MASTER THESIS

DESIGN FOR POSTPONING LONELINESS IN PUBLIC DOMAIN

MSC DESIGN FOR INTERACTION
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ŤUDelft

EXECUTIVE SUMMARY

This graduation thesis report gathers the research activities investigating loneliness and the design to postpone it.

The research approach refers to Vision in Product design (ViP), which includes exploring the domain. The context factors were gathered based on the literature, interview experts and non-experts, and observations. The research was formed in a world view, summarizing the driving forces around loneliness.

The vision was formulated from the context research, including a design statement, interaction vision, and product qualities. From the research summary, loneliness can happen for a variety of reasons. However, one thing that every lonely person has is a lack of control. In contrast, a driving force that keeps a person away from being lonely is a sense of security, including self-awareness, sense of place, and belongingness.

Following this insight, the design goal was **to enhance people's sense of security by giving them agency in the environment.**

Ideation involved creative sessions and individual brainstorming. The outcome was the Sound of a city, a sound creation tool using augmented reality, letting users create their sounds and add to their location. The design was validated through user testing of the interaction between users and the environment.

In conclusion, **the Sound of a city** provided users a positive experience in having their personal (sound) touch in the public space. Participants agreed that this could make them bond with the places, resulting in more security. Further research is required to improve the interactions and test the social effect.

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CONTENT

INTRODUCTION

Over the past few years, loneliness has become chronic for millions. In the UK, 60% of 18-34 years old are often lonely (Griffin J, 2010). In the US, 46% of the entire population feels lonely regularly (Cigna, 2018). Technology has made our lives more connected than ever, yet a significant number of us feel isolated.

Before defining loneliness, it is worthwhile to look back at the historical perspective. The concept of loneliness has started with a trend towards individualism, created by Protestant theology (Cacioppo & Patrick, 2008). In the nineteenth century, this trend was accelerated by the industrial revolution. There was a vast urban migration. People moved from rural areas to the cities and hoped to have a better life in the new economic hub. As the world has rapidly grown, the number of one-person households has dramatically risen. People are busy with their individual goals, becoming more isolated by giving up physical connections with their friends and families. While humans adapt to the modern lifestyle, their bodies and mind still function the same way as in the past. They deep down desire to form social connections under any circumstances (Baumeister & Leary, 1995).

Unsurprisingly, loneliness also directly affects our brains, producing cognitive biases, affecting hormones level, and leading to mental illnesses.

It is a metaphor for social pain (Cacioppo & Patrick, 2008). Unlike hunger and physical pain, which can be cured by eating or taking medications, instead of reaching out to people, loneliness makes them misinterpret social interactions and distrust others (Vanhalst, Gibb & Prinstein, 2017).

Lonely people can be seen as unfriendly because of their social anxiousness, making people around them respond accordingly. Furthermore, society perceives loneliness as a sign of weakness. People rather ignore and suppress their feelings instead. This is why loneliness becomes a loop and more problematic to escape each time.

Loneliness is depending on a person's perception at the moment. It can be a peaceful moment alone, which is called solitude. In contrast, it can also be alienation when a person was detached from society.

Loneliness has a massive impact on our lives in many ways. It changes the way we think, the interaction between people to people, and also the environment. This topic is worth investigating, leading to the main research question, what triggers loneliness? When does it happen? How can design intervene that moment and postpone loneliness?

ASSIGNMENT

The scope of the project is the moment when people get lonely while they are in public. There is a trigger that shifts people's feelings from not lonely to lonely. This project will identify the trigger and design an intervention to postpone it. The final deliverable consists of a report supporting the design (service, product, etc) and a presentation.

The assignment is formulated as:

"Investigate **what moment** and identify a **trigger** in the public space that changes people from the state of 'aloneness' to 'loneliness', and design an intervention to **postpone** the tipping point."

What triggers loneliness?

When is the shift?
From aloneness to loneliness

How to postpone it?

POSTPONE

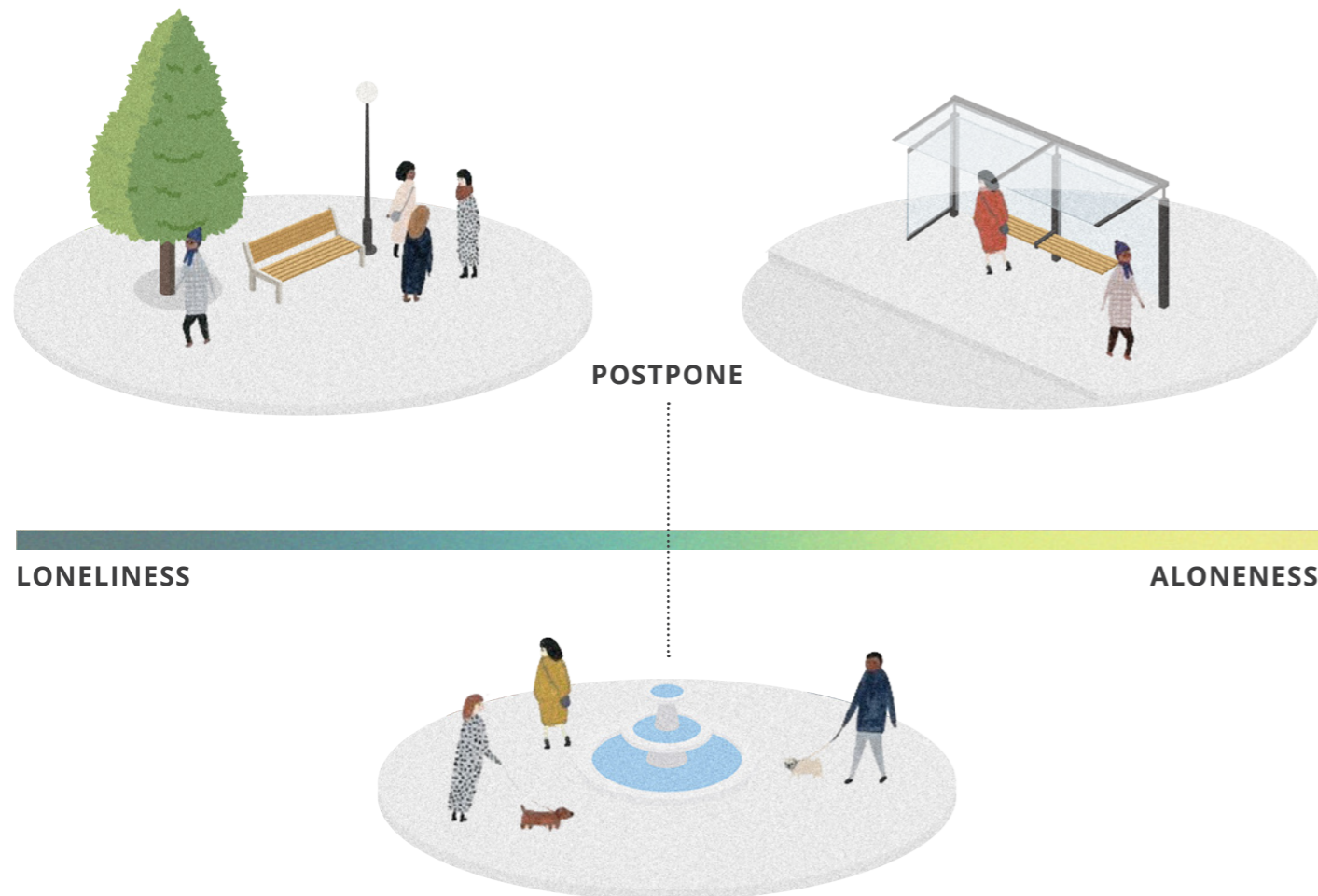LONELINESS   ALONENESS

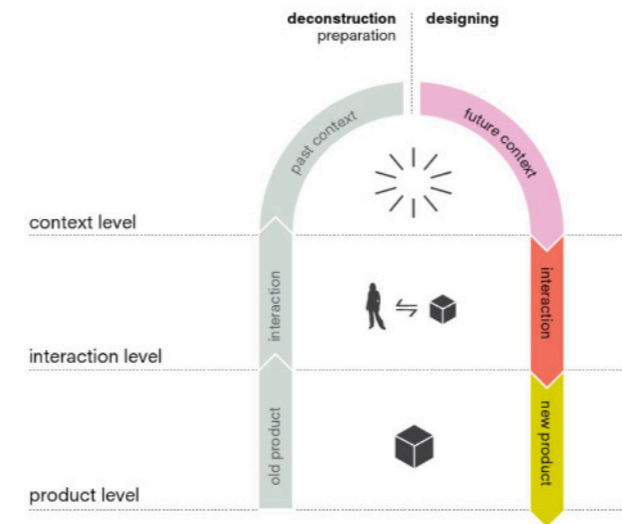Figure 01. Assignment diagram

APPROACH

Figure 02. ViP Method

Method

Because the problems of loneliness are complex and subjective, a method that can help in framing the project and scope the design direction is Vision in Product design, ViP (Hekkert & van Dijk, 2009), see figure 02. Apart from these benefits, this method also provides clear guidelines to structure this project. The project started with an exploration of the future context of postponing loneliness in the public domain. Then to see a clear vision, the worldview was mapped out from all the useful factors to formulate a design statement.

The deconstruction phase was left out as there was no clear current product or service that directly solved this issue.

Process

First, the future world is built around the domain of loneliness in public areas. The type of place is defined to see a possible solution space. Then, all the information about loneliness is gathered from literature reviews, experts and non-experts interviews, and some observations. Context factors were clustered and mapped into a world view to see different kinds of driving forces toward loneliness. The research findings are summarized. Then, a vision on the topic is developed, consisting of a design statement, interaction vision, and interaction qualities.

After the vision is created, an ideation phase consisted of a creative session, followed by concept generation. Initial concept directions were evaluated to find out the most effective solution that fits the context. Then, the final concept was improved to make it more tangible and the prototype was built. Finally, the final design was validated by experts and users.
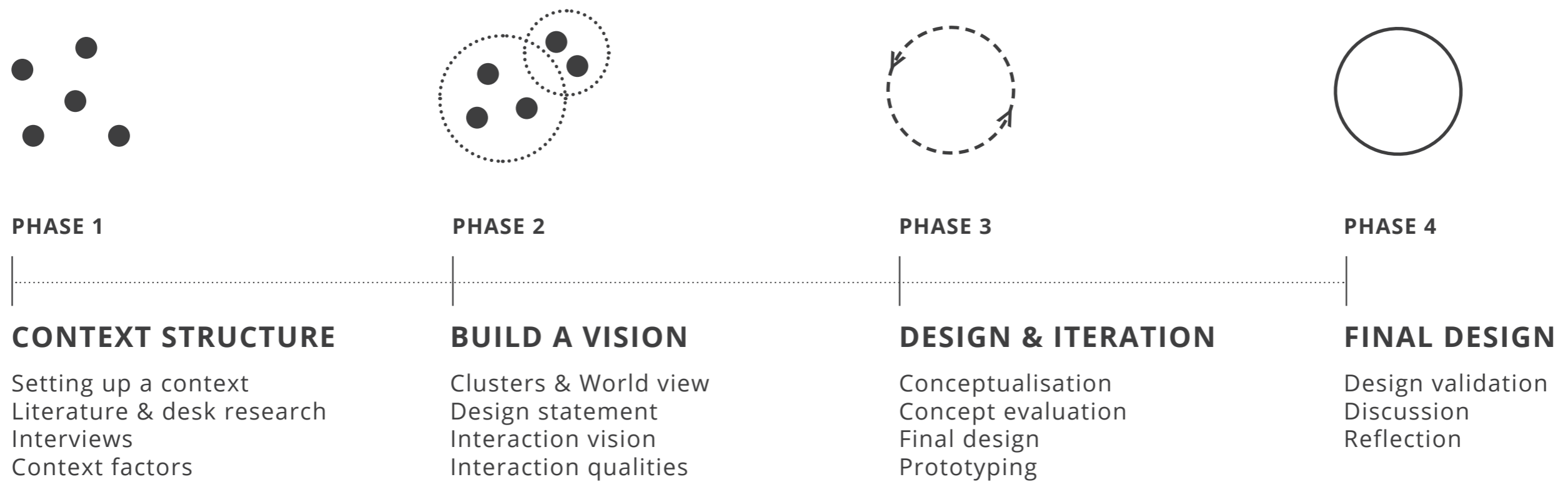
PHASE 1

CONTEXT STRUCTURE

Setting up a context
Literature & desk research
Interviews
Context factors

PHASE 2

BUILD A VISION

Clusters & World view
Design statement
Interaction vision
Interaction qualities

PHASE 3

DESIGN & ITERATION

Conceptualisation
Concept evaluation
Final design
Prototyping

PHASE 4

FINAL DESIGN

Design validation
Discussion
Reflection

Figure 03. Project plan

DOMAIN

FACTORS

Information gathering method

The first step of building a worldview starts by generating factors. Factors are documented varied from desk research, literature, documentaries, interviews, lectures, and podcasts. A literature review was the most important part of expanding the understanding of this phenomenon. Interviews with both experts and non-experts also contributed a big part to understanding the concept of loneliness. Observations were done to confirm some theories gathered from the literature. Factors are documented in a card (See figure 04) to be useful for clustering later, divided different fields into different colors (psychology, socio-economic, etc) and types of factors (Principle, trend, state, development).
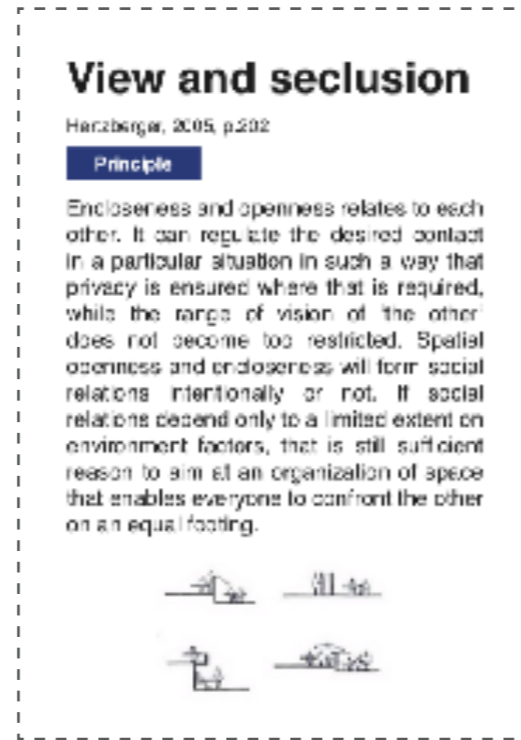
View and seclusion

Herzberger, 2005, p.202

Principle

Encloseness and openness relates to each other. It can regulate the desired contact in a particular situation in such a way that privacy is ensured where that is required, while the range of vision of the other does not become too restricted. Spatial openness and encloseness will form social relations intentionally or not. If social relations depend only to a limited extent on environment factors, that is still sufficient reason to aim at an organization of space that enables everyone to confront the other on an equal footing.

Figure 04. Factor card

Investigate loneliness in their perspectives and how they treat it in their professions

Expand the understanding of this phenomenon

LITERATURE REVIEW

EXPERTS INTERVIEW

NONEXPERTS INTERVIEW

OBSERVATION

Interactions with the existing designs

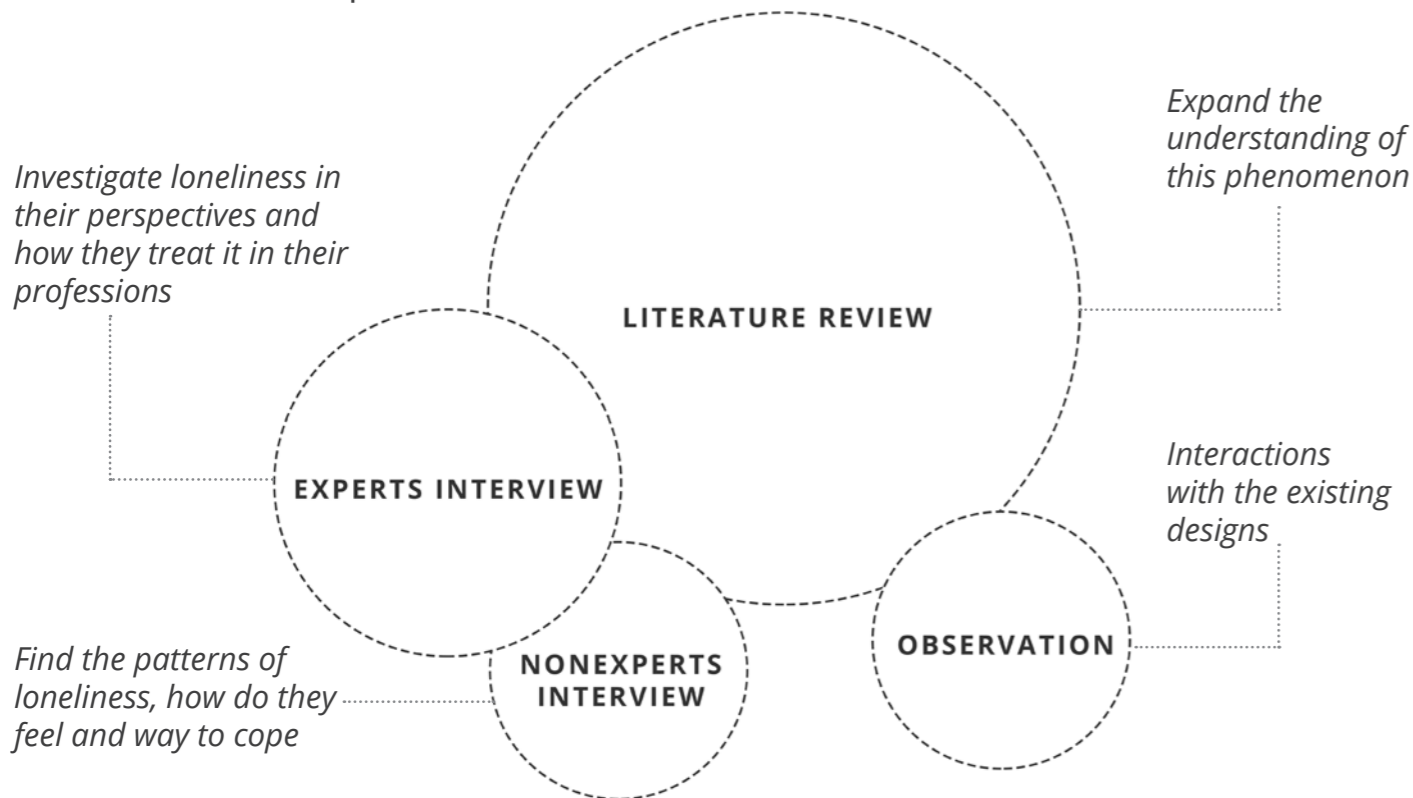*Find the patterns of loneliness, how do they feel and way to cope*

Figure 05. Factors gathering method

DEFINITIONS AND TYPES OF LONELINESS

To understand and design for this phenomenon, it is important to clarify the definitions of loneliness. Because it is unique and can be described in various ways, according to each person's experience. Kileen (1998) defined loneliness as:

"Loneliness is a discrepancy between a person's social and/or emotional needs/wants, and their social reality."

Preliminary research

There is a lot of evidence pointing out that people are becoming more and more lonely in public. The sets of questionnaires were also sent to ask about the experiences of loneliness. Most participants have felt lonely when they are in the crowd often and sometimes without knowing the reasons. Because it is often believed that loneliness occurs only when you are alone, the results from preliminary research indicate the opposite. Therefore it is interesting to investigate more why people are lonely in public.

