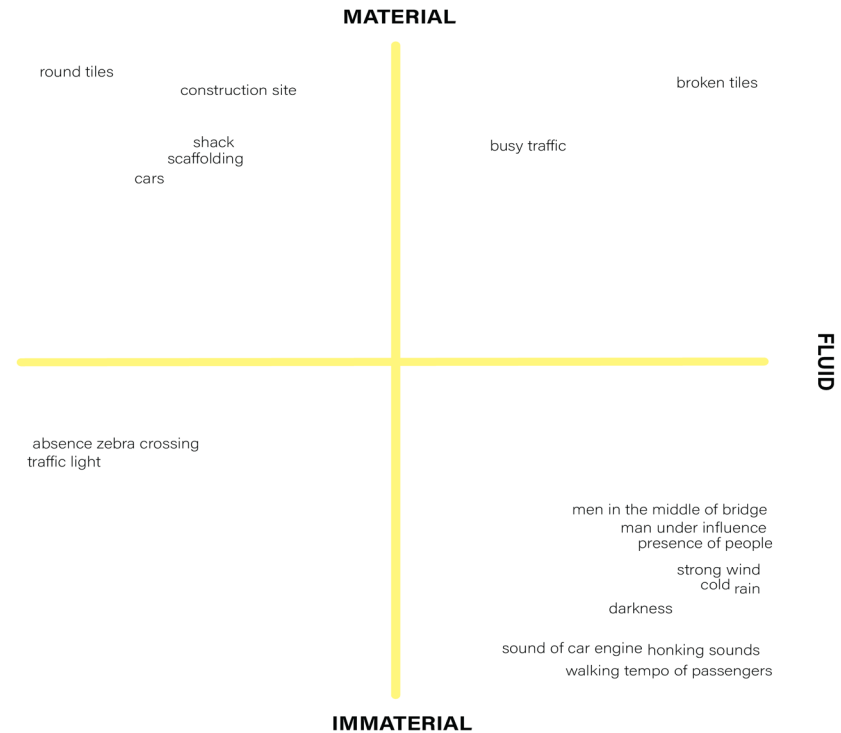


Figure 10: Chart Andrea

the participants to draw a legenda. Some of the participants use no icons, then a legenda is not necessary.

At the end of the conversation the participant fills in a list of data with their name, age, length, gender, time they are living in Rotterdam and their place of birth. This data gives me insight in their background and makes it able for me to distinguish the different participants. Furthermore, I ask them how they want to be represented in the research: the group they identify and associate with. This I do, because I feel no need in risking a placement of participants in a certain category they do not feel like they represent. And, asking the participants themselves could bring forth interesting information.



Picture 9: drawing table set-up

STEP 3 .

In order to create a wider range of participants in different areas of the city, I also approach people in the streets of Rotterdam. A table can be added to my cargo-bike and I bring two chairs so that a convenient drawing set-up can be installed. Since the people I approach are already on the move, I will invite them to draw a mental map of their movement so far and have a conversation about their map and experiences. Also the list of data and if necessary the legenda is asked to be filled in.

STEP 4 .

This step entails analysing the input and observations. While making a transcript of the conversation and a summary that is placed in the appendix of this document, I go over all the input they gave me. I distinguish the encountered implicit barriers of this participant. These implicit barriers are then categorised according to the chart as developed in chapter 3. The elaborate individual findings can be found in the appendix, the collective results are analysed and described in chapter 5.

the mental map

The city is reflected in the body and the body is projected onto the city. The body is not only a physical entity, but is enriched by the mental experience of memory, the past and the future (Pallasmaa 49). The city appears in our physical, sensual and embodied mode of being (Pallasmaa 35). To understand the perception of the city all these aspects are to be included (Milgram 93).

The mental map is a method to shine light on a comprehensive understanding of the perception of the city as it portrays the reality as it is mirrored in the minds of the inhabitant of the city. (Milgram 93)

The image of the urban reality varies between different observers, for the reason that the image is always a result of the interaction between the observer and his environment. The mental map is a development of the individual process of selection, emphasis, distortion and organisation of the environment (Lynch 6). It becomes a projection of the cognitive, emotional, intuitive components of the observer. But they are not only individual products, since the perception of the environment is shaped by social and political constructions also (Milgram 93).

Kevin Lynch introduced the method of the mental map in the field of architecture and urbanism in 1960. In his work "The Image of the City" (1960) he described his study on how observers perceive and orientate in their urban environment through mental maps. Later, the method of

mental mapping is picked up in social studies and psychology by Stanley Milgram (Sulsters & Schubert).

The mental map enables the communication about the urban environment beyond its geographical structure. It brings personal experiences to the surface that are defined by routines and habits which are less obvious, less conscious and less visible (Milgram 90). Therefore, the method of the mental map enables the exposure of the human experience of implicit barriers in the city.



Figure 11: path, edge, district, node and landmark from "The Image of the City" (Lynch)

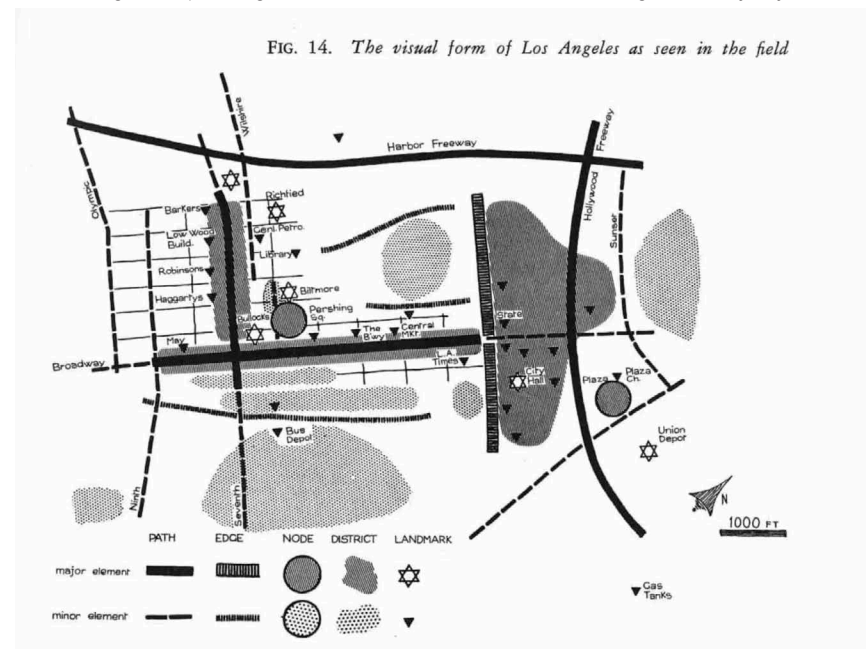


Figure 12: The visual form of LA as seen in the field from "The Image of the City" (Lynch)

6. RESULTS

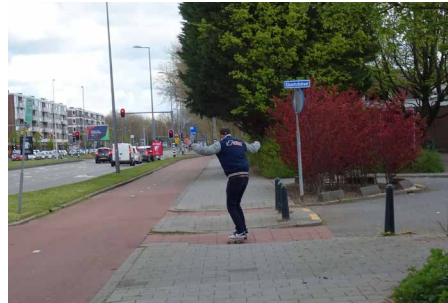
intro

To collect a wide variety of observations, I invited various kinds of people. The variety can be found in age, gender, speed of movement, identification, length, place of birth, time living in this city and area of the route. However, some groups of participants are not represented in this research due to a lack of time and resources: children under the age of fifteen, elderly above the age of 72 and different abled people. This should be considered while reading the document.

