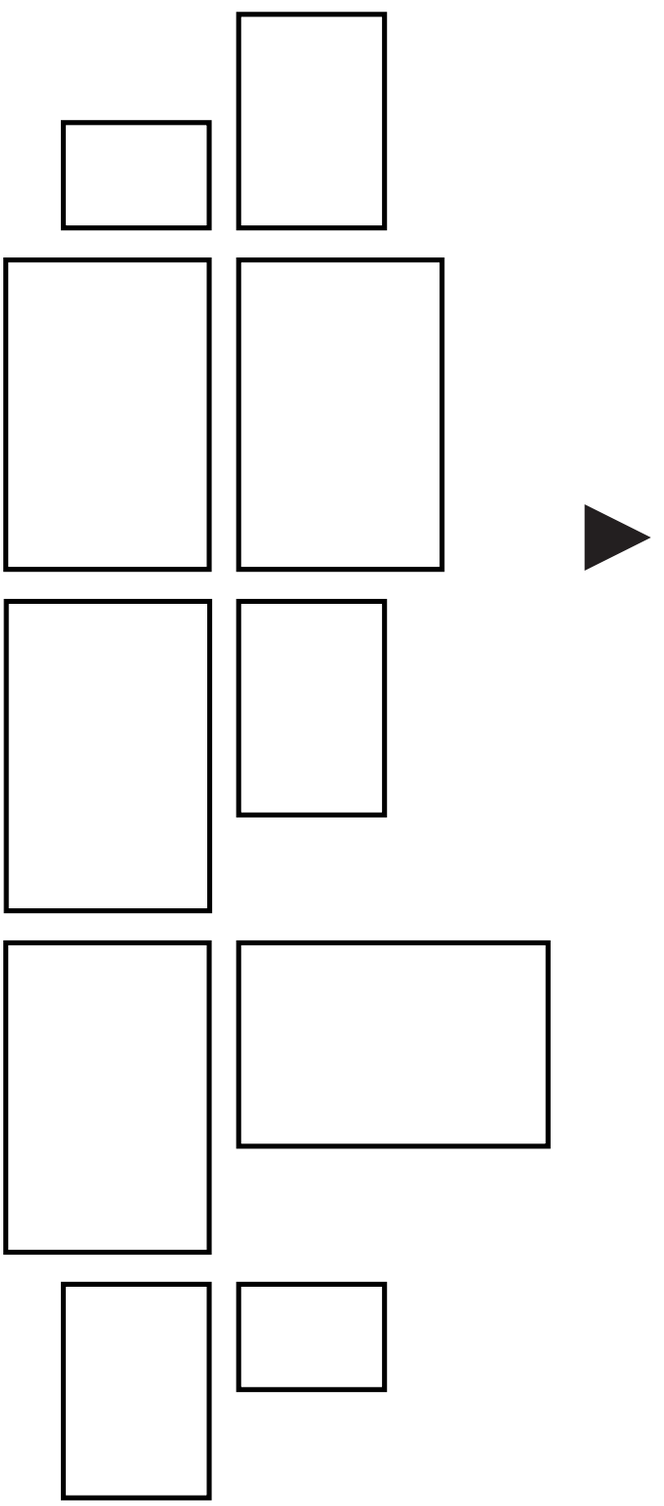
The Forgotten Sense.

How materials evoke tactility.



Content

01
Glossary.

Atmosphere:
noun
1. The envelope of gases surrounding the earth or another planet.”part of the sun’s energy is absorbed by the earth’s atmosphere”
2. The pervading tone or mood of a place, situation, or creative work.

Collecting:
verb
gerund or present participle: collecting
1. Bring or gather together (a number of things).
2. Call for and take away; fetch.

Encountering:
verb
gerund or present participle: encountering
1. Unexpectedly be faced with or experience.
2. Meet (someone) unexpectedly.
3. Running/stumbling into an experience.

Experience:
noun
1. Practical contact with and observation of facts or events.
2. An event or occurrence which leaves an impression on someone.

Expert:
noun
plural noun: experts
1. A person who is very knowledgeable about or skillful in a particular area.

Haptic:
adjective
1. Relating to the sense of touch, in particular relating to the perception and manipulation of objects using the senses of touch and proprioception.

Noun
1. The use of technology that stimulates the senses of touch and motion, especially to reproduce in remote operation or computer simulation the sensations that would be felt by a user interacting directly with physical objects.
2. The perception of objects by touch and proprioception, especially as involved in non-verbal communication.”haptics is that subsystem of non-language communication which conveys meaning through physical contact”

Hypersensitive:
adjective
1. Having extreme physical sensitivity to particular substances or conditions.
2. Easily hurt, worried, or offended.

Mapping:
noun
1. An operation that associates each element of a given set (the domain) with one or more elements of a second set (the range).
2. Methodology, namely collecting, organizing and combining information. Creating a sort of library of information, input, materials, photographs etc.

Material:
noun
1. The matter from which a thing is or can be made.
2. Information or ideas for use in creating a book or other work.

adjective
1. Denoting or consisting of physical objects rather than the mind or spirit.
2. Significant; important.

Material awareness:
1. Being aware of materials and their properties, qualities and origin.

Material awareness is about much more than just the touch and the visual. It can be about the smells that materials contain, the sounds that they produce when we touch or use them and even taste can play a role in some (natural) materials.

Memorize:
Verb
1.Commit to memory; learn by heart.

Memory:
noun
1.The fac ulty by which the mind stores and remembers information.
2. Something remembered from the past.

Multi-sensory:
noun
adjective: multi-sensory
1. Involving or using more than one of the senses.

Organizing:
verb
gerund or present participle: organizing
1. Arrange systematically; order.
2. Make arrangements or preparations for (an event or activity).

Parameters:
noun
plural noun: parameters
1. A numerical or other measurable factor forming one of a set that defines a system or sets the conditions of its operation.
2. A limit or boundary which defines the scope of a particular process or activity.

Physical space:
noun
1. The unlimited three-dimensional expanse in which all material objects are located.
2. An interval of distance or time between two points, objects, or events.

Quality:
noun
1. The standard of something as measured against other things of a similar kind; the degree of excellence of something.
2. A distinctive attribute or characteristic possessed by someone or something.

Inclusivity;
adjective
Including or encompassing the stated limit or extremes in consideration or account.
noun
1. The practice or policy of providing equal access to opportunities and resources for people who might otherwise be excluded or marginalized, such as those having physical or mental disabilities or belonging to other minority groups.
2. The practice or policy of equality in sensory experience. Providing opportunities for the different senses to show their full potential. Also for people who have an impairment to one or more of the senses, providing access to different opportunities to experience a space.

Sensory;
adjective
1. Relating to sensation or the physical senses; transmitted or perceived by the senses."sensory input"

Stimuli:
noun
plural noun: stimuli
1. A thing or event that evokes a specific functional reaction in an organ or tissue.
2. A thing that arouses activity or energy in someone or something; a spur or incentive.
3. An interesting and exciting quality.

Tool:
noun
1. A device or implement, especially one held in the hand, used to carry out a particular function.
2. A distinct design in the tooling of a book.
verb
1. Impress a design on (leather, especially a leather book cover).
2. Equip or be equipped with tools for industrial production.

The Forgotten Sense.

02

Royal
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The Forgotten Sense.
How materials evoke tactility.

Mae Alderliesten.

INSIDE
Master Interior Architecture.
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The Forgotten Sense.

02
Introduction.

My aim is to embark upon an expedition of exploring the world of architecture and interior design through tactility.