Concepts related to loneliness
There are a lot of psychological concepts that people relate to loneliness. These are examples of the most associated concepts:

Depression
A long experience of loneliness breeds depression, but it is also possible for a person to be depressed without being lonely. The difference between depression and loneliness is how a person wants when experiencing these. Generally, depressed individuals wish to be left alone. In contrast, lonely people yearn for the opposite. These different experiences lead to other behaviors.

Anxiety
This can be experienced with the thought of the possibility of experiencing loneliness. Individuals who fear being alone have anxiety.

Solitude
Being alone is a fact, a description of one's geographical state. Some perceive it, almost automatically, as loneliness. But as we mentioned, it only describes our geographical position. Solitude occurs when we welcome that aloneness because we chose it to do what can be done alone, such as reflecting, planning, walking in the woods, creating, painting, writing, and sculpting. Many well-known literary creations were a result of the author's solitude. Solitude is refreshing, providing us a respite from our fast-paced and demanding world, and is always welcomed by those who experience it (Rokach & Sha'ked, 2013).
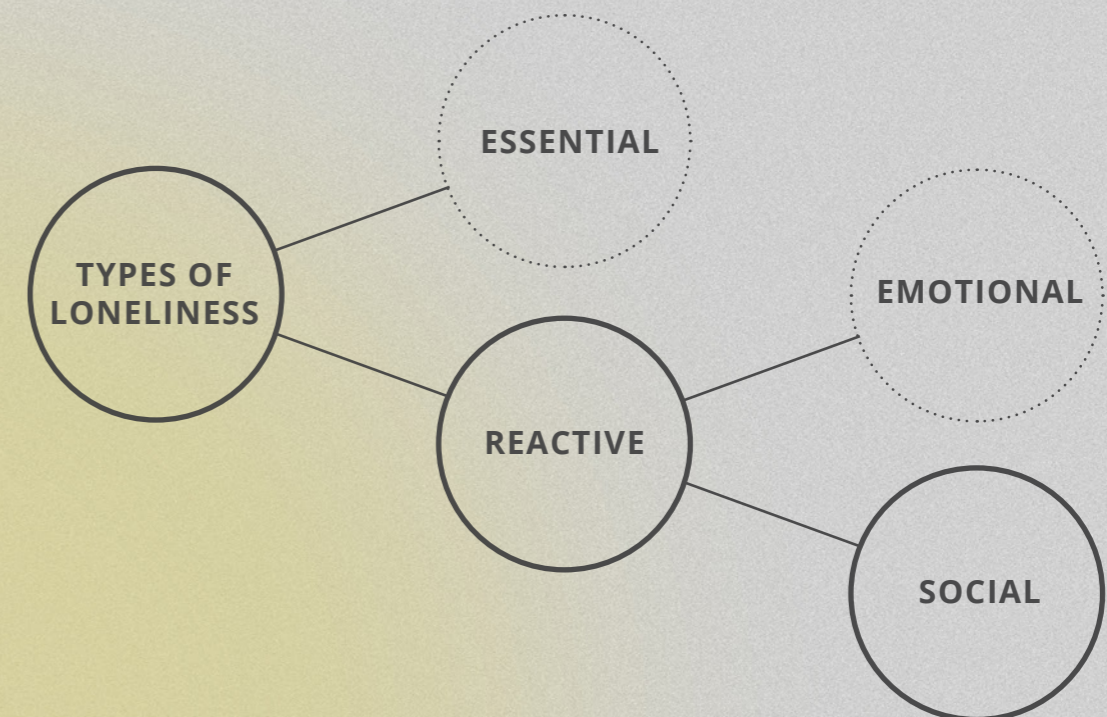
TYPES OF LONELINESS

1 ESSENTIAL LONELINESS

Essential loneliness
is intertwined into our personality, most probably as a result of infancy or childhood experiences with caretakers. Those people who are lonely at their core cannot only stop it unless they undergo in-depth and lengthy psychotherapy. In my clinical practice, I have treated couples who experienced relational disharmony. For example, the husband showed his wife love, caring, and attention, and the woman still complained of experiencing loneliness, alienation, and being unloved by the world.

2 REACTIVE LONELINESS

Reactive loneliness
Reactive loneliness is the occasional loneliness that may be experienced when a person is facing an adverse change in life. In reactive loneliness, it can also be divided by the types of relationship that a person is dissatisfied with or lack of

2.1 EMOTIONAL

Emotional loneliness
It can be experienced when undergoing the loss of a significant person or various other losses.

2.2 SOCIAL

Social loneliness
This type of loneliness occurs when a person does not feel a sense of belonging to a group beyond themselves. It is likely to happen in a situation when you walk into a party and don't recognize anyone familiar or when you don't typically feel comfortable approaching new people.

TYPES OF LONELINESS

ESSENTIAL

EMOTIONAL

REACTIVE

SOCIAL

Positive experience

SENSE OF BELONGING

Connectedness

SOLITUDE IS A CHOICE

ACCEPTANCE

MINDFULNESS

Solitude

TOXIC POSITIVITY

SOCIAL ANXIETY

Aloneness

SELF REFLECTION

FEAR OF REJECTION / AVOID INTERACTIONS

WRONG KIND OF COMPANY

COMPARE TO OTHERS

Social isolation

Loneliness

CHRONIC LONELINESS

Negative experience

Figure 06. The state of loneliness

STATES OF LONELINESS

What makes loneliness even more confusing is many closely related concepts evoke the images of loneliness depending on people's perceptions at the moment. Therefore, to better understand what loneliness means to people, we have to take a look at how they perceive it at each moment of their lives. Kileen (1998) explained the several states of separateness from self to others, indicating each state from alienation (negative) to connectedness (positive), depending on people's freedom of choices.

Figure 06 shows a simplified version of this perception continuum. Connectedness and solitude explain the states when people choose to be on their own and feel happy. Loneliness and social isolation describe individuals who feel lonely and sad. Whether it is because of the lack of meaningful relationships or the sense of belonging in their social groups, they have no choice in that matter. They don't want to stay in that condition. Aloneness indicates that there are some elements of choice of being alone even though they prefer to be with others and their feelings remain neutral.

These broad interpretations of loneliness that keep changing through the experiences of individuals made it necessary to define the scope of this project. Each state of loneliness is the perception, regarding one's experiences at the moment. What seems to be the most interesting from a design perspective is how people shift their perceptions. To make this design project possible in the given time, I decided to investigate the shift between the state of aloneness and the state of loneliness.
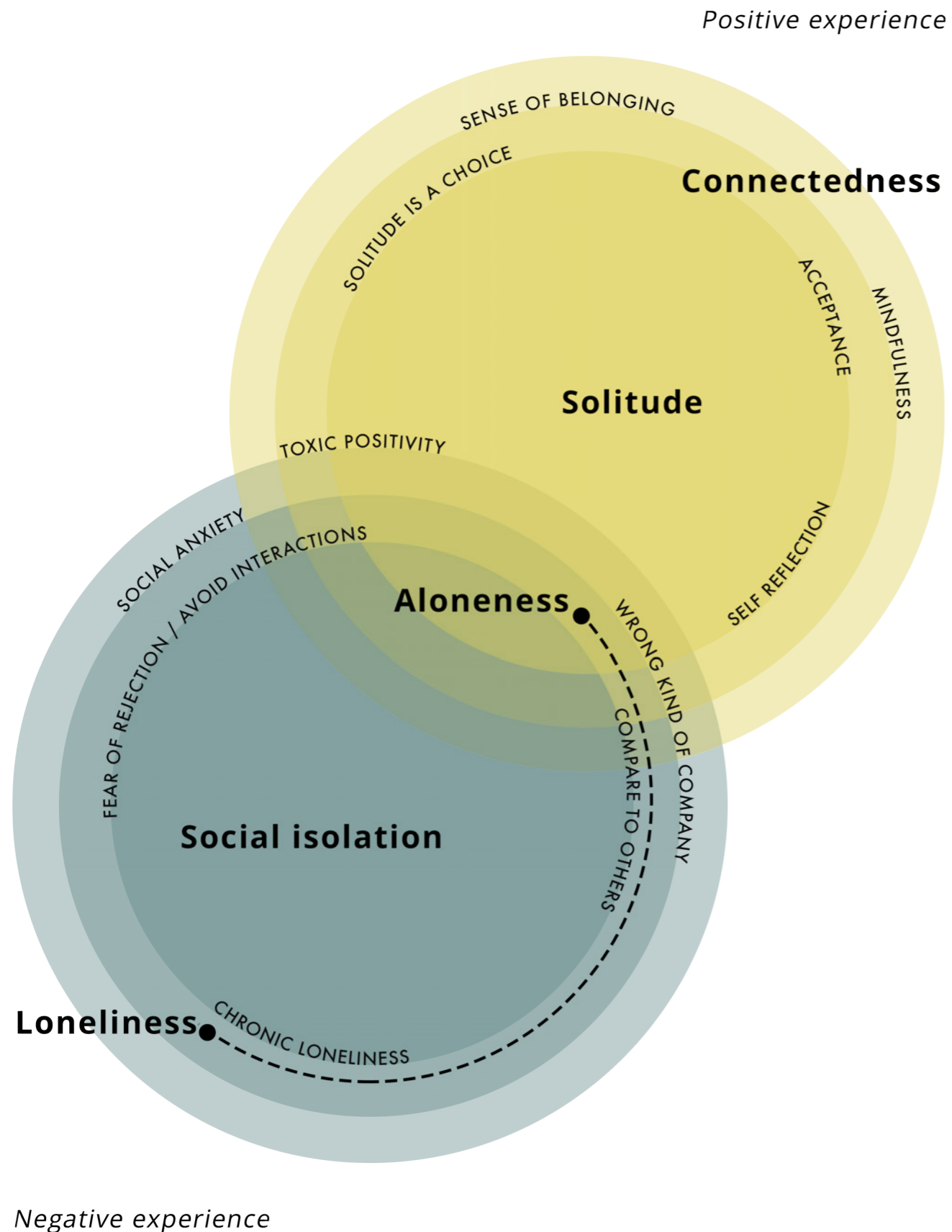

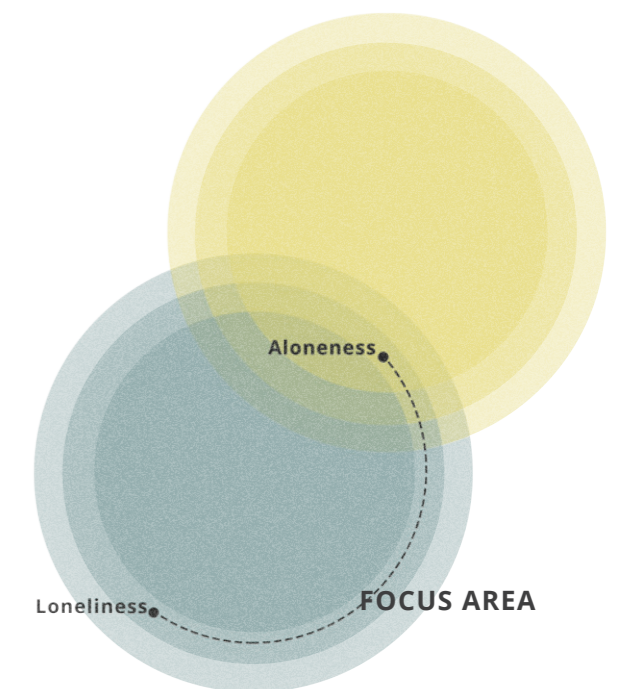Aloneness

Loneliness

FOCUS AREA

Figure 07. The focus area in this thesis

THE PUBLIC REALM

For this project, public space considers all spaces, including streets, sidewalks, squares, and any hard surface spaces accessible for everyone.

Public space is often determined by the behavior of its inhabitants, reflecting flows of human movements and social interactions. Activities performed in public could be divided into two categories (Carmona et al., 2009).
(1) Transportation and movement
(2) Interpersonal communications and social activities

In the past, public spaces were acted as sites with social interactions; people's personal identities were built upon exchanging thoughts and ideas with others. The concept of public areas is based on the idea of the inhabitants having something in common, therefore helping each other somehow. Throughout history, streets were the space for actions, revolutions, and celebrations to express themselves with others. Before the 19th century, public relations were for self-representation (Sennet,1976), representing identities to each other and as a whole community.

MODERN SOCIETY

With the rise of modernism, public spaces were designed mainly for the cities' expansions, focusing on functionality, zonings, and cars, putting the inhabitants the last priority. Capitalism and privatization transformed public spaces, reducing the public realm's significant roles (Nissen, 2008). With the decreased densities of housing, increased numbers of highrise buildings, which means less access to the public area, and people spend more time in their private spaces. The streets have become emptier than in the past, losing the sense of diversities, disregarding the relationships between social life and the built environment.

Sennet (1976) mentioned that the public realm has become more formal from the increased level of bureaucracy, and private life becomes distorted as people focus more on themselves and less on social interactions.

In short, this opposition between public and private has a vast effect in the disintegration of fundamental human relationships.

PUBLIC SPACE AND SOCIAL BEHAVIOR

Not only the public spaces have changed physically, but it also shifts people's perceptions. There is a correlation between the orientation of space and people's behavior. If space's characteristics are changed, it will also affect people's behavior; conversely, if you change the people's behavior within the space, the perception of individual territories will change (Stea, 1970). Because modern society shaped us physically and socially, public life has lost a sense of community among citizens.

Orientation
of

Space

Behavior   *Perception*
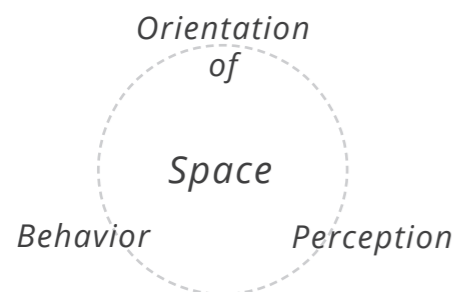
Figure 08. The use of space

To better understand how physical space can affect social behavior, Gehl (2010) explains three types of public activities.

(1) *Necessary* is the activities that people have to take, such as working and running errands.

(2) *Optional* is when people enjoy walking down the street, sitting on the public benches, etc.

(3) *Social* is the activities, including all communication types among people in the social spaces.

When the quality of the physical environment in the public space is high, people tend to do optional activities more, leading to increased social interactions. See figure x. As discussed earlier, public spaces nowadays are designed to pay little attention to social integration. People are not able to identify themselves with the community, losing belongingness, and becoming lonely.
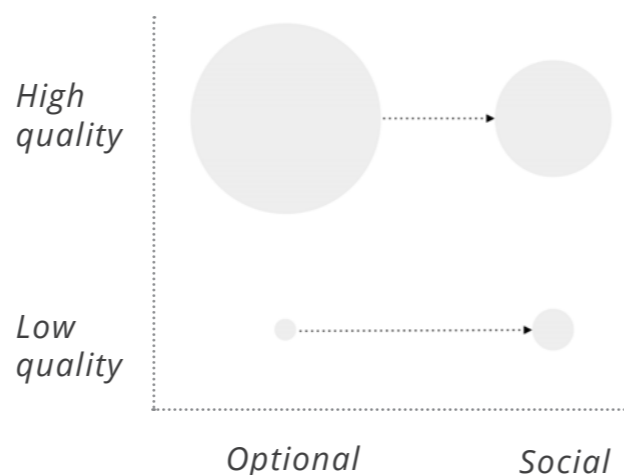
High quality

Low quality

Optional   *Social*

Figure 09. Quality of physical environment and social interactions

PUBLIC SPACE AND LONELINESS

Social loneliness is the effect of the lack of belongingness with the surroundings and people around them. It has been proven that with a certain amount of social integration, people felt a sense of community, increasing the levels of safety and security (Francis, Jacinta,2012). Additionally, time spent in public spaces helps increase the attachment and sense of community, reducing loneliness feelings (Cattell et al., 2008; Kweon et al., 1998).

The feeling of belonging together happens around everyday social interaction, such as children playing together, small talk concerning each other's health, all those cases and joys that one tends to underestimate the importance of small interactions.

The reason city inhabitants become an outsider in their environment is often from the underestimated involvement in planning and using (Hertzberger, 1991). The dwellers in the houses are not concerned with space outside. However, they still have to use it, leading to alienation in their environments.

The exciting aspect of a research question is how a design intervention can shape public life and postpone social loneliness.

INDIVIDUALISM

Individualistic cultures stress the needs of the individual over the needs of the group as a whole. In this type of culture, people are seen as independent and autonomous.

Cultural norms are reflected in people's behavior and identities (Cialdini, Kallgren, & Reno, 1991). More individualistic people tend to have less social integration, less variety of relationships, and lower frequency of contact, which leads to an essential factor for loneliness.

The trend was started before the nineteenth century by Protestant theology (Cacioppo & Patrick, 2008). It was enhanced by the industrial revolution when people begin to migrate to the big cities. The main focus for people's lives is better economic circumstances and individual goals. Nowadays, people highly value independence, autonomy, self-sufficient, and uniqueness with this ongoing trend. They become even more isolated from friends and families than before, making them more vulnerable to any type of loneliness.

ENVIRONMENT AND SOCIAL BEHAVIOR

This chapter presents an analysis of concepts representing the interpersonal control mechanisms to social interactions such as personal space, territory, and privacy.

1 TERRITORIAL

Territorial is a self or group boundary-regulation involving personalization, marking, and claiming the ownership of a place (Altman, 1975). It is designed to regulate social interaction and satisfy people's social motives. One of the common characteristics of animal and human territorial behavior is the use of markers. It is a symbol used to define their boundaries to control social interactions around them.

2 PRIVACY

The definition of privacy stresses the idea of control, regulating the interactions with others. It can also be defined as features of self-identity (Altman, 1975). Privacy can be viewed from two perspectives: (1) the desired level of interaction, (2) an outcome of the actual interaction. Concerning loneliness, people will fall into the phase of isolation when the desired level of privacy is high, but the achieved level of contact with others becomes low. In contrast, if people spend too much time with others, it will lead to crowding, which is also undesirable. See figure x.