In total thirteen participants joined this research of which eight of them participated in a walk along session. The other five were approached on the street as explained in the previous chapter. The next page shows the location of the various routes taken by all participants.

This chapter on results presents per individual participant the mental map and a brief review of the experienced implicit barriers that is tested against the categorisation of the chart. I would like to invite you to the appendix for more elaborate summaries, a bigger picture of the mental map and the visualisation of the filled in chart per individual participant.

The chapter closes with the analysis. The conversation and charts of the participants are compared and bundled to generate knowledge about the findings collectively.



Picture 10: Participant 1



Picture 14: Participant 5



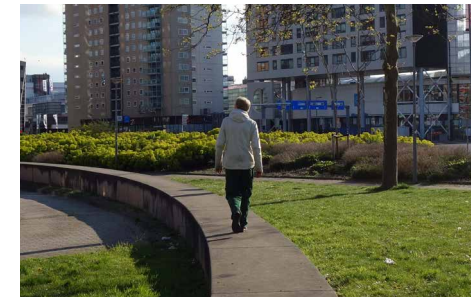
Picture 11: Participant 2



Picture 15: Participant 10



Picture 12: Participant 3



Picture 16: Participant 6



Picture 13: Participant 4



Participant 13

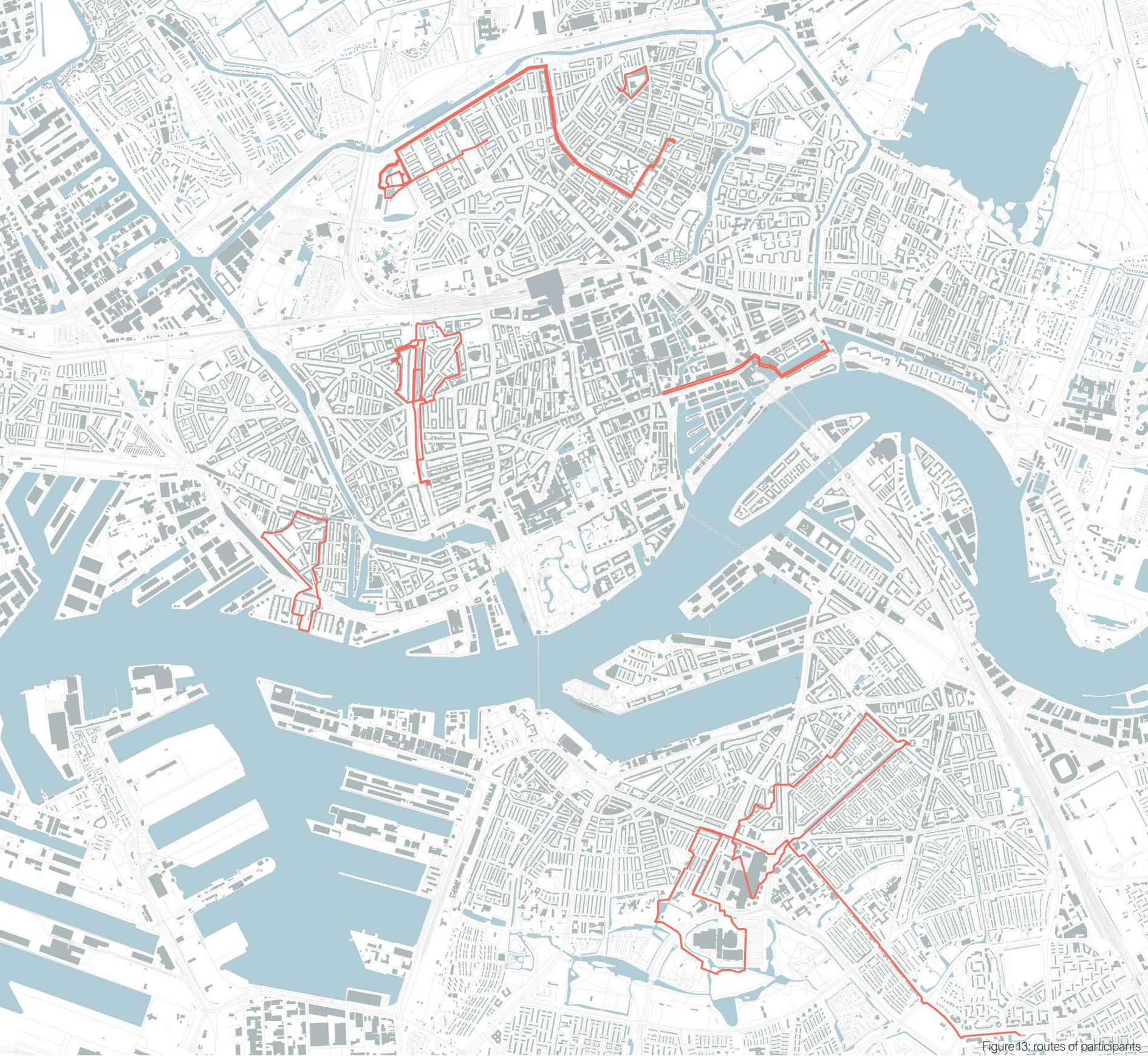
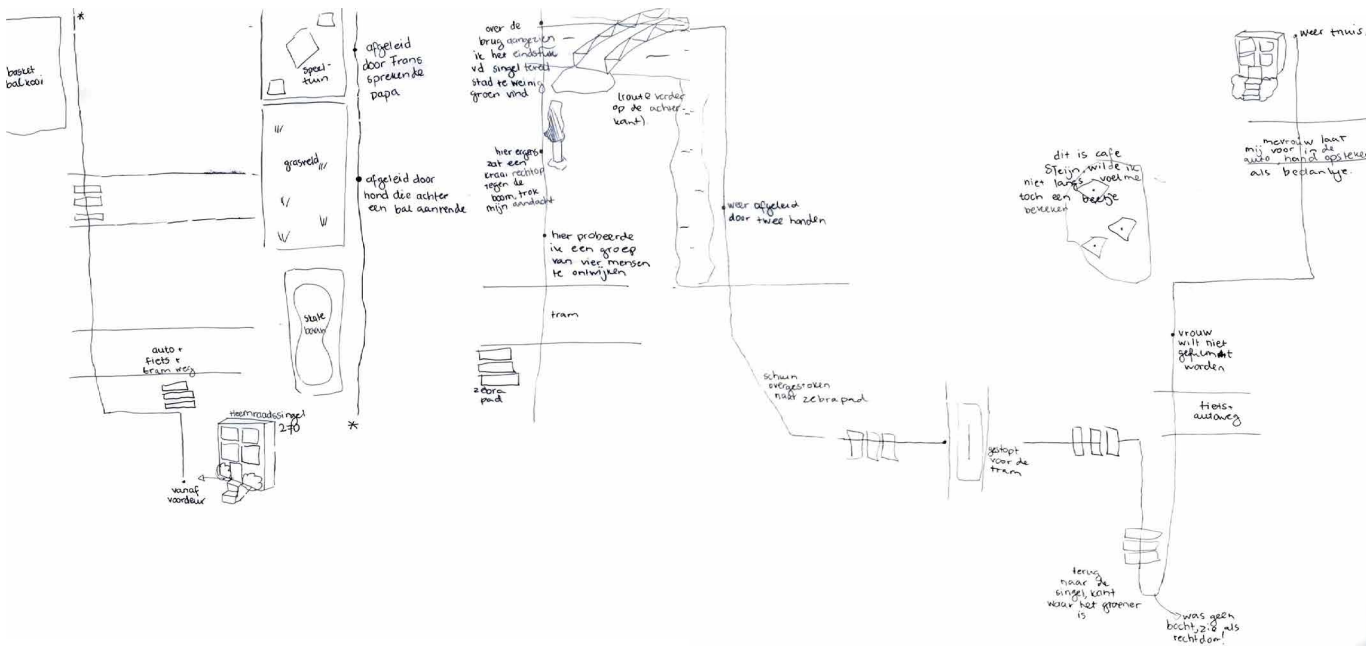