Material and tactility.
My designs reflect who I am as a person and my fascination is the starting point of my research. A fascination with materials, materials that help me understand, remember or enter a space. Making a memory or feeling physical, is for me a way to store it and to get a grip on it. Making it actually tangible. This applies equally to people I interact with or spaces I enter. I store them through a particular object or material. It is how I experience the world around me.

My aim is to embark upon an expedition of exploring the world of architecture and interior design through tactility. When entering a space, one uses one's senses, often subconsciously. In architecture, multi-sensory experiences of spaces, are becoming more widespread. During my earlier research of the senses, I often came across criticism on architecture that was primarily visually oriented.[1] At that time, I did not pursue investigating the aspect of criticism, but it always remained in the back of my mind. This not how I experience architecture, or criticism that I would use. I would prefer to approach my research on architecture incorporating other senses than just the visual. Even though I consider myself a visually-oriented designer, that does not exclude the fact that touch, sound and smell will determine how I experience and memorize a space. I am hypersensitive to certain sounds, smells and textures (possibly a compensation for my poor eyesight) and rely enormously on these senses to create an image and a memory of a space or an event.

"We appreciate a place not just by its impact on our visual cortex but by the way in which it sounds, it feels and smells. Some of these sensual experiences elide, for instance our full understanding of wood is often achieved by a perception of its smell, its texture (which can be appreciated by both

[1] Havik, K. Teerds, H. Tielens, G. (2013), "Building Atmosphere.", Nai010 Publishers, Rotterdam.

looking and feeling) and by the way in which it modulates the acoustics of the space."[2] As the author describes above, experiencing space involves a lot more than purely visual perception. When upon entering a space, all our senses are honed and we allow scents, textures and sounds to wash over us. These sensory aspects complement and reinforce one another creating atmosphere. It is encouraging that in the past decades the number of architects who consider senses other than visual, is growing. There seems to be an emerging desire and demand to redefine how users experience a space. A significant design development in reference to our current environment.

Diminishing tactility and material map.

As the use of digital experience increases and that of physical experience decreases, we are becoming progressively unfamiliar with materiality. This situation reinforces our dependency on the visual and the other senses tend to get a back seat. The current COVID pandemic has amplified these short comings. There is a lack of tactility as well as a lack of smell and sound. ***Can a design ignite a sense of tactility through the careful use of materials? Can a tactile sensation, regain a sensitivity towards this forgotten sense of materiality in architecture?***

With Neeltje ten Westenends help, I started creating a mapping, based on the information I already have and will gather for this research. This includes materials, photos, stories, interviews, quotes, travels etc. The mapping is very well-suited to my design methodology, namely collecting, organizing and combining information to create a valuable library which will allow me to delve deeper and analyze materials, add new characteristics and investigate the different architectural applications of materials. Another important aspect of my research is to analyze the use of different materials in spaces on the basis of parameters which could help me understand how spaces function in stimulating one or more of the senses. *Are there concealed material qualities which I could improve, enhance or change according to their use?*

[2] *Spence, C. Senses of place: architectural design for the multisensory mind. Cogn. Research 5, 46 (2020). https://doi.org/10.1186/s41235-020-00243-4 p7.*

The experiencing experts.

As part of my research methodology, I interviewed various sensory "experts". These range from a person with a sensory impairment to an architect/designer who deals with materiality and/or tactility in his or her work. This type of input will provide valuable information for my design-process

Ongoing research in the form of experiments and try-outs will shape the major part of my project. Chen Liu and I created an experiment - ***"Sensory capsule."*** In the conducted experiment we monitored how a visually challenged person experience a space. With this visual impairment in mind, we asked participants to concentrate fully on their remaining other senses. The research results will be discussed in this thesis and serve as an important resource in the continuation of my sensorial research in architecture.

In an interview of the open call Touching_Research Through Materials and Matter, the question they raised was: *"What did your sense of touch allow you to discover that other research methods couldn't?"*[3] The interview covers how I work as a designer and the research methods I use, one of them being the sense of touch. My response to the question was as follows; *"I think it is a research method that allows you to be in close contact with a building. It allows one to feel the building, its state, the temperature and of course the different materials that are used. For me it is something that I always do when I enter a building. I will touch the surface, to discover where and what I am dealing with."*

"What did your sense of touch allow you to discover that other research methods couldn't?"

[3] *This open call is initiated by KABK. Every so often they have an open call that is about the different ways of working and the methods used to do so. This open call is about how the student/person uses materials and matter as a research method and how they deploy this in their practice. So where the material is, as it were, the research tool to investigate different subjects.*

Material awareness.

During the course of my studies and development as a designer, it has become progressively obvious that working with "material awareness"[4] does not only have my preference but is also an aspect I find very important in design. Material awareness can involve all of the senses; obviously tactility and visual appearance are important, but also the smell, the sound and even the taste of a material can be useful for their interesting qualities to investigate and incorporate in a design. By assigning material awareness a more prominent role in architecture, one can anticipate that we will trust and use our other senses more. This will be my mission as a designer. I want to draw more attention to the subject and explore the tools that allow us to focus on the tactile experience of spaces and how this will influence the perception and experience of a space. My involvement as a designer will be to emphasize and illustrate the potential of materials in merging the senses.

Tactility backdrop.

"Architecture exerts a profound influence over our wellbeing, given that the majority of the world's population living in urban areas spend something like 95% of their time indoors. However, the majority of architecture is designed for the eye of the beholder, and tends to neglect the non-visual senses of hearing, smell, touch, and even taste."[5] The choice of space that will house my design is as yet undetermined. I expect the results of my research to assist in determining the choice of space. My aim will be, based on my analysis of materials, to find an ideal space with ample opportunity to change or enhance materials or show a different perspective. I think that especially at the onset of my pursuit for a suitable space, it may initially be one of the elements of that space on which I will focus most of my energies and whereby it will be important to pay attention to sensorial perception.

[4] Being aware of materials and their properties, qualities and origin. Material awareness is about much more than just the touch and the visual. It can be about the smells that materials contain, the sounds that they produce when we touch or use them and even taste can play a role in some (natural) materials.

[5] Spence, C. Senses of place: architectural design for the multisensory mind. Cogn. Research 5, P.1,46 (2020). https://doi.org/10.1186/s41235-020-00243-4

As my research progressed, the demand for a specific place or location became stronger and to search for a place where tactility can be invoked and where people can regain their sensitivity. Where the subject of senses is already very personal and experienced differently by everyone, it is tricky to work with a domestic environment. Although domestic atmospheres could offer intriguing locations, they could be problematic to work with as they are intensely personal.

When considering public spaces, it seems there are ample opportunities where attention can be paid to how one experience a space. The disadvantage of a public space is that often these are spaces that people purposefully enter and leave swiftly, and spend very little time. Semi-public spaces however intrigue me and seem to offer the right set of considerations. These are spaces that are private, but accessible to others. I define here private as in; people are there for their personal reason in a space that is accessible to others. Think of hospitals, crematoriums or revalidation centre. These are spaces where different kind of emotions can play an important roles. Where people are and can be vulnerable. And tactility, whatever its form, is comforting in such a situation. Touch and rapprochement is something that reassures us. Here I see the possibility of contributing to the tactile experience of space, which could impart qualities to the user experience.

Shitsukan -

Material Library.

03

"The careful use of material can evoke tactility as the viewer (or occupant) imagines or mentally simulates what it would feel like to reach out and touch or caress an intriguing surface."[7]

Carefully chosen.