3 PERSONAL SPACE

Personal space refers to an invisible bubble, which is the area around the body of a person. It is one of the control mechanisms regulating privacy and social interactions. It often leads to discomfort and anxiety when this area is disrupted. For this project, to what extent are designed environments designed to adapt to each person's personal space regarding their desired situations.
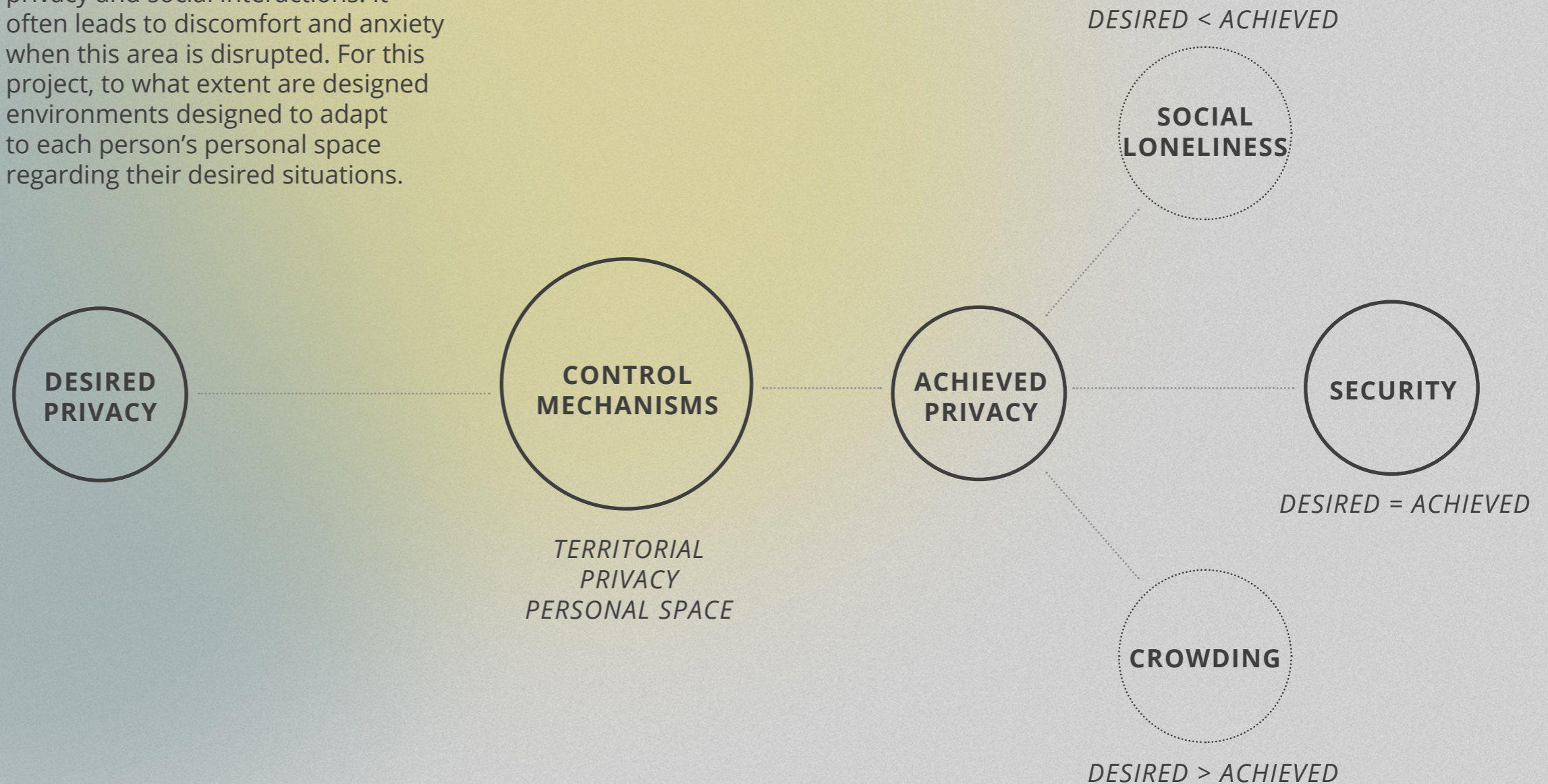
DESIRED < ACHIEVED

SOCIAL LONELINESS

DESIRED PRIVACY

CONTROL MECHANISMS

*TERRITORIAL
PRIVACY
PERSONAL SPACE*

ACHIEVED PRIVACY

SECURITY

DESIRED = ACHIEVED

CROWDING

DESIRED > ACHIEVED

Figure 10. Principles of privacy

INTERVIEW

Ami Rokach
Psychologist,
Researcher about loneliness

Sanders van der Ham
Urban psychologist,
Social spatial designer at
STIPO, Placemaking EU

Cognitive behavioral therapy
psychologist

Figure 11. Experts interview

Experts interview

Experts interviews were held via Skype because of the Covid-19 restrictions. Three people were selected. For these interviews, an interview guide wasn't used because they had different perspectives on the topic. Before the interview, additional details about this project were explained.

Goals

(1) To get a clearer image of loneliness
(2) Different ways of treating loneliness with their professions.
(3) The developments in their fields.

Process

(1) The short summary of the research question and consent forms were sent out.
(2) The meetings were held through Zoom due to the situation with Covid-19

Non-experts interview

6 participants were asked to take a picture or a video at any moment that they start to feel lonely (See figure 12). After a week of these small experiments, the participants were asked about their experiences and their attitudes towards loneliness.

Goals

(1) To find the patterns or activities of the people's behavior regarding to loneliness.
(2) Check their emotions before and after the experiment
(3) To see the way they cope with loneliness.

Process

(1) Short explanation about the experiment and consent forms were sent to the participants.
(2) In 1-2 weeks, the pictures, videos, and voice recordings were sent from the participants
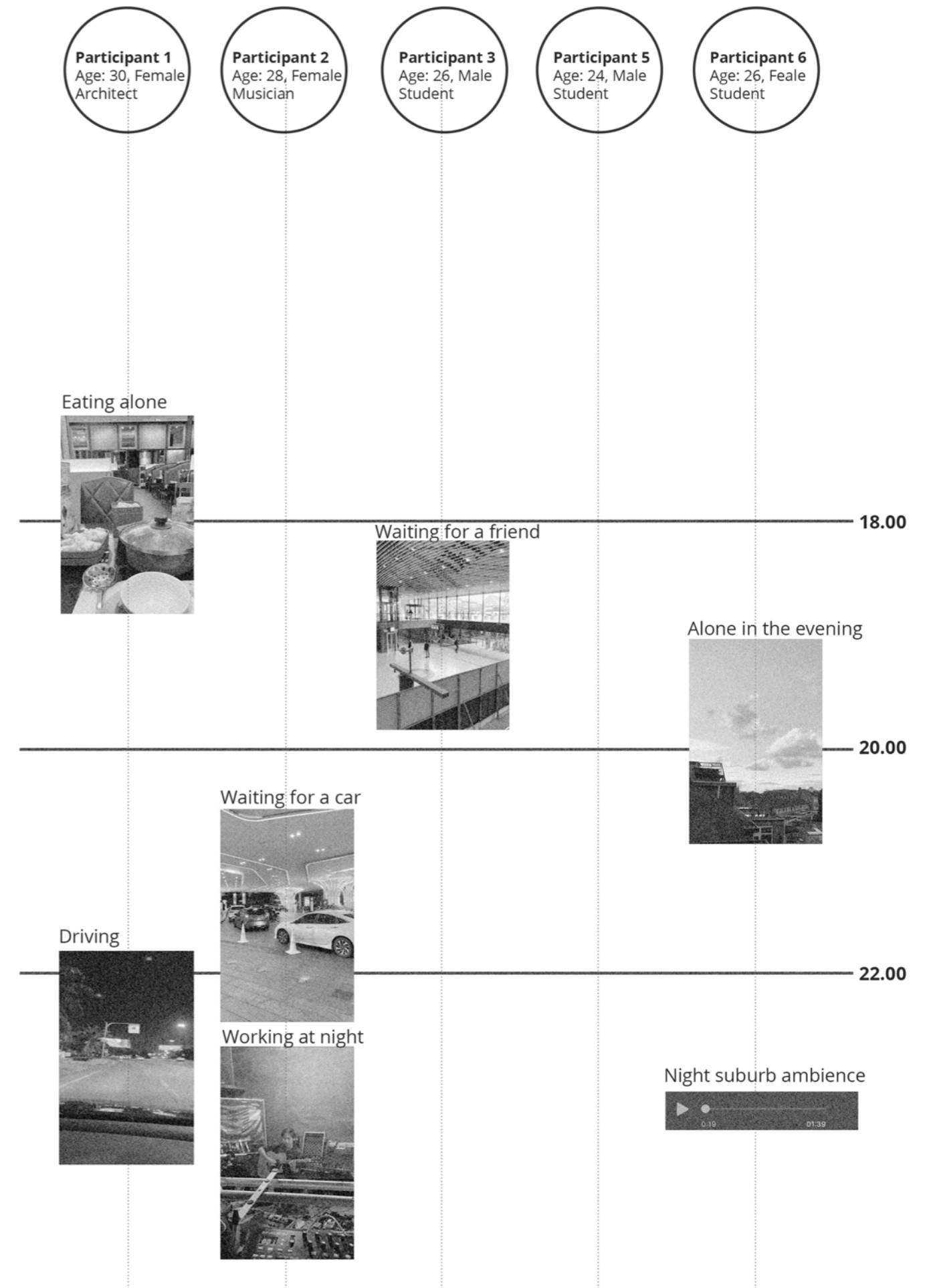(3) Informal interview were held with each participants.

Figure 12. Non-experts interview

Key insights

The two psychologists pointed out the same direction about the psychological aspect of loneliness. Reactive loneliness occurs when people are self-focused. They are aware of the feelings inside. Society nowadays also forces people to become self-obsessed by comparing their inner self with other people's outer images, leading to loneliness.

The interview and experiment with non-experts also showed that people get lonely at the end of the day after being busy, making them realize the loneliness and emptiness.

Loneliness is subjective, and how individual copes with it are various. It depends on their backgrounds, such as childhood experiences and genetics. However, the familiar feeling when people are not lonely is the feeling of security and trust.

People often feel lonely when surrounded by too many people, especially when they don't know each other well. They feel like they don't belong in that place or situation. Sometimes it happens when the environment is unfamiliar.

From the interview with an urban psychologist, the environment can help to provide a sense of security. It should be designed in a way that evokes some interactions and leaves room for adaptations.

> " At the end of the busy day, I suddenly felt so lonely. "

"This kind of noises make me feel empty, and maybe lonely too.

> " So what do these benches mean for people walking on, on the streets, like if you pass through the streets, you don't live there, but you see these benches that sort of evoke a sense of trust a sense of safety because you do feel that people have claimed the spaces. "

OBSERVATION

Figure 13. Observation (Blaak, Rotterdam)

The observations were aimed to find similar patterns of people's behavior between them and the environment such as sidewalks, plazas, and parks.

Goals

(1) To see the patterns of people's social life and how they interact among each other and the public space.
(2) To see case studies of the existing design elements in the public space.

Process

(1) Pick the location and stay there observing for 30mins to 1hour.
(Schouwburgplein, Lijnbaan, Blaak)
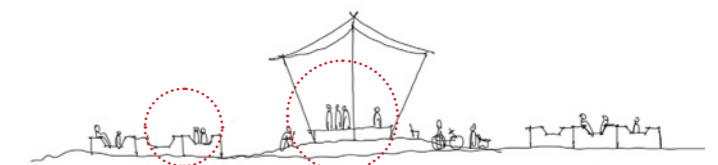(2) Video recording
(3) Activity mapping

Figure 14. Activities sketch

Key insights

People often chose to be near other people without interacting with strangers. They also chose the spot where they have the best view and have more privacy.

This observation turned out to have the same results as the studies Field Guide to Life in Urban Plazas by Domlesky and Schlickman (2019) in New York. For example, people seeking privacy often chose to sit where there is good visibility to others with strong backings such as walls, plantings, furniture, etc. See figure 15.

People also tend to occupy the 'In-between' space, such as seating areas that felt sheltered but close to an exposed area. These types of seatings were fully occupied. See figure 16.

Another fascinating insight is people always make furniture out of anything. They sit on objects that are not meant to be seating furniture, such as curbs, planting, electrical boxes, etc. See figure 17.

From the observations and the research review from Domlesky and Schlickman (2019) about city dwellers' patterns, behavior patterns can be useful in this design project.
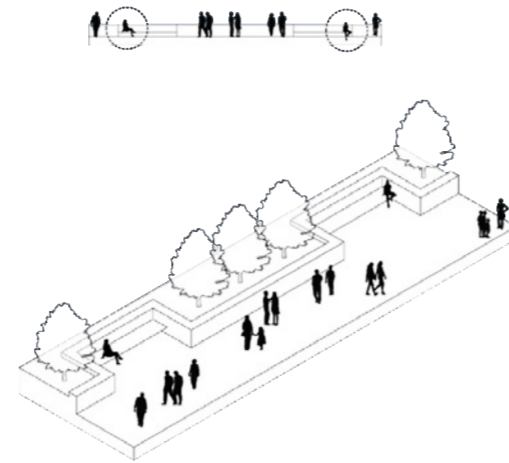
Figure 15. Patterns of social life in the cities
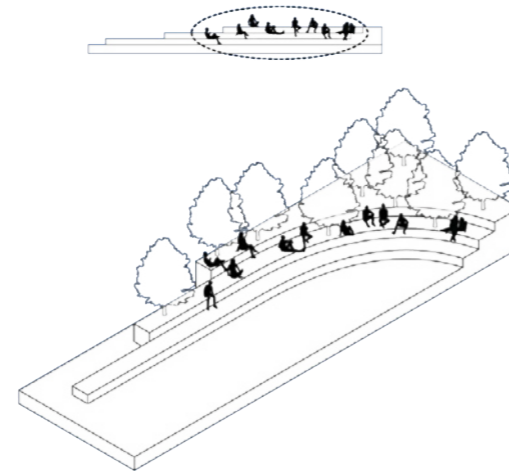
Figure 16. Patterns of social life in the cities
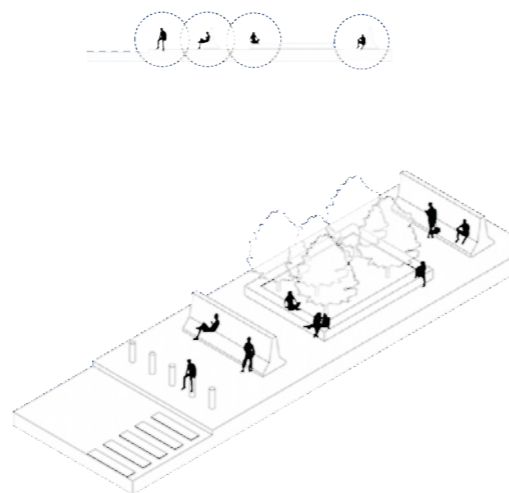
Figure 17. Patterns of social life in the cities

DESIGN FOR SOCIAL BEHAVIOR

Offering incentive, design as an instrument

With the rise of modernism, urban spaces are mainly designed for functionality. It was the expression of efficiency. The solutions for design problems often led to flexibility, making everything look the same, lacking identity and diversity.

As discussed earlier, public spaces without identities often lead to emptiness and loneliness. Additionally, people wish to interpret their identities into the usage of space. The designed product should offer an incentive, suggesting possibilities for a different kind of adaptation and addition (Hertzberger, 1991). The product should act as an instrument, letting users define their ways of using within the limitations of the design.

By increasing accomodating potential to make space more receptive to different situations enables people to take possession while creating the circumstances for contact with others. The more people can personally use the things around them, the more they will feel emotionally involved and feel a sense of belonging.

VISION

CLUSTERS

After gathering all information from desk research and interviews, all the insights are formulated into context factors. As explained in ViP, factors should be original and affected the values of the designer. In the end, 140 factors are documented in a field type matrix (See appendix a), categorized by different fields (Psychology, Environmental psychology, Socio-economic, Technology, Culture, Demographic). Each factor is divided into States, Principles, Developments, and Trends.

At this stage, it is possible to see that some factors are connecting under the same themes, and some factors stand out and could play a significant role later in the design phase.

Clustering method

All factors are divided into 9 clusters under three main categories (see figure x).

Individual	1. Self identity
	2. Self awareness
	3. Privacy/territory
	4. Lack of control

Society	5. End of public/private
	6. Individualism society
	7. Belongingness

| Place | 8. Sense of place |
| | 9. Patterns of social life |

Figure 18. Clustering

INDIVIDUAL

LACK OF CONTROL

LACK OF CONTROL

BALANCE OF PRIVACY/TERRITORY

PRIVACY / TERRITORY
(CONTROL MECHANISMS)

SELF IDENTITY

SELF IDENTITY (GENETIC)

SELF AWARENESS

SOCIETY

PUBLIC

PRIVATE

END OF PUBLIC / PRIVATE

BELONGINGNESS

INDIVIDUALISM

PLACE

SENSE OF PLACE

PATTERNS OF SOCIAL LIFE

Figure 19. Clusters

SELF IDENTITY

Factors:

Locus of control refers to which a person feels in control over the events that influence his/her life. There are two types :
Internal control - believe that they are in control.
External control - believe that their lives are guided by fate, luck, external circumstances

Attachment theory : The way we are treated in childhood has a long-term effect on who we are, including the way and the frequency that we feel loneliness. For example, people who are securely attached have the lowest amount of loneliness. In contrast, people who are anxious will have the highest amount of loneliness.

Essential loneliness is embedded with our personality, it can be explained as a result of genetic inheritances or childhood experiences. Those people who are lonely from this type of loneliness cannot simply be cured unless they take a serious psychotherapy.

The level of vulnerability depends on genetic inheritance, cultural backgrounds, personal features (self-esteem, shyness, etc)

Culture differences: There are cultural-psychological risk factors for loneliness based on different ideas about how individuals should be socially embedded.

Everyone is born differently. Genetics, races, nationalities, childhood environment, gender, age play a huge role in their vulnerability to loneliness. It has a direct effect on their mentality, wants, needs in social interactions. The most common thing that can differentiate people from one another is the attachment theory. The way people are raised in childhood has a long-term effect on who they are becoming. These psychological factors have a significant impact on the level of loneliness.

SELF IDENTITY

LONELINESS   ALONENESS

Figure 20. Cluster, Self identity

SELF AWARENESS

Factors:

Focusing on yourself makes you realize the emotions inside. Self-reflection time can help people learn to improve themselves.

When making decisions we generally do in two ways. When people make snap-decisions, they are likely to do it through system 1 (which is automated), while they use system 2 (slow, conscious, rational) for the more thought through decisions (logical, take more effort, use to recheck the decisions made from system 1).
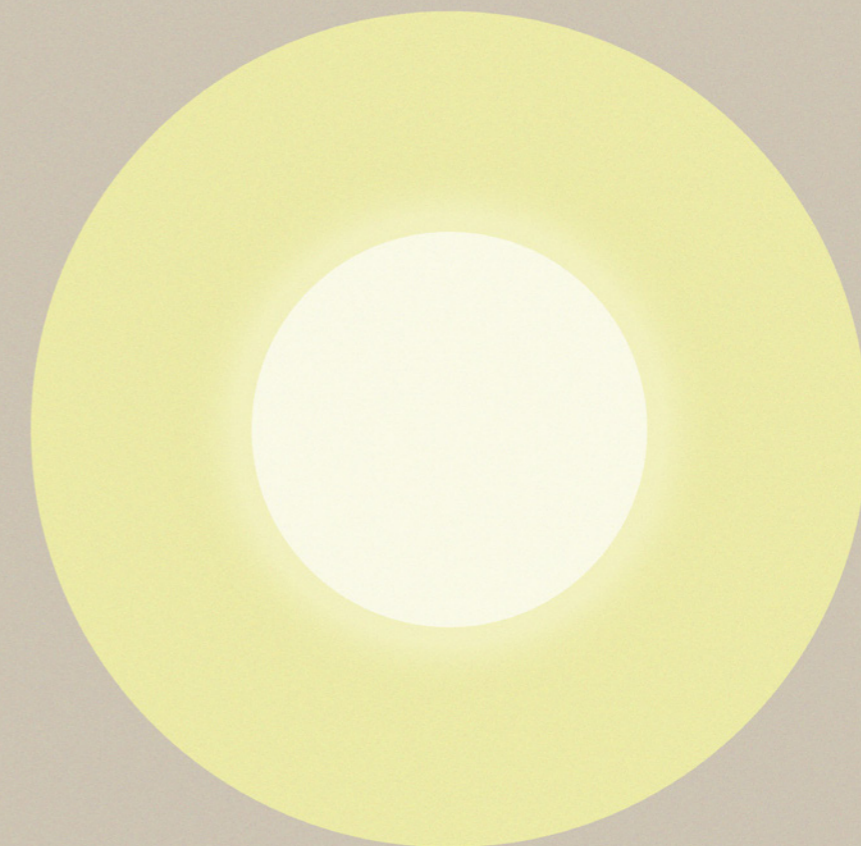- *Stroop effect (you need to use system 2 thinking process)*

Knowledge can prevent biases.
Using two survey instruments (the UCLA-3 loneliness survey and the SD-WISE wisdom survey), the researchers found that loneliness and wisdom had an inverse relationship.