Figure 13: routes of participants

32 min , 2,3 km , 4,3 km/h
age: 27
height: 1.70
gender: woman
living in Rotterdam: 2 years
place of birth: Leiden
identifies with: young professional

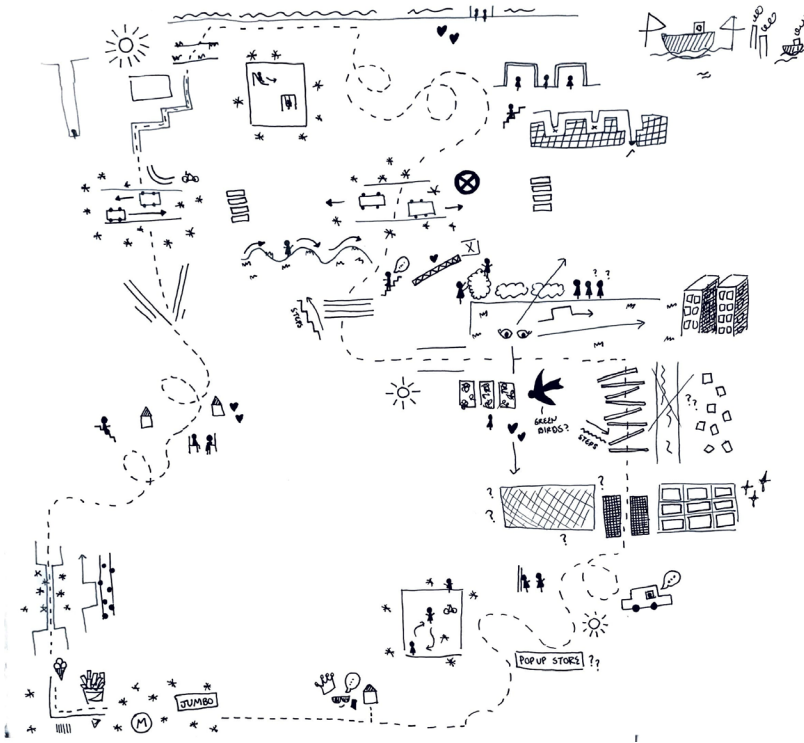
Diagram 1

Diagram 2



29 min . 2,2 km . 4,4 km/h
age: 22
height: 1.78
gender: man
living in Rotterdam: 3 jaar
place of birth: Willemstad,
Curacao
identifies with: black queer
community

crowdedness were encountered as implicit barriers as well. He took detours to be able to cross the street safer. Derrick avoided all surfaces that could potentially make his shoes dirty; like grass and rain puddles.



5- Alicia

26 min . 2,8 km . 6,4 km/h

age: 23

height: 1.63

gender: woman

living in Rotterdam: 4 years

place of birth: Dublin

identifies with: in and around my age group, female, the fast walker

Almost all implicit barriers that Alicia encountered are occurring as material and constructed, in the section built environment and objects, or as immaterial and fluid phenomenon. The absence of zebra crossings is the exception, but that one is connected to most of the other implicit barriers she mentioned, because she preferred to walk directly to her destination and felt limited by traffic, wide car streets and sounds. She looked for alternating routes and enjoyed human interaction, but avoided places where she felt being intrusive.

