Development of a product that supports healthy eating and wellbeing of Millennials suffering from Bulimia Nervosa

Anima

Development of a product that supports
healthy eating and wellbeing of Millennials
suffering from bulimia nervosa

Graduation Project // Integrated Product Design
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INTRODUCTION

This report compiles a design project which purpose was to design an intervention that could help people suffering from Bulimia Nervosa.

This project focuses on discovering what actually Bulimia Nervosa is, what are the existing solutions and approaches to help people with this maladaptive eating habits. Furthermore, understanding patients and what are the main triggers or causes of such behaviours has also been a significant research phase which has also been essential to further develop the final solution and interaction.

In order to come up with a final solution, the users have been the central pillar during the whole project. Apart from doing deep desk research on the topic, the problem has also been further understood by interviewing experts on eating disorders and actual patients suffering from Bulimia Nervosa. Besides this, the fact of having the user present during the whole project was to avoid mismatches between the users, their desires, needs and the final outcome

During this report, the reader will find all the different stages and chapters in which it has been divided. Starting from the discovery phase, followed by the definition and development and ending up with the evaluation phase.

EXECUTIVE SUMMARY

This project started with my interest in Design for behavioural change and how our society is influenced by trends and lifestyle. Nowadays, people are more concerned about their health and wellbeing than few years ago, however, there are still many bad habits or behaviours that go beyond our own capabilities, sometimes, we are not able to control some types of behaviours or addictions. These topics, have become a trend lately, designers together with healthcare institutions have started to research and develop new methods to engage the user to have a healthier lifestyle. Obesity and sedentary lifestyles have been related to serious health issues such as heart stroke, poor blood pressure and so on. Furthermore, many design interventions have been designed to solve such problems, it seems pretty straightforward that this issues should be solved by become more active and eat healthier.

Nevertheless, my curiosity went beyond that, I questioned myself: What if the problem is the restriction of food, what if users see food as their enemy and therefore start developing a mental disorder, and more specifically an eating disorder such as Anorexia or Bulimia Nervosa? What are the main causes of this mental disease, is it embedded in our own culture? how can these maladaptive behaviours be developed? are we too obsessed with our body and lifestyle? I really found it a fascinating topic to further research and learn from it.

The aim of this report is to discover and actually come up with a meaningful design intervention that can help Millennials suffering from Bulimia Nervosa to have a healthier lifestyle and overcome their maladaptive behaviours towards food.

Therefore, after doing some preliminary research and gain some knowledge about eating disorders, I decided to develop an intervention that could help people, in this case, Millennials suffering from Bulimia Nervosa.

I first started doing research on social trends in healthcare, lifestyle and technology. Also, since my target group are Millenials, who are actually now young adults, some research on their values, behaviours, and lifestyles needed to be done. Furthermore, during this desk research, I needed some deep understanding about the actual causes of the development of Bulimia Nervosa and what are the existing solutions and therapies that help these people overcome this mental disorder.
Also, interviews with specialists such as psychiatrists specialised on eating disorders and actual patients have been carried out.

Thanks to this extensive research, together with a design vision and the envisioned product experience, I transformed all this gathered information into a more tangible and meaningful outcome.
All of this was very important to further develop the

design intervention and engage the user.

After this phase, the reader will discover the development of the first ideas and the further development of the final outcome. The development of the concepts started with the idea of helping the user becoming more emotionally aware and help them find out different ways to cope with certain emotions. This idea of becoming more emotionally aware was also tested with the intended target group, and after having a very positive acceptance I realised that this approach had potential and decided to further develop it.
Consequently, I develop three main concepts that have been actually developed base on the users. Each concept was evaluated by the target group and improved up to a point in which the users though it could actually help them deal with their daily life activities.

The outcome is finally a product/system that creates a self-reflection daily ritual. The aim of this solution is to create a bridge between the therapy process to the more real life or self-care after the treatment. On one hand, there is the product or device that needs to be used every day in order to have a meaningful and inspiring feedback. Next to the device and App will finally help the users to create a community feeling, have an overview of how they are feeling and have access or communicate with their doctors if needed.

Afterwards, some testing needed to be conducted, the interaction with the device and the actual technology needed to be tested as well as the APP. This final tests will helped me detail and conclude the final result.

Eventually, the report includes a business proposal together with a roadmap with the aim t explain how Anima should be launched to the market and also make clear which further steps need to be done in order to finalise Anima.

Finally, the report also contains a list of aspects that need to be addressed and improved from the 3 basic pillars point of view, people, technology and business.

PHASE 1. DISCOVER

This phase entails the desk and user research that needed to be done in order to understand the problem and the main target group. During this stage, eating disorders will be introduced together with all the elements that might influence the development of these mental disorders. Eventually, the report will focus on Bulimia Nervosa, its causes, the existing solutions and therapies that are used. To finalise this extensive research, the discovery phase will conclude with user research in order to better understand the needs and values of the intended target group.

1.0 SETTING THE SCENE

Trend analysis

Millennial Generation

Perfectionism

What are eating disorders?

Stigma towards eating disorders

Stages of change

Role of family and beloved ones

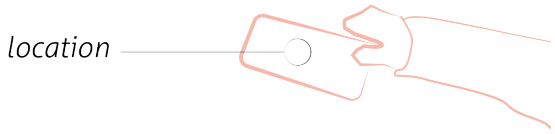
Technology developments

Market research

CHAPTER 1. SECTION 1

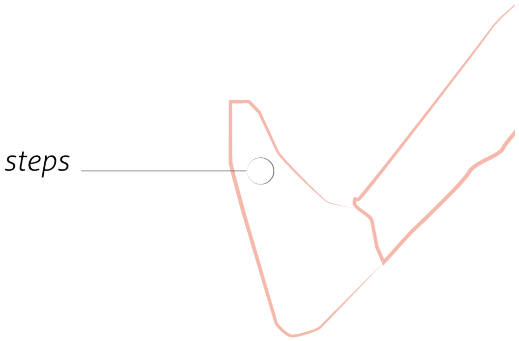
TREND ANALYSIS

This trend analysis aims to provide an overview of what is coming in a near future about society, technology, and economy and also as a short introduction to the problem and target group.



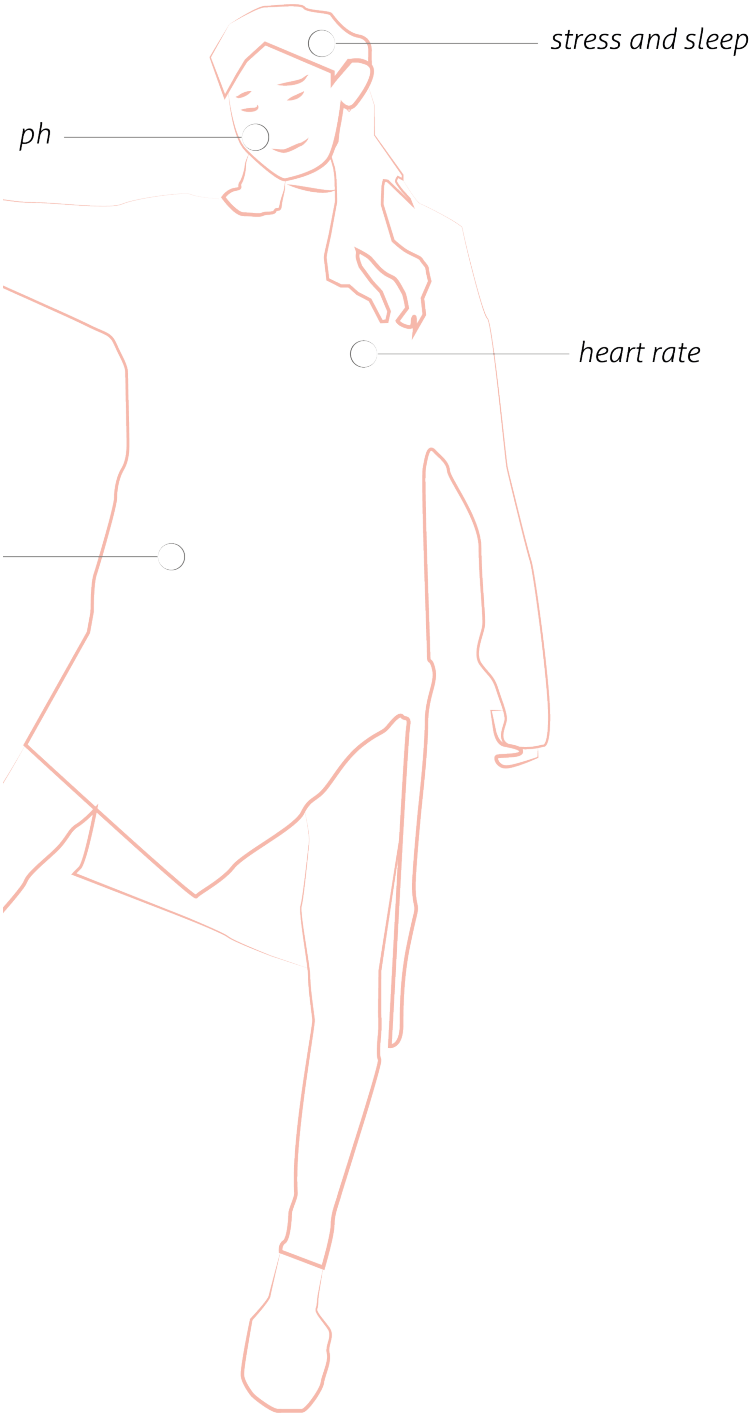
Technological improvements such as global connectedness, will help us to put and end to the barriers between cultures which will demand more understanding and respect towards diversity. It will bring people closer and redefine education, politics, healthcare, and leisure.

Technology developments such as the Internet of things (IoT), social media, augmented reality and the connection between machines and people will affect education in a way that the learning experiences will be richer and more accessible to everyone thanks to online platforms such as the MOOCs (Hyper Island, n.d)



Also, Big Data and IoT will also help to track people's well being and emotions which will also offer better experiences to the users. The link between physical and mental health will help consumers to be more aware of their health and will result in a redefinition of healthcare. There will be more focus on prevention of diseases and understanding of behaviors and better diagnoses rather than cure or heal a disease, "By 2020, chronic diseases will account for 75% of deaths worldwide. Mobile diagnoses and quantified self-apps will be key to the personal analysis of our general wellbeing, diet, fitness, and health. " (Kjaer Global, 2017)

Users will also demand to have better and personal experiences and a more mindful approach to work and live in general. Companies are already starting



to realize the importance of aving motivated and healthy employees. As an example in Silicon Valley, they use mindfulness as another tool to work. "Meditation is a tool to better understand oneself and improve productivity," (Cole, 2014). Societies are also becoming obsessed with work. Thanks to technology development there are more gadgets that can substitute the concept of what we understand as an office. People can work wherever they want. Even if it seems like an improvement, people don't know when to stop or "switch off" from work (Hyper island, n.d). That is why using mindfulness in the workplace is becoming so important in European societies. However, this trend is not only influencing the workplace, it is also used for general wellbeing. One of the areas in which mindfulness is also a big trend is food. According to Nova Market Insights, "Mindfulness illustrates how that body-mind connection is influencing new food and beverage product introductions in the supermarket, and how that buyer is seeking out ethical claims on products." Consumers want to be aware of what they are eating, the precedence and its authenticity. That is why also people are starting to go to local supermarkets in which they can trust and know where does the food they are going to eat come from.

figure 01: Wellbeing & Self-quantification

What is more, according to the teacher and NY Times bestseller, Sharon Salzberg, mindfulness is also being used to cope with eating disorders such as overeating and other unhealthy habits. Practicing this technique trains patients to feel more satisfied and enjoy what they are eating.
This raising awareness of our general wellbeing will also derive in more general aspects such as the zero-emission trend "By 2020, more than 40 global cities will emerge as smart cities leading to convergence of competition across energy, infrastructure, building Automation and technology players, technology, grids, cars, buildings, utilities, and infrastructure". Currently, society is focused on going green, but the aim will be to go for smart zero emissions. E-mobility will take importance with the use of electric vehicles "Over 40 million electric two-wheelers and four-wheelers will be sold annually around the globe in 2020" and smart cities in order to build up an eco-system that is beneficial for us all.

Also, there are some demographic changes that will affect the world's population. The rise of the middle class will lead to a narrower gap in economic, education and employment. What is more, the urbanization and integration of cities will lead to megacities which will include the core and the suburbs of existing cities "75 % of world's population is expected to live in urban areas by 2050 according to (Morgan, 2017)

Furthermore, there would be an increase of single household due to the aging society, the increase of singles, divorce rates, later marriage and infertility rates. With this increase of people living alone with no relatives will lead to the need for more social and health support by the community and other public sources. (M. Gilford, 1998)

This trend analyisis aims to give a glimpse of where european societies are going and how important is to become aware of our mental wellbeing and how imporatnt it is to have a healthy livestyle in general. Next steps will go deeper into a more specific subculture, Millennials, their values, behaviours and practices and how it is affecting their wellbing.

CHAPTER 1. SECTION2

MILLENNIAL GENERATION

Who is actually being affected by these social changes? How are they dealing with that and what are actually the main problems they are facing? In this section, I will introduce the Millennial Generation, their behaviours, culture and values.

Nowadays, society is suffering from high rates of s**tress and anxiety**. One of the target group which is suffering from many of those problems is the generation called **Millennials**, according to Thomas Curran from Bath University, "college students are currently suffering from higher levels of perfectionism due to competing society, social pressures and their aim to succeed." (Curran and Hill, 2017). Anxiety and stress and **perfectionism** can lead to some serious mental diseases such as Obsessive-Compulsive Disorders (OCD) and eating disorders. (Limburg et al., 2017).

Millennials, the generation born between 1982 and 2000 are currently facing many problems that could lead to some serious health problems. They have been raised with higher expectations and sometimes even have been overprotected by their parents. The reason behind this issues is usually is because their parents who belong to a former generation, and emerged after the II World War, they tried to offer a better quality life and make things easier for their children than they were for them.