Solitude is one way to welcome aloneness. It can be used as their reflecting, relaxing, etc moments.

When people acknowledge their feelings, whether negative or positive, they are aware of what is going on inside and have control over it. By accepting their feelings, people become more rational, tolerant of adverse situations, and less lonely. Factors are explaining that it is possible to practice the thinking process to think consciously.

SELF AWARENESS

LONELINESS

ALONENESS

Figure 21. Cluster, Self awareness

PRIVACY/TERRITORY

People want to have control over their privacy — to open and close at any time they want. Having the freedom of choice gives people a sense of security. Loneliness occurs when there is an imbalance of privacy.
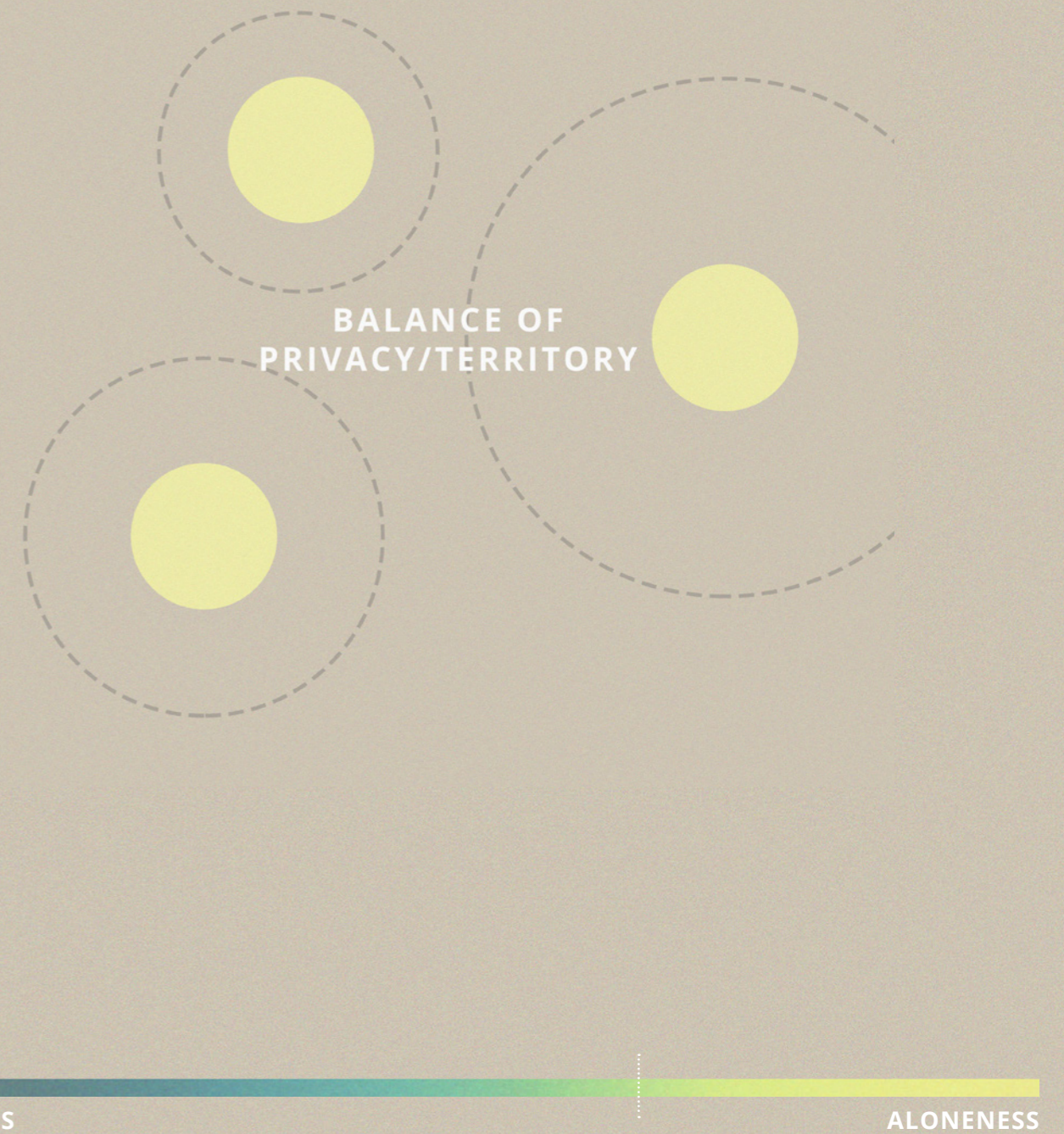
Factors:

Territoriality in humans is a pattern of behavior and experience related to the control. Personalization, marking, and status are used much more often than physical aggression to control space and ideas. Architects can and should incorporate knowledge about territoriality to allow building users as much control as they are capable of responsibly exercising and as the organizational context allows; territory holders then benefit from a greater sense of self-determination, identity, and even safety. (Altman,1975)

Privacy is an optimizing process, with it being able to have too much privacy as well as too little privacy. (Altman,1975)

When achieved privacy is lower than the desired privacy, such situations are labeled as intrusion, crowding, invasion of privacy. When achieved privacy is greater than the desired privacy, it is loneliness, or isolation.

The combination of Privacy and Territory creates feelings of security. (Taylor, Ferguson,1980)

BALANCE OF PRIVACY/TERRITORY

LONELINESS

ALONENESS

Figure 22. Cluster, Balance of privacy/territory

LACK OF CONTROL

When people have little or no control over their social relationships and situations in life, they become vulnerable and will try to escape from reality. It usually happens when a significant change affects a person emotionally; he or she will become self-preserved and avoid any interactions, which results in chronic loneliness.
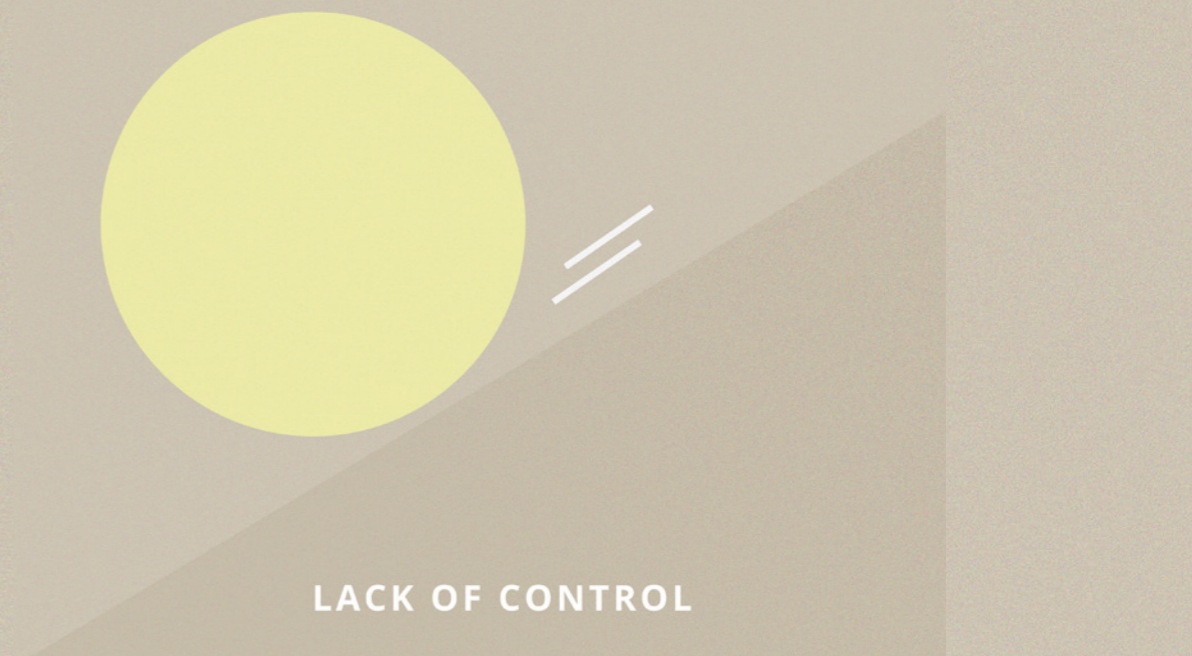
Factors:

Self-preservation mode is one of the ways people try to escape from loneliness unconsciously. Their minds interpret social interactions incorrectly.

Security blanket : When there is an uncomfortable situation people tend to check their phones or act like they've received some notifications. (Security blanket)

Oxytocin increases sensitivity to the salience of social cues. (both negative and positive)

Loneliness produces cognitive biases, affecting hormones level, and leading to mental illnesses. This creates dysregulation in the cognitive process, making them unable to evaluate others' interactions.

There is a significant correlation between feeling lonely and exhaustion. The more people are exhausted, the lonelier they feel.

Learned helplessness : This theory explains the shock escape from inability to control trauma. It directly interferes with adaptive behaviors in many species. It is caused by the acceptance of powerlessness.

LACK OF CONTROL

LONELINESS   **ALONENESS**

Figure 23. Cluster, Lack of control

BELONGINGNESS

Factors:

The feeling of belonging together happens around everyday social interaction, such as children playing together, small talking in the corridor, etc.
Public spaces are basically expressions of the plurality of individuals.

6 Social needs : There are six social needs that if unmet, it contributes to loneliness. (Weiss)
    Attachment
    Social integration
    Nurturance
    Reassurance of worth
    Sense of reliable alliance
    Guidance in stressful situations

Collective self-concept is composed of attributes that a person shares with others in the group (that they belong).

People fear to be excluded or left alone, and often have the anxiety of not belonging to society. (Bauman, 2015)

Less social participation is a problem of losing the human ability to play roles in the public. (Sennet, 1977)

The need to belong is instinctual. People are born with this feeling of wanting to be part of something, wanting to help each other out, and share memories. This feeling motivates us to keep connecting and building social relationships with others. People's identities are derived from shared identification with a social group. Social integration contributes to a sense of community, increasing their feelings of safety and security.

BELONGINGNESS

LONELINESS

ALONENESS

Figure 24. Cluster, Belongingness

END OF PUBLIC/PRIVATE

Factors:

The other-directed individuals identify themselves through references of others in the communities. (by their taste in music, food, travel, and so on)

Other-directed individuals can identify themselves through the references of others.

The blurred line between public and private. Private and intimate activities are held in public spaces and vice versa.

The social media exploited users for financial gain by collecting and selling their data. It is made to create an addiction, causing loneliness, alienation, etc

Online engagement is not intimacy. People use the screen as a protective membrane, creating a new online identity to gain more acceptance.

The existence of people's identities is shared and maintained online.

With its fast development, the digital age has thrown us into a new realm where privacy and human rights are violated. The barriers between public and private are dissolved, and every decision is made based on a technology-influenced society. It is the end of the public and private divide. Social media has exploited users for financial gain through data mining. All activities of users are maintained and shared online. It is designed to capture users' attention as long as possible. With this technology-driven world, people also use social media as the protective membrane. They can create a new online identity, choose whether or not to reach out or hide. Although people can connect online, it is still far more different than the real connection, and in the end, people tend to feel lonelier than usual because they can't find real intimacy.

PUBLIC

PRIVATE

LONELINESS

ALONENESS
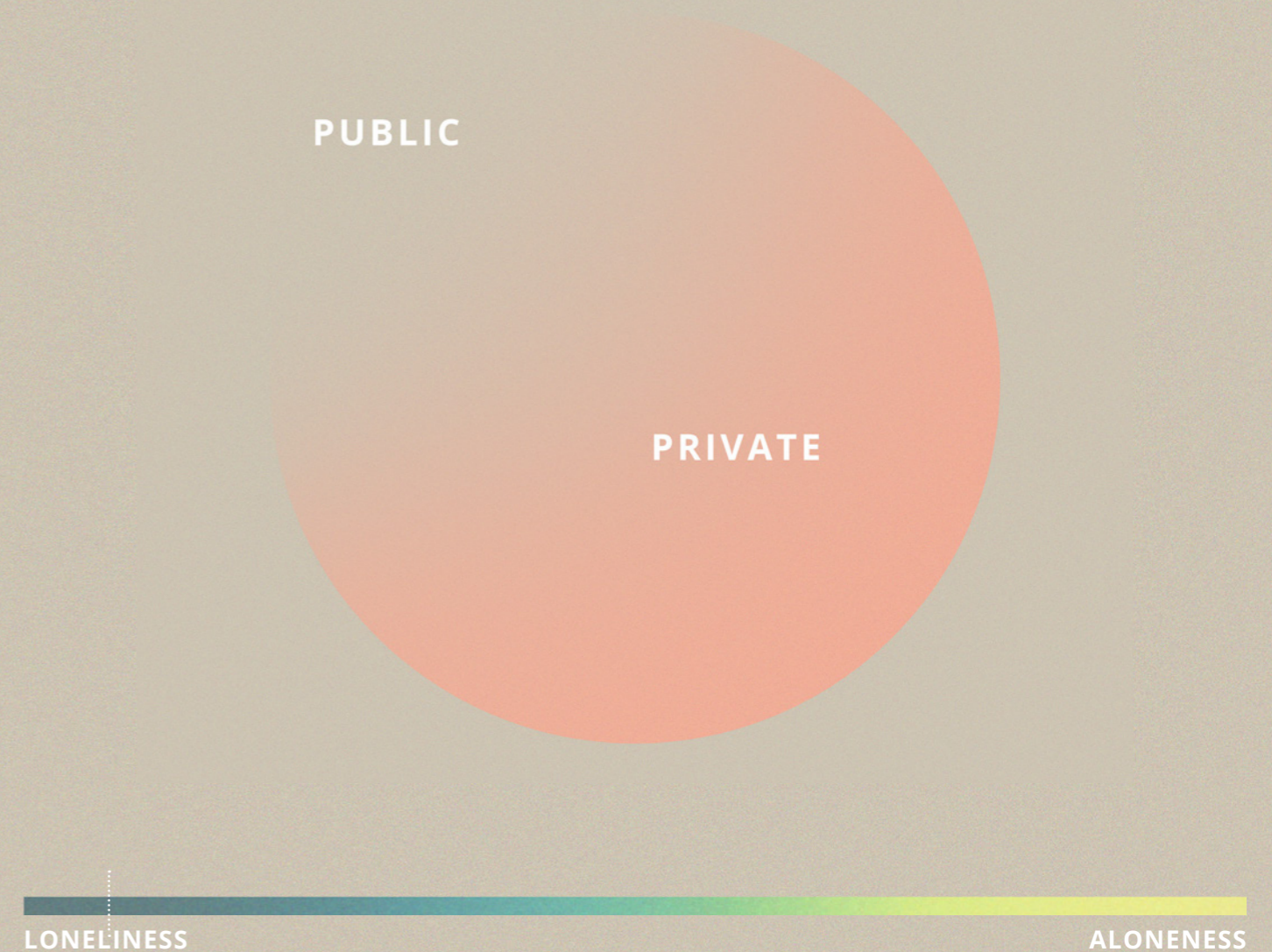
Figure 25. Cluster, The end of public/private

INDIVIDUALISM

This trend started with individualism and capitalism, promoting private ownership, run by profit motive and competition. This concept influences people to only focus on their individual goals and detach themselves from others. People's better economic situations also make them need each other less and avoid unnecessary interactions, resulting in a more divided society.
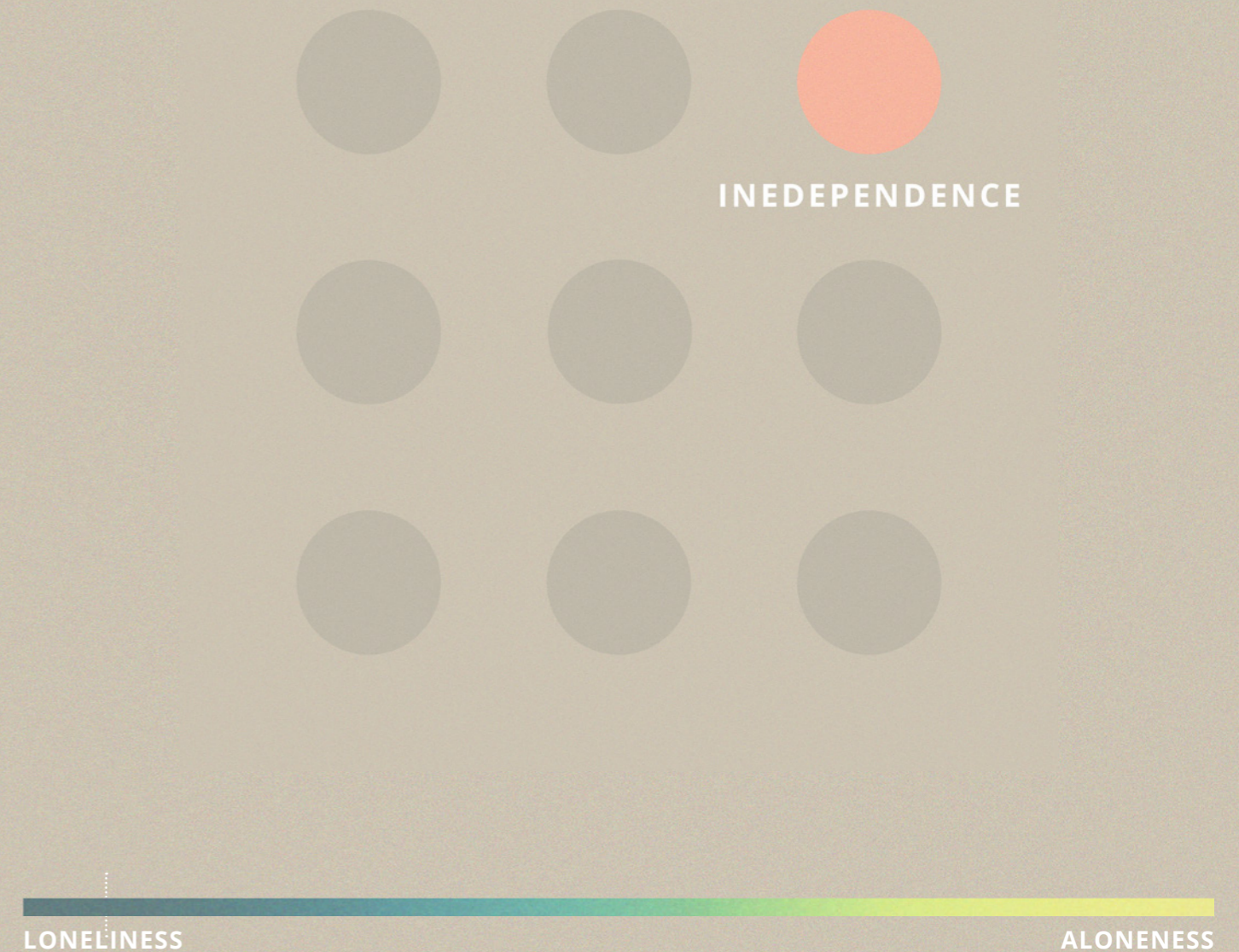
Factors:

Modern urban planning principles were made for functionality, zoning, and automobile transportation. This has changed the way the citizens live. There's less space to interact, making people disregard social life.

There is an improvement in the size and quality of the housing, it implies that people spend more time indoors and less in the street.
Individualism is driven by profit motive and competition.

Almost 40% (3.0 million) of all 7.9 million households consist of one person. The single-person household is the most common type of household. (In The Netherlands

Individuals are effectively less socially embedded. As such lower embeddedness (e.g., less variety of available relationships, lower frequency of contact seems to be an important structural risk factor for loneliness.