6- Emil

41 min . 4,16 km . 6,1 km/h

age: 28

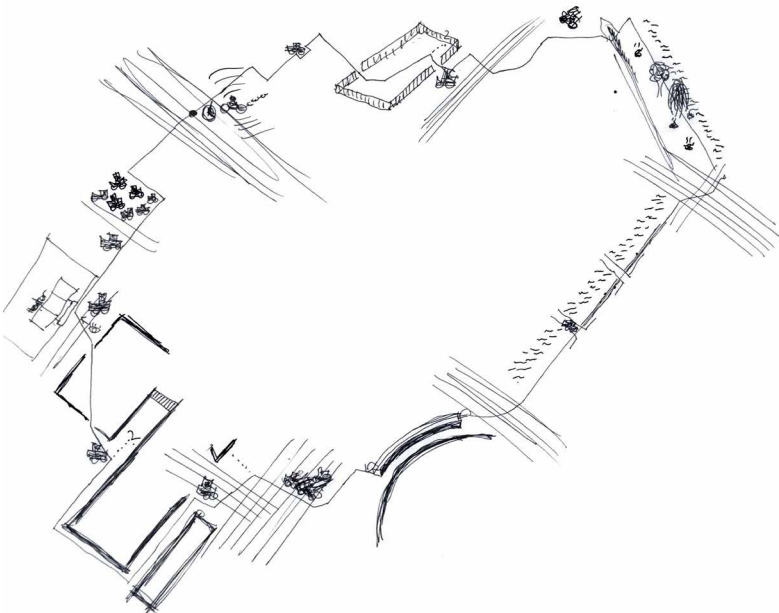
height: 1.78

gender: man

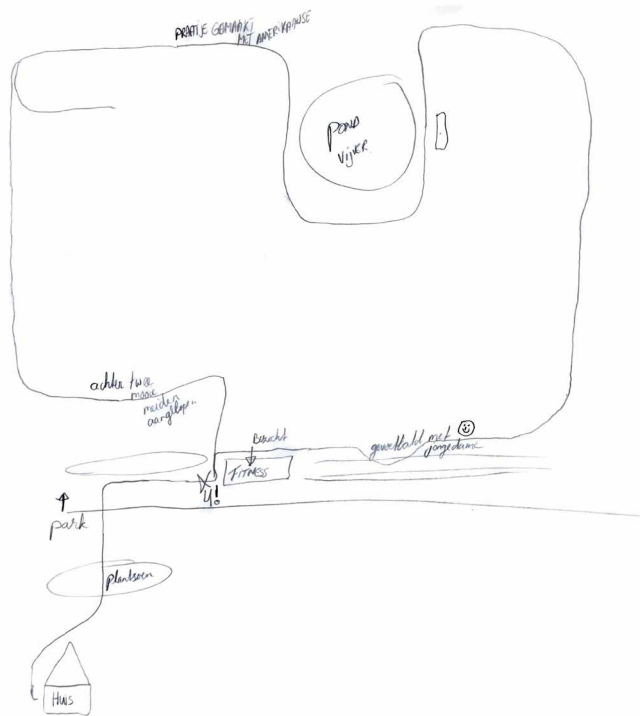
living in Rotterdam: almost 3 years

place of birth: Hamburg

identifies with: himself, pedestrian



The implicit barriers that Emil encountered are almost equally spread out over the chart. The main elements in his mental map are the places where he had to cross the street and the cars that he encountered. He experienced traffic streams, their sounds, speed, the surface they are occupying and traffic regulations, like traffic lights and zebra crossings, as implicit barriers. Some unexpected fences limited his way of moving. He was hindered by dog shit, shadow and blinding sun as well.



9- Anonymous

street session

age: 52

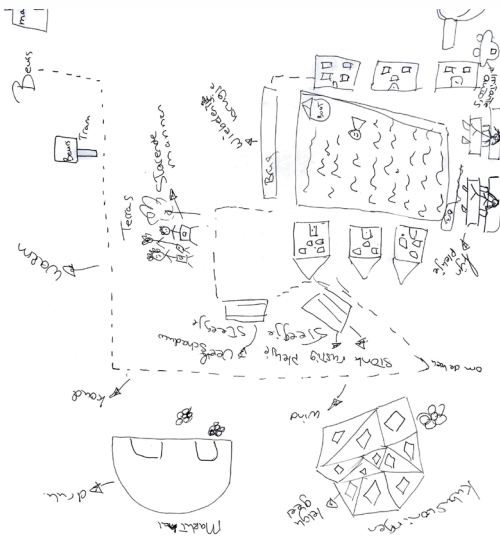
height: 1.83

gender: man

living in Rotterdam: 52 years

place of birth: Rotterdam

The only implicit barrier that he encountered was the absence of, in his words, beautiful women. This made him leave the park and go home. He stated that the purpose of this walk was to be entertained and to entertain others.



7- Shakti

street session

age: 15

height: 1.70

gender: woman

time living in

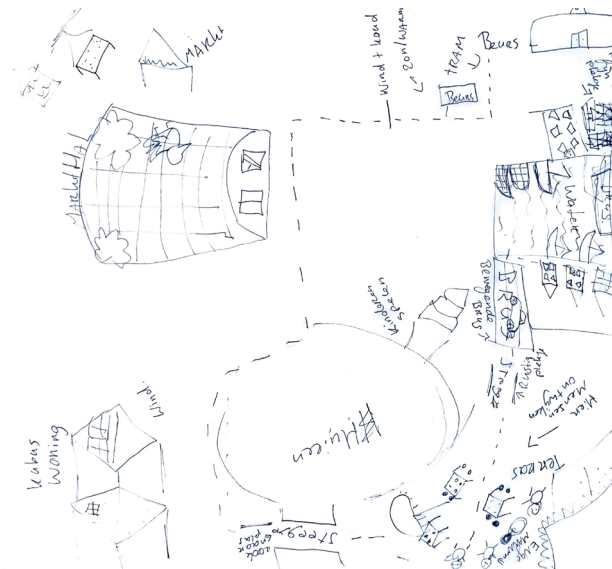
Rotterdam: 15 yr

place of birth:

Rotterdam

identifies with:

minor aged girl with migration background, not an "ordinary girl with blond hair"



8- Shiraiza

street session

age: 17

height: 1.52

gender: woman

living in Rotterdam:

17 yr

place of birth:

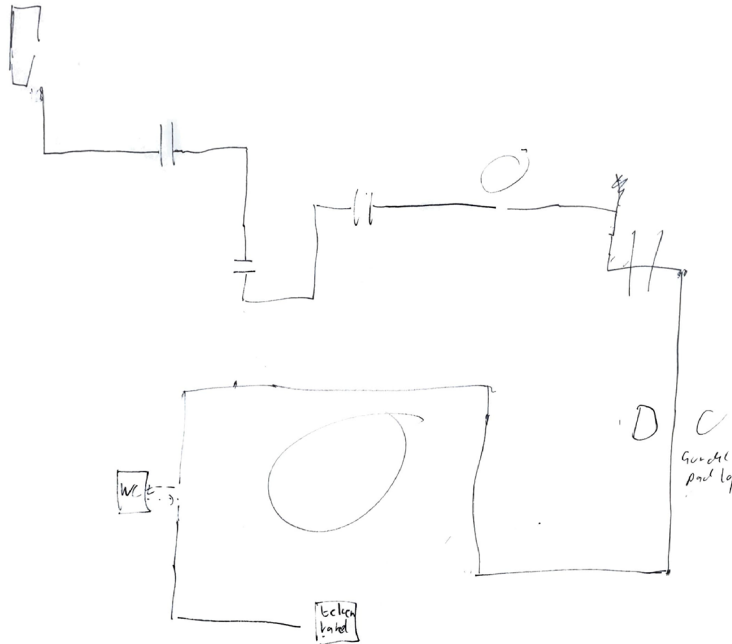
Rotterdam

identifies with:

migration background

The mental maps of Shakti and Shiraiza influenced each other highly, so I explain them together. Both experienced most implicit barriers in the field of immaterial and fluid phenomenon. To specify, they frequently occurred in the section human behaviour and were related to crowdedness of people, feeling watched and

gazing men. They both mentioned the wind and cold as implicit barrier. Shakti described busy traffic and its noises as hindering. Other material implicit barriers that both Shakti and Shiraiza mentioned are a wobbling bridge.



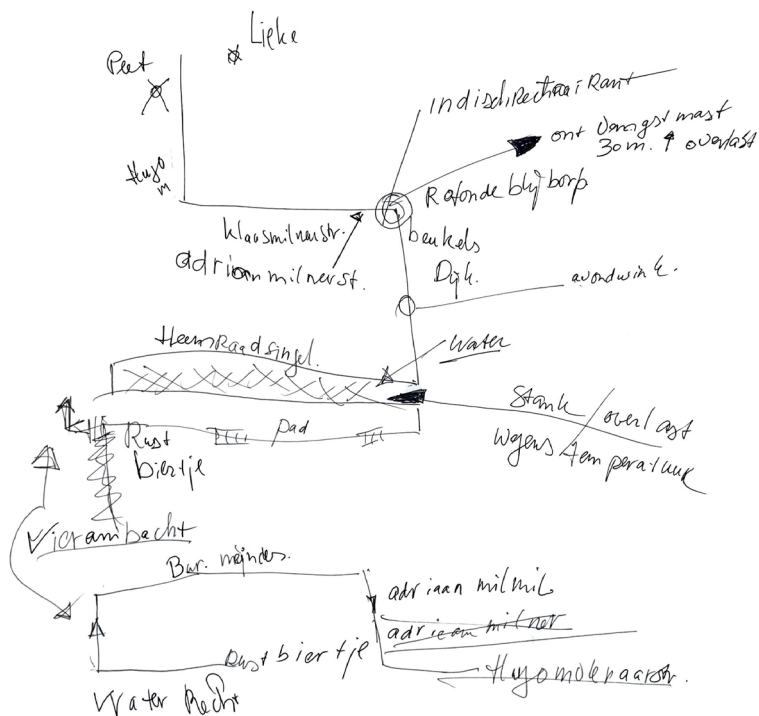
12- Kees

street session
dog owner
age: 71
gender: man
living in Rotterdam: > 15 years
place of birth: Amsterdam
identifies with: mathematician

Kees mentioned mostly fluid implicit barriers concerning noise, smells and crowded streets due to traffic. His dog got stressed because of the car noises. The fact that he had to pee during his walk was experienced as hindering as well.