Even though they are known as the best-educated generation "About 61 percent of adult Millennials have attended college, whereas only 46 percent of the Baby Boomers did so" (BestWork, Inc., 2017). Millennials are dealing with the highest rates of unemployment, they have more problems in finding a job which is related to their studies and degree. Millennials also earn much less than the "Baby Boomers" or "Generation X". Due to these facts, Millennials are reporting higher levels of stress, depression, and anxiety than other generations. "One in five young workers has experienced on-the-job depression, compared to only 16% of Gen X'ers and Baby Boomers." (BestWork, Inc., 2017). What is more, Millennials have fewer chances than former generations to own a house and as a consequence, more people between 25-35 years old live with their parents. Finally, he millennial generation has more difficulties in paying their financial expenses and thus are more financially fragile and are also less likely to become entrepreneurs.

Millennials have also been criticised for their careless behaviours, lack of responsibility and for the **seek of instant gratification.** However, they are also obsessed with success and perfectionism, they don't know how to fail "Today's young people are competing with each other in order to meet societal pressures to succeed and they feel that perfectionism is necessary in order to feel safe, socially connected and of worth." (Curran and Hill, 2017).

This generation has also some characteristic values. Millennials value **diversity**, this could be the cause of globalism and the unlimited and easy access to information thanks to the Internet if we compare them with their former generations.

Even if they are quite criticised by their laziness, they are also considered **enterpreneours**, driven

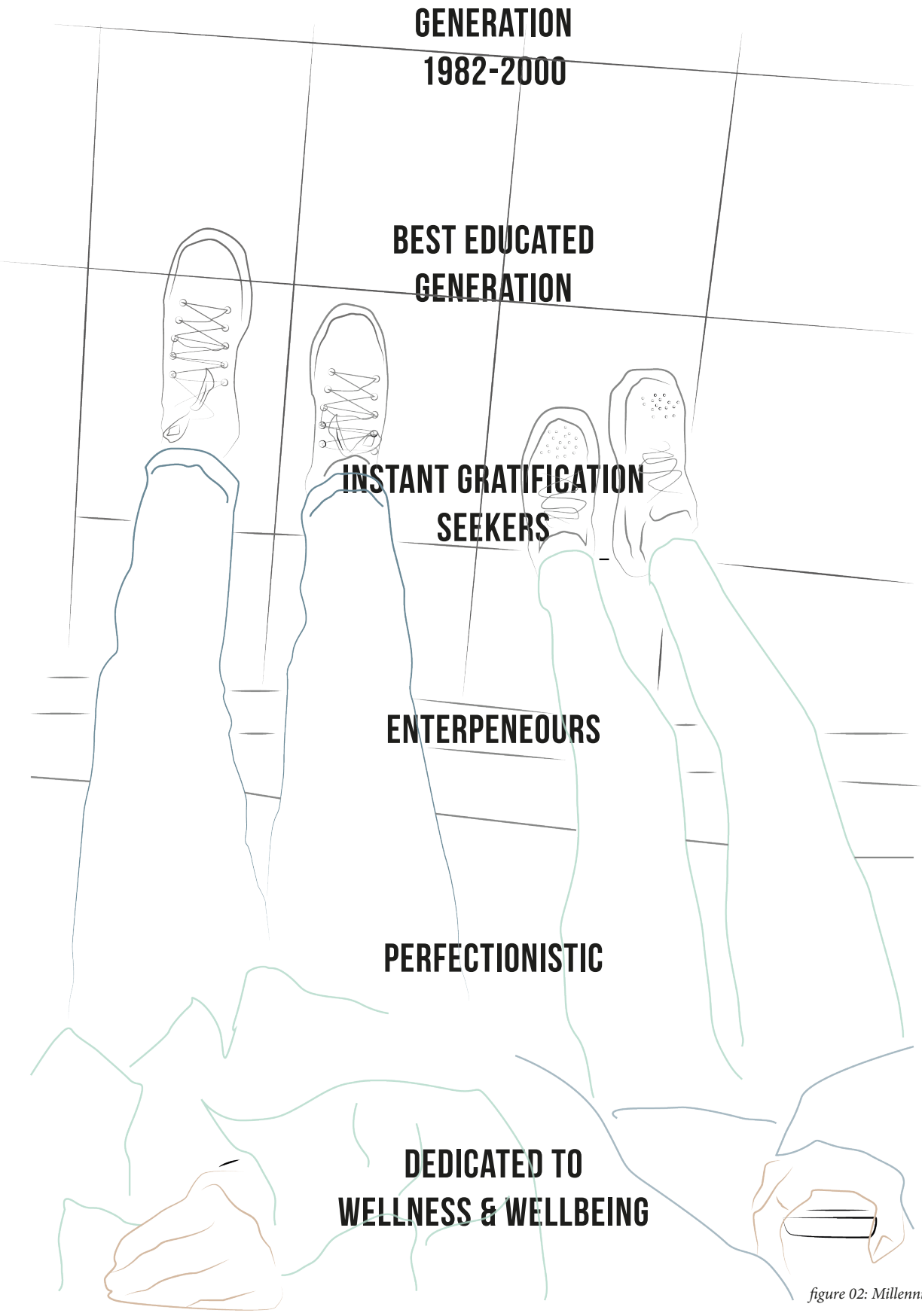


figure 02: Millennials' values

by their perfectionism, sense of achievement and **nonconformity**. At work, they appreciate being in a nice, flexible and fulfilling environment. A place where everyone is at the same level and there is less hierarchy between co-workers. Being able to expand their knowledge and work in teams of creative and innovative people are also values that define this generation. However, having a **balance** between work and personal life is also very important. They want to have a job that fulfills them and gives them some spare time to spend on their hobbies, family, and friends. Spending money on wellbeing and a healthy lifestyle is also pretty characteristic for Millennials, "they are dedicated to wellness, devoting time and money to exercising and eating right" (Goldman Sachs, n.d).

Millennials also value the **community** sense, even if they spend more time using their mobile phones, they have a different perspective towards the community sense. They appreciate being connected, being authentic despite the distance, the location or circumstance. They base their relationships on social media and apps, which can also be seen as something negative, but still, it is something that defines them.

In conclusion, it can be said that Millennials are a generation that seems to have all the means to have a fulfilling life in terms of education, social life and connectedness. Even if mindfulness and the seek of a balanced life is important for them, they are still suffering from high rates of anxiety and stress levels, which could lead to the development of some serious mental diseases such as OCD or Eating Disorders (ED).

CHAPTER 1. SECTION 3

WHAT ARE EATING DISORDERS?

In this part, I will introduce what are eating disorders, their causes and the differences between them.

An **eating disorder** (ED) is a mental illness that is characterized by inadequate and **irregular eating habits** and severe distress or concern about body weight or shape. They can cause serious damages to people's health and well-being.

The most common eating disorders are Anorexia nervosa, Bulimia nervosa, and Binge eating disorder.

Anorexia Nervosa is characterized by an obsessive fear of gaining **weight** and a wrong **perception** of body image. People who suffer anorexia will **limit** the amount of **food** intake. It can produce severe health problems such as brain damage, heart difficulties, multi-organ failure among others.

Bulimia Nervosa: Individuals who suffer Bulimia Nervosa fear weight gain and do **not accept** their body shape and size, for that reason they usually overeat and in order to **compensate** that behavior they force **vomiting**, do excessive exercise and make extreme use of laxatives or diuretics. Those behaviors arouse some **negative feelings** such as guilt, **shame** and lack of control. Some of the most common injuries are dehydration, gastrointestinal problems, and heart failure.

Binge eating Disorder: This eating disorder is characterized by the loss of control followed by **overeating** behaviors but does not overcompensate as the ones suffering from bulimia nervosa. Those who suffer from this eating disorder usually develop obesity which increases the odds of developing **cardiovascular diseases**. They also experience feelings of guilt, **embarrassment**, and distress.

There are many factors that lead to suffering an eating disorder. On one hand, there are the **individual factors** that affect the development of an eating disorder. Research has shown that there is a **genetic** predisposition in which food is perceived as a threat. This predisposition is due to a misregulation of some neurochemicals like the 5-Hydroxytryptamine and the serotonin-transporter-linked and the estrogen-related receptor and the histone deacetylase 4 (Salafia et al. Journal of Eating Disorders, 2015). In other words, anorexia and bulimia have some genetics irregularities but they differ in the way in which each disorder behaves towards those abnormalities.

The levels of serotonin and dopamine increase in anorexic people and thus their anxiety levels which makes eating a stressful action. However, bulimics have the opposite response to increments of serotonin and dopamine due to the binge. Instead of increasing tension, **binge eating reduces stress** and improves their mood, which reinforces binging (Ekern,2017).

However, not only biological and psychological factors endorse eating disorders. Currently, we are living in a **society** which is driven by perfectionism and society's approval. Even if the concept of

beauty has been evolving through the past years, the **idealization** of a healthy life style and **perfect** body shape has led to obsessive and compulsive behaviours towards food both in men and women. Social media has become the most influential media on which those values are being reinforced by unrealistic beauty canons. Thus, these trends should promote a healthy life style, they also can be the causes of some eating disorders in adolescents and early adults. In western cultures, the idealization of **thinness** in women and the incidence of anorexia and bulimia nervosa have increased during the 20th century (Keel & Forney, 2013).

Also, unhealthy eating behaviors are connected to high levels of perfectionism, low self-efficacy and the ego threat of high body dissatisfaction. Studies have shown that people with high levels of perfectionism try to hide their mistakes and imperfections, preventing themselves to learn from their mistakes. Binge eating and bulimia appear to be related as a way to escape from the anxiety that perfectionism causes to them.
According to Thomas Curran from Bath University, "college students are currently suffering from higher levels of perfectionism due to competing society, social pressures and their aim to succeed." (Curran and Hill, 2017) These problems could be the cause of mental illnesses and concerns about their body image leading to eating disorders as well as anxiety disorders such as Obsessive-Compulsive behaviors. Perfectionism is a personality trait characterized by striving for excellence and setting extremely high standards of performance, accompanied by concern over faults (Hewitt & Flett, 1991). It can be divided into two different categories. On one hand, there is positive perfectionism, people who have this perfectionism are characterized by high self-esteem, being able to overcome problems and are satisfied with themselves.

On the other hand, negative perfectionism or maladaptive perfectionism has been related to eating disorders, anxiety, and stress. People usually have unrealistic high standards which could end up in failure and lead to anxiety, stress, and dissatisfaction (Wang & Li, 2016). It can also lead to emotional eating as a tool to avoid negative feelings, hence eating disorders such as bulimia and binge eating may arouse.

Maladaptive perfectionism is associated with anxiety disorders and more specifically with social anxiety disorder (SAD) (Laessle & Schulz, 2009). According to Silgado, Timpano, Buckner, and Schmidt (2010), individuals that suffer from SAD and perfectionism are more likely to have bulimic behaviors. Hence, anxiety and stress may result in emotional eating behaviors, which are a coping mechanism to avoid such negative feelings. Individuals cope with stress through eating because it distracts them from thinking about things that bother them. (Van Blyderveen et al., 2016).

figure 03: Mindmap factors

On the other hand, there are many social factors that cause or trigger perfectionism, the evolution of the culture of competitiveness, meritocracy, and individualism. There have been some cultural changes that have directly affected the behaviors, attitudes, values, and beliefs of current adolescents and young adults. The emergence of neoliberalism has led to more competitive individualism, hence higher levels of narcissism, extraversion and individualism have increased (Bushman, 2008).

This phenomenon has also affected individuals in the way they look at themselves, they worry about failure and negative social evaluation. Another phenomenon which characterizes Millennials is the rise of meritocracy and perfectionism (Curran et al, 2017). It has led to an increase of students' expectations, competition in order to accomplish societies expectations and demonstrate their merit, which can sometimes be misleading since unrealistic high standards and goals are set up.

Parental control, families with high standards, parents pushing their kids to be perfect feeling responsible for their kids' success and failures (Verhaeghe, 2014) overprotective and worried about social acceptance would also be a factor that might contribute to the development of an eating disorder. Same happens with the influnce of friends, reserach has also demostarted that peers have an imporant role in the development of an eating disrder. Sometimes, people might feel the pressures from friends to start following a diet (R.W Lam et Al, 1991) and lose weight.

According to E.Stice professor of Psychology at Arizona State University, culture also plays an important role in the development of an eating disorder. He mentions that E.D are a "culture-bound syndrome, a constellation of symptoms that are not found universally in human populations but is restricted to a particular culture (Nasser, 1988). Also, westernization might also be an important factor, he even uses the term acculturation as a factor of developing an E.D. In other words, trying to adapt to a new culture or to a mainstream culture could affect the eating habits of a society or sub-culture.

Furthermore, low self-esteem and inadequate coping skills (Cooper et al, 2017) also affect the development of E.D. The fact that someone has a low-self esteem makes them more vulnerable to society's pressures. Their aim is to feel accepted and feel better with themselves, so they will let themselves be influenced by society demands and beauty canons. Also, having issues with their coping mechanisms increase the chances of suffering from an eating disorder (Troop et al,1997). The fact that some people are not able to cope with their emotions also influences their eating behaviours. People with deficient coping mechanisms towards certain situations may try to find a solution by binge eating.

CHAPTER 1. SECTION4

STIGMA TOWARDS EATING DISORDERS

Here I will introduce the stigma that people who suffer an eating disorder feel and how important is to understand that eating disorders are not just an obsession with the body and image.

Eating disorders are considered mental illnesses, however, there is an existing misunderstanding about them among the society.

Actually, the lack of information about eating disorders in our current society leads to a delusion about the problem. People usually blame the patients for their issues towards food and have a wrong image about them. Eating disorders are conceived as problems that are easy to overcome and that patients are usually superficial people who only care about their body image "vain and superficial because they care so much about thinness and their physical appearance" (Dimitripoulos, n.d).