Shitsukan, the Japanese word for "sense of material quality" or "material perception"[6] is about perceiving and recognizing a material, surface quality or internal state of an object based on sensory stimuli such as visual, tactile and/or auditory sensations. A concept where there is room for growth - improving our material awareness. Where we now mainly rely on visual stimuli, is it also important to look at the tactile and/or auditory sensations. By analyzing my own material collection, I want to bring more attention to these also so important sensations.

These are some questions to consider, when investigating my collection of materials. I have shaped both the questions and the characteristics into a matrix. This will act as a starting point, to support a search for applications of tactility in architecture, to which one could continually add characteristics of other materials. The most effective way to research the topic, is working with materials hands-on. Working with materials, makes you feel closer to your surroundings and also teaches you a lot about tactility.

"The careful use of material can evoke tactility as the viewer (or occupant) imagines or mentally simulates what it would feel like to reach out and touch or caress an intriguing surface."[7]

[6] *"Shitsukan -"GLOSSINESS PERCEPTION". DR. ADEEL ZULIFQAR, 11 may 2020. Fabrieka. Accessed 6 Nov. 2021* https://fabrieka.com/2020/05/11/shitsukan%E8%B3%AA%E6%84%9F-glossiness-perception/

[7] *Spence, C. Senses of place: architectural design for the multisensory mind. Cogn. Research 5, p.9, 46 (2020).* https://doi.org/10.1186/s41235-020-00243-4

	Clay/ceramics	***Copper sheets***	***Mycellium***	***Silicone***	***PVA***	***Pink plastic***	***Fabric***
Texture	*Soft, smooth, grainy.*	*Smooth.*	*Grainy, Silk soft, sawdust.*	*Smooth, sticky.*	*Depends on shape, but the texture is rough, a bit sharp.*	*Smooth, sticky, soft.*	*Depends which one; but soft, itchy.*
Smell	*Clay; earthy biscuit; plaster Glazed ; -*	*Metal, blood smell.*	*woody, sawdust smell. it smells soft.*	*Chemical smell.*	*Plastic smell.*	*Very strong plastic smell.*	*Depends on fabric.*
Temperature	*Clay; cold, long enough in hands, warm biscuit; warm Glazed ; cold*	*Cold.*	*Lukewarm.*	*Cold.*	*Skin tempearture.*	*Cold .*	*Depends on the fabric, but mostly Skin temperature.*
Acoustics/ sound	*Clay; + biscuit; - Glazed ; -/+*	-	+	+	-/+	-	-/+

	Clay/ceramics	***Copper sheets***	***Mycellium***	***Silicone***	***PVA***	***Pink plastic***	***Fabric***
Personal feeling.	*Super strong material with fragil attitude.*	*Aesthetic material, soft color but sharp aspect. very strong smell*	*Natural material which has different textural qualities.*	*Flexible material which I prefer mostly when it is colorless*	*Print filament used for 3D printers. It is solvalble. It is temporary.*	*This ons is for a long time in the collection. Flexible, smelly, likeable.*	*Of course there are different kinds, I prefer the soft ones, the provide a homey feeling.*
Application.	*For me known as table ware. but also used in art, industrial use, tiles, bathrooms etc*	*I don't know its use, I would use it as decoration, extra texture, color and smell*	*It is nowadays used for package material and making building blocks.*	*Closing holes, flexible element, kitchen utensils, making molds, liquid version in cosmetics.*	*Filament 3D printing - supporting material, fishing line, solvalble bags,*	*It was used as packing material for a really big order that was on a ship.*	*Known for clothes, curtains, bedsheets, bags, reusable cleanpads.*
What does it evoke?	*How to create more flexibility? the different ways of finishing give different feelings and uses.*	*It is mysterious. it is used for finishing. It gives a posh look.*	*It is reuseable, super sustainble, has possiblities for different textures within the process.*	*Slippery and very strong material, very flexible, not sure what the real purpose is.*	*It is temporary, which gives it a time limit. It can have different shapes and is colorless.*	*For me this evokes excitement. It is not sustainble but for me aesthectically very strong.*	*A soft, warm and homey feeling, but certain fabrics can also be itchy. Really need to pay attention to the material.*

The material matrix.

Touch and learn.
Over the years, I have collected various materials, from plastic to copper and from mycelium to casting resin. In all shapes and sizes. It is a logical step for me to integrate this source of information into my research and design. There is a lot to be gained from the materials I have collected.

The first question is, *why these specific material(s)?* The initial answer is often the appealing tactile characteristics the materials have. The feel and how a material moves is one of the is one the most important criteria when adding a material to my library. A good example of this - blocks of flake foam, also called polypress or compressed foam. At first touch the material possesses a certain softness, while at the same time it is very compact. Touching the material in a certain way, it feels rough, as if one is stroking in the wrong direction. But the most fascinating character of this material is its resilience, it always springs back to its original shape.

Material application.
For a location-based study on material substrates and to orient myself on the application of materials at locations, my choice was a typical neighborhood playground with astro-turf and colored jungle gyms. The material used as ground covering is what first caught my attention. It was slightly elastic and bounces up when walked on. Not a property that necessarily belongs to astro-turf or artificial grass. Upon closer investigation it appeared that there was a thick layer of foam under the artificial grass resulting in its springy character.

Although I was looking for a suitable location for my project, instead I received valuable information about my material library. I gained the insight that trying out new ideas can lead to surprising results. As described above, I was able to experience a material from my own collection in a specific context. Enabling me to imagine how certain materials can be applied and what their actual addition is on a larger scale.

The feel and how a material moves is one of the is one the most important criteria when adding a material to my library.

A. *Mient playground, Mae Alderliesten, The Hague, 2021.*

[B.] Mient playground, Mae Alderliesten, The Hague, 2021.

Material methodology.
The compilation of my material library is based on first impressions. Materials are chosen for their tactility and what sensation it evokes. How the material can be applied is not what I look at initially. Some of the choices of materials can be related to certain moments in my life, For example PVA, a water soluble plastic which is used as a print support for 3D printing. This becomes a “supporting” material, it has a temporary function which later disappears. *Why couldn’t it be used as a stand-alone material?* An intriguing question. I can also imagine the temporary property of this material in the question of tactility. Considering this material changes when it comes into contact with moisture, would it also transform when coming into contact with moisture like tears from crying or laughing, of sweat droplets produced by fear or excitement, or could ambient moisture – rain or humidity trigger a change. The tactility of the material changes with the users.

With my material library I orient myself in the tactility of materials, contributing to research methodology-searching for tactility through encountering materials. *“The individual sensory experience alone, the subjective relationships and linkages created by the participation of those entering into the space, and their tactile memories. It is the slowed passage of time that allows the tactile experience to resonate within one’s consciousness long after departing from the design: the memory of granite disc or colonnade, a sweeping curve of tile and wall, a stair of an attenuated steel structure, a continuous succession of perforated door, wall and ceiling panels.”*[8]
The tactile memories of materials ensure that each time a person enters a space containing these materials, it is easier to orientate themselves and feel comfortable because the sensation is already familiar.

[8] *Pallasmaa, J. (2012), “The eyes of the skin.”, John Wiley & Sons Ltd, p105.*

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Close up of The material matrix.

My material library as a tool can illustrate how the contact with materials (tactility) evoke emotion and thus connection in the form of memories or deja vu.

Material matrix.
"The actual physical properties and qualities of materials ground understandings of structures and orientate the body by touching emotion at the moment of experience."[9] My material library as a tool can illustrate how the contact with materials (tactility) evoke emotion and thus connection in the form of memories or deja vu. These in turn provide reassurance as they reminds one of a moment that has already taken place.