INEDEPENDENCE

LONELINESS

ALONENESS

Figure 26. Cluster, The individualism

SENSE OF PLACE

Factors:

Development of basic cognitive processes: perception, attention, and memory. The cognitive processes are mental operations of thought that help us to adapt to the environment.

The physical aspects of the city are presumed to affect residents' actual behaviors in urban spaces, such as how fast they walk, how the parks are used, or where people choose to sit.

If you change the characteristics of the space, you will also change the behavior conversely, The perception of the individual territories will change.

Cognitive maps are the type of mental representation that serves an individual to learn information about the locations.

Place attachment can't be instantly attained. People need to spend time in a place, hear the stories, to be part of a center there.

It is the study of how people use knowledge about their environment to determine where they are, obtain resources, find their way home, how differences in background and sensory ability could play a role in shaping self-identity. Using their knowledge to identify a place, people tend to feel safer around that area, increasing their sense of place.
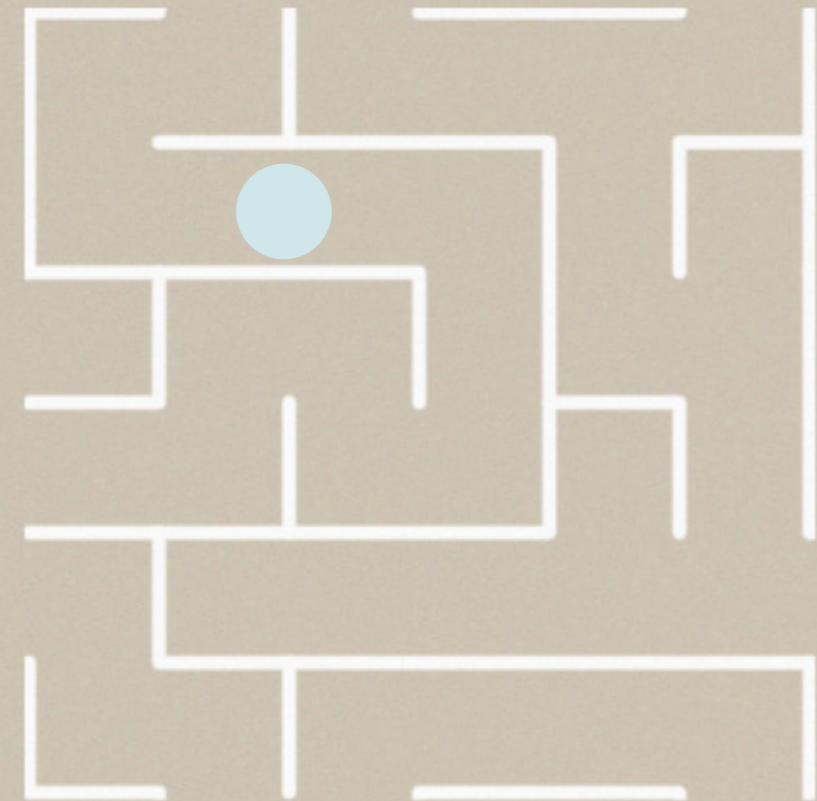
LONELINESS

ALONENESS

Figure 27. Cluster, Sense of place

PATTERNS OF SOCIAL LIFE

People need to be able to place their markings, have the freedom of choices in where to go, what to do, who they interact with, and relate and identify. These factors explained the patterns and how people behave in public spaces.

Factors:

They seem to be attracted to spaces with a medium to the high density of people over spaces with a lower density.

People seeking privacy with good visibility. Individuals eating alone, on a phone call, or reading often found seating outside of the main plaza space and off of the main circulation routes. Favored locations tended to have strong backing (walls, furniture, or planting) and clear views out into the plaza.

People tend to occupy protected, in-between spaces. Liminal plaza zones -- seating areas that felt sheltered but were directly adjacent to a more open and exposed area. These type of spaces were very crowded and had long dwell times (often more than 30 mins/group)

By increasing accommodating potential to make space more receptive to different situations enables people to take possession. Ex. seating - a place to sit offers an opportunity for temporary appropriation, while creating the circumstances for contact with others. The establishment of contact is like the process of seduction, making claims that the retreat is possible for users at any time.

PATTERNS OF SOCIAL LIFE

LONELINESS   ALONENESS

Figure 28. Cluster, Patterns of social life of cities

BUILDING A WORLD VIEW

All of the clusters represent the driving forces towards loneliness and aloneness. See figure 29 on the next page for the worldview.

To have a clear image of loneliness, clusters are plotted into the two-dimensional graph. The first axis indicates the two opposing sides, the state of loneliness and aloneness. The other axis indicates the people's ability to control their situation.

In the bottom-left, three clusters (Individualism, End of public/ private, Lack of control) are the driving force towards loneliness and unable to control area.

In the bottom-middle, the Self-identity was plotted. This area means that the information in this cluster was neither heading towards loneliness nor aloneness. However, it can not be changed.

In the bottom-right, two clusters (Balance of privacy, Patterns of social life) were plotted. This means that these two are the driving forces towards aloneness, but controlling the situation is not much.

In the top-right, there are three clusters (Self-awareness, Sense of place, Belongingness). This area represents the strongest driving force towards aloneness. Moreover, people can control situations.

Plotting clusters into the two-dimensional graph gave a clear picture of a promising area to postpone loneliness.

See figure 29. the highlighted clusters (black square) were the chosen area.

These clusters are selected among the nine. 'Lack of control' has the most potent force to make people lonely. In contrast, the three clusters on the right side, 'Sense of place,' 'Belongingness' and 'Self-awareness' are the strongest forces to keep people in the state of aloneness (okay to be alone), which can be concluded as a sense of security (in control). See figure 30 for the conclusion of the world view.
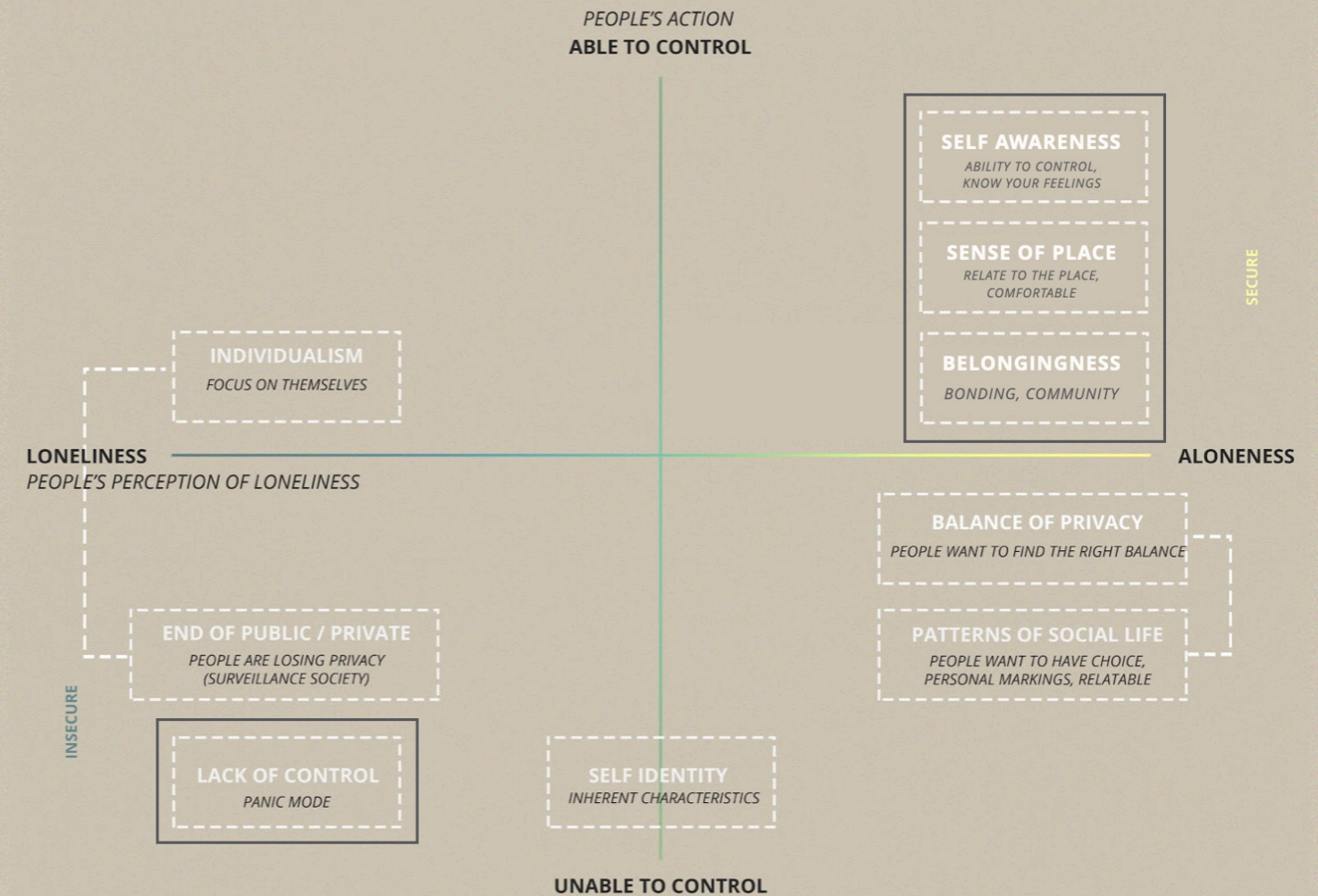

Figure 29. Dimensions of the clusters (Building a world view)

WORLD VIEW

These clusters are selected among the nine. 'Lack of control' has the most potent force to make people lonely. In contrast, the three clusters on the right side, 'Sense of place', 'Belongingness' and 'Self awareness' are the strongest forces to keep people in the state of aloneness (okay to be alone), which can be concluded as a sense of security (in control).

POSTPONE

SENSE OF SECURITY

LACK OF CONTROL

SENSE OF PLACE   BELONGINGNESS   SELF AWARENESS

LONELINESS

ALONENESS
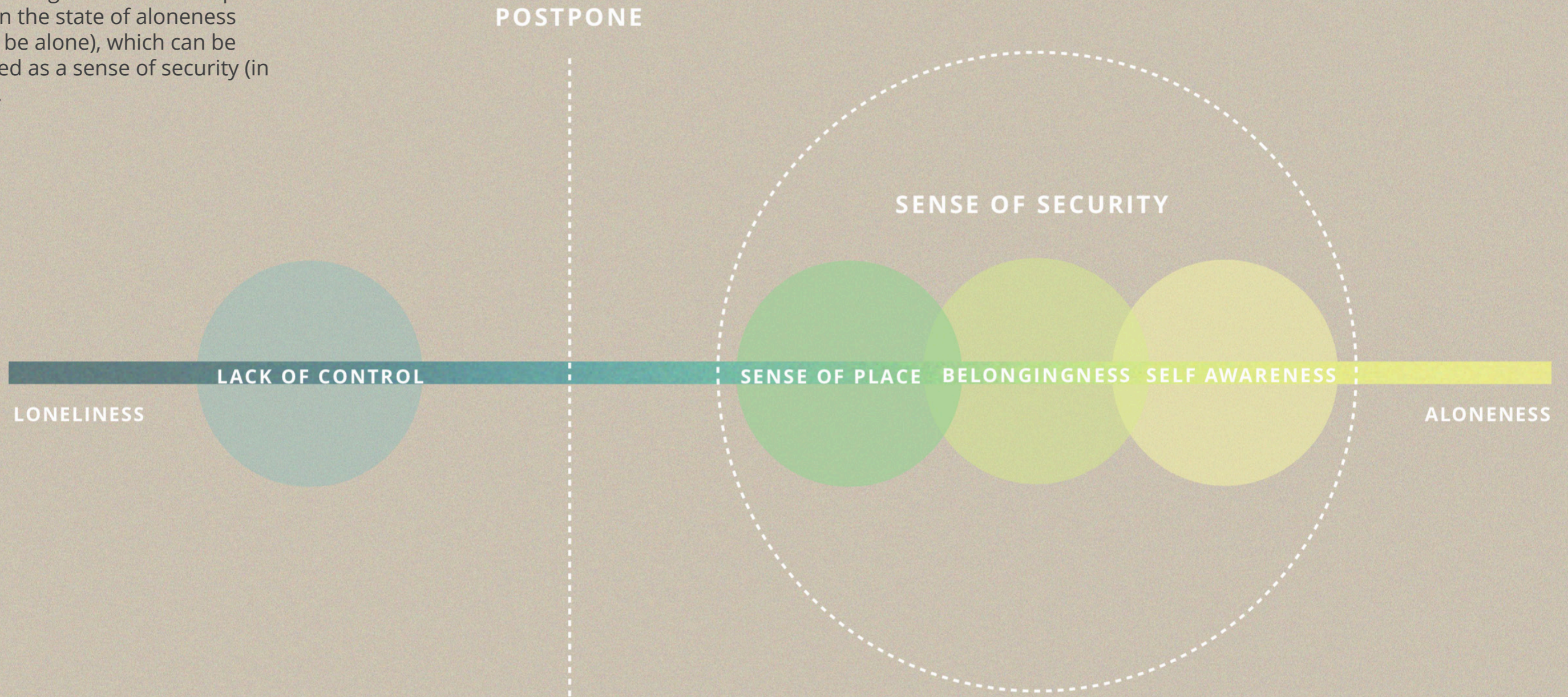
Figure 30. World view of loneliness

DESIGN STATEMENT

A statement defines what the design goal for the product is. It should help the designer to see the opportunities for the design intervention. After the realization of the world view, a design statement is formulated as:

"I want to enhance people's sense of security by giving them agency in the environment."

From the created world view, there are many possible opportunities to tackle loneliness in the public domain. However, the chosen statement was formulated from selecting the critical driving forces that could lead to the most promising design solution, as is shown in the world view (figure 30).

Sense of security
A sense of security ensures people stay in a state of aloneness (alone but not lonely). For this project, a sense of security is the combination of having asense of place' and 'self-awareness'.

Agency
Having an agency in the environment means that people can control the situations, be part of the place, and feel more secure.

"I WANT TO ENHANCE PEOPLE'S SENSE OF SECURITY BY GIVING THEM AGENCY IN THE ENVIRONMENT."

Sense of security
Sense of security makes people stay in the state of aloneness longer.

Agency
Being in control helps people become more aware of their situations, and feel secure.

INTERACTION VISION

The interaction vision is an analogy that explains the way users will interact with the design intervention. The interaction will act as an appropriate means to realizing the design goal, as formulated in the statement. Therefore, it should be specific enough to enable a designer to define the values the product is proposing to the users.

The interaction vision used for this project is **"Like when you're choosing a song in a bar."**

This can be explained with the following scenario. You enter the small and cozy bar. They have a jukebox or shared Spotify playlists, allowing (or inviting) you to add the music freely with just a simple click. After you pick a song, you feel the agency of the atmosphere. Slowly, you feel more comfortable and secure.

This scenario will be used to build the interactions/experiences between users and the product.

Interaction qualities

This interaction vision has important qualitative characters that will help designer to create a specific effect in the product. As ViP suggests, these characteristics are defined to give a clear qualities of the desired interaction between users and the product. Additionally, the qualities from selected interaction vision are:

Incentive
The atmosphere of the cozy bar is encouraging users to change the atmosphere

Intant
The interaction should give users instant feedback. The atmosphere will change according to the song that users selected.

Having choices
The experience should allow users to have choices whether to change the atmostphere or select different types of music freely.

Independent
This interaction should be independent. Users will have the agency to change the atmosphere.

Relatable
This interaction allows users to identify the experiences with their personal interpretation.

POSTPONE

LONELINESS   ALONENESS
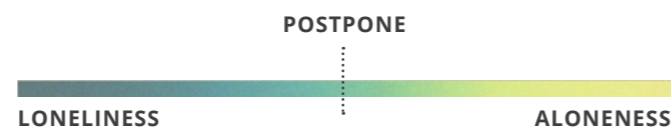
Vision conclusion

Because loneliness is the perception, shifting between the state of loneliness and aloneness. To postpone the shift to loneliness, the design intervention will enhance a sense of security by giving users the agency of the environment. By doing so, they will become more secure and less lonely.

Figure 31. Interaction visoin, bar

Figure 32. Interaction visoin, jukebox

Intuitive
The system of the product should be easy enough to let people understand the way to use it without any help.

Direct
The outcome of the product is expected. Users already know what they can do.

Adaptable
The product should be designed in a way that allows users choose their preferences.

Simple
The product should be subtle and let users explore it freely.

"LIKE WHEN YOU'RE CHOOSING A SONG IN A BAR."

DESIGN REQUIREMENT

POSTPONE

INTUITIVE

SIMPLE

LONELINESS ← SENSE OF SECURITY ← AGENCY ALONENESS
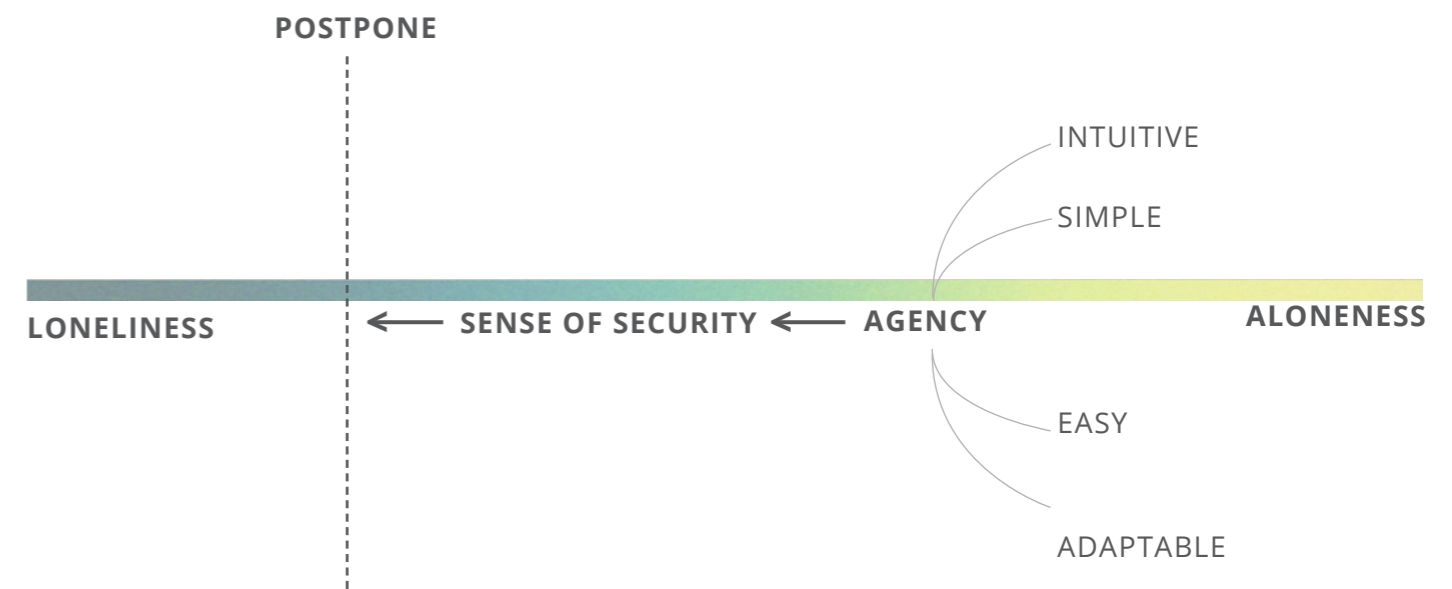
EASY

ADAPTABLE

Figure 33. Design requirements

DESIGN & IDEATION

Before starting the ideation phase, a design requirement should be stated to transition from a vision to a more tangible solution. In the ideation and conceptualization phase, this should be taken into account as a design guideline.