This wrong perception affects directly to the recovery of the patients. They fear of being negatively evaluated by their social group, family, and co-workers. They experience themselves as defective and different from the rest. What is more, it also contributes negatively to seek help. They feel ashamed, judged and guilty of their issues towards food. What is more, there is even a bigger stigmatization towards individuals with bulimic behavior than the ones with anorexia as they are seen as people with less self-control (Int J Eat Disord, 2014). Also, because it is not as noticeable as anorexia. Patients suffering from bulimia nervosa are more difficult to identify by their body appearance, they usually have an average weight and normal body mass index. This also affects the way people think about the mental disease, it seems that is less harmful

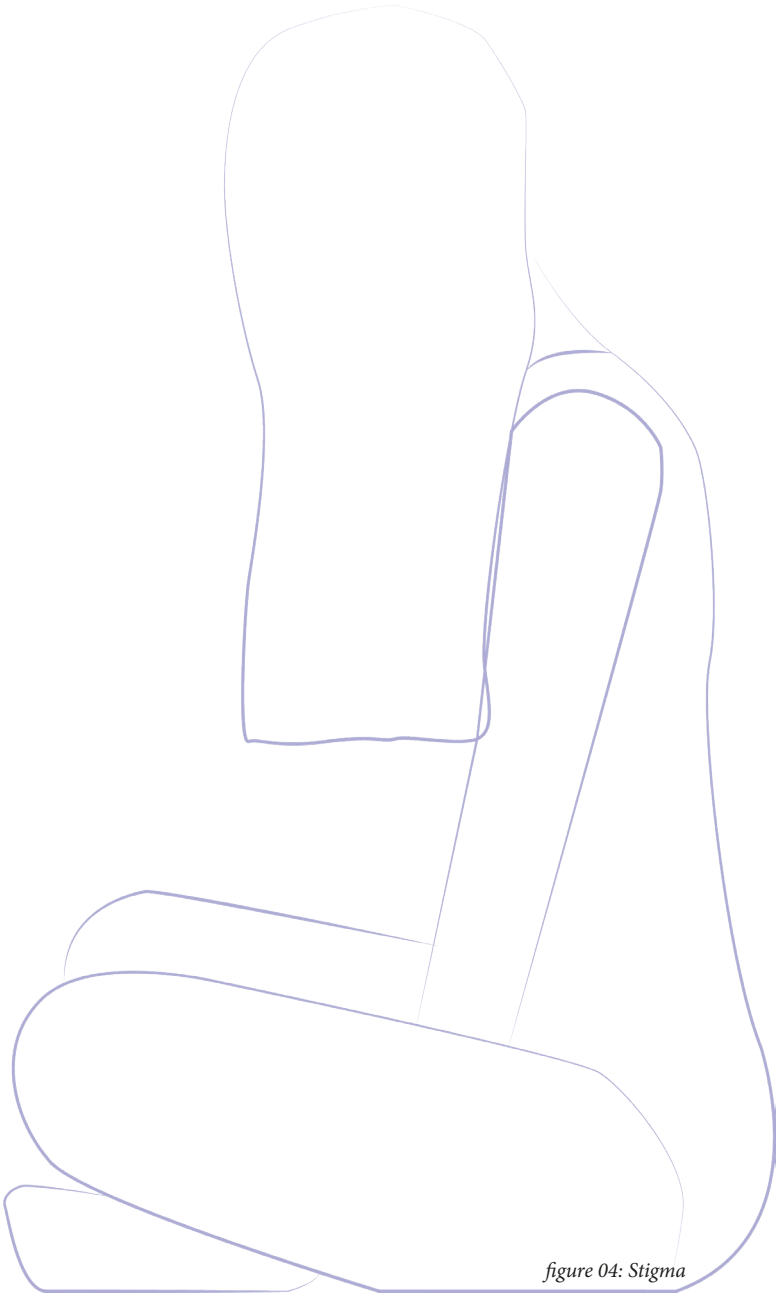


figure 04: Stigma

than anorexia and that it is easier to overcome.

It would be interesting to explore how that existing stigma can be overcomed by educating society in general, and more specifically family members and friends about the eating disorders and how to treat people experiencing problems with food. “Improved educational programs should seek to give those who are uninformed a greater understanding of how psychological, social, and relational factors influence those with eating disorders” (Salafia et al., 2015).

This would be an interesting opportunity to build up a community that embraces the difficulties experienced by patients suffering from eating disorders. Involving patients, therapists and family members, teaching and sharing their experiences towards eating disorders would be a nice platform to open people’s eyes and assumptions about this type of mental disorders.

CHAPTER 1. SECTION 5

STAGES OF CHANGE

During the development of an eating disorder, the patient usually experiences different phases or stages. From the stage in which they don't even recognize that they have a mental disease until the moment in which they are considered recovered.

It will also be important for this research to know more in-depth the stages in which users go through since they start to develop an eating disorder to the recovery phase. It is also important to know that being 100% recovered from this type of mental disease is pretty challenging and in many cases, some relapse episodes might happen. So, this process shouldn't be seen as something linear, patients usually have ups and downs during the recovery phase.

Here I visualise the define 5 phases in which the patient goes through

Precontemplation: During this stage, the person suffering an eating disorder will deny that has a problem. They usually have no awareness of the disorder and mainly focused on controlling their food and eating patterns.
They are usually difficult to approach and with hostile and frustrated feelings.

Contemplation: In this phase, they start to be aware of their problem. However, the attitude will be still quite negative and willing to maintain their eating disorder.
Preparation and determination: In this stage, they have taken the decision to change their behavior and preparing themselves for recovery. They might also suffer from stress and anxiety.

Action: They are pretty focused towards completing the recovery progression. It is quite usual to have a relapse during this stage.

Maintenance: In this phase, those with an eating disorder would have modified their behavior and are mainly focusing on mating their new and healthier lifestyle. It is also possible to have a relapse since they are still learning and adapting to the new habits as well as coping with the eating disorder.

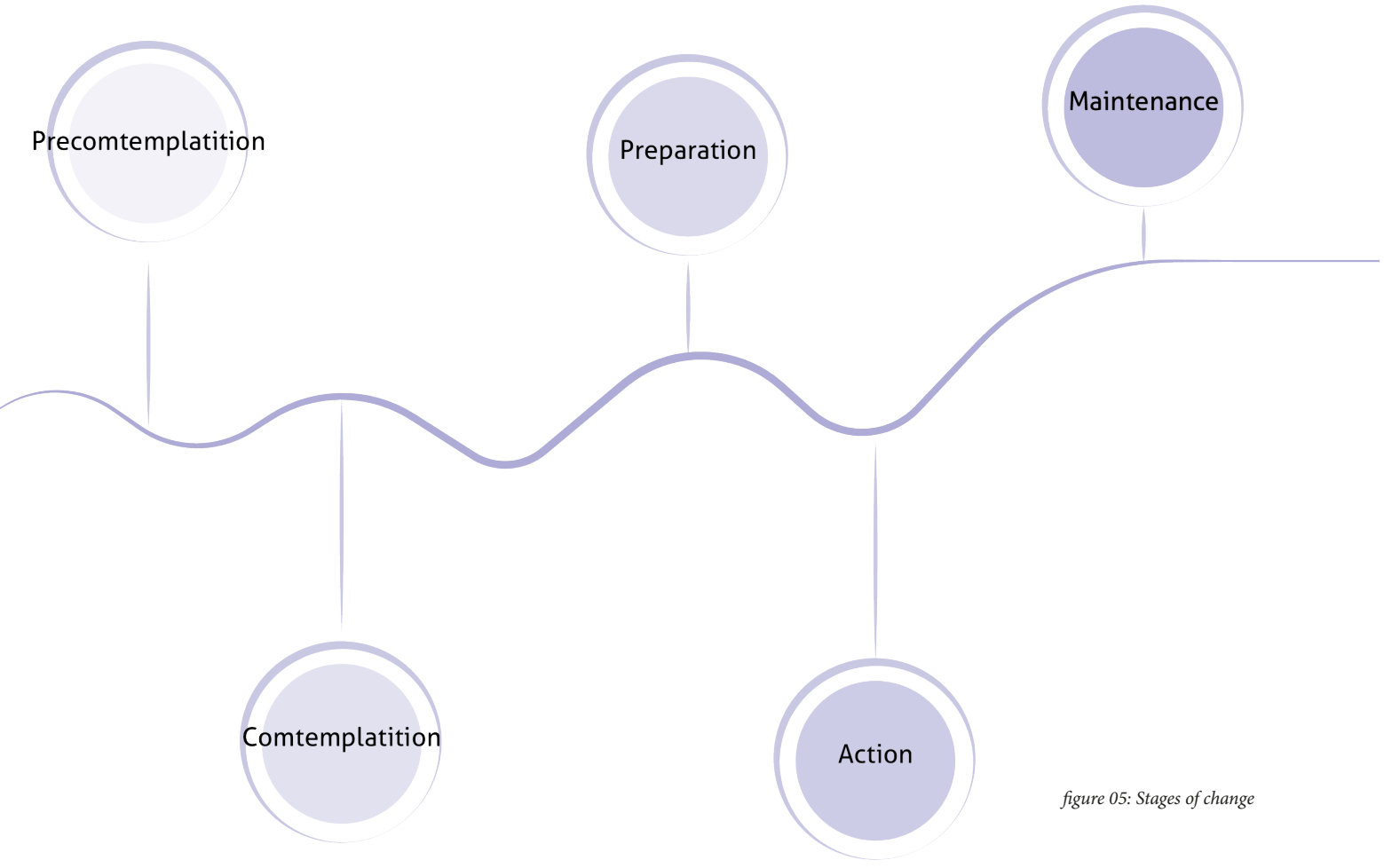


figure 05: Stages of change

1. DEVELOPMENT

The patient has been suffering from Bulimia Nervosa already for a long period of time.

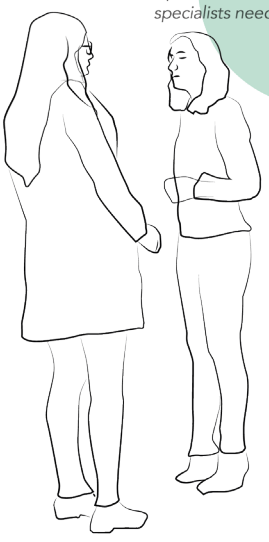
2. BELOVED ONES

The patient accepts that needs some help and talks about her/his problem with someone she/he loves

Here I visualised the stages the patients usually face in order to make it clearer for the reader and to have a better picture of what actually happens in reality. Also, to show how important it would be to keep track of the patient once she/he is released from therapy. As already mentioned before, after therapy there are still many chances for the patient to have relapse episodes. Therefore, I believe that this is a nice opportunity to make a design intervention, however, this topic will need some further research by doing interviews with specialists and patients.

4. GP

First, she/he will talk with the GP, the Gp will evaluate her/his stage and afterward, the patient will be sent to all the specialists needed to start the treatment.

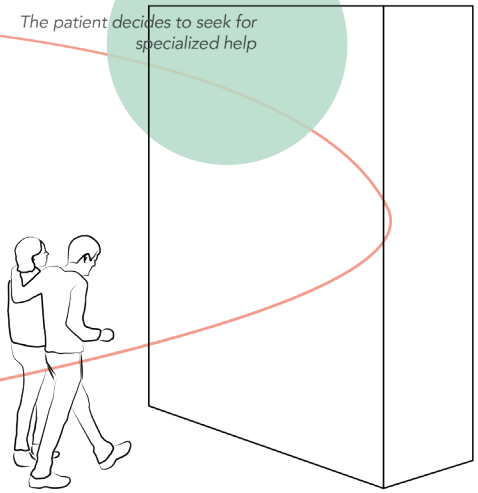


6. RELEASE

The patient will have appointments with the specialist (psychologist, psychiatrist, nutritionist) and follow different therapies

3. SEEK FOR HELP

The patient decides to seek for specialized help



5. SPECIALIST

Finally, the specialist will evaluate to release the patient from therapy and will only have few appointments during the year. However, there are still some possibilities for relapse

7. INTERVENTION

Here, in this stage, what is called the maintenance stage, is where I envision to make a design intervention

figure 06: Journey

CHAPTER 1. SECTION 6

ROLE OF THE FAMILY & BELOVED ONES

As in many other mental disorders, being supported and understood by the ones who care about us is a very important aspect of the recovery process. In this section, I explain how important is feeling supported and understood when suffering an eating disorder.

A part of the patient who is the main sufferer of the disorder, family members and friends also suffer from it and have an important role during the whole recovery process.

Relatives usually have a misconception about the disorder, they do not really understand why a family member has issues with food and what are the main causes. Sometimes, family members underestimate the disorder and think that is a common behavior in adolescents (Espíndola CR & Blay SL, 2008) and once they realize about the severity of the situation they might become a bit negative and pessimistic towards the recovery. They might feel sad, fear of the possibility of losing a family member, impotence because they do not really know how to help. Furthermore, they feel guilty or responsible as they might think they could have influenced their relative with their own eating patterns.

Relationships between family members are also affected as the one suffering from the eating disorder might change his or her mood. They become more aggressive and moody, they avoid communicating about their issues towards food and start to lie.

However, once the patient starts to recover, the relationship starts to improve, and in some cases, it can be pretty crucial to have support from their beloved ones.

This topic would need further research on the target group that is being analyzed. They are young adults and there might be some differences in the possible relationship with their relatives and beloved ones. Since these people have more independent than adolescents, they might live by themselves and far away from their families, in some cases could be that friends become the support they need, or they might also decide to not to tell anyone and try to find a solution by themselves. Therefore, this research would be finished by conducting interviews with the intended target group and therapists or specialist on eating disorders

figure 07: Beloved ones

CHAPTER 1. SECTION 7

TECHNOLOGY DEVELOPMENTS

Technology developments can actually help people changing their behaviours. However, many aspects need to be taken into account when using technology. Here I present the main technology developments in the field of behavioural change and their advantages and disadvantages.

As already mentioned in the trend analysis, people are becoming more aware of their mental well-being. Also, **quantifying** ourselves and our general health by tracking our daily activity, stress levels, blood pressure, heart rate and many of our vital signs is also becoming a trend.
Here is where technology has an important role to understand and cover the needs of the users.
One example is the **Internet of Things** (IoT).
"It is the network that connects everything with the internet, through sensors, radio frequency identification, and global positioning systems and so on" (Yaghoubi Suraki. M. et Al, n.d). Hence, IoT could contribute to the improvement of mental and general healthcare as well as in the prevention of illnesses by encouraging **behavioral changes** in patients lifestyle. According to Deloitte Insights, IoT could be beneficial for patients with chronic diseases and help them in having a more normal life. It could be beneficial for them to live at their homes and being supervised by their doctors or specialists. This could be possible thanks to sensors that could monitor their health and behaviors, such as glucometers, fall detection and so on. Using IoT to analyze behavior and wellness data could help patients by promoting **healthier habits** and offering valuable information and **engagement** to them.
Being able to have access to our activity and vital signs could help people to be more aware of their health on a daily basis which could lead to healthier habits as well. IoT has already being used to cope with mental and psychological diseases such as OCD. In this case, the aim was to obtain information about the behavior of the patients and warn them and their therapist when the behaviors were becoming more repetitive (Yaghoubi Suraki. M. et Al, n.d).
IoT can also make possible to connect with other people and create a **community** feeling which in some cases it can be beneficial for some patients. It can connect with people who are suffering the same illness, with your doctor, your friends and beloved ones which in most cases is a key factor to improve patients health and behavior.