The characteristics that are referred to in the matrix are, texture/surface, smell, temperature, acoustics, my personal thoughts on the materials, the application and what it evokes. The matrix is a tool to get a better grip on why I collect these materials and what the possible input could be. Throughout the text, the different aspects that are mentioned in the matrix will be cited with an example or a comment based on that aspect. Giving these elements more depth and enabling one to envisage their application. The aspects discussed in this chapter are therefore found throughout the rest of the text.

Through analysis and reflection I am constantly recognizing more elements from my material library reflected in my research, both in the experiments and in the interviews. I am getting a better understanding on my approach of how to implement materials in a design process.

[9] *Coleman, N. (2020), "Materials and meaning in architecture.", Bloomsburry Publishing Plc. p21.*

04.1
Architecture of the unseen.
- Tactility table.

04

The Architecture of the Unseen.

This experiment illustrates that we do have sensitivity towards tactility, but that we are seeking support from our other senses.

Sensory capsule.
One of the most striking observations that came out of the ***"Sensory Capsule."*** workshop is the difficulty of defining the materials felt by the participants, when deprived of sight, their most trusted sense. My research partner and I created a space to be experienced using multiple senses. We shared a common interest in how sensorially challenged individuals create an image of a space. In this experiment, the participants were blindfolded, and the focus was on hearing and touch. We created 3 walls, with different materials attached to them. For each wall there was one element that was more prevalent than the others. Sand, water and ticklish materials were the main elements. There was also a point light source in the middle of each wall. This point light was linked to an abstract sound, produced with some of the materials we also used on the wall. The participants wore headphones with a solar panel attached. The solar panel was the device that harbored the light and converted it into the accompanying sounds. In this way three experiences were created, to be seen as three separate experiences or to be merged into one. We were also interested in whether the sensory stimuli triggered memories or rather created "déjà vu".

Many of the results showed that it is mainly the sound that triggered a memory or a visual image. The participants found it very difficult to define the materials. Often they would try to define what kind of material they were actually touching using their personal imagined visualization combined with the sound they heard. With this result, I would like to illustrate, that our sense of touch, when not reinforced by our sight, is underdeveloped.

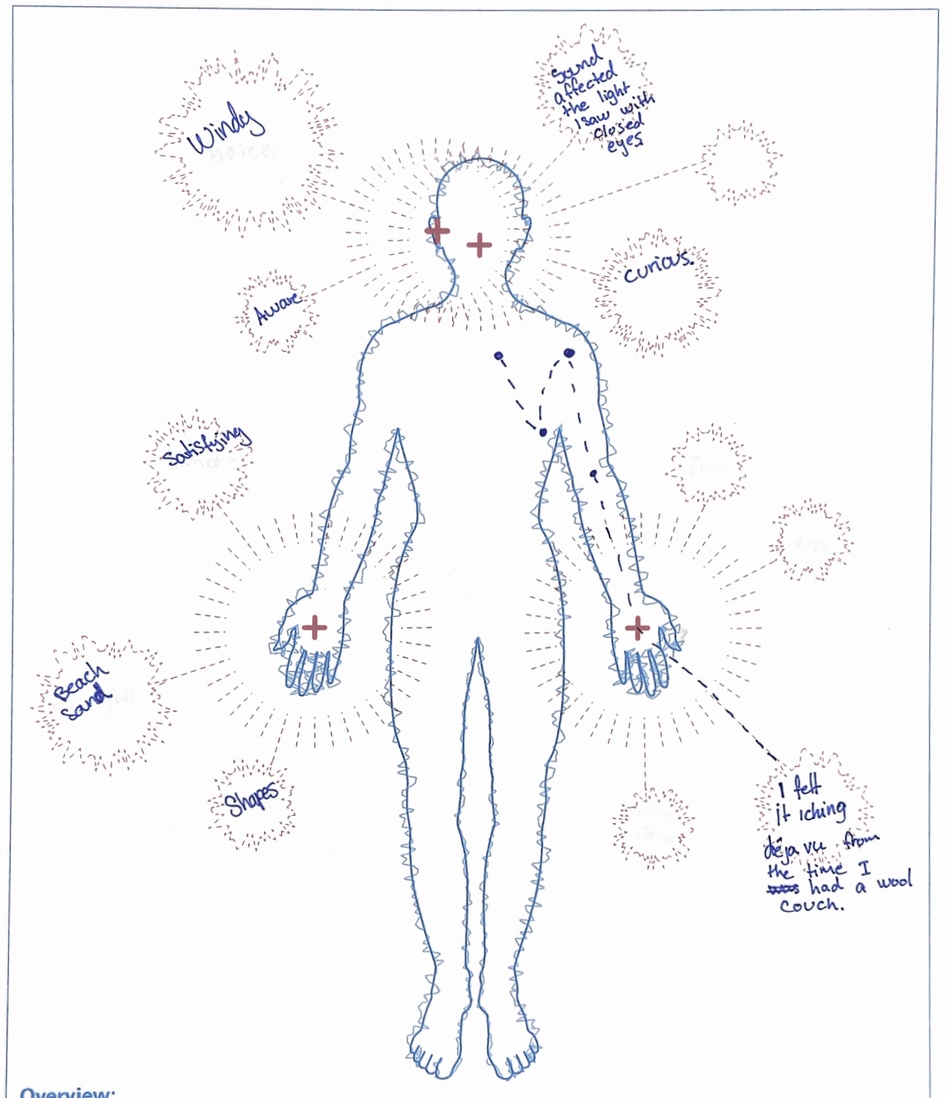
This experiment illustrates that we do have sensitivity towards tactility, but that we are seeking support from our other senses. In addition to focusing more on tactility, I also need to investigate the cooperation between the senses and how they support each other. The tactility of materials is about more than touch alone, it is also the sound the materials produce that stimulates the sensation of touch.