13- Peter

17 min . 1,3 km . 4,5 km/h
age: 58
height: 1.87
gender: man
living in Rotterdam: 21 years
place of birth: Tilburg
identifies with: musician, poet, guitar player, good people, former homeless person



All implicit barriers that Peter experienced occurred as immaterial and fluid phenomenon. A lack of communication or bad driving behaviour in traffic hindered him and gave an unsafe experience of crossing the road. When he was homeless, the streets did not feel as a recreational space at all, but as a working space. Now his walks are relaxing, except when the weather is hot. Hot weather is bad for his health conditions. He named two implicit barriers in the section frequencies, being about vibrations of an antenna and the smell of water in the Heemraadsingel.

6. RESULTS

analysis

It is remarkable to notice that most of the participants started drawing somewhere on the paper that was most close to themselves, in the middle front of the paper. Instead of orienting the north to the top, most started by drawing their home first on this closest spot and then moved away from themselves when drawing the rest of the route. Almost everyone walked in a circle: one route to the destination, another one back. I could not discover any significant correlations between the mental maps and details of the participants that concern their height, length of the walk and living time in Rotterdam.

The body and the environment are in constant dialogue. I analysed changes in the moving behaviour of the participants while walking behind. When encountering an implicit barrier, the moving behaviour of the individual was affected. The reaction of the participants was frequently to accelerate or slow down the moving tempo, step aside or turn another direction. Many participants were also avoiding potential hinderances by walking on the outer end of the pavement at the left or right side, depending on what was avoided.

All the mentioned implicit barriers are bundled in the chart on the next page and displayed by little black dots. It clearly reads the most shared implicit barriers. In general, most implicit barriers appear as fluid phenomenon. Most dots show up in the immaterial-fluid field: big black spots appear in the section human behaviour-fluid.

The underlying reason for the experience of these implicit barriers were opposing. Either the presence of humans and the (potential) interaction was appreciated or unpleasant. Some were enjoying the hustle and bustle of other people on the street, others were avoiding people to find more quiet places.

The weather-fluid section is covered with a significant number of dots as well. Many participants were hindered by wind, rain, cold, absence of sunlight and shadow. Some of the dots in this section are placed more towards the left of the x-axis. These concern situations in which the sun was blocked or the wind was enforced as a consequence of constructed elements of public space. For instance, Shakti was experiencing more wind in this particular alley.

The dots in the section frequencies are more spread out owing to the distinction that is made between sounds and smells that are created by organic processes, like a smelly pond, and the biggest group that are a spin-off of human created instruments, such as cars.

In case of the field material-constructed, almost all dots are collected in the section built environment and a few in the section objects. These cover the implicit barriers that concern narrow pavements, wide car streets or certain tiles that were inconvenient to walk on. The situations with construction site are represented

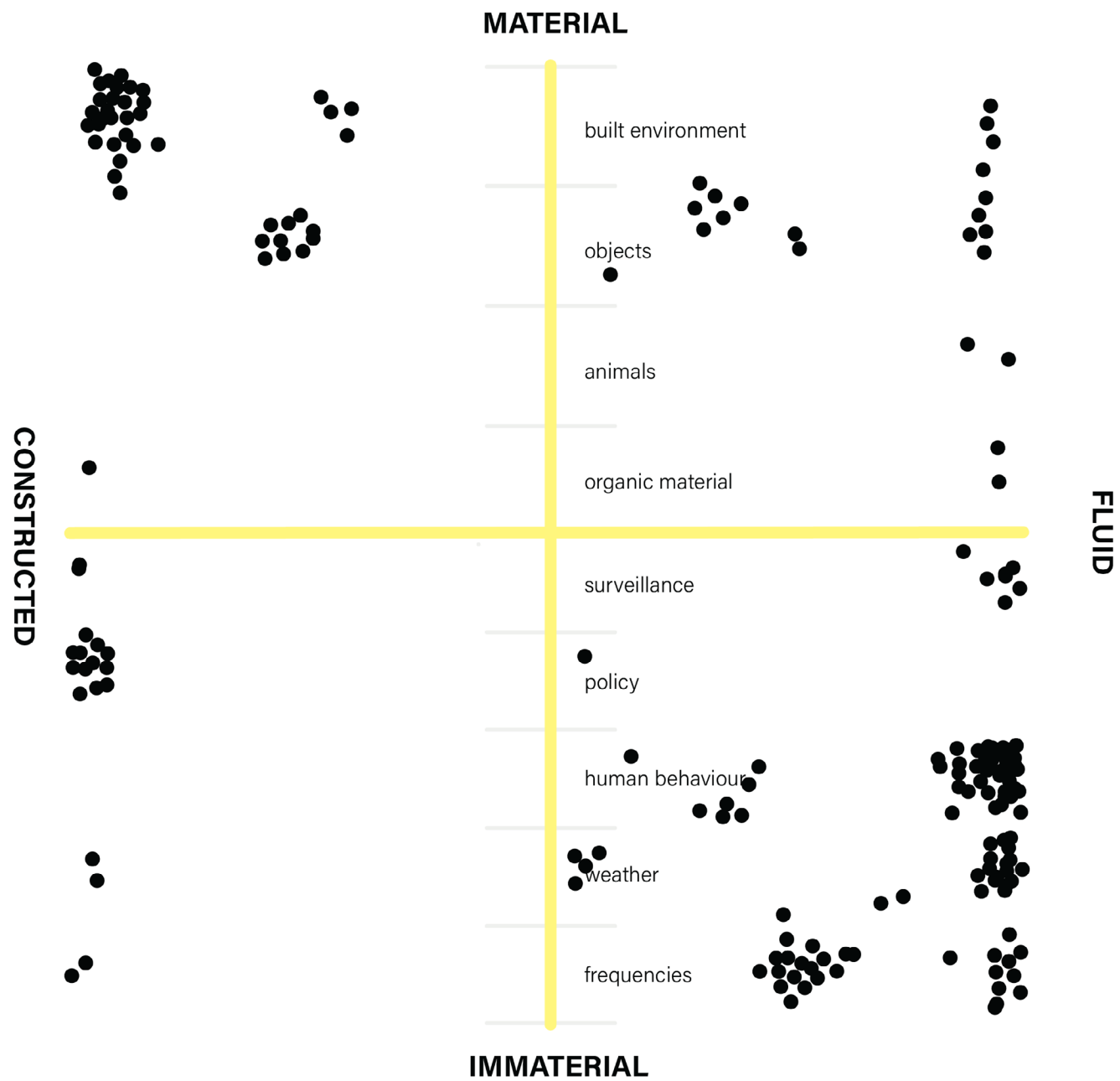


Figure 14: overview results

by the dots more to the left. The dots in the fluid-built environmental section cover damaged surfaces.