However, it can also have some drawbacks, monitoring mental health can be difficult to maintain during a long period of time. It should be **unobtrusive** and avoid a stigma association by the patients. People are still pretty skeptical about being tracked and sharing too many personal information with other people. People with a mental disease, usually avoid objects that make them feel different and thus increase their stigma towards their mental illness. (Matthews. M. et Al., 2014)
Nevertheless, it is true that IoT could help patients to learn about their mental disease and also appreciate if the system offers a more individual and **personalized** information. Providing control over their personal data will make them more responsible for who they want to share their personal data and also avoid stigmatization of their mental illness, what patients need is a "Deeper and more personalized understanding of their illness" (Matthews. M. et Al., 2014) which i would also help patients to engage and

not fall back on former unhealthy behaviors.

Apart from IoT, there have been already some solutions that try to understand what happens in our brain. Electroencephalography technology (EEG) is being used to recognize emotional stress and help people deal with anxiety and stressful situations. EEG records the activity of the brain by attaching electrodes to the scalp. It was firstly used in the diagnosis of epilepsy and sleep disorders such as apnea or narcolepsy (Muller. R, 2014). However, thanks to technology development, EEG has been applied in the development of EEG headsets. They help understanding personality traits, health, and other medical applications (e.g stress detection, emotions, and mood) or disease diagnose, like Alzheimer or Autism or deficit in behavioral, attentional and cognitive processing.
Furthermore, EEG headsets can also be used to monitor relaxation, concentration, and sleep training. These headsets are usually connected to an app which gives tangible data to the user's brain behavior. According to Tan Lee, an innovation, and medical researcher,"People are more interested in quantifying their physical health, and I think we are going to start seeing people more interested in quantifying their cognitive, behavioral and mental health".
These headsets, they are not only being used in healthcare but in other areas such as marketing, they are being used to process the brain waves that drive consumer decisions.

Eventually, all these technological developments could be a source of inspiration in later stages of the project. It would be important to take into account that the final outcome should not be intrusive and increase the stigma towards Bulimia Nervosa. However, making a wise use of the technological improvements such as the IoT.

CHAPTER 1. SECTION 8

MARKET RESEARCH

Here some products and services designed for behavioural and healthy habits are shown. The aim of this market research was to see whether there was an opportunity to design something more specific for people with an eating disorder and to see if this solution could differ from what already exists.

In order to validate the possibility of designing a product that can help people with an eating disorder, an analysis of the existing products or concepts was made. As can be seen, there are many products on the market that are aimed to help people to cope with stress, anxiety, and mood. However, few solutions have been done to directly help people ED's which leaves a market and design gap that could be addressed.

Here I show the different products with a short description. In order to visualize the differences between each product I also tagged them with a logo that specifies what type of problem or mental disease they are designed for.
For each product I made a short decription and also tag them with their main function (see figure 07)

Current solutions that try to address the problem with eating disorders are mainly apps that track the meals and the emotions of the patients. They also offer coaching and support from specialist throughout the app. Nevertheless, the products that try to help the patients focus on enhancing the dining experience or trying to relax them when having an anxiety episode while eating.

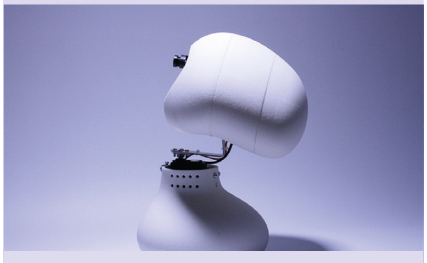
On the other hand, there are other solutions which are less intrusive or less specific towards eating disorders. They focus more on the mental wellbeing of the user by tracking their mood and feelings during their daily activities. What is more, they make use of the senses in order to mitigate the moments in which the users might feel weak or having negative thoughts.

In conclusion, most of the apps and devices are mainly focused on the individual wellbeing. Depending on which disorder they are aimed for, they approach the problem differently. When the products/systems are focused on more psychological illnesses, they try to help the users in a more subtle way, whereas if it is related to reduce the food intake and becoming more active, the solution usually acts directly on the eating and activity patterns of the users.

Analysing what has been already designed for mental and eating disorders, it is clear that there still space for designing for Millennials and eating disorders. Current solutions do not focus on the disease, they try to help users by setting up meal schedules, control their mood, their eating patterns and exercise, however, they do not tackle what triggers them to behave in that way.

Mr. fooder

home product



Domestic robot for kitchen able to suggest how to cook and how to present custom recipes based on our sanitary profile. For users suffering from an eating disorder or follows a specific diet, he will eat particular foods and in certain quantities often to detriment of the enjoyment related to the experience of having a gratifying meal.

Magic wand

wearable

Modular structure of filters soaked with essential oils. Designed for management of eating habits and disorders. The smell is recognised by a colour ring marking the top of each module. This is an allusion to synesthesia ,when stimulation of one sensory or cognitive pathway leads to automatic experiences in a second sensory or cognitive pathway.

ELF EMMIT

wearable

ELF EMMIT aims to improve to focus, sleep and meditation.
It uses inducing brainwaves that will adjust the mood to how we want it to be. At night, it'll put the brain into 'sleep' mode, while in the daytime, it can help to relax and meditate more effectively.

Pip

wearable

The Pip teaches how to manage stress better. It allows to see the stress levels, connecting the emotions with engaging apps, teaching not only how to recognize stress, but to know a life without it.

Calmingstone

wearable

Device to cope with stress by guided audio recordings and heart rate pulse control

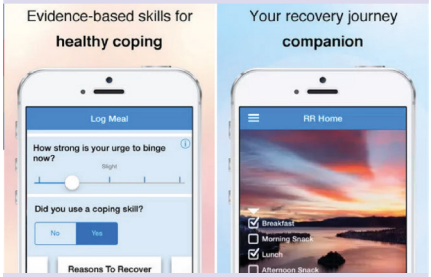
Feel

wearable

Feel is a device that recognizes and tracks emotions throughout the day. Alongside personalized coaching options. It measures a variety of bio-signals that frequently accompany certain moods, such as electrodermal activity, blood volume pulse, and skin temperature.

Recovery Record

App



Recovery Record helps to chart the progress of the patient and check in with their mood throughout the recovery process. This app is aimed to help people with binge disorders and overeating.

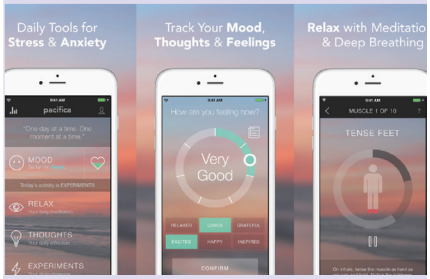
Temstem

App

Helps people cope with 'hearing voices'. people recover from psychosis. It is a smart phone application for people who hear voices and are obstructed by them in their daily activities.

Pacifica

App



Daily tools for stress, anxiety, and depression alongside a supportive community. Based on cognitive behavioral therapy & mindfulness meditation.

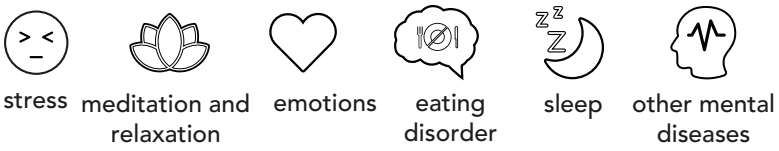


figure 08: type of products

CONCLUSIONS

After analyzing and understanding the most common eating disorders and taking into account what are the possibilities of making a design intervention, I decided to go deeper into Bulimia Nervosa.

The main reasons for taking this decision are that patients who suffer from Anorexia Nervosa are determined to stop eating and it can be very delicate and difficult to change their mindset.
On the other hand, binge eating disorder is still a quite unknown mental disease and is mainly suffered by people who also suffer obesity and hence a different target group.

Furthermore, I believe that patients suffering from Bulimia Nervosa, develop a habit or certain behaviours towards certain situations, that is why I see it as very interesting and also challenging to try to mitigate or substitute those behaviours for other ones that promote a healthier lifestyle. However, this is something that will be discussed during the next chapters.

Also, since the problem is too broad and of course patients with this type of mental disease need to be treated by specialists, I will not focus on all the stages of change of the mental disease, but focus on one. I consider that it would be interesting to design for the maintenance stage. The main reasons why I attempt to do that is because at that moment patients are already aware of their maladaptive eating behaviour and want to change that. What is more, it would be interesting to analyze what are the prompts for having a relapse episode.

Also, I don't want to take the role of a doctor, I strongly believe that first of all patients should be treated by a specialist or therapist and afterwards once the patient is ready to take a step further towards recovery, is when I want to do an intervention.

In the next chapter, I will go more in detail to what Bulimia Nervosa is, the main characteristics of the patients, the phases that they go through the recovery phase and the main therapies that are actually being used.

2.0 BULIMIA NERVOSA

What is Bulimia Nervosa?

Scenario

OCD & Bulimia Nervosa

Habit formation & Bulimia Nervosa

Conclusions

CHAPTER 2. SECTION 1

WHAT IS BULIMIA NERVOSA?

In this chapter, I would like to emphasize the characteristics of people suffering from bulimia. Also, defining a bit more the target group and how bulimia can also be related with other mental diseases.

Bulimia is a psychological disorder characterized by the ingestion of big amounts of food in relatively a short period of time (approx 2h) and followed by a purging behavior.

The methods used for the purge are usually induced vomiting, use of laxatives and diuretics. The aim of purging after the binge is used as a coping mechanism to recover a sense of control, not gaining weight and as a way to face difficult situations that trigger anxiety and stress.

According to the Diagnostic and Statistical Manual of Mental Disorders (DSM-5), instances of both binge eating and compensatory behaviours must occur on average at least once a week for a period of three months or more in order for an individual to be diagnosed with BN.

Individuals with BN usually have a normal or are above a normal weight. This could be explained by the fact that purging not always eliminates all of the calories consumed during a binge thus repeated binge-purge cycles often lead to weight gain over time (Kaye et al 2003).

BEAT a UK's eating disorder charity, estimates that 45% of individuals with BN make a full recovery, 27% improve considerably and 23% suffer chronically. Recovery from BN takes, on average, five years (BEAT n.d.). However, these statistics are widely questioned (Keski-Rahkonenet al 2009).

BN is most commonly diagnosed in young adult females; as with AN, the male-female ratio is approximately 1:10 (APA 2014a)

Young-adult women, predominantly from Western countries and mainly white. The disease is more evenly spread among all societies classes compared with anorexia nervosa whose patients usually come from higher social classes. Most patients with Bulimia Nervosa feel ashamed and distressed by their loss of control over eating, which makes them easier to engage in treatment than the ones with anorexia nervosa (G Fairburn and J Harrison, 2003). However, it takes longer to seek for help compared to people with Anorexia.

It usually appears at a later age than Anorexia Nervosa and it starts by doing extreme dieting and afterward binge episodes start to arouse interrupting the restrictive diet and hence the purge episodes start to happen in order to counter the binge episodes and the calorie intake (G Fairburn and J Harrison, 2003). The age of onset ranges from from16.5 to 20.9 and the current age range of people suffering from bulimia is from 23 to 28 years old. (E. Stice, 1994)

There are two types of Bulimia that can be defined: Purging type: is the most common one and is characterized by self-induced vomiting and/or abuse of laxatives and diuretics.

BULIMIA NERVOSA PROFILE

Female
Western Culture
White people
Young adult

figure 10: Bulimia Profile

Non-purging type: in this one, the purging episodes are less regular than in the other case, however, individuals do excessive exercise and fasting.

Individuals suffering from an eating disorder like B.N present some physical and behavioral symptoms.

Some of the physical symptoms are: Weigh fluctuations, broken blood vessels within the eyes due to inducing vomiting, electrolyte imbalances which can provoke cardiac arrhythmia and cardiac arrest, enlarged glands in the neck and under the jawline and lacerations inlining of the mouth and throat due to as well the repetitive vomiting. What is more, they suffer from chronic dehydration, inflammation of the esophagus, chronic gastric reflux after eating and infertility.

Some of the common behaviors related to .N are the intake of few amounts of food during meals, eating in secrecy and a lack of control when eating. Frequent use of bathrooms and a smell of vomit are also symptoms that give a hint when someone is bulimic.
People with bulimia, apart from experiencing stress and anxiety, they also have problems with their coping mechanisms towards certain emotions and situations. Emotion regulation seems to be a pretty challenging task for bulimics, according to the International Journal of Eating Disorders

"Binge eating is assumed to proximally occur under aversive affective states, especially negative mood, and to provide temporary relief from this negative mood, thereby reinforcing binge eating behavior".

Even if developing an eating disorder depends on many factors, such as depression, anxiety disorder, dieting, perfectionism, culture, family, and friends' influence, it seems that most of the people suffering from bulimia share this difficulty in their coping mechanisms and mediating negative affect. The lack of adaptative skills in certain situations drives them to binge eat as the only solution to feel at ease in certain situations.

"Emotion regulation is a dynamic and reciprocal interaction involving a flexible use of a wide variety of emotion-regulation strategies, such as active problem-solving, cognitive reappraisal, emotional acceptance, and awareness, information-seeking and support-seeking. Allowing individuals to adjust their goals and behaviours to those others, creating a cycle of mutual influence. " (A.D'agostino et Al, 2017).