C.. *Sensory Capsule, Chen Liu & Mae Alderliesten, The Hague, 2021*

D. Sensory Capsule, Chen Liu & Mae Alderliesten, The Hague, 2021

E. Sensory Capsule, Chen Liu & Mae Alderliesten, The Hague, 2021

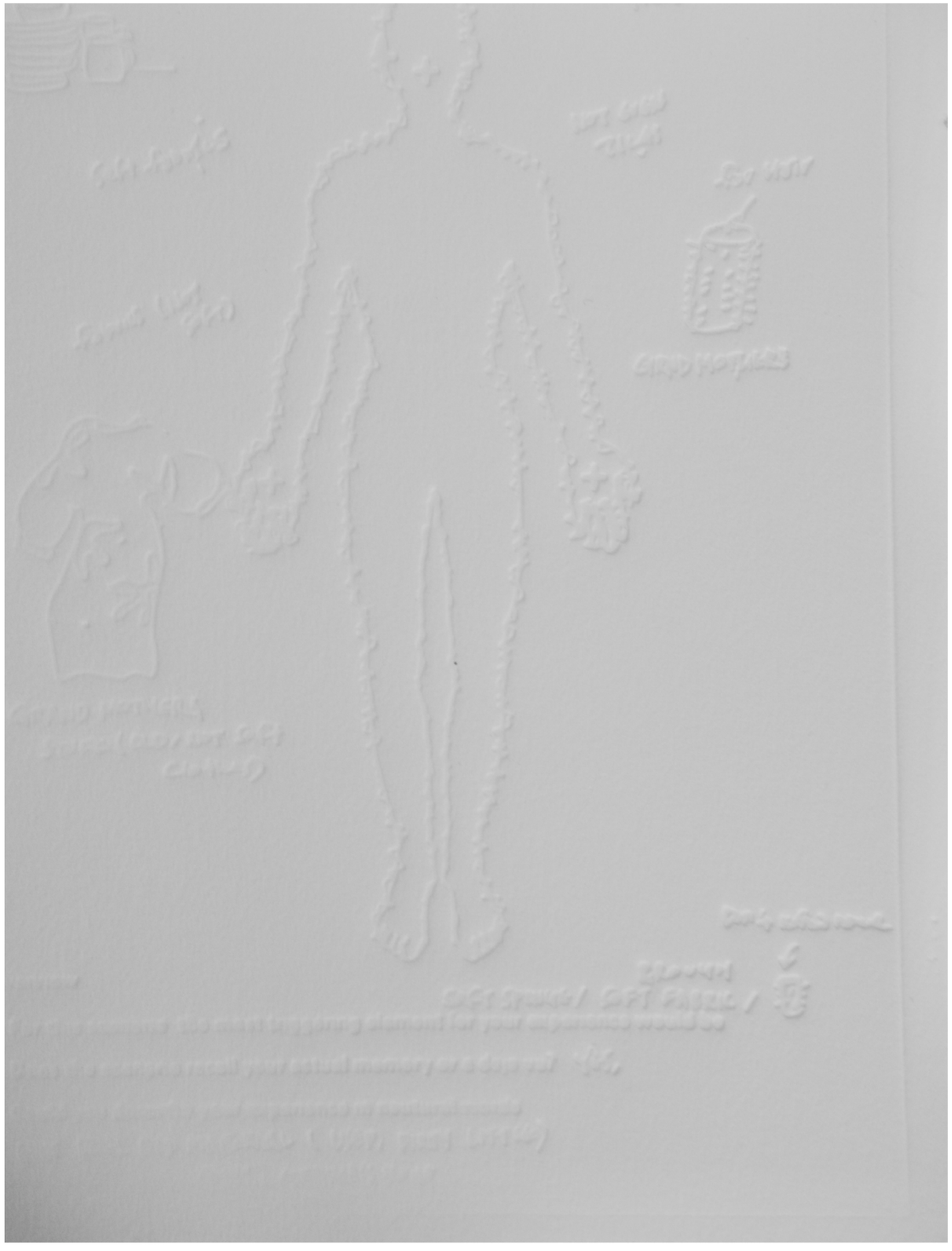
SENSORY CAPSULE REPORT **No.1**

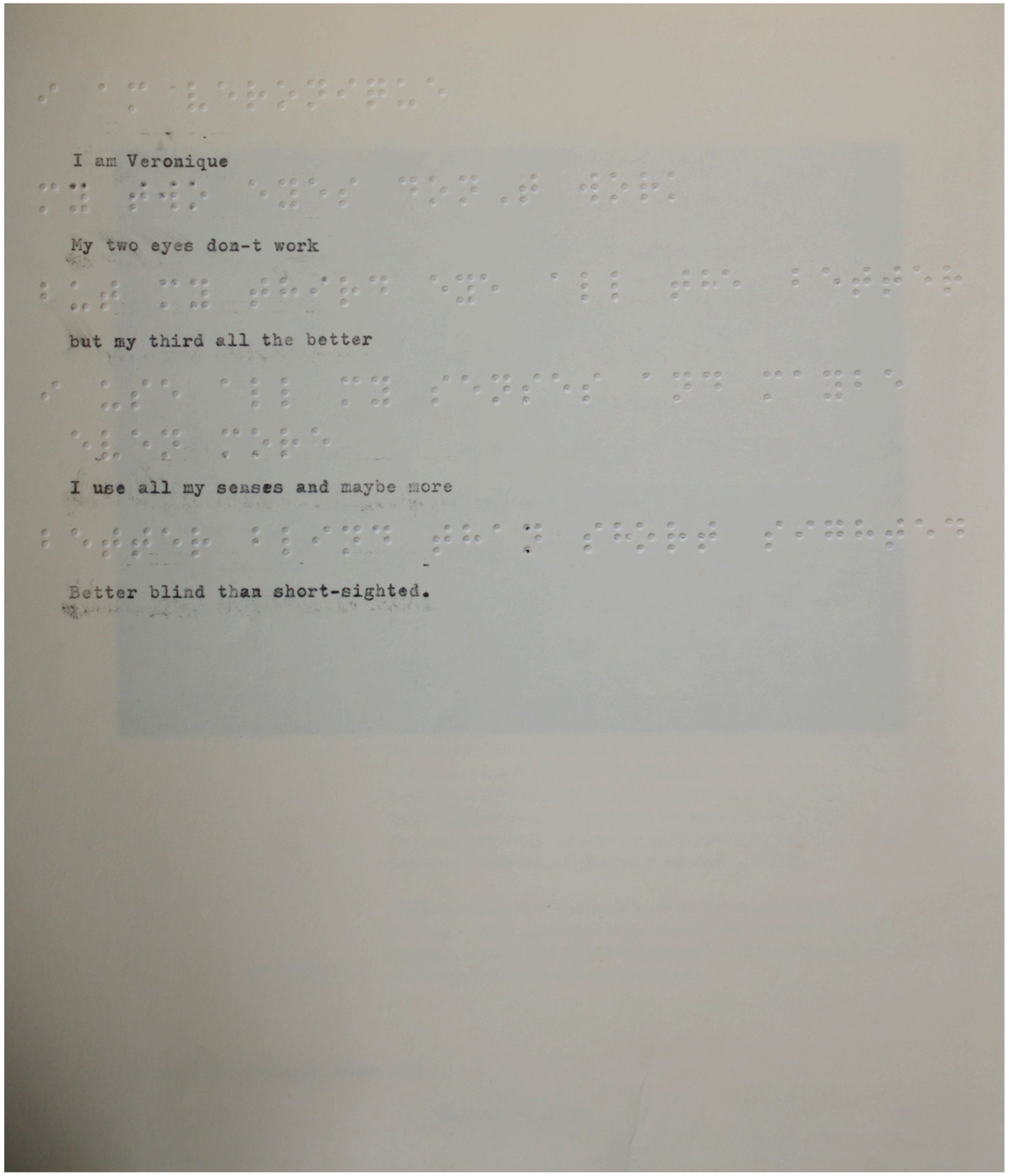


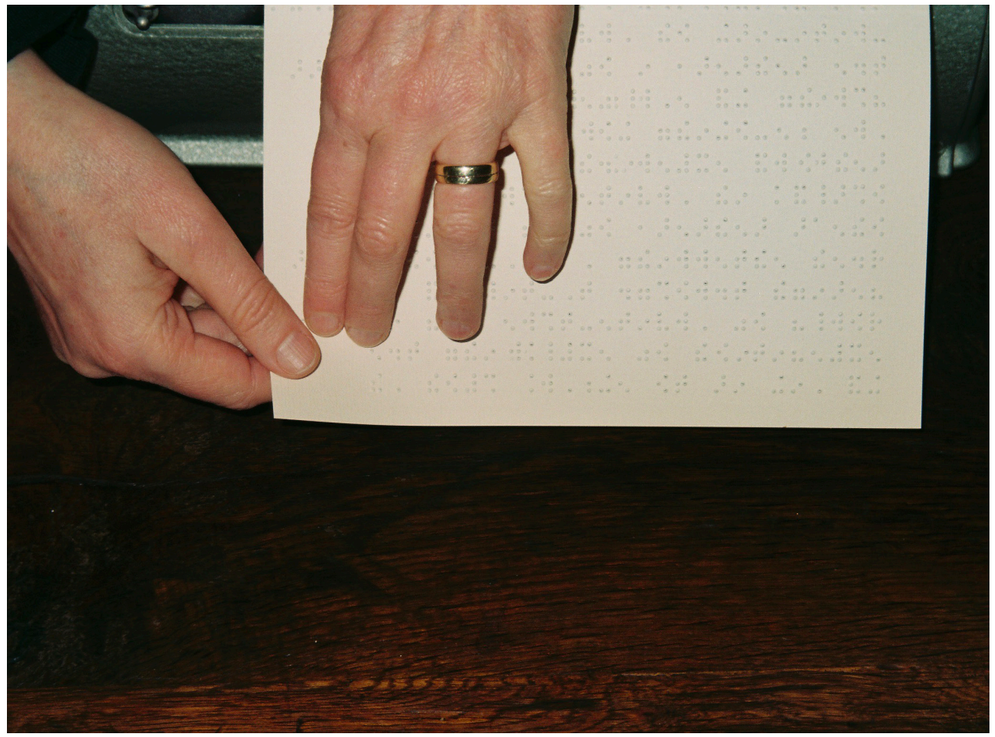
Overview:

1. **For this scenario, the most triggering element for your experience would be:** the wool
2. **Does the scenario recall your actual memory or a deja vu?** Yes, I had a wool couch when I was a kid and it always made itchy.
3. **Could you describe your experience in neutural words:**
   Curious - Awarness - Calm - patterns in my head - Soft.

F. Sensory Capsule format, Chen Liu & Mae Alderliesten, The Hague, 2021







G. Veronique, Mae Alderliesten, Arnhem, 2021

Elements of orientation.
This makes it all the more interesting to seek for an expert in the field of touch or tactility. At the beginning of my research, I looked for “experts” in certain senses. My starting point is an “expert” on touch, but also on sound and smell. Veronique was introduced to me by a friend. Veronique, who is visually impaired, has been an inspiring source of input for my research. Not to investigate how I can create a space for visually impaired people, but how I can incorporate their insights into my design. Being curious if she is an extra sensitive person, I decided to visit her to find out how she uses her senses of touch and hearing in her most intimidate environment: at home.

When I met Veronique for the first time, I had expectations of what her interior would be like for someone who is blind. I assumed she wouldn’t have paid so much attention to details in her environment, but her home reminded me a lot of my own home. Throughout the apartment, little corners were created where objects were displayed. Objects, which, as she explained, all have a personal story. There are different kinds of materials to be find throughout the house, from soft to cold leather, from wood to tiles. She explained to me that the use of different materials divides the house into different spaces. When one material on the floor changes to another, she knows where she is and how to move on through her house. *“Sound, acoustics, echo. In a room, it’s mainly that, how something sounds. Difference of surface. The feeling of light, if I can feel where a window is, this is nice to be able to orientate.”*[10] My talks with Veronique were very valuable as they confirmed my hypothesis that the tactility of materials can be a tool to divide spaces, to create different senses and experiences of spaces and, especially in her case, to remember a space and define a routing.

The visit encouraged me to contemplate how I can design a space comfortably and efficiently from a person such as Veronique’s perspective and yet maintain a certain tranquillity of the space through the use of materials or objects *“If it contributes to the way of orienting space. Smell changes of space, change of surface from hard to soft. Or it can be whether there is a lot of light or not. Those are things that contribute to how a space radiates peace or not.”*[11] When we discussed the use of materials in her home, she mentioned elements such as acoustics, smell, surface and light that play an important role in how she orientates herself in the space. They are interesting elements for me to consider when investigating which properties of materials are important in my quest for tactility.

The elements that Veronique mentions are also characteristics that I evaluate in the matrix for my material library. They give me a foothold on how the materials can help in orientation in a space. I will use these different elements as starting points and parameters in my design.

[10] *Veronique, Arnhem, 2021.*
[11] *Veronique, Arnhem, 2021.*

[H.] Material use in the house of Veronique, Mae Alderliesten, Arnhem, 2021

I. Material use in the house of Veronique, Mae Alderliesten, Arnhem, 2021

J. Material use in the house of Veronique, Mae Alderliesten, Arnhem, 2021

User-experience.
So & So Studio is a Berlin-based design studio with partners Kevin Driscoll and Rion Philbin, who believe that design should be experienceable and accessible for everyone.[12] In all their projects they search for the most appropriate materials to achieve the most efficient level of function in the design. One of the examples is a house in Vizenca for a blind homeowner where using the right materials and combining them was important. *"For a blind homeowner, the process of learning a new environment is vital, not only for the function of the space, but also for the daily life in that home. So from day one, the overarching theme of the project grew out of a simple glyphic language. Realized through thorough material choices of stone and porcelain, So & So Studio strived to find the perfect balance of textures to guide the home's end user between program elements using an embedded map system."*[13]

Designing a personal living space for someone is vastly different from how you design a public space used by multiple people. In a home, individual daily routines that occur in the space will dictate the design. In this project, So & So carefully studied these routines and habits and then incorporated them into a design. By means of "feel" models and material samples, they ensured that the user understood on what their ideas were. *"The end result expressed itself in each node for the client: a glyphic alphabet of simple rules in the floor of the house. The use of a textured stone tile within the floor pattern accentuated program nodes and activated a system of way-finding."*[14]

So & So's project gives me an insight into the importance of the user experience. Especially in the design phase, I want to keep involving users and incorporate their experiences in my design. It is very important that different elements, such as materials, are not only experienced and analyzed by myself, but also by end users.

It is very important that different elements, such as materials, are not only experienced and analyzed by myself, but also by end users.

[12] *"Designing a new home for a blind client / So & So Studio" 23 Aug 2018. ArchDaily. Accessed 6 Nov 2021. <https://www.archdaily.com/897946/teaching-a-blind-client-how-to-read-her-new-home-so-and-so-studio> ISSN 0719-8884*
[13] *"..."*
[14] *"..."*

K. Designing a new home for a blind client, So&So Studio, 2018.

Multi-sensory visit.
Veronique mentioned some cases, such as visiting museums where nothing is allowed to be touched, where actually too little attention is paid to people with disabilities or sensory impairments. Due to the visit and conversations with Veronique I started to look for initiatives who deal with such spaces that include impaired people to visit myself. In order to extract certain techniques or applications from it or be inspired by it. One of the examples is the exhibition in the van Abbemuseum, DELINKING AND RELINKING.[15] The permanent collection of the museum is shown, which originally contains paintings, sculptures and installations, but in a multi-sensory way and as a multi-sensorial exhibit. The original works are replicated which can be experienced by touch, sound and smell. Works that highlight touch have been created by a blind artist. While wandering around the exhibition the question arose - *how do you feel colour? How do you know which colours are part of the painting?* The sensory works that are imitations of the original works were made of one type of material and were colourless, whereas for example in a Picasso's painting the experience of the colour composition is also very important. One work did however addressed his question. A work where the colour was also included; each colour had been assigned a material and a Braille description. Hence the painting could be "read" with colour in mind.

This example shows how valuable it is to consider a space which can be more accessible for everyone. Including people with disabilities. It also teaches people who don't have disabilities to observe differently and explore a "familiar" environment using different senses. I think it's refreshing to think in an inclusive way.

To make a space accessible to all, there are many aspects to consider. It will be my goal to create a space that can be experienced a diverse group of people as possible. I want my final design to be not only aesthetically stimulating from the visual aspect, but also aesthetically stimulating for the other senses.