From the vision concluded in the previous phase, postponing the most potent driving force of loneliness has to be done by enhancing the opposite driving forces, a sense of security.

SENSE OF SECURITY

Sense of place defines the relationship between people and spatial settings. The differences in the environment and people's ability to identify themselves with a place can significantly enhance self-identity and security.

Self-awareness happens when people are aware of what they are doing and feeling (being in control). They will use analytical thinking skills, which lacks power (out of control).

Belongingness defines the relationship between people and the community. They can relate themselves to a group of people in the same interests, occupations, cultures, etc.

The product should enhance users' sense of security in a very simple and direct manner. The product is also flexible enough to let users interpret their own needs.

In conclusion, the design should fit with both the statement (sense of security, having agency) and the interaction.

IDEATION
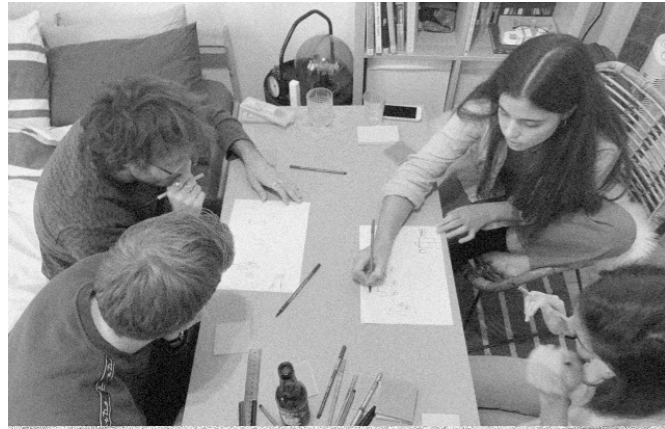
Figure 34. Creative facilitation

Creative session

Creative facilitation is the practice and skills of managing a research group by experimenting with methods and techniques to solve a design problem or expand new visions.

The session

Two creative sessions were held with four students from the faculty of Industrial Design Engineering (DFI) and three students from the architecture faculty.

Insights

To generate as many directions as possible, the sessions were held in a free manner to explore ideas that are outside the box. Then the results will be investigated later in the conceptualization phase. To postpone loneliness , the design should provide some purposes and guidance for the users. A sense of purpose helps people cope with isolation. In public settings, users should be able to relate.

Reflection

The creative session helped to broaden the project's direction and to gain a new perspective towards loneliness. Although the concept direction
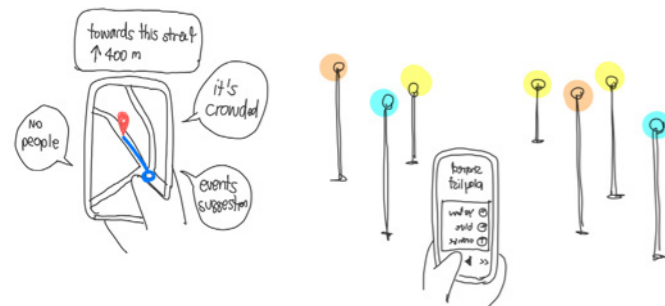
CONCEPTUALISATION

Design direction

All the design directions give users the agency in the public space. Whether it is changing the physical objects, showing new perceptions of the place, or creating their own interpretations to build new memories.

| **1**	**2**	**3**
Manipulate the space	**Perception shift**	**Composing colors**
This design direction allows users to physically manipulate the street elements such as fences and walls.	This design direction allows users to physically manipulate the street elements such as fences and walls.	This design direction allows users to physically manipulate the street elements such as fences and walls.
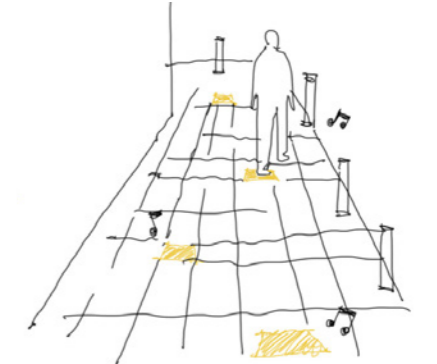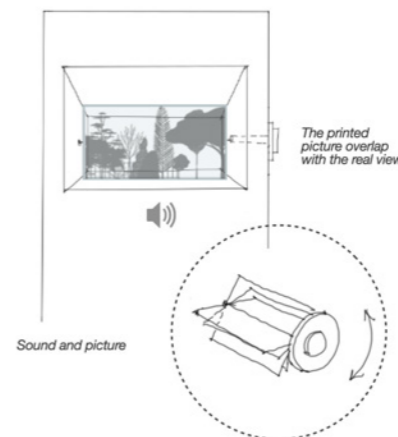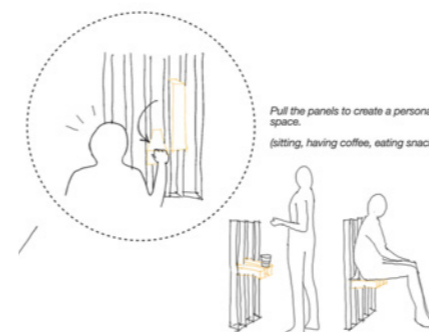
Figure 35. Concept directions

CONCEPT EVALUATION

After transforming the design vision into three concept directions, all concepts show different ways of providing agency to users. The evaluation started with finding which direction fits best with the characteristics of the design statement and interaction (product) qualities. The chosen concept direction was letting people either physically manipulate the environment or attaching the product to the place. Both approaches are proven to be the most promising direction that serves best with the design statement.

Another essential aspect of evaluating the best direction is deciding through the concept of **MEMM (Maximum effect for minimum means).** This judgment helped explain which design can be aesthetically appreciated for the intended results. The final direction is judged to fit best with minimum means and give the maximum effects for users, which is considered aesthetically pleasing.

Conclusion

Concept 1 Manipulating the environment was chosen. The remaining design question at this stage is what would be the better fit for the project whether to design a public element such as facades,

$$\begin{array}{cc} E & E_{max} \\ & \\ M_{min} & M \end{array}$$
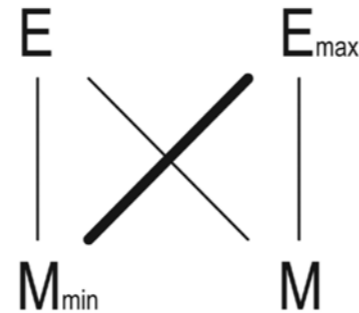
Figure 36. MEMM

fences, walls that let people play around with or design a small product that allows users carry around and plug/attach it with the existing public elements.

Both of these two directions answer all the checkboxes of the vision for this project. The remaining question is more suitable and can be applied anywhere without getting too much involved with other sectors. Which way is more straightforward.

Therefore the design outcome turned out to be a simple product, allowing users to carry and attach it to anywhere that it can fit. Users are provided the sense of agency to create their own space, serving their innate needs for having a sense of security.

The final design is presented in the next chapter.

Evaluation process

VISION

Concept:	Concept 1	Concept 2	Concept 3
Idea:	Physically change the environment	Changing the perception of the environement	Let them build their own vibes
qualities:	**Direct, Instant**	Indirect, subtle	**Guidance**, Direct
	-- - + ++	-- - + ++	-- - + ++
Design statement:			
Having agency	++	++	++
Product qualities:			
Intuitive	-	+	++
Direct	+	-	+
Adaptable	+	-	+
Simple	+	+	-
Other qualities:			
MEMM	+	+	-

Concept 1 : Possible directions   MANIPULATING ARCHITECTURE + ATTACHABLE PRODUCT
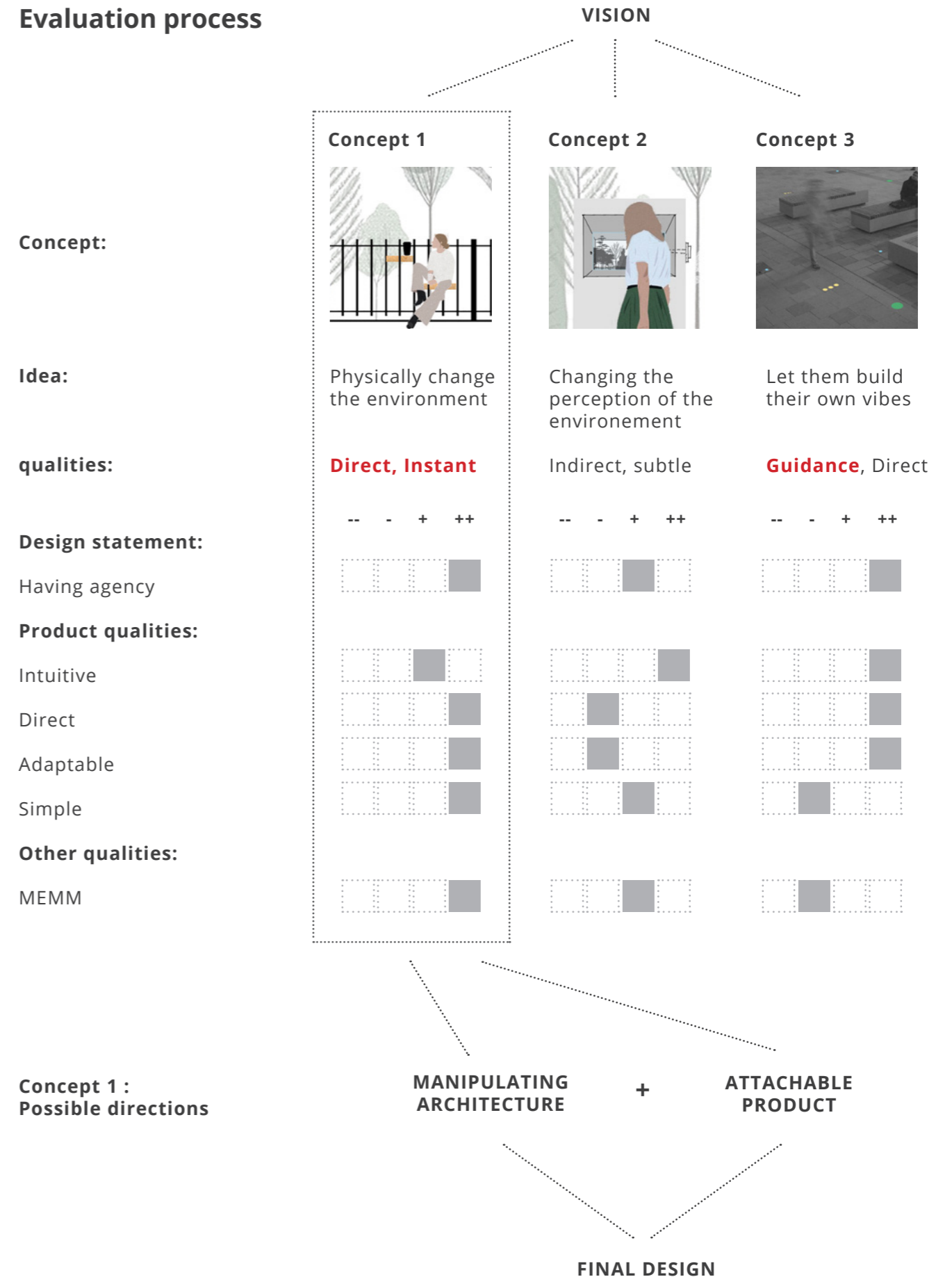
FINAL DESIGN

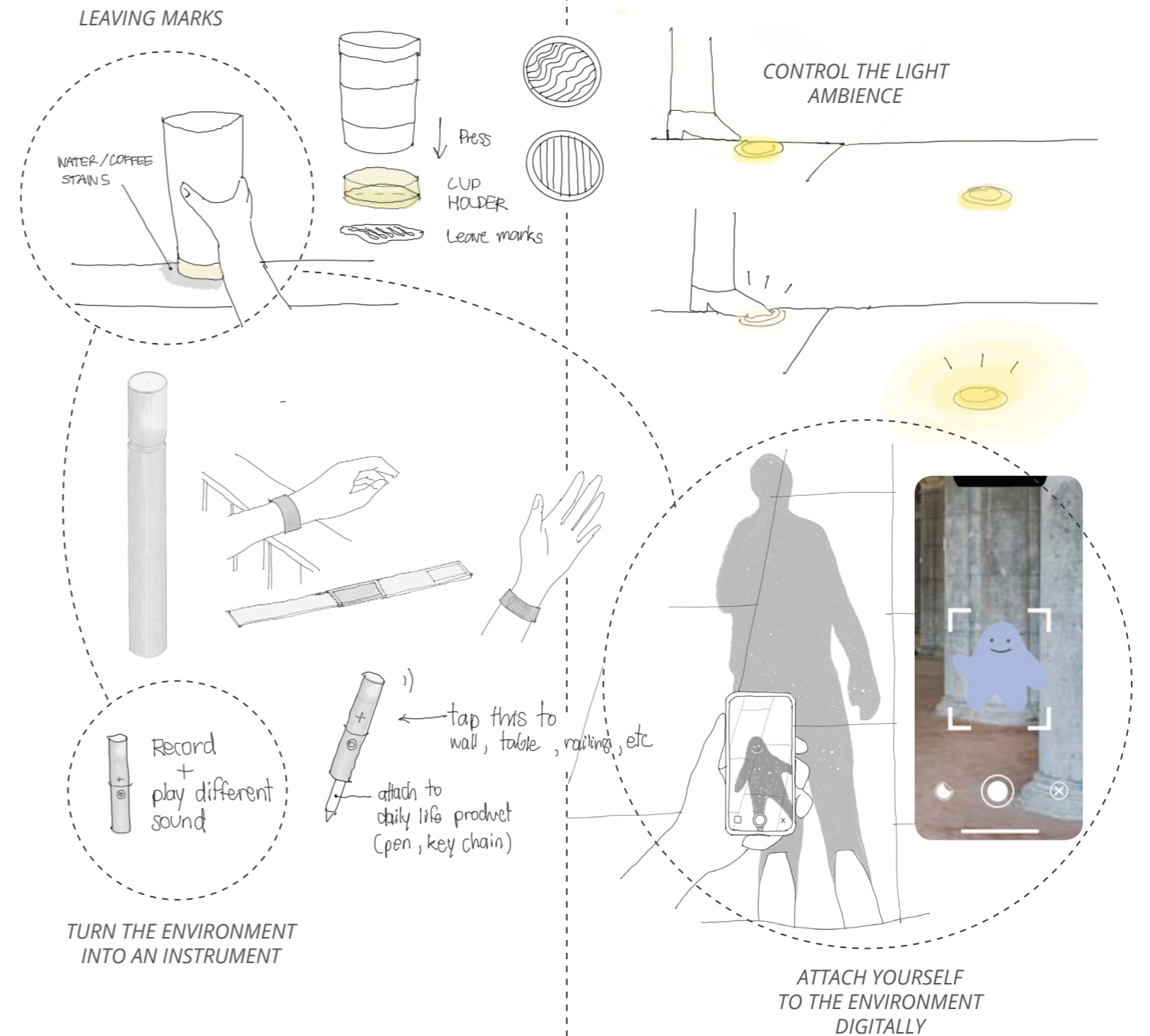*Figure 37. Concept evaluation process*

ITERATION

Figure 38. Previous concepts

These two concepts were developed from the idea of letting users manipulate the public spaces physically. The products are adjustable to their personal use. It can be used as a chair, table, or shade. These two concepts' main idea was to recreate the living street, letting users claim the public spaces. However, through the iteration process, there were a lot of unanswered questions from these two concepts. Therefore another iteration and evaluation had to be done.

From the idea-generating process, the concept of leaving marks, adding a personal layer, and turning the environment into an instrument was promising and had potential to create something meaningful and fun for the final product. I decided to combine the qualities of these concepts (See figure 39).

GIVING AGENCY TO THE ENVIRONMENT

LEAVING MARKS

CONTROL THE LIGHT AMBIENCE

WATER / COFFEE STAINS

Press

CUP HOLDER

Leave marks

Record + play different sound

tap this to wall, table, railing, etc

attach to daily life product (pen, key chain)

TURN THE ENVIRONMENT INTO AN INSTRUMENT

ATTACH YOURSELF TO THE ENVIRONMENT DIGITALLY

FINAL DESIGN

**SOUND CREATION   +   ADD PERSONAL LAYER
TOOL   (LEAVE MARK)**

Figure 39. Iteration for final concept

FINAL DESIGN & VALIDATION

FINAL DESIGN

VALIDATION

FINAL DESIGN

Based on the research, to postpone the loneliness, the design must provide a sense of security for users. This product will change some aspects of users' behaviors in public. Therefore, they will be more secured and connected to that place.

From the vision conducted through research, the design statement is "to enhance security by giving agency to people in the environments."

Sound of the city is a sound creation tool using spatial augmented reality to let users listen to the soundscape of the environment and create their sounds as a personal layer into that location.

9292 Collaboration

Sound of the city is a sound creation tool using spatial augmented reality to let users listen to the soundscape of the environment and create their sounds as a personal layer into the exact location. This final concept will be featured to users with a 9292 application – a personal public transport planner.
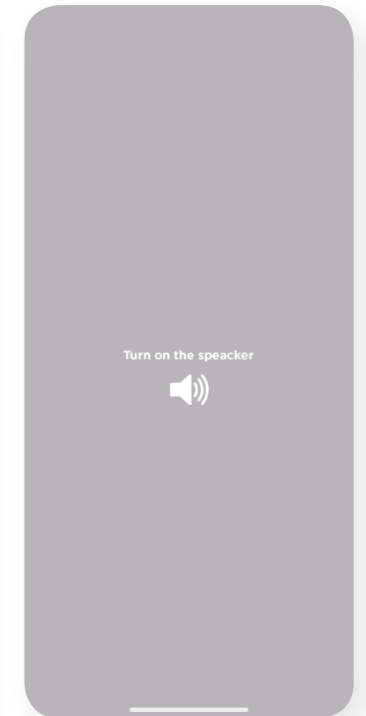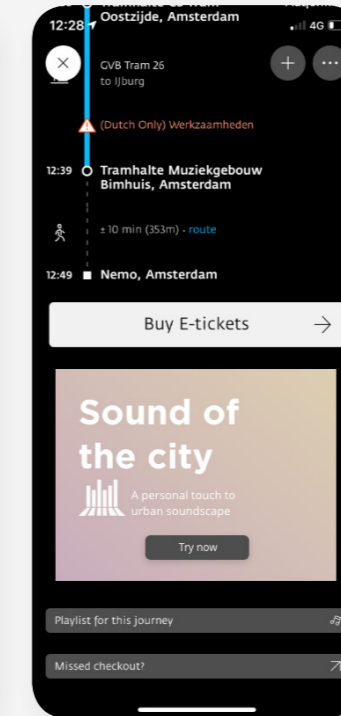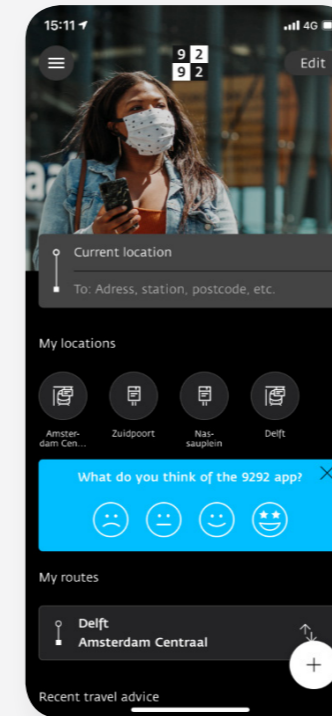
Turn on the speaker or put on your headphones

Introduction

After the users select this feature from the 9292 travel planner screen, the blank screen with the instruction "Tap anywhere to start" will appear. It will create an element of surprise for the users, letting them explore by interacting with the empty screen. Each tap will create different types of sound and graphics, mimicking the main feature of the application.