In contrast, individuals with emotion dysregulation show a maladaptive use of their strategies or coping mechanisms to regulate their emotions or lack the ability to select the most suitable strategy for achieving certain goals.
People with emotion dysregulation are characterized by avoidance, denial, emotion suppression and rumination and may also suffer from some mental

Problems re-evaluating emotions and attributing meaning to certain situations

Cognitive reap-praisal diffciulty

Restricted emotional range
Context-inappropriate emotional resposnses

Emotional rigidity

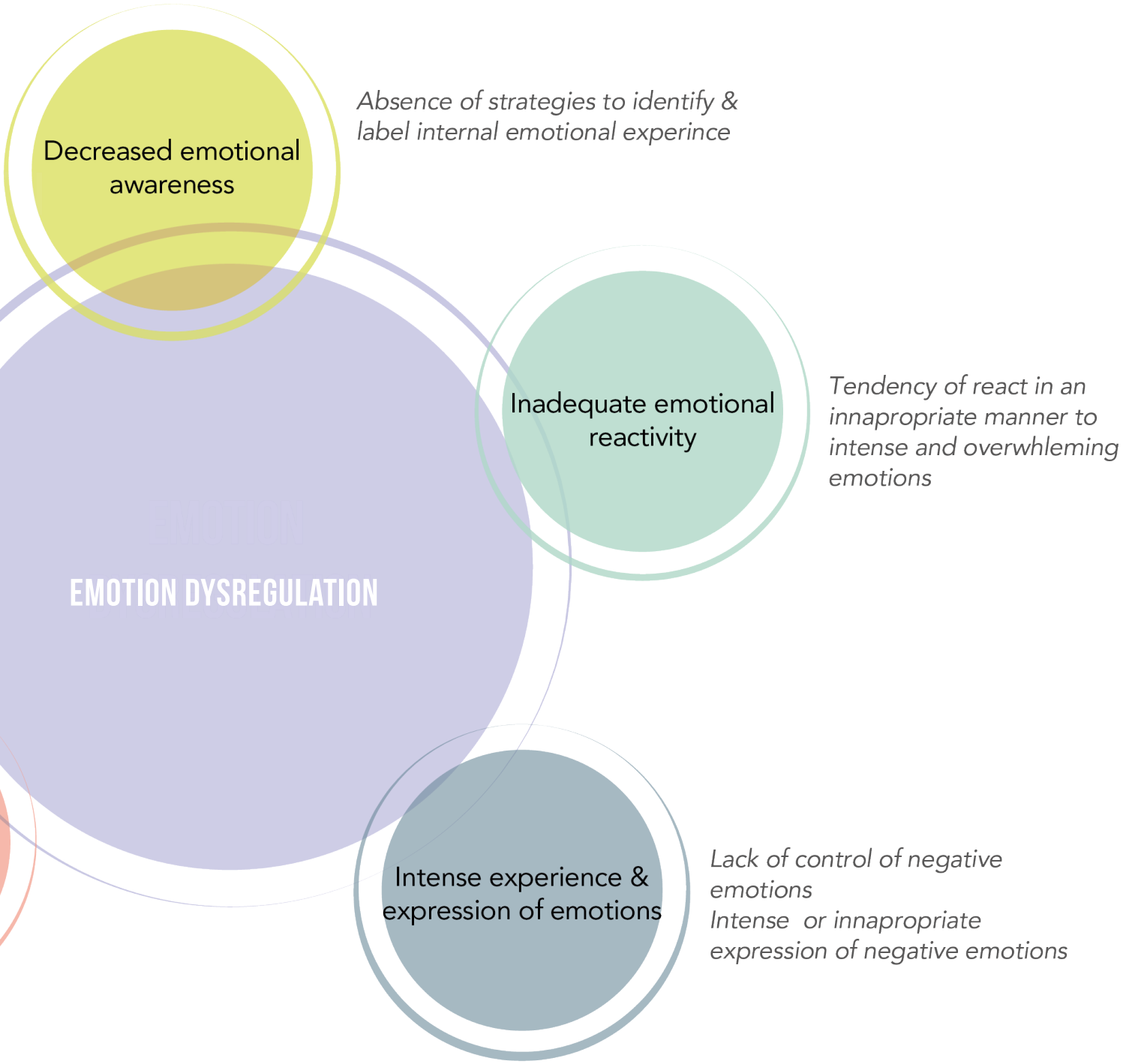


figure 11: Emotion dysregulation scheme

disease such as anxiety disorder, hyperactivity disorder, borderline personality disorder, and eating disorders.

Since emotion dysregulation is one of the characteristics that people suffering from Bulimia Nervosa have in common, I will explain what are the main emotion dysregulation dimensions that characterize this target group.

Decreased emotional awareness relates to the ability to identify and label internal emotional experiences (A.D'agostino et Al, 2017). Individuals who suffer from Bulimia Nervosa show low levels of emotional awareness, negative emotion, and non-constructive strategies towards negative emotions.

Inadequate emotional reactivity is another dimension which is characterized by inappropriate behaviours towards overwhelming emotions. Thes intense emotional reactions can be caused by too much control and the constant suppression of negative emotional experiences which can lead to an intensification of those experiences. Individuals with Bulimia Nervosa usually feel overwhelmed by strong emotions and show a lack of self-control towards them.

Another dimension is **intense experience and expression of emotions**, it refers to the ability to regulate negative emotions. Individuals are usually not able to cope with negative emotions which also characterizes patients with Bulimia Nervosa. They experience both negative and positive emotions more intensely than other individuals (Overton et Al, 2005), and have issues in accepting them.

Emotional rigidity is defined on one hand, by the ability to the number of emotions that a person is able to experience and express. If the individual has maladaptive experience and expression of an emotion and is not able to switch to another emotion is known as having a restricted emotional range. Another manifestation of emotional rigidity is the context-inappropriate emotional response. This indicates to what extent individuals can understand't their emotions in a certain context. This will occur when the person expresses her/his emotions in an inappropriate manner or violates social or cultural norms.
Nevertheless, individuals with Bulimia Nervosa are not characterized by having emotional rigidity.
Same happens with Cognitive reappraisal difficulty, even if it is another aspect which defines emotion dysregulation, it is not a dimension that people suffering from Bulimia Nervosa are characterized by. It is described as the ability to re-evaluate and attribute relevant meaning to certain situations.

Furthermore, **impulsivity** is also another typical characteristic of people suffering from bulimia. According to E.Stice from the psychology department of Arizona State University, "impulsive people would be more likely to both binge and

response to triggers and to purge after binging".

Hence, if we summarise all the characteristics of people suffering from bulimia we could say that further research on the coping mechanisms of real patients and the way they confront certain situations and emotions should be done. This will be done by doing interviews with people who are at a more mature stage of the mental disease, which means that they are already aware of their lacks or flaws and are trying to have healthier relationship towards food.

CHAPTER 2. SECTION 2

SCENARIO

In order to put the reader in context and to make more understandable how people with bulimia feel and behave when they have an urge, I visualized a scenario.

I found out that these urges of binge eating followed by a purge could happen anywhere. However, it is most likely to happen when they are alone and have pretty negative thoughts and feelings. They usually feel lonely, depressed and anxious and that is the starting point. Afterward, in order to satiate those emotions, they start to look for food desperately, it is their way of scaping and somehow feeling better. They usually set up the food in a comfortable and private environment, their room. They start eating a great amount of food in a very small period of time, mixing salty with sweet things up to the point of feeling stuffed. Eventually, feelings of guilt, disgust, and shame will arouse, users feel so bad and disappointed with themselves that they have to put a solution to what they have just done by means of purging. Purging as mentioned before could be done by doing sport until exhaustion, use of laxatives or throwing up, this one is one of the most common technique, mainly because is the fastest one.

1. Feeling down, lonely, depressed and anxious

2. Craving food in order to satiate those negative feelings

3. Binge eat up to the point of feeling stuffed

4. Feeling guilty, disgusted and ashamed about her former behaviord

5. Urge to undo the damage, in this case by throwing up all she has ingested

figure 12: Scenario bulimic episode

CHAPTER 2. SECTION 3

OCD & HABIT FORMATION

Studies have shown that people who have a predisposition towards suffering from an anxiety disorder could lead to a development of an eating disorder (Builk et al. , 2007). One anxiety disorder that has been related to the development of an eating disorder is Obsessive Compulsive Disorder (OCD).

OCD is a severe anxiety disorder involving distressing obsessions and repetitive compulsions. On one hand, obsessions are unwanted, intrusive thoughts, images or impulses that increase anxiety. On the other hand, compulsions are repetitive behaviors or mental acts used to decrease anxiety. Those compulsive behaviors can interfere with a person's daily life and social interactions. Even if the sufferers are conscious about their compulsive and irrational behaviors they feel driven to pursue those behaviors in order to ease their anxiety.

OCD is a complex mental disease that varies in its symptoms, it can manifest towards obsession with cleanliness, perfectionism, symmetry, and arranging, among others. It has been proved that there is a relationship between Anorexia Nervosa and OCD, as they have in common a dysregulation of the serotonergic function (Builk et al. , 2007). However, there is not only a relation with Anorexia but with other eating disorders such as Binge Eating Disorder and Bulimia Nervosa. The relation between those behavior diseases lays on the wrong management of impulses, usually, people who suffer from BED and Bulimia Nervosa are characterized by their impulsivity and their lack of control over their eating instincts.

Common symptoms of OCD are:
Fear of germs or infection, unwanted forbidden or taboo thoughts involving sex, religion, and harm, threatening thoughts towards others or self, have everything in order or in symmetry. These thoughts are followed by impulsive behaviors which the sufferer cannot control, what is also known as a compulsion.

The common compulsive behaviors are:
Excessive and continuous cleaning and/or handwashing, arranging things in a particular and specific way
Ordering and organizing things in a particular and precise way, constantly checking things like if doors are closed or if some household appliances are off and compulsive counting.

Compulsive behaviours could also be seen as habits or routines that the patients have developed as a coping mechanism for specific situations.
Habits can be defined as an "automatic response to a specific situation, acquired normally as a result of repetition of a learning". According to Charles Duhigg, our brain tries to make less effort and that is why it seeks to create new habits into routines, that way it will not require too much effort since it will become an automatic behavior. This happens with daily activities such as brushing our tooth or lasing our shoes. The process within our brains is a three-step loop. In order to build up a new habit, first, there is a trigger that activates certain behavior, then an action arouses as a result of that trigger or cue, and finally, there is a reward, which helps our brain to remember the outcome of that trigger. Afterward, if this situation is repeated for a certain period of time

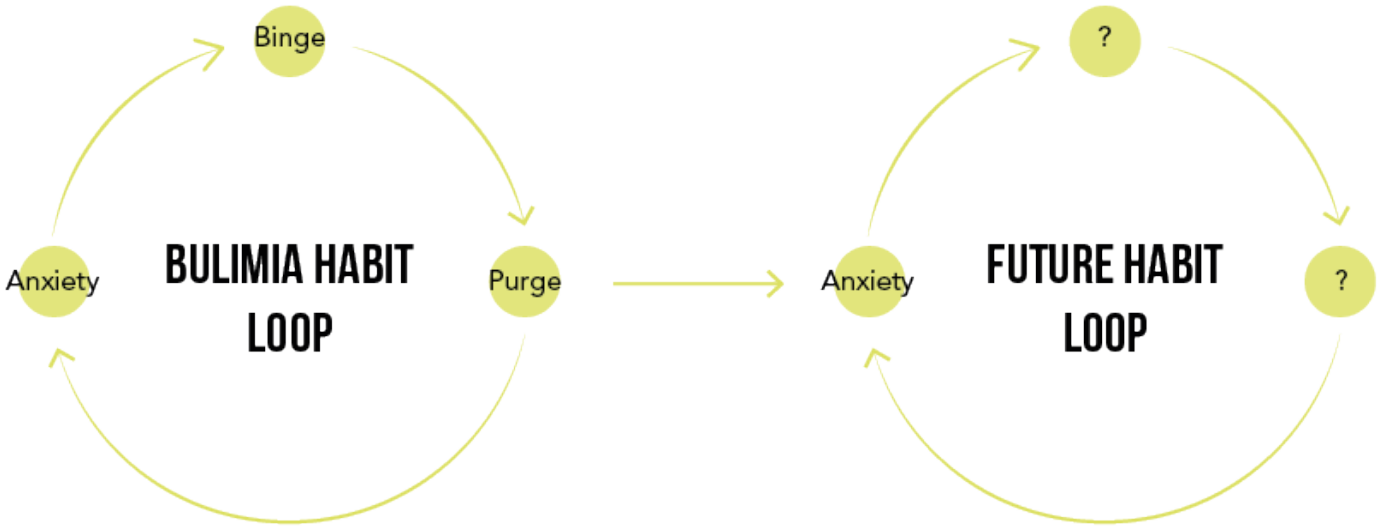


figure 13: Habit loop

it becomes more and more automatic and eventually, a habit is born.

Usually, people with high reward sensitivity have more chances of developing an addiction. Even if routines are usually related to healthy behaviors, they can also be related to unhealthy patterns such as smoking or drinking alcohol and hence become an addiction. As mentioned before, people who suffer from bulimia nervosa are characterized by their impulsivity and lack of control over their eating patterns. So if binging and purging are used as a coping mechanism to deal with stressful situations driven by their impulsivity and lack of control, they will eventually become a habit

The therapy that is the most common in treating this disease is **Cognitive Behavioral Therapy** like the most used to treat Bulimia Nervosa. During treatment sessions, patients are exposed to the situations that create anxiety and provoke compulsive behavior or mental rituals. By exposing the patients to certain situations they learn how to stop or decrease their impulsive behaviors, likewise in Bulimia Nervosa treatment.

However, there is another technique which has been proved to be successful in treating OCD as well. This technique is Mindfulness, Dr. Jeffrey Schwartz is one of the leading experts on neuroplasticity. He believes that the mind can control the brain's chemistry and hence mindfulness meditation could ease the fears of the patients by giving a detached perspective from the patient's own thoughts.

Due to the fact that OCD and Bulimia Nervosa are both anxiety diseases which are driven by the lack of control and impulsivity, it is interesting to look at the treatments that are being used to control OCD. In this case, mindfulness techniques could be useful to take into account when designing for people who are in the maintenance stage of Bulimia nervosa.

What is more, there is a therapy which is used to cope and overcome some behavioral problems such as smoking, gambling, OCD, anxiety and so on. In those cases, they try to identify the triggers and rewards of those behaviors and afterward change them in order to modify the maladaptive existing routine

It would be interesting to see whether the eating habit that has been aquired by the patients could be substituted by a more healthy habit or routine and change the emotions that are aroused by that maladaptive behavior.

CHAPTER 2. SECTION 4

THERAPIES

Another important aspect to understand is the existing therapies. The main characteristics and the aspects they tackle during the therapy sessions will be presented hereafter.