[15] Dwarsverbanden. (2021, 18 september). vanabbemuseum.nl. Geraadpleegd op 4 november 2021, van https://vanabbemuseum.nl/programma/programma/dwarsverbanden/

Triggering memories.
From the moment I got in touch with Veronique, I thought about how I in our meeting could implement an experimental twist. Indeed, I see Veronique as one of my most important resources. A living tool, as it were, that helps me to observe tactility in for different angles. For our meeting I brought along part of my material library. These were all different materials, with different characteristics like, a velour fabric, the flake foam, glazed wall tile, MDF and PVC tarpaulin. *How does she experience and value these materials? Do they evoke a certain memory? Which materials does she prefer and for what reason?* What surprised me is that several times she pointed out a colour, of what she thought the colour could be. She explained that touching the fabric triggered a certain memory of a certain time. A memory of a time when someone told her that, for example, a velour fabric is often associated with red, velvet. These are qualities that she cannot experience, but assumes from people around her. This creates as it were her orientation in colours combined with materials she can feel.

She identified characteristics such as, a glazed tile, what she liked or disliked about it. She often gave examples of how the material intrigued her in her surroundings. She liked tiles, but not with the shiny glaze. This creates a chilly atmosphere for her. Therefore, in her house where there are ceramic components, she has chosen a mat glaze, which she experiences as warmer and therefore more pleasant.

The material experiment with Veronique showed me that a small adjustment to a material can result in a totally different emotion. For example, the adjustment with the ceramic tile. Here, I observed an interesting possibility to assign different finishes to a material, so as to evoke multiple emotions with one type of material.

Meet the experts.

05

The (visually impaired) user.

When asked if Veronique has developed her other senses better, her answer was: *"I have developed it better. There is more room in my head for the other senses. I am more aware of smells, sounds and structures. And especially textures. A lot of people just don't touch anything anymore. If people go to the forest and there are these beautiful big red mushrooms, people say they are red of course hahah, and that feels so good! It's just a nice feeling! But people just don't do it... then they think; I'll get dirty hands. People just don't touch anymore."* Her answer reinforces my thoughts on our ever decreasing use of tactility and hence less affinity with the materials that surround us. Merely visual perception seems to suffice, a statement with which Machiel Spaan begs to differ *"Touch makes us aware of our environment and allows us to familiarize ourselves with it. Moving through space, the body feels the dimensions. Touch allows us to experience the space and material and increase our unstinting of tools, constructions or how something was created."*[16]

Inspired by my conversations with Veronique and the resulting, I am encouraged to find other "experts". These different perspectives on the subject, contribute a great deal to my research. They provide an understanding of how to strengthen my research and where possible points of improvement lie.

[16] *Spaan, M. (2019), "The wandering maker.", Architectura & Natura. p33.*

The maker.

I decide to get in touch with a maker, someone who makes materials that are eventually applied in a space. I am curious how he sees the value of tactility or does he see the aesthetic, the visual as the most important element. From the contents of my library my choice fell on a maker who uses clay as a medium. Clay is one of the materials that can evoke a strong tactile experience. There are different finishes and applications of clay, namely clay in its natural state as a raw material, soft and malleable, biscuit; fired clay without applied glaze and then finally the 'end product' glazed ceramic.

The company Koninklijke Tichelaar is a well-known and respected expert in this field. It is the oldest ceramics company in the Netherlands and is a real household name.[17] They are known for their fine ceramics and tiles, but the company has recently taken a different direction. The application of their fine products have become very popular for architectural, but also design and art applications. The durable properties and the certain techniques that can be applied with glazing are very much in demand. When asked which senses are appealed by the designs, their answer is primarily the visual aspect.

[17] *Over. (z.d.). tichelaar.nl. Geraadpleegd op 12 januari 2022, van https://www.tichelaar.nl/over*

In particular, the reflection of light on the ceramic work. As the interview with Harm progresses and I delve deeper into the materiality and the interplay between light and texture, together we come to the conclusion that the texture is also an important aspect of the tactile quality. The person, Harm, I interviewed also noted that a demand for tactile elements in their products is on the increase, leaving me to believe that there is much to be gained in this tactility aspect[18]. Another aspect that goes hand in hand with tactility is temperature. This also applies to ceramics. Touching a material is about its tactile qualities, but here the temperature of the tactile surface also plays a role. The temperature of the surface that you touch contributes to how you experience the material. A cold material can create a feeling of coldness or remoteness, where a warm material can create a feeling of comfort.

As a result of my interview with a maker, I became aware of the possibility that only physical contact with materials may not be enough to make users appreciate other sensorial qualities other than only the visual. I will have to investigate and find other methods to create value to additional sensorial qualities incorporated in a design.

[18] *Harm van der Ploeg, 2021.*

Sensory capsule reconsidered.

A few weeks after the ***'Sensory Capsule'*** experiment took place, I contacted some of the participants with a follow up interview. I value to investigate thoughts or observations they may have had in hindsight. Unexpectedly, for the participants temperature also played an important role in defining the materials. Almost all participants mentioned the aspect of water, linked to temperature. As this was very recognizable, it overshadowed many of the other materials present. In this way, when we focus on tactility, temperature plays an important role in how we experience something and in what way it is experienced.

The follow-up interview revealed that in my designs it will be important to find a good balance of quantity, size and different qualities of materials used. In the earlier described experiment, whereby my fellow student Chen and I used many different materials on a relatively small surface. This caused overstimulation in the participants. Evoking emotion is a positive result but in this case it caused an overkill of information and hence confusion.

Evoking emotion is a positive result but in this case it caused an overkill of information and hence confusion.

[L] The Emotion-Whisperer, Simon Dogger, 2021.

[M] Haptics of Cooking, Studio Boey, 2021.

The designer(s).

I am also interested in exchanging ideas with an architect or a designer who consciously incorporated materiality or tactility in their work. At Dutch Design Week, I came across Simon Dogger. He participated in Dutch Design Week together with Boey with their project 'Haptic Aesthetics', an empathic design method developed by this design duo[19]. Simon is a visually impaired designer and Boey is a designer with sight. This is also what connects the method. They made two designs that were not about the visual, but about the sensation of touch. Gathering information by feeling it.

The method they developed together is about the inclusiveness of a space. About the multi-sensory experience of a space. Not just for the visually impaired, but accessible to everyone. A place that can be experienced in a fair way by everyone. The projects they showed during Dutch Design Week are two outcomes of this method. Haptics of cooking, a series of kitchen tools based on touch, is the product created by Boey. The kitchen tools help visually impaired people to work more independently in the kitchen. It shows that sight is not always needed to be functional. Simon created a tool that helps visually impaired people to experience facial expressions through tactile sensations of vibration. The tool, called *'The Emotion-Whisperer'*, contains glasses with a camera. The camera scans these facial expressions, as it were, and converts them into vibrations via an app. These vibrations can be felt through a small object that can be held in your hand. In this way, you can feel when someone smiles[20].

Simons and Boey's vision to apply their developed method to a large space during the DDW, reinforced my desire to create a design not only for myself, but also for others, not looking at the limitations in one of the senses but designing more inclusively.

[19] *Dutch Design Week. (z.d.). Haptic Aesthetics. DDW. Geraadpleegd op 12 januari 2022, van https://ddw.nl/en/programme/6637/haptic-aesthetics*

[20] *"..."*

Materialized atmospheres.

06

It will be essential that in my design I use tactile models and experiments to empathize with the space as well as with the user.