After a few taps, the final introduction screen will appear, leading to the main features of this final design which will be explained on the next page.

Let the users start by tapping
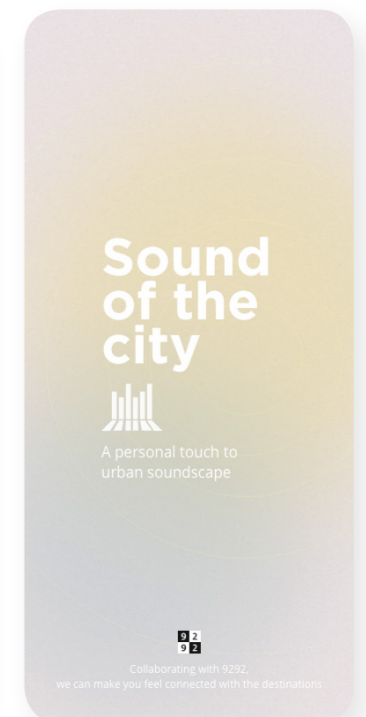
Sounds and graphics as feedback
(used the motion graphics
from Patatap for the prototype)

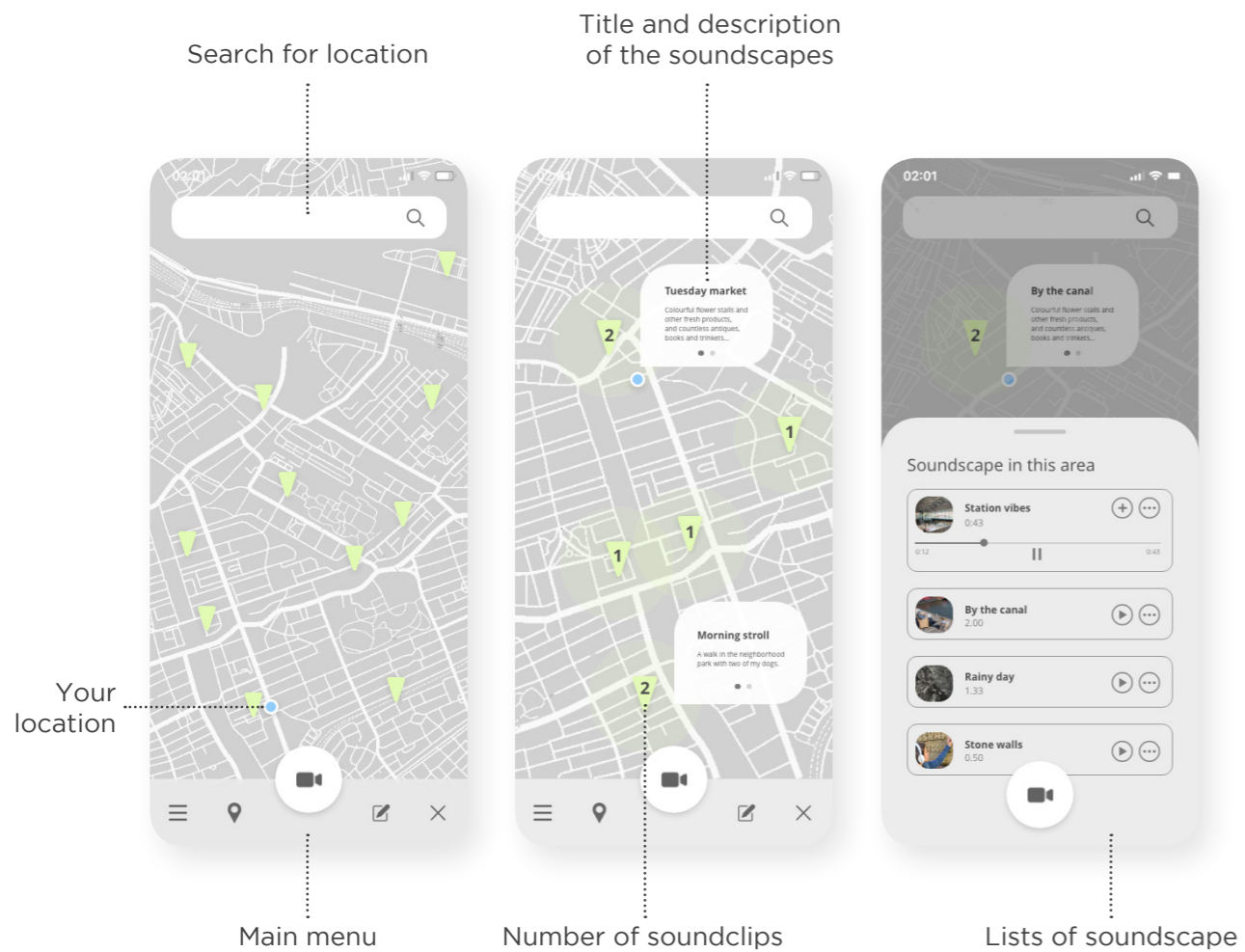*Figure 40. Start screen*

Figure 41. Introduction

Search for location

Title and description of the soundscapes

Your location

Main menu

Number of soundclips

Lists of soundscape

Figure 42. Map

Side menu   Record   Exit

Explore   My template

Figure 43. Main menu

Soundscape exploration

The first feature of the Sound of The City is the exploration. It is started with the map, showing users where they are. The screen offers many green pins, which indicate the soundscapes and the sound created by other users in that area. Each pin covers the area approximately 500 meters radius. On this page, users can explore all the sounds showing on the map. When they select the pin, the list of the area's soundscape will show up from the bottom. Users can listen to the sound, seeing more details, and add it to their template.
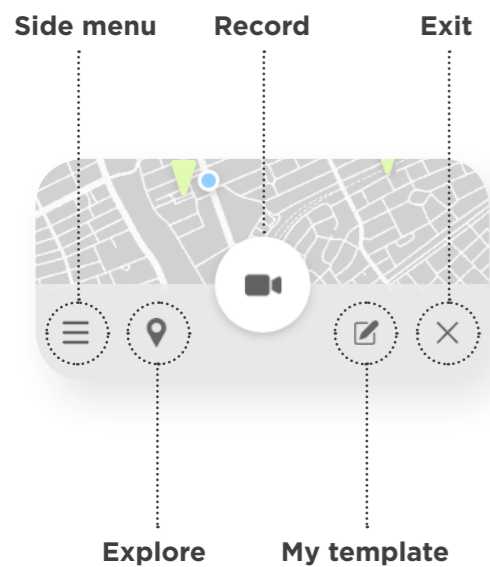
Figure 44. Template

Add   More

Play
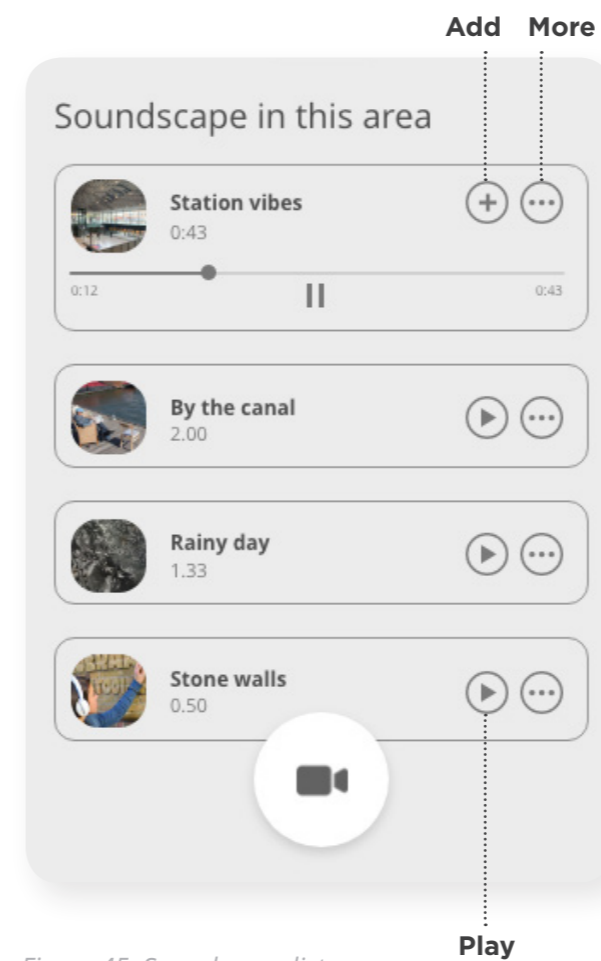
Figure 45. Soundscape list

After the users select the plus (add) button from the sound clip, the screen will show the pop-up question of whether they want to add this sound to their template.

My template

The third button from the main menu (see figure.43) can access the template screen from the left on the main menu tab. The screen will show your selected soundscape from the location. In this feature, users will able to edit their starting and ending point of the sound for the recording. After users are done selecting, they can press the record button to start creating their sound.
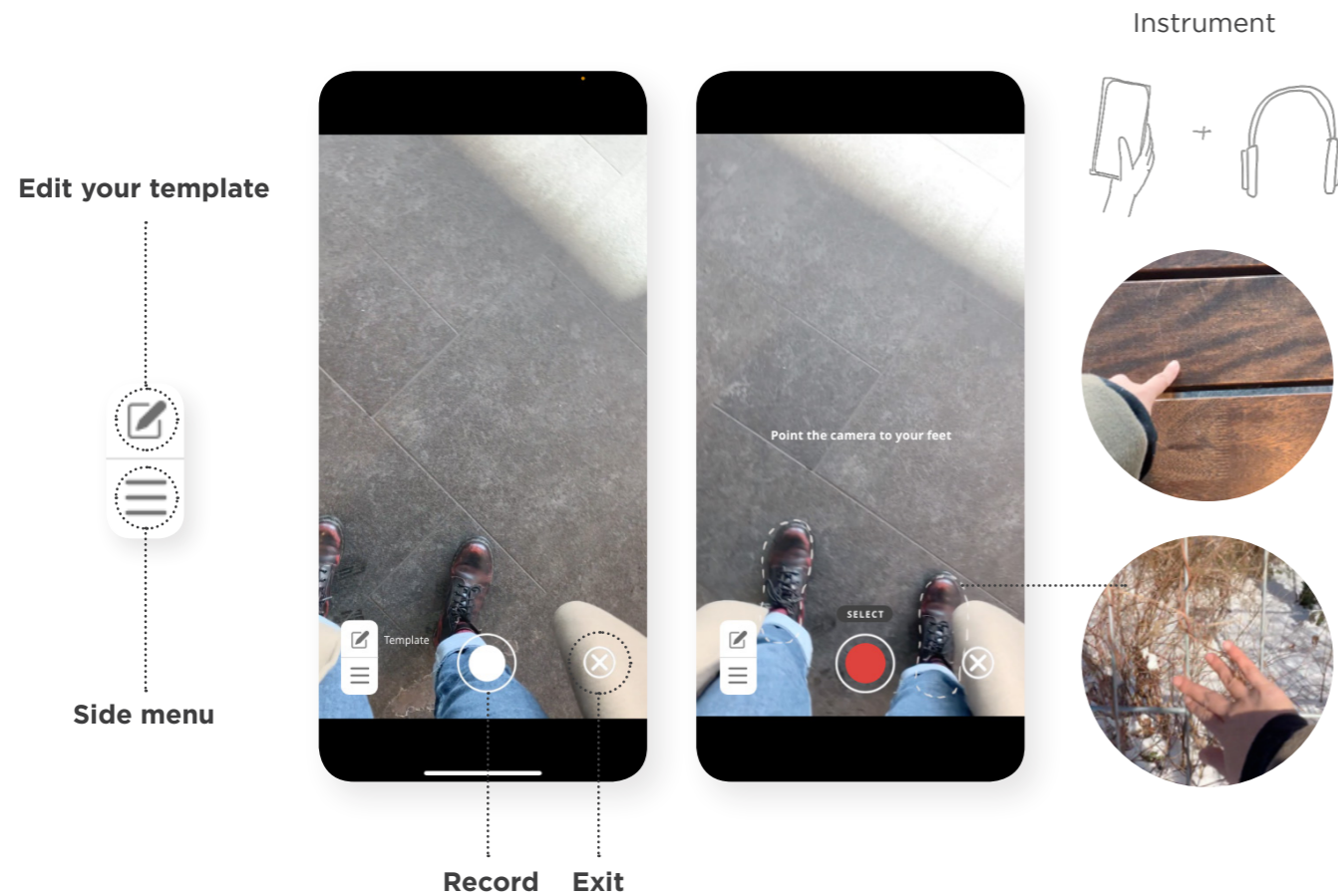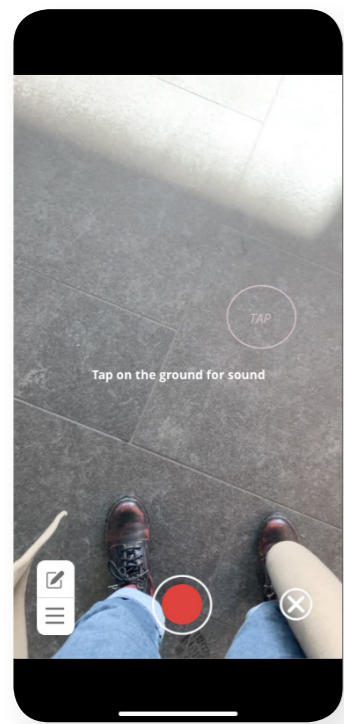
Edit your template

Side menu

Instrument

Record **Exit**

Point the camera to your feet

Template

SELECT

Figure 46. Recording screen

TAP

Tap on the ground for sound

Tap for sound

Figure 47. Tap for sound

The sound creation tool

The sound creation tool transforms the environment around users using augmented reality to generate sounds that fit with the interactions and the surfaces, letting them build their musical touch to space by walking around with their phones and headphones.

First, users are guided with the instruction to aim the camera to their feet or hands as an instrument. On the next screen, another instruction pops up asking users to tap their feet for the sound overlapping the ambiance sound of the location. There will be sounds and graphics as feedback for every tap/touch from the users.
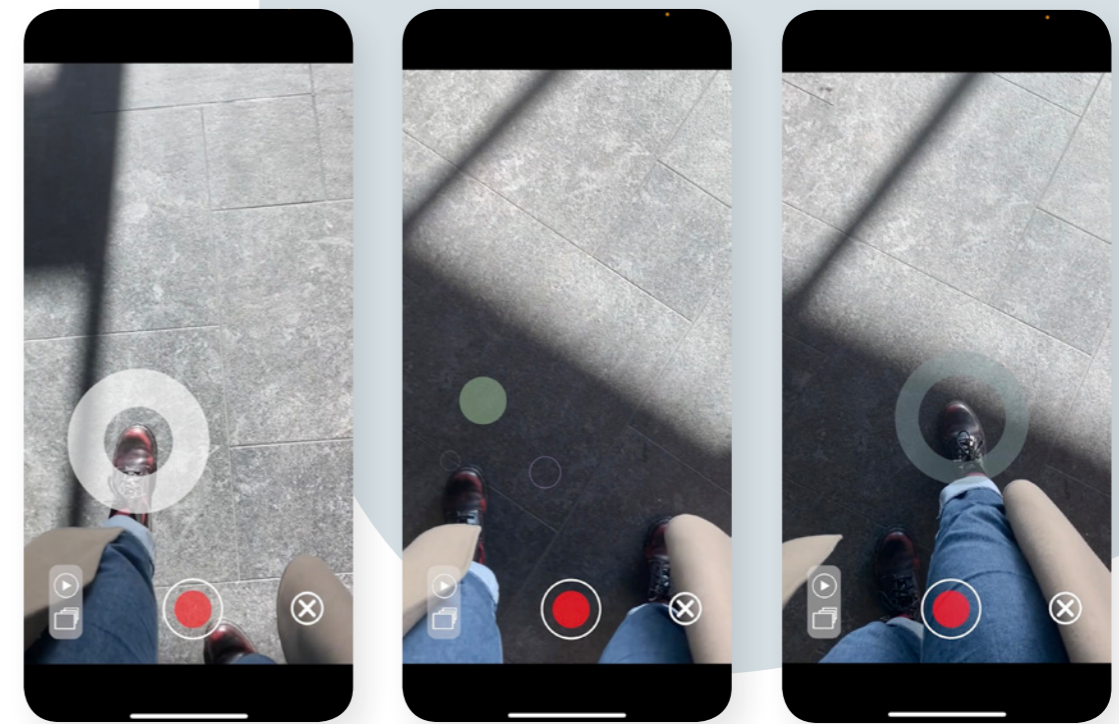
Figure 48. Interaction with AR

Metal

Concrete

Wood

Nature
(grass, water)

Xylophone

Piano

Classic guitar

Clarinet
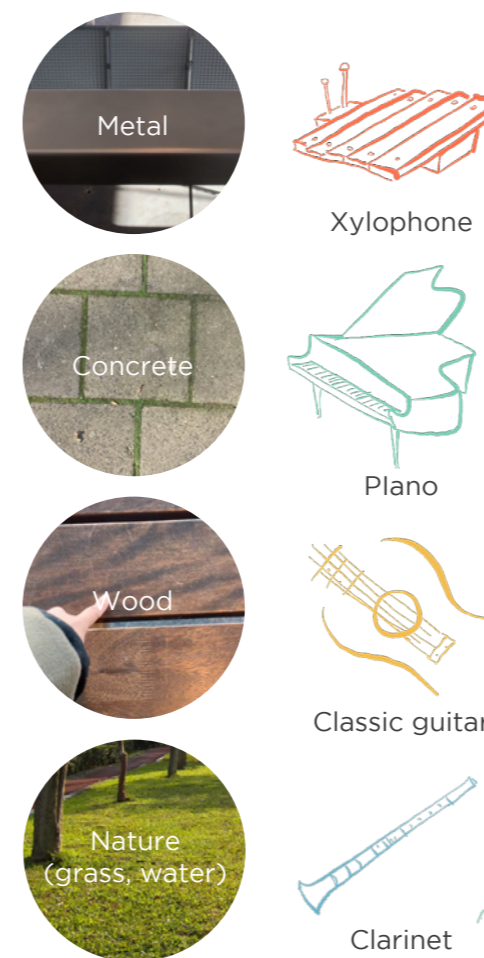
Figure 49. Examples of sound and material

Interaction with AR

The interaction can be varied from tapping, knocking, stroking, touching, etc., creating many types of notes and sounds like when you are playing a different musical instrument.