Treatments
There are many therapies which help the patients to overcome their eating issues. The most common ones for recovering from bulimia are Dialectal Behavior Therapy (DBT), Interpersonal therapy (IPT) and Cognitive Behavioral Therapy (CBT) which is known as the most efficient one.

Dialectal Behaviour Therapy was developed to treat borderline personality disorder (Am J Psychiatry, 2001). This therapy helps patients to cope with negative emotions and focuses on individuals who have a predisposition to have extreme reactions towards an emotional situation. It tries to educate and regulate self-defeating thoughts and to cope with stress. However, it is not used as the first choice to treat an eating disorder, it is mainly used when other therapies have not worked and the patient is driven by negative emotions.

The therapy consists of 4 components:
-**Skill training:** group sessions in which behavioral skills are taught and homework is assigned. Patients practice mindfulness, distress tolerance emotion regulation and learn to express their needs and self-boundaries
-**Individual therapy:** helps to enhance the individual motivation and to put into practice the learned skills during their daily life
-**Coaching**: Patients are allowed to their therapist and ask for help to cope with difficult situations during their daily life.
-**Case management:** patients learn strategies to manage their physical and social environments.

Interpersonal Therapy (IPT) was originally used to treat depression and afterward applied to help patients with eating disorders, however, is not seen as the most effective therapy. It makes a "practical link between patients' mood and disturbing life events that either trigger or follow the onset" of the eating disorder (Eating Disorder Hope, 2016). IPT focuses on helping patients expressing their emotions and how former experiences are affecting present interpersonal situations, more specifically those ones which have provoked their eating behavior. Specialists also try to teach them how to perceive themselves in a more positive way and do not just make a self-evaluation about their body, weight, and image.

This therapy is characterised by 3 phases:
- During stage 1 the therapist tries to find the problems that are causing a **maladaptive behaviour** (relationships, past life transitions, unresolved problems or interpersonal deficits)
- During stage 2 the patient learns and puts into practise new and **healthier strategies** to cope with her/his problems)
- Finally, during stage 3 together therapist and patient review the **progress and improvement**s done as well as the new acquired coping skills.

Cognitive Behavioral Therapy (CBT) is considered

the most effective one among all the treatments used to overcome an eating disorder, and particularly for bulimia. It also used to treat depression, mood disorders and personality disorders among others. It helps individuals to understand that they cannot control everything that surrounds them, but they can learn how to **cop**e with **overwhelming situations** and make them more manageable and smaller. (Ekern, 2012)
Patients learn to analyze and identify problematic thoughts or situations, they also learn new **techniques** that can help them comping with those situations and put them into practice in real-world situations.
There is a variant from this therapy which is focused more specifically on treating eating disorders known as Enhanced Cognitive Behavioral Therapy (ECBT). (Murphy et Al, 2010).

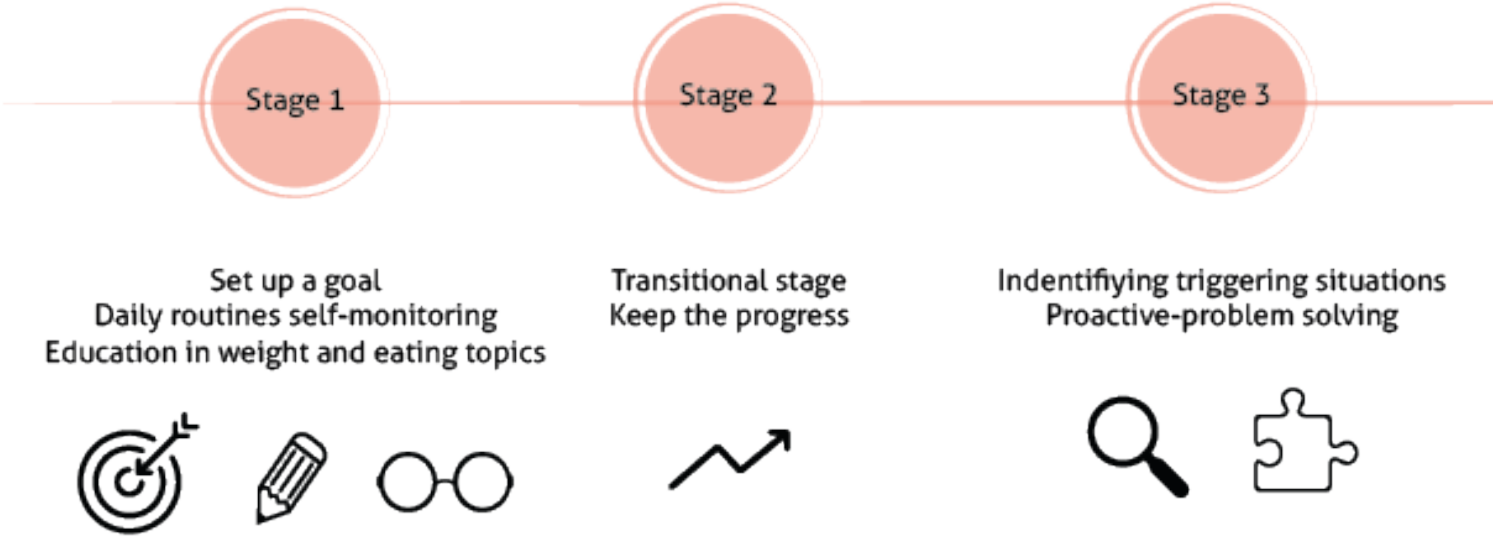
This therapy has 4 stages:

-During stage 1 the specialist aims to **engage** the patient in the treatment. Together with the therapist, the patient has to formulate what she or he wants to change, in this case, could be binge eating. Afterward, the patient has to start **self-monitoring** their **daily routines**, meals, and **feelings**. The purpose of this is to make the individual more aware of what is happening when they have the prompt to binge. Furthermore, the patient will start to be **educated** towards weight and eating and topics related to the eating disorder. Examples would be the damages of vomiting, the use of laxatives and diuretics as well as interpretations of body mass and weight.

-Stage 2 is a transitional stage in which the aim is to recognize what stills need to be addressed and **keep the progress** from stage 1.

-Stage 3 tries to solve what are the issues which are still keeping the eating disorder. **Self-evaluation** is addressed, patients are taught to not over-evaluate weight and shape. Also, together therapist and patient try to find **activities** that can help them to recover and feel engaged with. Body checking has to be avoided as well, the individual has to learn to identify situations in which they check their body and might feel unsatisfied such as comparing with ideal bodies or scrutinizing parts of her/his body. Another important point is to stop dieting, break the rules that the patient has set up when eating and start to introduce those specific foods that the patient tries to avoid. Patients are also trained in **proactive problem-solving** in means of being able to cope with mood swings and outside events that might affect their eating behavior.

-The final stage is the **maintenance** of the progress made and try to avoid relapse episodes. Patients are recommended to find activities or hobbies which can help them avoid binge eating. They also start weekly weighing at home and follow a personalized plan for the following months in which they have to



work towards body checking, practice on problem-solving and food avoidance. Furthermore, in order to avoid relapse episodes, patients should set realistic expectations and expect moments in which they might be triggered to binge eating and that are still vulnerable to relapse.

Nevertheless, even if someone follows a treatment, there are still some possibilities of having a relapse episode. According to some studies, 50% of bulimics maintaine a maladaptative behaviour with relapse episodes and 20% of patinets remain symptomatic (Medina et al., 2003). Even if CBT is considered to be the most effective one in eliminates bulimic behaviours on a 30% to 50% of the cases (Wash et al., 2005)

For these reasons it would be wise to continue with a further analysis of alternative techniques and other anxiety disorders such as OCD and the therapies used to treat those mental diseases.

Eventually, it will be interesting to see whether it would be interesting to fill the gap that remains once the patient is out of the therapy. In order to do so, I will conduct interviews with a specialist who could give some more specific information about to what extent do they keep track of their patients and what are the techniques they use in order to avoid relapse episodes.

Alternative techniques

A part of the techniques mentioned above, there is another technique which can be also beneficial for overcoming an eating disorder. Practicing mindfulness has been proved to be helpful to some individuals.
Mindfulness is an Eastern practice, more specifically it is a Buddhist meditation technique. However, it has been lately used by Western therapists to overcome some mental stress-related illnesses.

There is more specifically an approach to help individuals with an eating disorder recover from it. It uses **DBT** together with **mindfulness** interventions and **emotion regulation training.** It uses mindfulness skills in order to teach participants to become aware of the negative emotions that trigger them to binge eating. Individuals learn to be aware and to not be judgemental about the emotions that trigger their destructive eating patterns. They learn to observe their emotions without acting in a specific way and **without self-criticism** for having those feelings.

Mindfulness-based eating awareness training (MB-EAT) it promotes awareness and **acceptance of emotions** by breathing and body scanning meditation (Baer et Al, 2006). Instead of making adaptative choices like in DBT when negative emotions arouse, participants learn to do mini-meditations during the day, they have to stop for a

figure 14: CBT stages

few minutes to practice nonjudgmental recognition of feelings and thoughts. In other words, being in a mindful state should help individuals to comprehend that those feelings or thought are temporary and the might be substituted by other thought and that they do not really represent the reality or need any specific behavior (Baer et Al, 2006).
Mindfulness techniques

-**Understand the momen**t: individuals have to understand what is the main cause of making them carry out negative eating behaviors. Becoming aware of the moment will allow patients to become more flexible and to remove the negative triggers. Examples for this would be activities such as yoga, relaxation and meditation techniques
-**Focus on the positive:** Remove negative thoughts and emotions with positive behaviors like exercising, cooking healthy meals and meet friends and family.

-**Take action**: patients should take care of their mind and soul. Try to stick to a routine, surprising distraction while eating and enjoying healthy meals with family and friends.

Therefore, knowing all the different therapies that can be used to overcome Bulimia Nervosa, it would be important to take them into account for designing an intervention. It is clear that even if they all vary in some aspects, they also have some commonalities, such as the **emotion regulation activities**, seeking for activities that prevent patients from binge eat and the development of **coping mechanisms** that help patients overcome certain situations that might cause stress or anxiety.

CHAPTER 2. SECTION 4

DILEMMAS

"Concern conflicts jeopardize self-actualization because of our inherent disposition to seek pleasure and diminish pain" (Ozkaramanli et Al, 2012)
Taking into account that the people to whom I am going to design for, it was interesting to look at how to design for dilemmas.

The fact that the main users are people who are characterized by their impulsivity and lack of control when binge eating, but at the same time they want to stop those behaviors and find a way to cope with their triggers to binge eat, it could be said that they are in a situation of conflict with their personal concerns.

Adopting an emotion-driven approach could be helpful to find a solution to this situation. This approach uses the emotions that cause an impulsive behavior, in this case, binge eating, together with the ones that empower a more reflective and healthier behavior. Distant concerns are the ones which can be defined as aspirations and goals whereas concrete concerns are the ones which are more immediate (Ortony et al, 1988). Sometimes these concerns can conflict and depend on some variables the users will prioritize which of both concerns they will carry out. (Ozakaramanli, Desmet, and Hekker 2012) explain that there are three different variables:

The size of the hurdle, which means how difficult and the amount of resources that a concern needs to be pursued.

Awareness, which are the requirements and implications that each activity needs to fulfill each concern.

Authenticity, which relates to the expectations and emotions that the users presume to experience for attempting each concern.

They eventually conclude that if we want to avoid people engage with maladaptive behaviors, it is important to "anticipate the **emotional** consequences of a certain action could help people make choices that facilitate goal pursuit","if people could anticipate feeling guilty about giving into their immediate desires, they could better commit to their meaningful goals to avoid guilt"

Based on Ozkaramanli et Al, "Proud to be in control", I visualized the conflicting concerns of people suffering from bulimia, on the one hand the immediate concerns which would be to feel at ease and the long concerns which would be in control over their maladaptive behavior together with their respective emotions (see figure 13).

"It is important to design for clear emotional rewards, which can help people attach an emotional value to their personally meaningful goals" (Ozkaramanli et Al, 2012)