A significant number of dots appear in the objects section of the y-axis. Many concern the presence or overcrowding of traffic in public space. The most fluid ones represent waste and dog shit.

A widely shared implicit barrier in the section surveillance concerns the experience of feeling watched by people: men gazing and (potentially) calling. This group of dots is shared by almost all women and by Derrick. Only Emil and Thalia felt watched by cameras being sometimes.

The implicit barriers in the constructed-policy section are shared among a great deal of participants. Outstanding are the implicit barriers that have to do with zebra crossings for the reason that the absence and the presence of zebra crossings are both indicated as implicit barriers. By some, the zebra is experienced as the safe option to cross a street and appreciated as a positive tool. The absence of zebra crossings was in these cases hindering. On the other hand, the presence of zebra crossings, but somewhere else from where the participants wished to cross,

was in its turn experienced as an obstacle. In this case, the zebra crossing is limiting other options to cross the street safely. Multiple participants stated that they actually did not feel safe on zebra crossings at all, because drivers were braking late, driving fast or not seeing the users of the pavement.

When looking at the whole chart, crossing the road relates to multiple implicit barriers in various fields. Due to separated traffic streams in Rotterdam, crossing the street is inevitable. The other traffic streams, parked cars, the driver's behaviour, the smell and noise are hindering a smooth and safe walk to the other side of the street. Next to that, almost all mental maps show clearly where streets were crossed, frequently by obvious lines standing perpendicular to the line that represents the route. In other cases, zebra crossings were drawn.

The significance of the widely shared implicit barriers that concern crossing the street is presented in the next chart. This chart shows all the dots that stand in relation with the obstacles experienced in the inevitable act of having to cross the street.

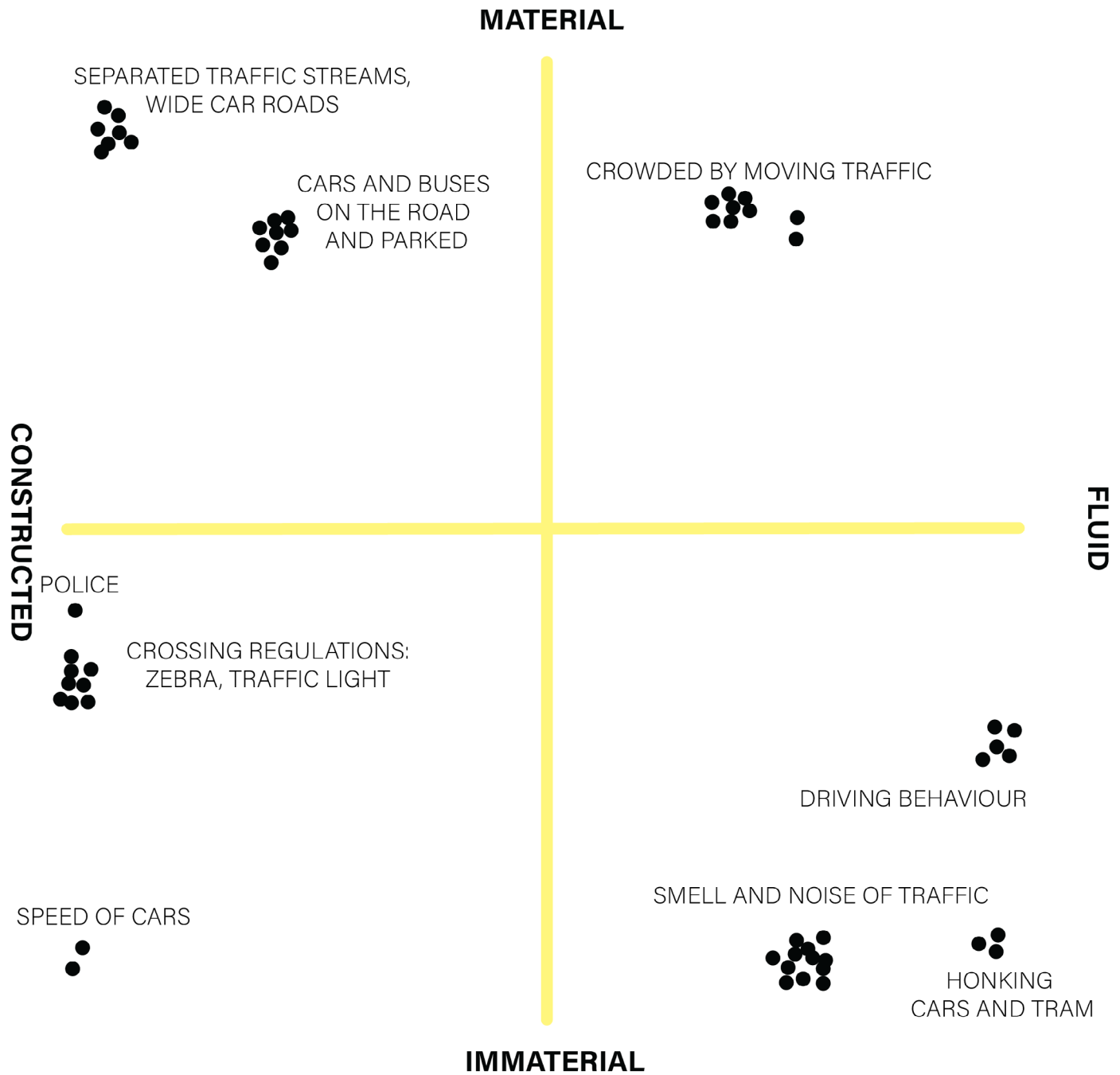


Figure 15: overview results relating to crossing the street

7. CONCLUSION

Combining all the information and findings in this research document creates the input for the last chapter. The main research question is answered here.

How are the inhabitants of Rotterdam experiencing implicit barriers when moving on the pavement in public space and how can I react to these?

The implicit barrier refers to a hinderance you encounter on the pavement that disrupts your way of moving or that you have to endure during and which is influenced by personal experiences and learned behaviour that frame the perception of this hinderance.

Emphasising the impact of learned behaviour on our perception of public space in this research, made it necessary to elaborate on the development of public space in Rotterdam. From this research it can be concluded that two major developments influenced the current state of public space in Rotterdam: the 16th century in which public space was increasingly shaped by the state-controlled infrastructure as it is the case now. And the 20th century in which the notion of distribution of functions and concept like efficiency, flow and speed shaped the urban landscape. This is the time when the pace of walking lost its value and the pavement became inferior to streets that facilitate higher speed. Consequently, the inhabitants of Rotterdam that can afford to have access to fast mobility are

privileged in the current state of public space compared the inhabitants that can not.