Technologised touch.
One of the urgencies in my project is to address the influences that a rapidly changing technological world, and the burden of Covid, is placing on our lives. Both are causing us to become increasingly distanced from our physical surroundings. Especially in a situation like lockdown, where we look for technological solutions to compensate our need for touch *"Computer imaging tends to flatten our wonderful, multi-sensory, simultaneous and synchronous imaginative capacities by turning the design process into a passive visual manipulation, a retinal journey. The computer creates distance between the creator and the object, while drawing by hand and working with models bring the designer into a haptic contact with the object, or space."*[22] Could there be alternatives that are much more physical, rather than looking to fulfill our needs with technological solutions only. No matter how good technology gets, it does not replace physical touch.

"We in the western world are beginning to discover our neglected senses. This growing awareness represents something of an overdue insurgency against the painful deprivation of sensory experience we have suffered in our technologised world.' Writes the anthropologist Ashley Montagu. This new awareness is forcefully projected by numerous architects around the world today who are attempting to re-sensualise architecture through a strengthen sense of materiality and hapticity, texture and weight, density of space and materialized light."[23] I think that at a time when our hunger for skin is increasing, because we are touching each other and our surroundings less and less, it is very important to look for the tactility, the touch, that assists us at times when we need it. Skin hunger is the strong need for touch through the skin.[24]

As Pallasmaa also addresses above, I think it is important to feel the space, literally and figuratively. So, I will have a clearer understanding of how a space is put together. It will be essential that in my design I use tactile models and experiments to empathize with the space as well as with the user.

[22] *Pallasmaa, J. (2012), "The eyes of the skin.", John Wiley & Sons Ltd. p14.*
[23] *"...", p41.*
[24] *"Definition; Huidhonger.", ENSIE, 30 may 2017. Accessed 12 jan. 2022 https://www.ensie.nl/anw/huidhonger*

[n.] *Tactile Model Ideal space Veronique.*

Changing materiality in interiors.
The use of materials in interiors over the years has changed, not only because of technological advancement but other factores too. For example; as global population grows, an ever-increasing amount of people come into physical contact with materials used in space. This often results in a stricter hygiene code effecting which materials are chosen for finishes. Veronique elicited an interesting observation concerning this matter when I asked her about her preferences in wall finishes; *"I prefer the wallpaper that you can press down on, it looks a bit rubbery. Everyone used to have this wallpaper. It's very soft, it's lovely. The smell of a new carpet is also lovely. Carpets hold odours better. Everything is the same nowadays. I used to hear and smell differently because spaces used to be more closed off. Every room was different. In the big shopping malls nowadays, everything is the same with the same smell. At the end of the day, that's very tiring."*

The fact that the use of materials is changing in public spaces has also partially to do with hygiene as fabric surfaces are much harder to keep clean than for example a stone floor *"There is a pharmacy in Amsterdam that I used to visit regularly. They used to have a carpeted floor and it just smelled more intense. Now there is laminate and the smell is just not intense or present anymore. It's very tiring for me that all smells indoor public spaces are the same. It makes it harder to orientate where I am because the smell and materials are almost the same."*[25]

[25] *Veronique van Velzen, 2021.*

"Everything is the same nowadays. I used to hear and smell differently because spaces used to be more closed off."

We often look at the problems that a material presents and are fixated by its need to be functional.

If Veronique could choose which materials and elements were to be present in a room, she would opt for a carpet on the floor, and walls covered with soft and thick wallpaper. Large windows with lots of light coming through in one part of the room would be a must. A low ceiling that provides fine acoustics is also important for her. And while we're at it, it would also be nice for part of the room to be a bit darker, which in turn creates a sense of security. In order to make my conversations with Veronique tactile, I have created a model in which all these qualities as well as the elements I mentioned earlier come to the fore; acoustics; light incidence; surfaces and smell.

This is a good example of how by working with models and materials, I can make a story tangible. We often look at the problems that a material presents and are fixated by its need to be functional. In this it is easy to overlook its appealing qualities. It would be challenging to turn this process around - look at the materials appealing qualities and through this discover its functionality.

07.1 Design principles.

Stimulate, don't overstimulate;
Awareness that a multi sensorial approach can lead to sensorial confusion.

One material, multiple emotions;
By considering even tiny adjustments to an existing material and its function, an unorthodox emotional response could be evoked.

Sensorial inclusivity;
By appealing to more senses than just the visual, I hope to approach a more diverse group of users.

User experience;
Consider the user's experience before designing the function.

Tactility first;
First feel the emotion, there after define the function.

07
Conclusion.

By analyzing and reflecting upon the lessons I have learned from this research, I have been able to generate design conditions for myself, from which I have deduced a set of design principles to act as tools for my design phase and how I proceed as a designer. To generate the principles I repeatedly asked these three questions at the end of each phase of my research and was able to find out what is important for the next step;

Does this aspect evoke emotion?
Does it stimulate one or more senses?
Does it appeal aesthetically to more than just the visual?

Some of the principles cohere to these questions, others only partiality, but I was able to evolve tools which will assist me in the next fase of my design -
Tactility first;
First feel the emotion, there after define the function.

Sensorial inclusivity;
By appealing to more senses than just the visual, I hope to approach a more diverse group of users.

Stimulate, don't overstimulate;
Awareness that a multi sensorial approach can lead to sensorial confusion.

One material, multiple emotions;
By considering even tiny adjustments to an existing material and its function, an unorthodox emotional response could be evoked.

User experience;
Consider the user's experience before designing the function.

All the sensorial aspects that she mentions such as light, smell, surfaces and acoustics have lost their value.

Ideally, as a designer I would want to adhere to all these design principles. However, considering my current position in the design process, my main focus will be on ***"Tactility first."***- first touch and then the functional aspect, which will eventually make a design relevant. It goes without saying, that I will bare the other principles in mind and possibly apply them at a later stage. Especially ***"User experience."*** is very important to me, as I feel you can't design a space without keeping in mind the people who are going to use it.

With these tools and using the knowledge I have gained during my research I have come up against an exciting design challenge; namely where my focus lies in the tactile and emotional aspects of the material and at what point the functionality of the materials comes into play. Here I refer back to the last chapter where due to technological changes and population growth, there is a demand in changing characteristics in materials. In the case mentioned, it has to meet more stringent hygiene and durability standards.

Unfortunately, these aspects do not yet go hand in hand with sensorially stimulating characteristics, exactly the issue addressed by Veronique in the previous chapter. All the sensorial aspects that she mentions such as light, smell, surfaces and acoustics have lost their value. This to me, is a challenge I can respond to as a designer. Regarding firstly the sensorial qualities of materials and subsequently to discover their functionality.

This awareness already leads me to what type of space I could work in to execute my design. I believe this approach could add value in spaces such as revalidation centers and crematoria. I would categorize these spaces as semi-public, because they are accessible to everyone, yet are emotionally intensely different for each individual user. Where hygiene and the repeated use of space and its materials are important, but where the tactile and emotional aspects should have more value. Choice of materials could influence how a space is experienced which in turn could affect how users deal with their emotions. As a designer, I feel the urge to address this emphasis of material choice and in this way contribute to a sensorially fulfilling experience for the user.

Choice of materials could influence how a space is experienced which in turn could affect how users deal with their emotions.

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List of images.

08

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The "experts";

Simon Dogger + Boey Wang - 'Haptic Aesthetics.'

Harm van der Ploeg - Koninklijke Tichelaar

Veronique van Velzen - visual impaired woman

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[H] *Material use in the house of Veronique, Mae Alderliesten, Arnhem, 2021*

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[J] *Material use in the house of Veronique, Mae Alderliesten, Arnhem, 2021*

[K] *Designing a new home for a blind client, So&So Studio, 2018.*

[L] *The emotion-Whisperer, Simon Dogger, 2021.*

[M] *Haptics of Cooking, Studio Boey, 2021.*

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The Forgotten Sense.