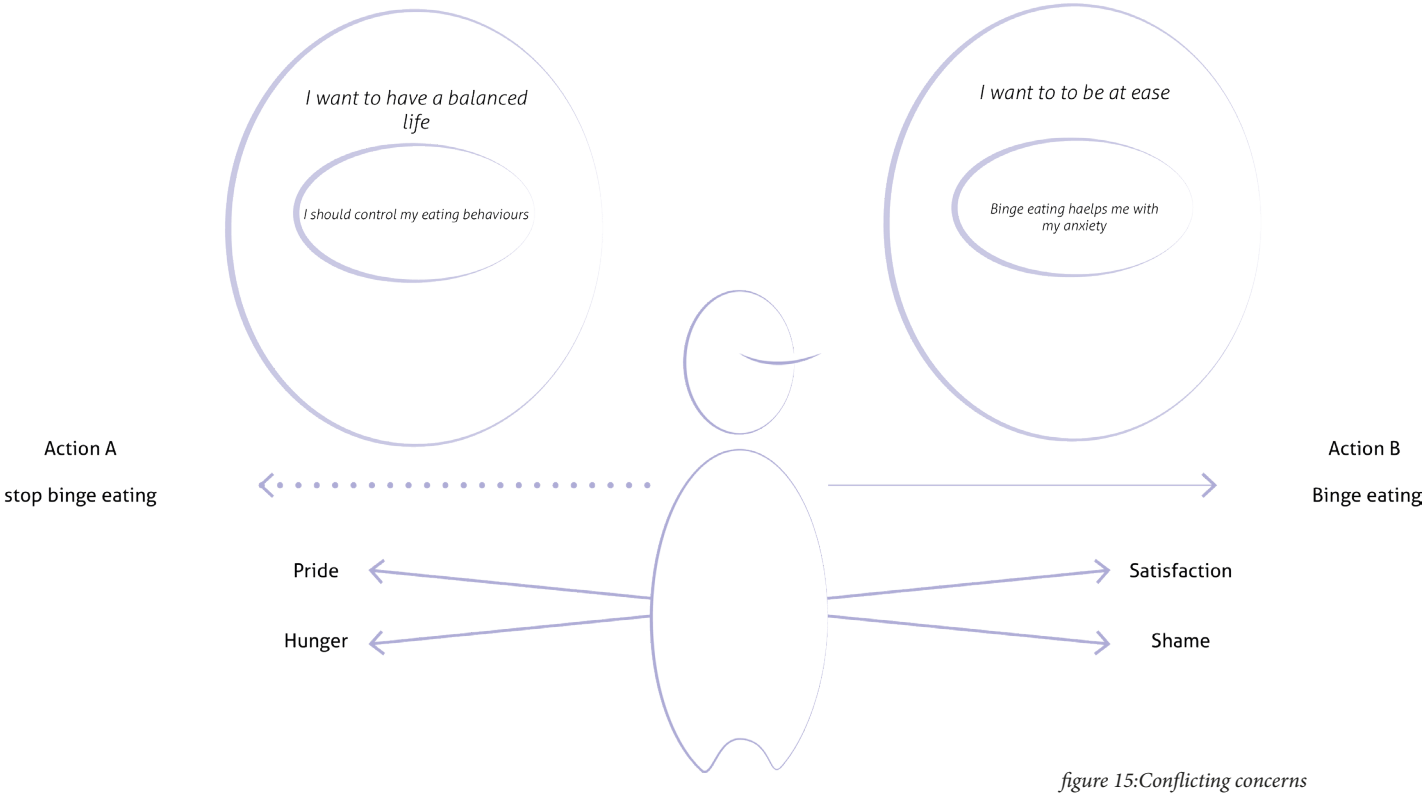
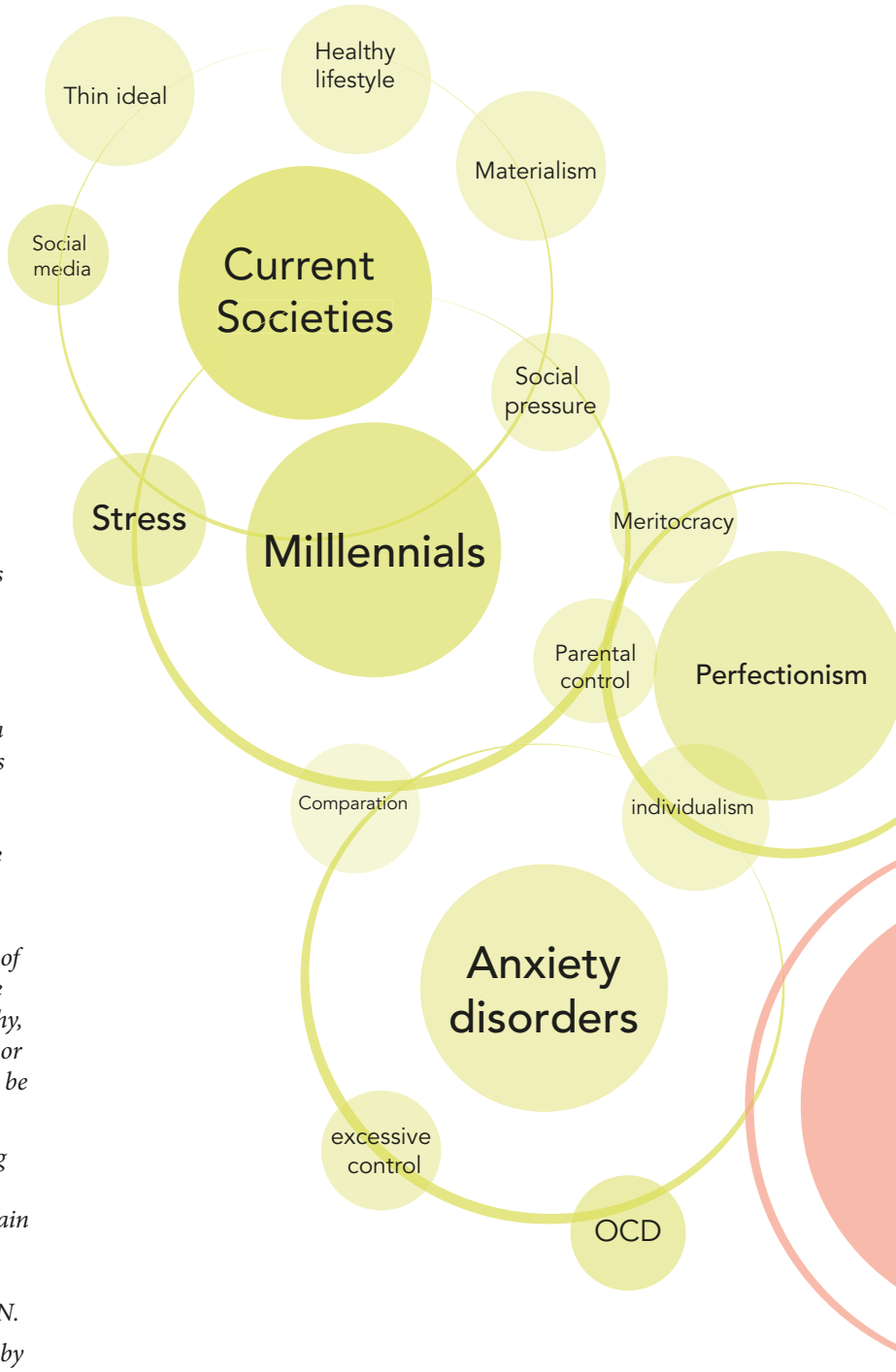


figure 15:Conflicting concerns

CONCLUSIONS



Now, that the desk research about Bulimia Nervosa has been done, many insights have been gathered. Bulimia is one of the most common eating disorders and even if there are some biological factors that endorse the development of the disorders, social al cultural factors are also a key factor in the development of the disease. Individuals who have this mental disease are having these behaviours as a coping mechanism to escape from anxiety and stress situations. Also, emotion regulation is a key factor for developing BN, individual encounter difficult to cope with their emotions and therefore maladaptive behaviours arouse.

Even if there are many treatments to overcome BN such as CBT, I believe that there is an existing need of having a better understanding of the mental disease and the lacks that current solutions have. That is why, further research with real patients which are facing or have faced the disease and with specialists, needs to be done.

Here, there is a mind map with the aim of clarifying and linking all the information motioned during previous chapters. Here I visualised what are the main causes of Millennials developing an eating disorder, the most common eating disorders and the current therapies that are being used to cure or overcome BN.

In the upcoming chapter, I will finalise the research by doing interviews with first therapist or specialist on eating disorders as well as interviewing actual patients. All this information will be analysed and used as the base for the final intervention.

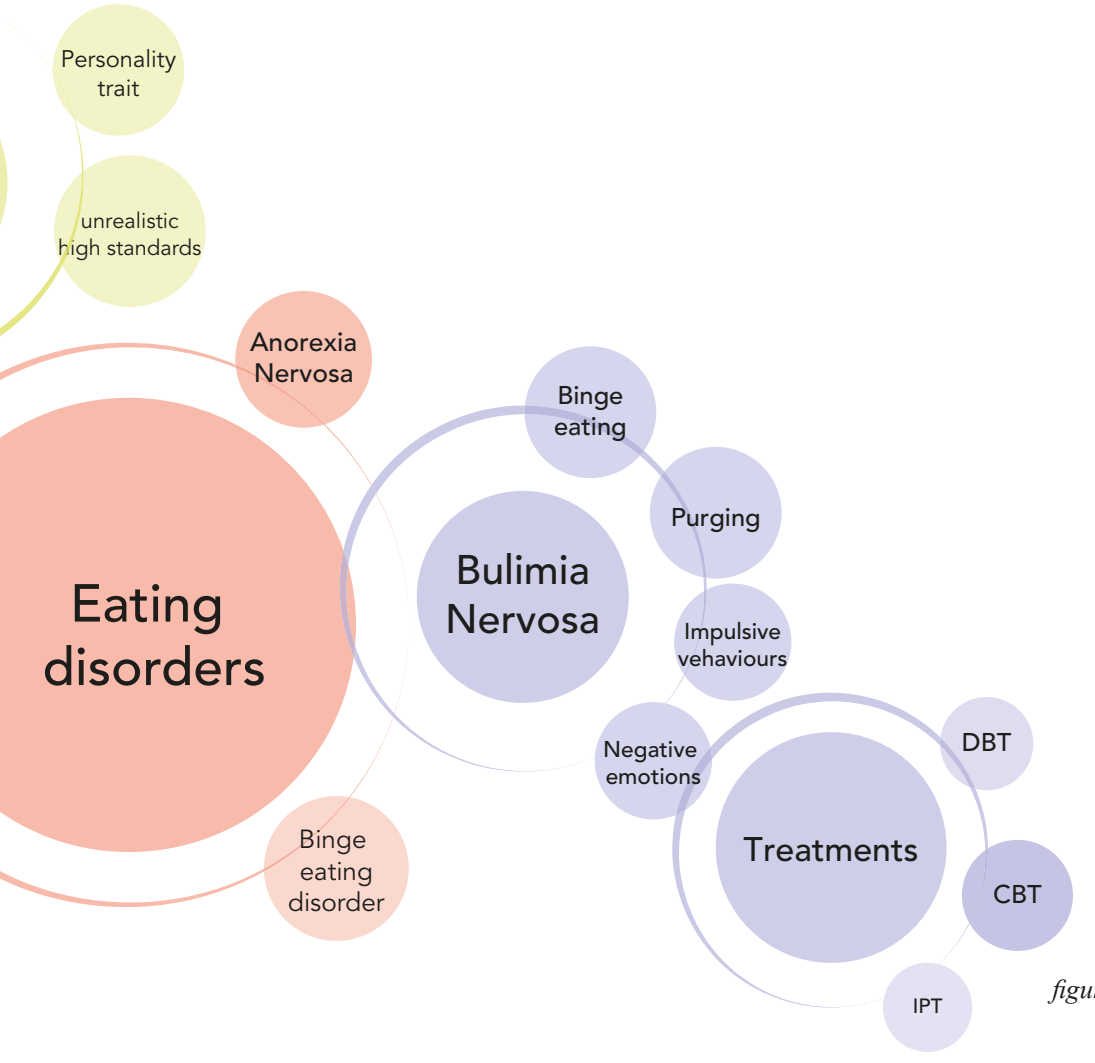


figure 16:Mindmap conclusions

3.0 USER RESEARCH

Interviews with specialists

Interviews with patients

Conclusions

CHAPTER 3. SECTION 1

INTERVIEWS

In order to get a deeper understanding of the problem and the actual patients, interviews with specialists on eating disorders such as psychologists and psychiatrists were carried out as well as with the target group.

These interviews were semi-structured interviews, the reason for doing this type of interviews is because it is a delicate topic and I considered that getting to know the actual patients and specialists on the topic would give a wither overview of the problem (Hermanowicz,2002). What is more, each patient is different, they have their own stories, experiences, and points of view towards their eating disorder, that is why a semi-structured interview could help me to unveil personal details that might be interesting to know for the further development of the project.

The material used during all the interviews was a voice recorder and some illustrations that can be found in the appendix A. Before starting each interview, I made clear what was the purpose of interviewing them, I also asked for permission to record their voices and mentioned that any personal data would not be shared. Finally, before starting the session, I also informed them that they were free to not answer any questions if they considered doing so and that they could decide to finish the interview at any moment.

Before interviewing people who suffered from Bulimia Nervosa, I interviewed two psychiatrists specialized on eating disorders.

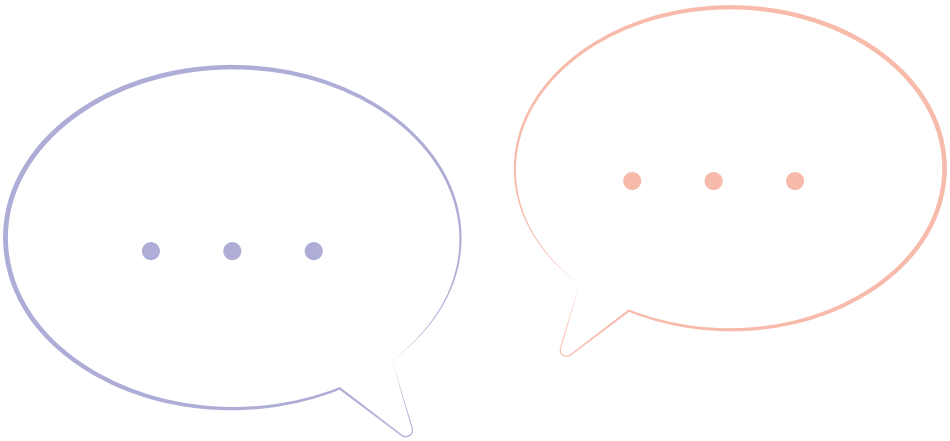
INTERVIEWS WITH SPECIALISTS

First I interviewed Prof.dr. Erik van Furth at Ursula eating disorder center in The Hague and afterward, I had another interview with Dra. Maria del Cerro Arastey via Skype. Both are psychiatrists specialists on eating disorders.

The aim of the interviews with the specialists was to ask them more general details about the eating disorder, such as the typical behavior or personality of the patients, the common treatments, their probability of success after the treatment and additional activities or solutions they use to treat the patients.

Both psychiatrists agreed on the psychological characteristics of the patients. They mentioned that people who suffer bulimia are rather **perfectionists**, and have some issues controlling their **impulses**, "They are perfectionistic and with high striving levels, and tend to be more impulsive", "They do not know how to control their impulses, that is why sometimes we prescribe them anti-impulsive drugs". They also agreed on that **low self-esteem** and **depression** are also pretty common as well as having some problems in **emotion regulation.**
Since my objective with this project is to prevent patients to have relapse episodes, I asked them what they usually recommend to the patients once they are out of therapy and also the principal cause of having those episodes "In general patients make their own relapse prevention plan", "People make these tips themselves, it's very individualised". Erik and Maria agreed made clear that if the patient has a maladaptive behavior once in a while it should not be considered as a relapse episode and it should be considered as a failure, "One binge episode doesn't make it a relapse". Also, regarding the relapse episodes, I asked them what are the probabilities of having them and what are the main triggers, **"In general, people who relapse feel very ashamed about their relapse and behaviors and they come back to us too late"**, "If someone would need help it would be nice that people could contact us as soon as possible", "Bulimia Nervosa is much more episodic so the chances of relapse are relatively high", "People with Bulimia are pretty "all or nothing" so they have one binge and everything is lost, whereas you could also say that it was just one binge". The main triggers are usually stressful situations that affect their **mood** and also that it happens as an accumulation of things, "tensions build up, it doesn't happen suddenly, it would be nice if they could notice it at an earlier stage and prevent them from binge", "In general, when people have negative emotions can be a trigger but also when they have positive ones, when they are very happy"

I was interested as well to know how difficult is for them to share it with other people and how important is to get social support. "Breaking the silence and getting social support is always difficult" "It's very difficult to talk about it, people feel very ashamed, shame is always a big issue". However, it is true that people also like to share their experience



with others that are going through the same " Social support is always helpful, there is a popular blog called "Proud2beme" with a diary section where people write and get comments from staff and other people".