Thus, this research focuses on the users of the pavement instead. They suffice as source to get insight in the potentiality of public space. Their movement cultivates a varied collection of data about the environment: sound, smell, touch, interaction with humans, traffic or objects. In this research, the methods of observation, mental mapping and interview were used to indicate implicit barriers. The mental map brings less obvious experiences of the interaction with public space to the surface and points out implicit barriers by which the participants experienced stress, hinderance or were avoiding certain elements. Observation of the moving behaviour of participants, like changes in tempo and direction, made it possible to point out additional implicit barriers if not illustrated in the mental map. During the interview these observations, the mental map and the experience of the participants were shared and interpreted.

Implicit barriers are characterised according to its materiality on the scale of material to immaterial. My personal archive of implicit barriers forms the basis of the division within this scale. I experienced implicit barriers in the shape of the built environment, objects, animals, organic material, surveillance, policy, human behaviour, weather, frequencies. This scale embodies the y-axis of a chart in which implicit barriers find its place. The x-axis runs from

constructed to fluid phenomenon. Constructed barriers are those that are initiated by human operations, as in case of the activities of urbanists and traffic engineers. These operations do not comprehend the complexity of a city as a whole. Fluid phenomenon do influence the experience of public space as well, such rain and loose tiles.

The majority of the implicit barriers experienced by the participants appears as fluid phenomenon. Most of these are immaterial, since they frequently occur as frequencies or are related to weather and human behaviour. Within the constructed field, the majority appears as material implicit barriers. Within this field of constructed-material, almost all implicit barriers are related to objects and the built environment and only a few are related to animals and organic material.

The inferiority of the users of the pavement in the current state of public space in Rotterdam is the source of the majority of implicit barriers that are found in this research. It can be concluded that the current mobility system that dominates public space, creates a wide range of implicit barriers. These implicit barriers are appearing as either constructed or fluid and as material and immaterial phenomenon: no significant majority in one of these fields can be distinguished. The mental maps clearly show how dominant and limiting the street pattern is. Crossing the streets is inevitable in Rotterdam due to the separation of traffic streams. Participants

frequently marked where they crossed streets or drew zebra crossings on their mental maps. The implicit barriers that concern crossing the street are occurring in the shape of: separation of traffic streams, wide car streets, (crowded) traffic streams, vehicle objects, traffic regulations, speed, smell and noise of traffic and driving behaviour.

A short explanation of the project that is based on this research is explained hereafter.

reaction

Spatial designers have the most direct tools to transform constructed implicit barriers in public space and by that potentially influence the fluid implicit barriers. For my practice project, I want to disrupt the current mobility system that initiated the implicit barriers relating to crossing the street that were widely shared among the participants. Within this realm I focus on the zebra crossing. Paradoxically, participants experienced both the absence and the presence of zebra crossings as an implicit barrier. Some even experienced the absence and the presence as a hinderance during the same walk. This inspired the concept for my practice project. In reality, the zebra crossing is a symptom of the prioritisation of fast mobility and the matching streetsurfaces over the users of the pavement. The current mobility system reduces the options of users of the pavement to find a way to the other side of the street, since it is limited to only there where zebra crossings are marked on the street.

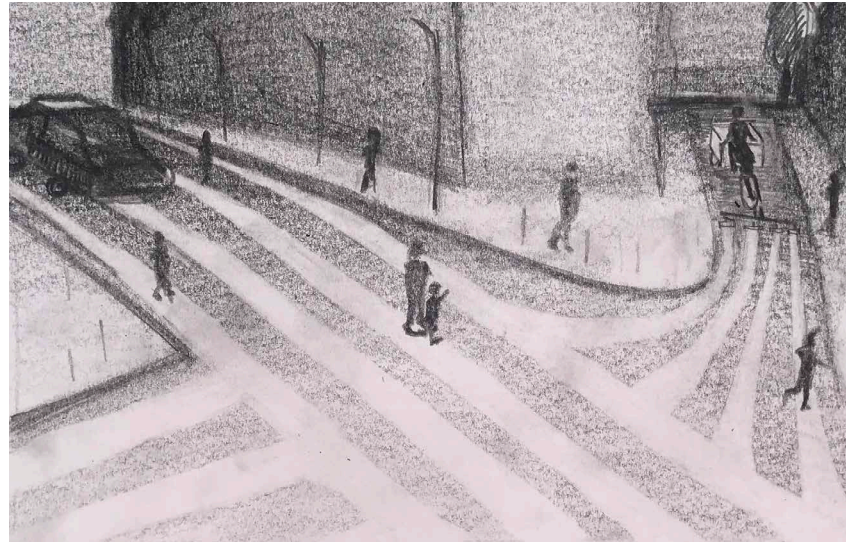
Diving into the phenomenon of the zebra crossing, I came across the term 'jaywalking'. This term originates from the early 20th century in the US. In this time, pedestrians, cyclists, carriages and other passenges were sharing public space and not separated on their own streets. When the car arrived, many people were killed in accidents. Consequently, the car was experienced as an intruder and not accepted as part of public space. The reaction of the car industry was the invention of the term jaywalking. People that 'just'

crossed the street, as done before, were called jaywalkers. In this time, the term 'jay' was used to call out people that moved from rural cities to the city. By using this term, the car industry managed to change the perception of the moving behaviour of the users of the pavement and create more space in public space, literally and figuratively for the fast mobility vehicles. From now on, users of the pavement were blamed for any accident happening between a car and a users of the pavement. The user of the pavement has to watch out for traffic and not the other way around (Verkade 89): "mind your step". To me, this is a good example of how people can develop and change their learned behaviour regarding the perception of public space. This dynamic inspired the concept of my project.

In my project I will expose the implicit barriers relating to crossing the street. By the means of a public intervention I emphasise the implicit barrier and simultaneously disrupt the dynamic of the same implicit barrier. By using the universal sign of the zebra crossing I will overturn the priviledge of the fast mobility. Lengthening the white lines of the zebra crossings throughout the whole street gives the users of the pavement the priority in the image of the city. In doing so, the focus in public space shifts away from enabling speed, flow and efficiency. The public intervention aims to illustrate how public space can develop into a less violent and stressful space for the users of the pavement. The space is shared with all users of public space, and not

excluded for the users of the pavement. Sharing public space has the potential to develop rich lively places that supplement living and working in the city. Public space is in that case not dominated by circulation of traffic, but seen as a place that attracts city life in a broader sense (Hamilton-Baillie). The public space can arise as genuine *public* space.

The project manifests in a public intervention in Rotterdam. Temporary, eco-friendly paint will be used to paint zebra lines across one street in Rotterdam. A paint-machine was needed to be designed for this action. The action will be filmed and a short video will be produced that present the project. The drawing gives a little impression of the public invention. More will be visible in the practice document.



literature, video and podcast

"Aflevering 72 – Hoe de auto onze openbare ruimte kwam te domineren, met Marco te Brömmelstroet." Narrators Armen Hakhverdian. Stuk Rood Vlees. Episode 72, 2020. www.open.spotify.com/episode/430UyuJOL4ms2WlWwTO0Ci?si=ff2e2020d1a849b7

Bot, Wim. "Hoe Ons Verkeer Steeds Asocialer Werd." Fietzersbond, 26 May 2020, www.fietzersbond.nl/nieuws/hoe-ons-verkeer-steeds-asocialer-werd/.