The other factor that played an essential part in generating the sound is the material of the surface. It imitates the sound of different instruments, such as tapping on a metal railing will create a higher pitch on the xylophone. Stepping on the wooden floor will generate a lower pitch from the classical guitar.
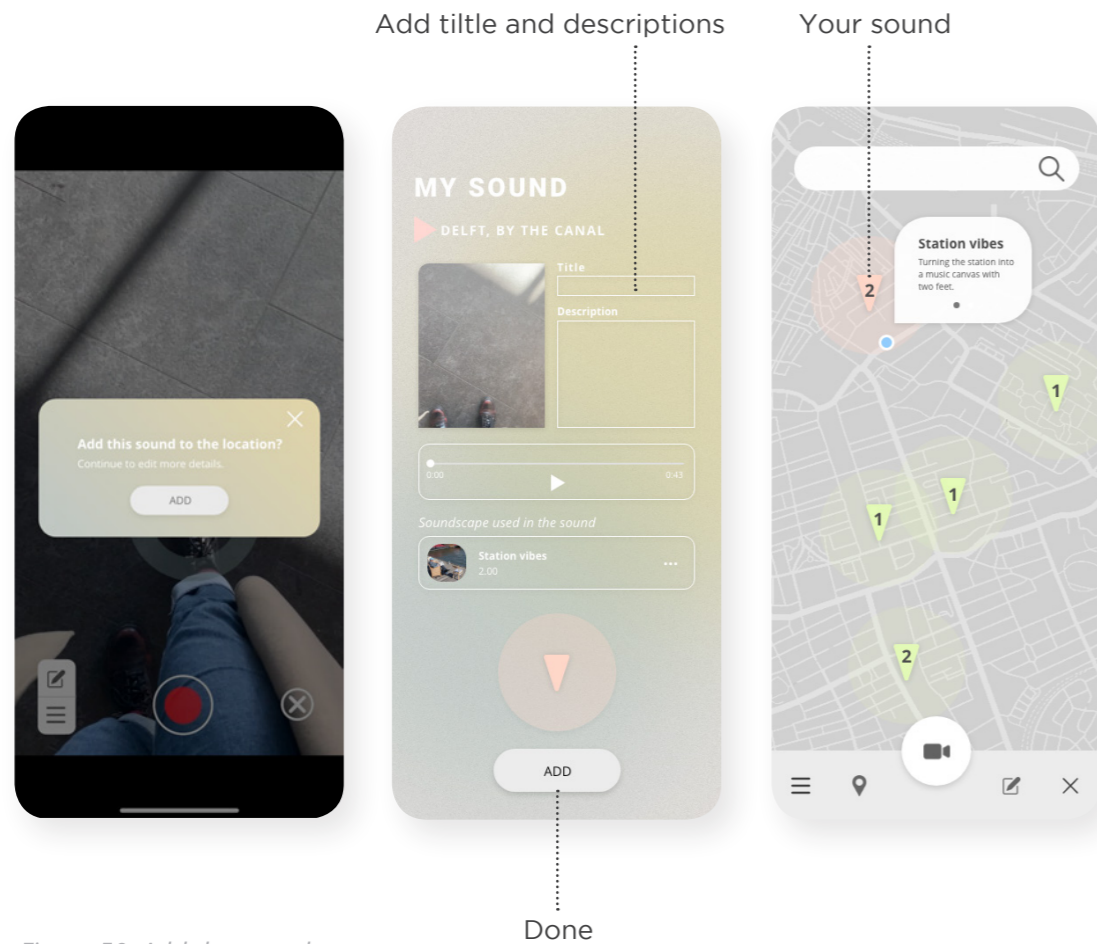
Add tiltle and descriptions   Your sound

Done

Figure 50. Add the sound screen

Your sound

After the users are satisfied with their sound clips, they can stop the recording, entering the next screen to add more details such as titles and descriptions. When the users add their new sounds, the pin on the map will change the color, showing their personal layers on the city's soundscape.

This small interaction will help users realize their sense of place in the unfamiliar location, allowing them to have the agency in the public space

Figure 51. Map 2

Sound collaboration

In this project, all the sounds are generated in key C major, which is the most fundamental key and easiest to collaborate. The purpose was to make the application suitable for any user. Music knowledge is not required. If all the sounds are produced under the same key, users can quickly build upon each other's sounds and have more opportunities to personalize their sound or a simple song.

For the next phase of developing this application, which will be explained in the future recommendations chapter, there should be more guidance in making music in the city and other users.

Although the primary purpose of this project is to provide users the agency in the public space, sound collaboration can also play a significant role in giving a sense of community, increasing the feeling of security for people.

Sound from other users
(in the same area)

Press record at 0.00

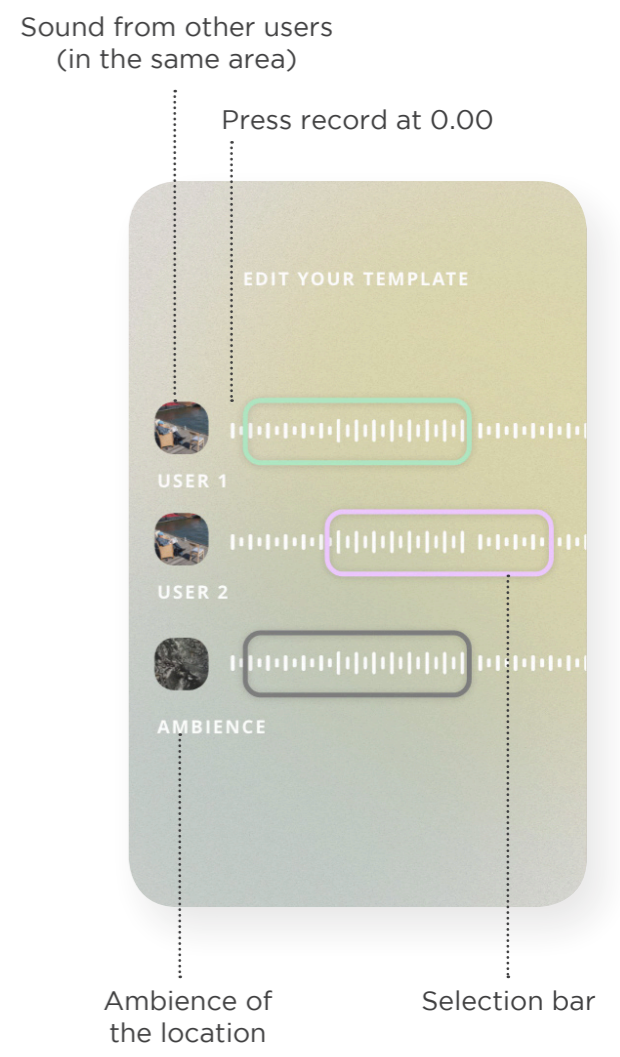Ambience of   Selection bar
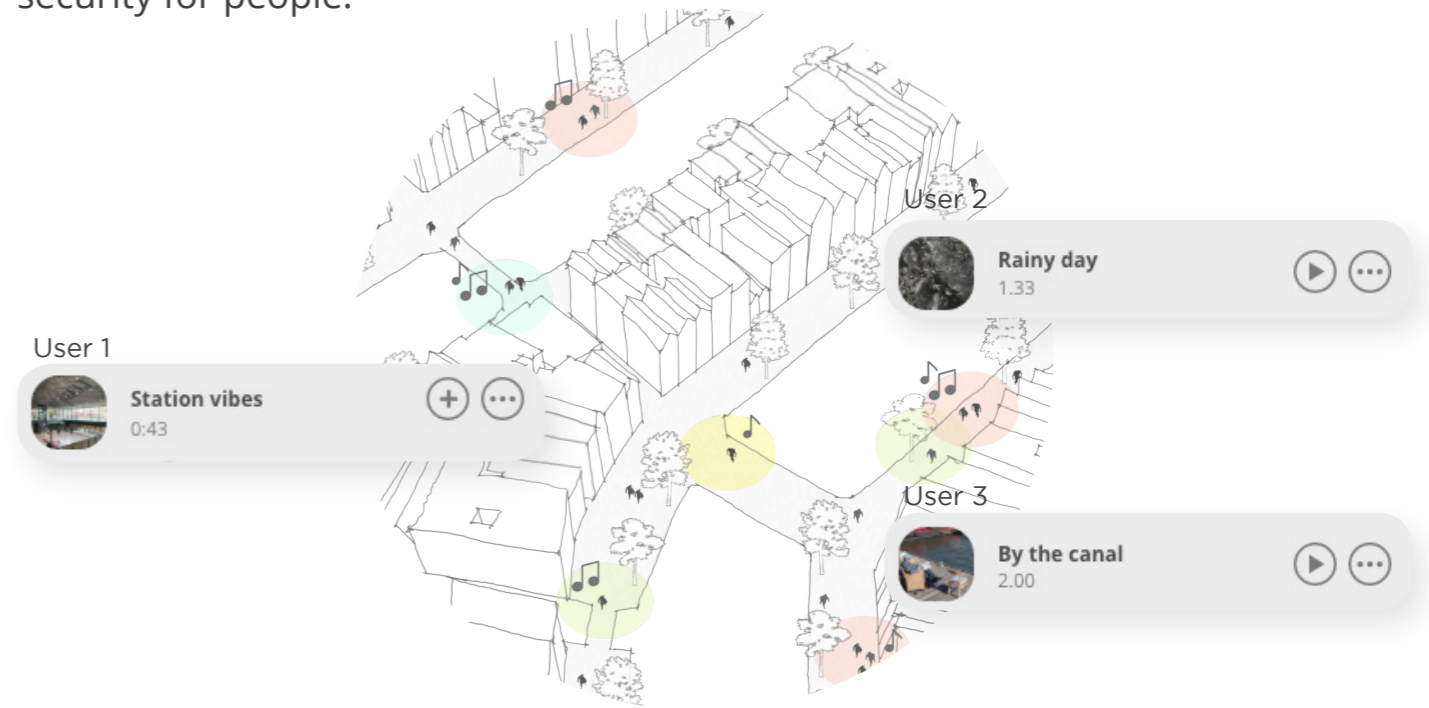the location

Figure 52. Sound collaboration

Figure 53. Sound community

VALIDATION

Method

Due to the COVID-19 situation, the final concept validation test has some limitations. All participants' professional backgrounds are in a design field-related. Two masters students (DFI) tested in the faculty's classroom setup, and the other two participants were designers testing on the street.

The final user test aims to assess the quality of the interactions between the users and the environment. Assuming they were able to follow the guidance and interact as suggested in the final concept will increase their sense of security, making them less likely to be lonely in the public space.

Research questions

Overall experience
- *feelings before and after*

What make the participants do the tapping?

Does the guidance help the participants' understand what to do?
How well can they perform?
- *the intro of the application*
- *the "Tap" for sound instruction*

Sound collaboration

Scenario :
Getting out of the station in the city that the participants have never been to.

Let participants use the prototype & follow the guidances

Improvising :
While users were tapping the floor, the sounds were played accordingly.
* Using Garage band and Patatap.

Observation

Questionaire + PrEmo
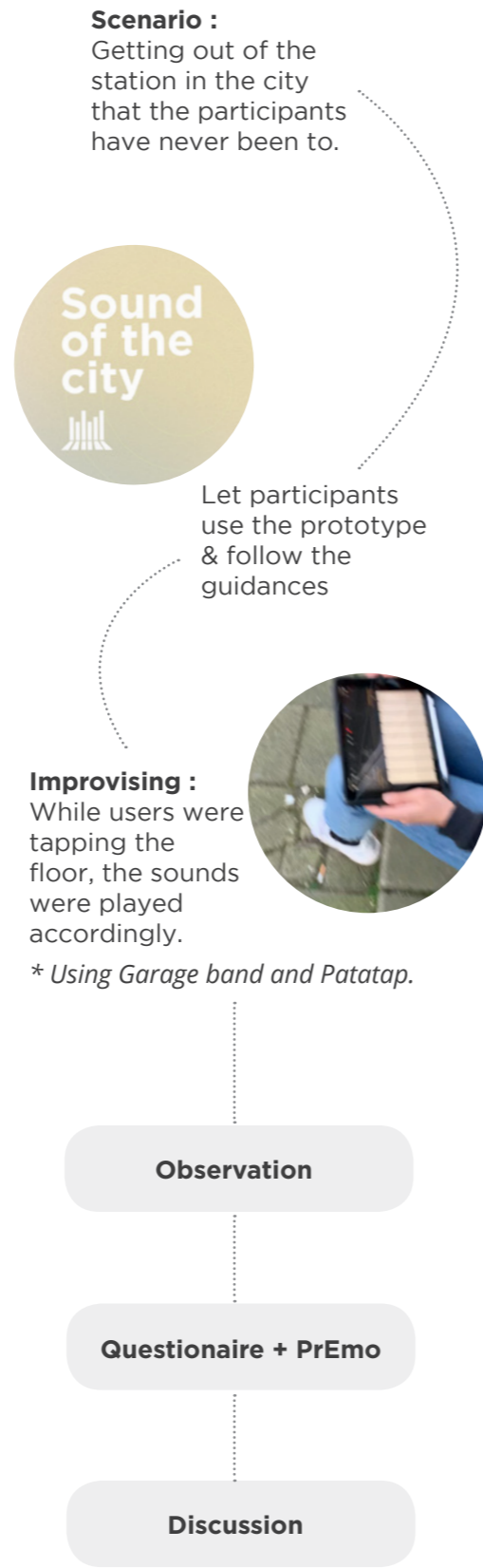
Discussion

Figure 54. User test procedure

Figure 55. Final user tests

Results & discussion

Interaction quality validation:

What make the participants do the tapping?

Guidance/example

1. The intro of the application

Figure 56. Introduction screen for user tests

The participants were introduced to the application prototype, starting with the blank screen, asking them to tap to start. Everyone was able to continue this part and agreed that it helped them understand the concept clearer.

2. The "Tap" for sound instruction

Two participants were able to perform every interaction as expected smoothly. One participant was confused a little when they see the "Tap for sound" icon. She was unsure whether to tap on the screen or the floor with her foot.

Quote: *"I tap on the screen many times. Not sure what to do next. Maybe it should be clearer like 'Tap on the ground to start"*

The other participant tried to move the camera first to check if the Tap sign was moving. One of the participants was tested right after the other started tapping the floor (to have an example), resulting in faster performance than others.

Curiosity / the unknown

From the observation, one of the Participants tried to ring the doorbell because they wanted to see what kind of sounds will the application generate. I found this result interesting and worth investigating more for future development. If the floor has patterns, such as the concrete tiles, participants assumed that each tile would produce a different note/sound.

Once the participants could tap on the ground the second time, the interaction flowed fast. Because the interaction (tapping, touching the environment) is new, users need guidance and example to help them start interacting. After users realized that the sounds were created from their movements, they would continue to explore immediately.

Product qualities:

The participants were asked through the interview whether the design product meet with the product qualities, which were chosen from the interaction vision are simple, direct, intuitive, and adaptable.

The results were quite positive. All participants agreed with the product qualities. However, there were some confusing parts. They were not sure what to do in the next step. Some participants suggested that the product could be improved to make it simpler and more straightforward with more guidance.

Product qualities:

1= Not at all, 5 = Totally agree

Figure 57. Product qualities assessment

Collaborating with others:

The participants were also asked their opinions about this feature during the interview. They were all agreed that it is interesting to combine the sounds with others and create music. Some suggested that they would like to hear other people making the sound at the same time.

Quote: *"if we can interact and create sound as a band, that would be interesting. Each instrument can be assigned to each person."*

Overall experience:

The PrEmo evaluation showed that this concept has positive effects on users' feelings. The blue dots showed the feelings before the interaction, and the pink dots showed the feelings after. Generally, the results were quite positive. All participants felt good about trying this new concept and would like to know more about the details.

Before

After

Figure 58. PrEmo evaluation results

From the interview and questionnaire, most of the participants felt interested and fascinated by this concept.

Quote: *"The idea to make a soundscape at a certain location is really exciting. It captures the environment in a digital and non-digital way at the same time."*

Quote: *"I like the creativity it enables individuals, and the sharing of this creativity."*

Another participant felt that idea of expressing via sound to the location is new. However, one participant was a little concerned about how to create a nice combination of sounds.

Quote: *I like the room for expression I have, especially because its via sound, which is a rare element.*

One of the participants were intrigued by the idea of tapping each materials will generate different sounds.

Quote: *The most exciting part is that every component in public area can be interacted.*

Limitations:

It is essential to mention the limitations of these user tests. First, the tests only assessed the quality of the interaction, not the design goal, assuming if users could perform/interact, the loneliness will be postponed. Secondly, the ambiance of the public space was lacking. The tests were done in the classroom and on the quiet street. Lastly, the participants are DFI master students and designers. They were familiar with the test procedure and concepts. The results may be different if tested with other users from different backgrounds.

CONCLUSION

CONCLUSION &
FUTURE RECOMMENDATIONS

REFLECTION

CONCLUSION
& RECOMMENDATIONS

The goal of the user tests was to validate the quality of the interactions in the final design, which determined the value of this project from the users' point of view, whether this design will add a positive experience when they are in the public space.

From the research questions at the beginning of this project.

What triggers loneliness?

When is the shift?
From aloneness to loneliness

How to postpone it?

During the first part of the project, the information was gathered to build a clear picture of the world view of loneliness based on the research question above. The design statement is formulated from the crucial driving forces against what triggers loneliness.

To enhance people's sense of security by giving them agency in the environment.

Having the agency of environment is to control and identify themselves with the place, resulting in increased sense of security (sense of place, self-awareness, and sense of belonging).

During the ideation process, several design directions were explored. The concepts were narrowed down considering which fit the interaction vision and qualities the most. The final direction was to let users manipulate the environment to add their personal layer into the environment. This direction led to the final design decision. The outcome was a sound creation tool using AR technology, letting users create their sounds and add to their location.

From the validation tests, the main interaction qualities were validated. Participants were able to interact with the environment in a new way with guidance and some curiosity. The overall experiences were positive and inspiring. Therefore it is safe to say that this final design has great potential in achieving the design goal.

However, as discussed in the previous chapter, there were some limitations from the user tests. The final design is still in the early phase and not ready to launch in the real market yet. Some areas can be improved and needed more iterations and testings. Moreover, designing for behavioral change requires long-term testings or in-depth study. Thus, some questions are left unanswered, which I will explain more in future recommendations.

RECOMMENDATIONS

Sound creation tool improvement

The main focus of the tests was the interaction between users and the environment. From the discussion with the final user tests, some participants gave nice insights on how the product could be developed further in the future. The sound creation and the collaboration with other users should be developed in more detail. Should the application give more information on the screen while tapping the notes or more tips on making the music through the process? The AR technology implementation can also be improved.

Sound community

The design aimed to let users build their sound on other users' sounds. Another insight gained from the discussion during user tests was about the sharing aspect of whether the application should let users communicate and exchange their (sound) experiences through the application. However, this needed to be considered in the future development to change the whole direction of the design into another type of social media platform or artist collaboration tools.

Social effect testings

As stated earlier, the final user tests were done mainly to focus more on the interactions and assumed that if a user does a specific interaction, it will increase security (sense of place, belongingness, self-awareness).

This project is an effect-driven design aiming to tackle loneliness. It is crucial to assess the desired effect if having agency by creating sound in the public space can enhance their sense of security and postpone the loneliness.

Group testings

From the final user tests, it was evident that the other participant's present can influence the experiences and feelings. For this project, the user tests should be conducted as close as the real settings, such as crowded streets, train stations, and squares, where real people are there.

Prototyping

The final tests were done with the demo of the application without the AR. Users used the standard video recording. With the better quality of the prototype, the test would give better, more specific results.

REFLECTION

The first challenge in this project for me as a designer was to deal with a structured methodology. In this project, I followed ViP method, which was entirely new for me. The method helped me broaden all my perspectives about this topic and saw opportunities to design. At first, I was not familiar with the method at all. During the research phase, the information (all the factors) was overloaded. However, it began to make more sense as I continued with the process and built my worldview around this domain. I was able to see the area where this design project can make a change. I think the method helped me transform the research into a design goal successfully.

The second challenge was the design iteration part. I was fixated on a specific idea and unable to make it concrete and real. I had to generate new ideas and redo the process, causing a small delay with the project. It kept me struggling and become unmotivated. I knew already that I need to step back and be more patient with the learning process. In the end, I put my reluctance aside and came up with the final design that answered all research questions.

In the end, this project has taught me a lot of ways of working. I see this learning process as an important milestone for my future as a designer.

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