"Building and Dwelling: Ethics for the City." Narrators Jonathan Green and Richard Sennet. ABD Radio National. Blueprint. 27 Jul. 2019, <https://www.abc.net.au/radionational/programs/blueprintforliving/building-and-dwelling:-ethics-for-the-city/11345848>

"Centrum." Platform Wederopbouw Rotterdam, wederopbouwrotterdam.nl/artikelen/centrum.

Culver, Gregg. Death and the Car: on (Auto) Mobility, Violence and Injustice, vol. 17, no. 1, 2018, pp. 144–170, doi:<https://acme-journal.org/index.php/acme/article/view/1580/1429>.

Grundmann, Claudia. "Placemaking En De Stad." Synchroon, 2 July 2019, synchroon.nl/inspiratie/placemaking-en-de-stad.

Hamilton-Baillie, Ben. "What Is Shared Space?" Project for Public Spaces, 5 Oct. 2017, www.pps.org/article/what-is-shared-space.

Knöll, Martin. "A Tool to Predict Perceived Urban Stress in Open Public Spaces." Centre for Urban Design and Mental Health, 13 Feb. 2017, www.urbandesignmentalhealth.com/blog/a-tool-to-predict-perceived-urban-stress-in-open-public-spaces.

Jacobs, Jane. The Death and Life of Great American Cities. Jonathan Cape, 1961.

Lynch, Kevin. The Image of the City. MIT Press, 1960.

McKenna, Amy. "Rotterdam." Encyclopædia Britannica,

Encyclopædia Britannica, Inc., 2021, www.britannica.com/place/Rotterdam-Netherlands.

Milgram, Stanley, and Thomas Blass. The Individual in a Social World: Essays and Experiments, Pinter & Martin, 1977, pp. 88–113.

"O. Voor Laten Gaan Van Blinden, Gehandicapten En Voetgangers.: Theorie Leerboek." Theoriewereld.nl, www.theoriewereld.nl/theorie-leerboek/o-voor-laten-gaan-van-binden-gehandicapten-en-voetgangers/.

Pallasmaa, Juhani. The Eyes of the Skin Architecture and the Senses. John Wiley & Sons Ltd, 2012.

Polikhun, Masha, director. Ray Oldenburg, Author of "The Great Good Place." YouTube, YouTube, 9 Mar. 2013, www.youtube.com/watch?v=hd1_NIn-qw.

"Reclaiming the city. Narrator Jonathan Green. ABC Radio National. Blueprint. 27 Jun. 2021, <https://www.abc.net.au/radionational/programs/blueprintforliving/reclaiming-the-city/12390092>

Rieniets, Tim, et al. Open City: Designing Coexistence. SUN, 2009.

Sennett, Richard. Building and Dwelling: Ethics for the City. Farrar, 2018.

Smirnov, Nikolay. "Meta- Geography and the Navigation of Space." e-Flux, 2019, worker01.e-flux.com/pdf/article_271896.pdf.

Speck, Jeff, director. The Walkable City. TED, 2013, www.ted.com/talks/jeff_speck_the_walkable_city.

Sulsters, Willem, and Lotte Schubert. "Mental Mapping : Op Zoek Naar De Collectieve Identiteit Van Stedelijke Gebieden." Agora, vol. 22, no. 1, 2006.

Te Brömmelstroet, Marco. "Framing Systemic Traffic Violence: Media Coverage of Dutch Traffic Crashes." *Transportation Research Interdisciplinary Perspectives*, vol. 5, 2020, p. 100109, doi:10.1016/j.trip.2020.100109.

van Berkel, Sebastian. "Straatgevecht Tussen Stedenbouw En Verkeerskunde." *Archined*, 14 July 2020, www.archined.nl/2014/01/straatgevecht-tussen-stedenbouw-en-verkeerskunde/.

Van der Meer, Lieke Muis, and Camille Zwaan Van der Meer. "Conditioning and Habits: neuropsychology and creative therapy." 26 May 2021.

Verkade, Thalia, and Brömmelstoet Marco te. *Het Recht Van De Snelste Hoe Ons Verkeer Steeds Asocialer Werd*. De

Correspondent, 2020.
Vittorio Aurelli, Pier, and Maria S Giudici. *The Grand Domestic Revolution: Revisiting the Architecture of Housing*.

Vocke, Wouter. "Waar Staat Het Oudste Gebouw Van Rotterdam?" *Indebuurt Rotterdam*, 26 Feb. 2021, indebuurt.nl/rotterdam/genieten-van/mysteries/wat-is-het-oudste-gebouw-van-rotterdam_45319/.

"Voetganger." CROW, www.crow.nl/thema-s/fiets-en-voetganger/voetganger.

pictures

"Centrum." Platform Wederopbouw Rotterdam, wederopbouwrotterdam.nl/artikelen/centrum.

"Dictionary by Merriam-Webster: America's Most-Trusted Online Dictionary." Merriam-Webster, Merriam-Webster, www.merriam-webster.com/.

"Hoe Rotterdam Ontstond: Tijdlijn." Hoe Rotterdam Ontstond: Tijdlijn – Historisch Genootschap Roterodamum, www.rotterdamum.nl/over-roterodamum/onstaansgeschiedenis/.

Lynch, Kevin. The Image of the City. MIT Press, 1960.

Oud, Bert. "Rotterdam." Lijnbaan Rotterdam (Jaartal: 1960 Tot 1970) - Foto's SERC, SERC, 17 Jan. 2015, fotos.serc.nl/zuid-holland/rotterdam/rotterdam-19056/.

Pati, Jual Rumah di. "Definition of Coronary Heart Disease." 17, 1 Jan. 1970, livemusic99.blogspot.com/2016/09/definition-of-coronary-heart-disease.html.

Vandale, and Hans de Groot. "Van Dale Uitgevers." Van Dale, View, 28 May 2021, www.vandale.nl/.

"Verdict Media Limited." Verdict Traffic, www.roadtraffic-technology.com/features/featureaugusts-top-storiesintelligent-vehicles-traffic-information-national-funding/.

"Voetganger." CROW, www.crow.nl/thema-s/fiets-en-voetganger/voetganger.

(conceptual) places

These references inspired me along the process of this research. A short sentence explains what inspired me about these projects.

BLAUES LICHT. Rocco und Seinde Bruder
going where you think there are limits and no possibilities

CONSTANT NIEUWENHUY
New Babylon and other work: maps

CRITICAL MASS. Berlin. Germany
what happens if you move on street not designed for your way of moving (cycling in this case)

KOWLOON WALLED CITY. China
extreme to Rotterdam, movement decided by cultural boundaries and not governmental policies

RUIJTERKADE. Amsterdam. The Netherlands
example of free movement, street and square with no streetlines, traffic mixes and moves around freely, shared space

THIS WAY BROUWN. Stanley Brouwn
maps and interaction piece

HAPPY PLURALITY. Raumlabor
hacking in public space, urban furniture