Continuing with the relapse episodes, I also asked if there is any kind of **follow up process** after finishing a treatment, Erik mentioned that they don't do too much, "**We do very little, there is not a formal follow up, usually we hope the patient is well enough when she/he leaves..."**

Eventually, we talked about what types of therapies do they use to treat Bulimia Nervosa. They both mentioned that the most common one is CBT, which is usually done part individually, part in groups and sometimes they also involve the family members.

INTERVIEWS WITH PATIENTS

The aim of interviewing people who have suffered bulimia was to gather more information about the disease. The social, cultural and personal causes that might have affected the development of the mental disorder. Also having a better understanding of what I call "The bulimia cycle", in other words, what were the triggers or situations which caused the bulimic episodes, and how did they feel in each phase of the episode. Furthermore, as most of the interviewees have overcome the illness, some interesting information about their tricks and techniques to avoid relapse episodes was retrieved.

A total of 6 people were interviewed, 5 females and 1 male. They also differ from their nationalities, there were 3 Spanish people, 2 Italian and 1 Chinese between 18 and 27 years old.
It should also be mentioned that 4 of them are completely recovered, while one has still some symptoms and relapse episodes and another one is still fighting towards the illness. 2 of them went through therapy and lived for a period of time in a mental health clinic. One of them is on treatment and the 3 other participants never had contact with a therapist.

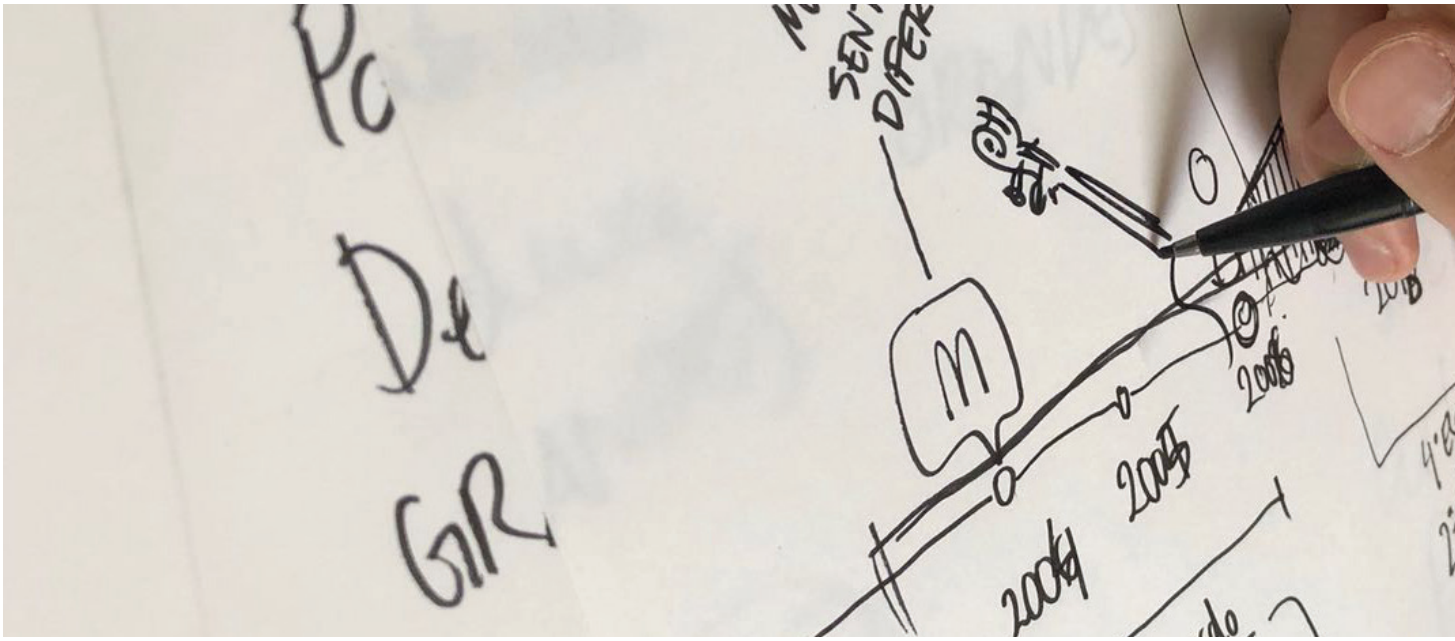
3 interviews were done via Skype and the other 3 in person and lasted around 1h and 30 min. The face-to-face interviews were done at IO Faculty.

During the first phase of the interviews, I asked the interviewees to make a timeline of their lives and pinpoint the moments in which they thought they started to have bulimic episodes and analyze the causes and how they were feeling.

First, I will analyze the commonalities on the cultural and social influence on the development of the eating disorder.

3 participants mentioned that were involved in activities that required **compromise**, and **hard work** such as doing ballet, playing an instrument or doing some sport. These activities required to put extra time an effort after school and affected in their effectiveness in pursuing things during their daily life "I had a strict schedule, so after school I had music lessons that lasted until 10.30 pm and afterwards I still had to study for school, which made me much more efficient and hard worker", "It also made me be very demanding and critical about myself", "From 3 to 14 years old I did ballet, it kind of shaped my body and my way of working", "I had to fit into the standards of ballet".

However, there were also some commonalities regarding the **social pressure** or culture where they were born, "Every summer I used to go to China and visit my family, and they would start to make comments about my body, they were reminding me that I should not eat a lot", "In Italy, the culture of body and beauty can be pretty mean, they are a bit posh and picky about the way you look". Also, social environment such as family and friends could be the cause of the development of their disease, "My parents were pretty critical, my mum was pretty demanding", "I used to compare myself, with my



best friend, he was really handsome and I was losing at it, it made me feel bad, because I'm always been good at everything, almost the number one", "My friend was picking up on me, she was like a bully, she stole 13 out 17 guys that I liked, and she was always commenting that I had to wear a fringe because I had a big forehead", "I was trying to please my family standards", "At that time being hot and handsome was what it mattered, and I couldn't be like that because I was fat".

Nevertheless, not only cultural and social pressure might be the cause, these people share as well some similarities in their personality traits. They are characterized by being **perfectionistic,** strict, and used to **control** everything that surrounds them. "I'm very well put together person, and kind of a control freak. For me, discipline is beauty, like harmony", "I think I'm a clever person, I'm a good person, so how can it be possible that I don't accept myself?".

What is more, they also mentioned that sometimes they are pretty **impulsive** and that they need to work with that, "I used to be pretty impulsive, I was doing whatever my mind told me to do, now I know better how to control those emotions", "I can't get out of control, I need to follow a strict diet, I need to control my daily life, I'm pretty perfectionist and I can't allow myself to fail." "I've been always seeking the perfect balance, the equilibrium, if let my emotions go I get lost and I become impulsive towards food". All this information gives some hints about how their character and background, however, all of them have different reasons and stories that made them develop an eating disorder, anyway, it is true that there are some situations in which they have started to feel insecure, wondered about their image, or affected by some personal experiences. "After I left ballet I felt so free, I could eat everything and I gained so much weight", "After my first depression I started to have some issues with food, I felt insecure", "I wanted to catch the attention of my parents and my brother, they were always looking after my brother, not me", "Somehow, I thought that it would be great to be a little bit less", "My boyfriend broke up with me, that was one of the worst periods, I thought I was the cause of all of our problems", "I wanted to fit, seem perfect towards everyone", "I guess that I wanted to be like my sister, so I did everything and controlling everything that was for me to be like her".

In conclusion, it can be seen that these people are characterized by their **compromise to be perfect** and control whatever it's on their hands to do so. They all are intelligent and eager to give the best of themselves. It can also be seen that there are periods or situations in their life that affect their condition, in order to have a better understanding, I visualized a timeline (see figure 18) with interesting quotes that help pinpoint the times that were crucial or critic towards the development of the mental disease and a simulation of the development of their eating

figure 17:Timeline interview

disorder. It can be seen, that adolescence is the time where they have their peak points towards their relationship with food and as soon as they enter into the adulthood they start to reduce their maladaptive behaviors.

Once the interviewees felt comfortable talking to me, I started to ask some more personal questions and more related to the eating disorder. During this phase of the interview, my aim was to analyze what were the actual triggers of pursuing a maladaptive behavior. I tried to find out specific situations and moments that are crucial for them and how afterward be tackled. In here I asked them to analyze a personal episode and afterward explain how they envision a bulimic episode.

The interviewees also had some commonalities in the specific situations in which they felt triggered to binge eat. Most of them share that being alone and **bored** is a driver "You need to find something to do and eating is the easiest way to fill that, so you eat whatever, then you will throw it up and your afternoon just ends", "I cannot skip my diet if I'm alone and bored if I do it I need to throw it up". However, there are more **emotional situations** in which the users also feel triggered, and those ones are related to their mood and mental state. Feeling depressed, anxious, stressed or sad are also emotions that encourage them to binge eat, "Usually it happened when I was depressed, I was also hungry so I used to start with a few cookies and finishing the whole pack", "When I'm stressed, when I don't feel at ease...".
Also, when being on a strict diet for a long period of time, people start to feel hungry and that also can be a cause "I was on a diet the whole time, I ate a whole package of chips and I needed to get rid of it", "The first year in London I started a difficult relationship with food, I put on 9 kg and I wanted to lose weight, so I started dieting and having crisis in front of the mirror". Anyway, not only negative emotions can be the cause of maladaptive behaviors towards food, many respondents mentioned that having a spike of happiness could also provoke them to binge eat, however, those moments were usually social events in which in some cases prevented them from purging "When I'm with people, sharing a moment I feel great, so I don't really think about purging, it's more about enjoying the moment".

However, is not always like that, social events do not always prevent them from purging "It was a Christmas dinner, everyone was there, so I felt happy and I ate a lot, for real, when everyone left I kept on eating and I had to throw up" "Gathering all together was great, but I already had planned that I was going to throw up, I knew I was going to eat too much". Furthermore, 3 of them mentioned that they kind of created a **habit** or a little obsession towards food "It's like a bit obsessive when you start eating something that you like, so it's like losing control and when you

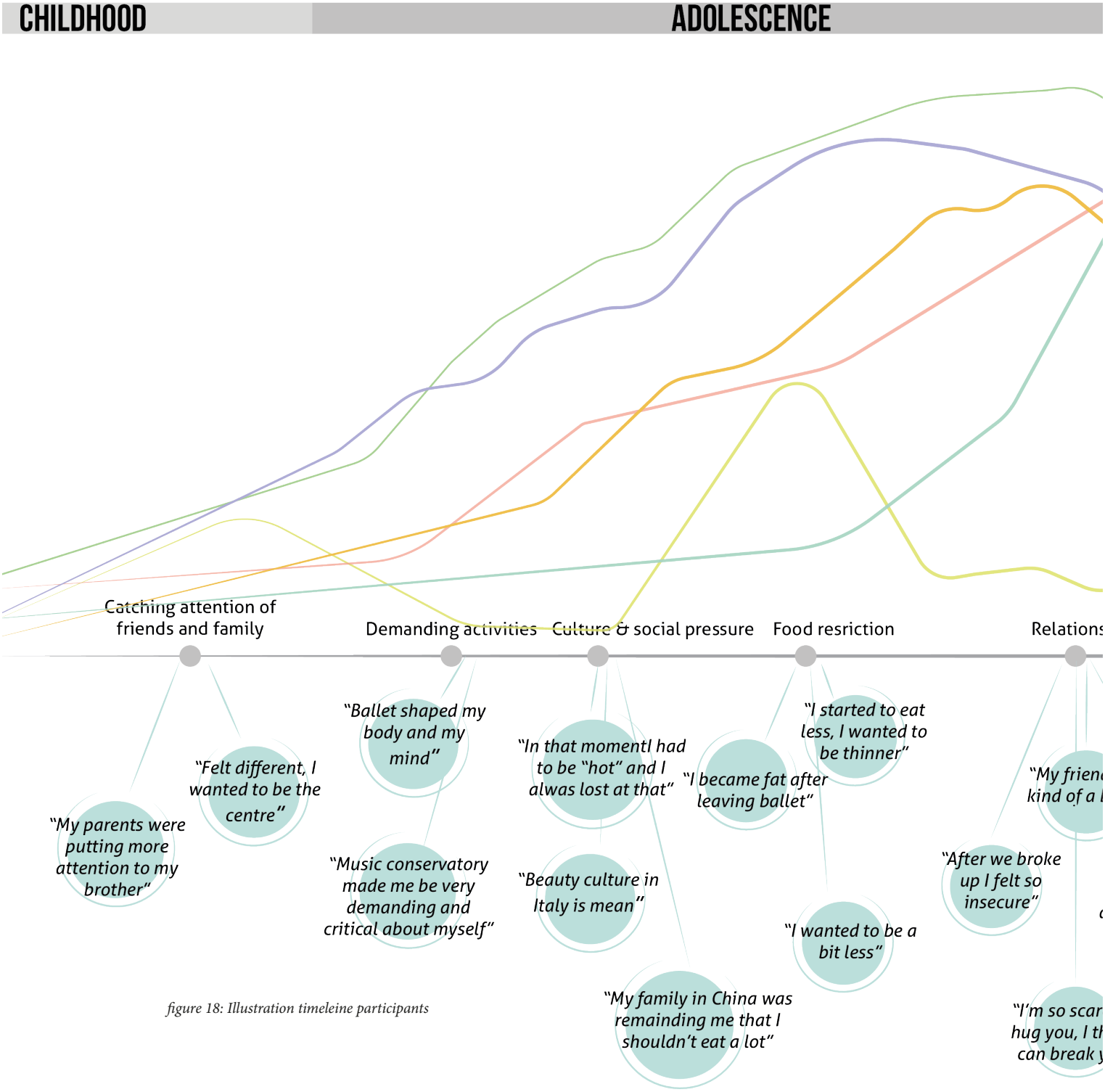
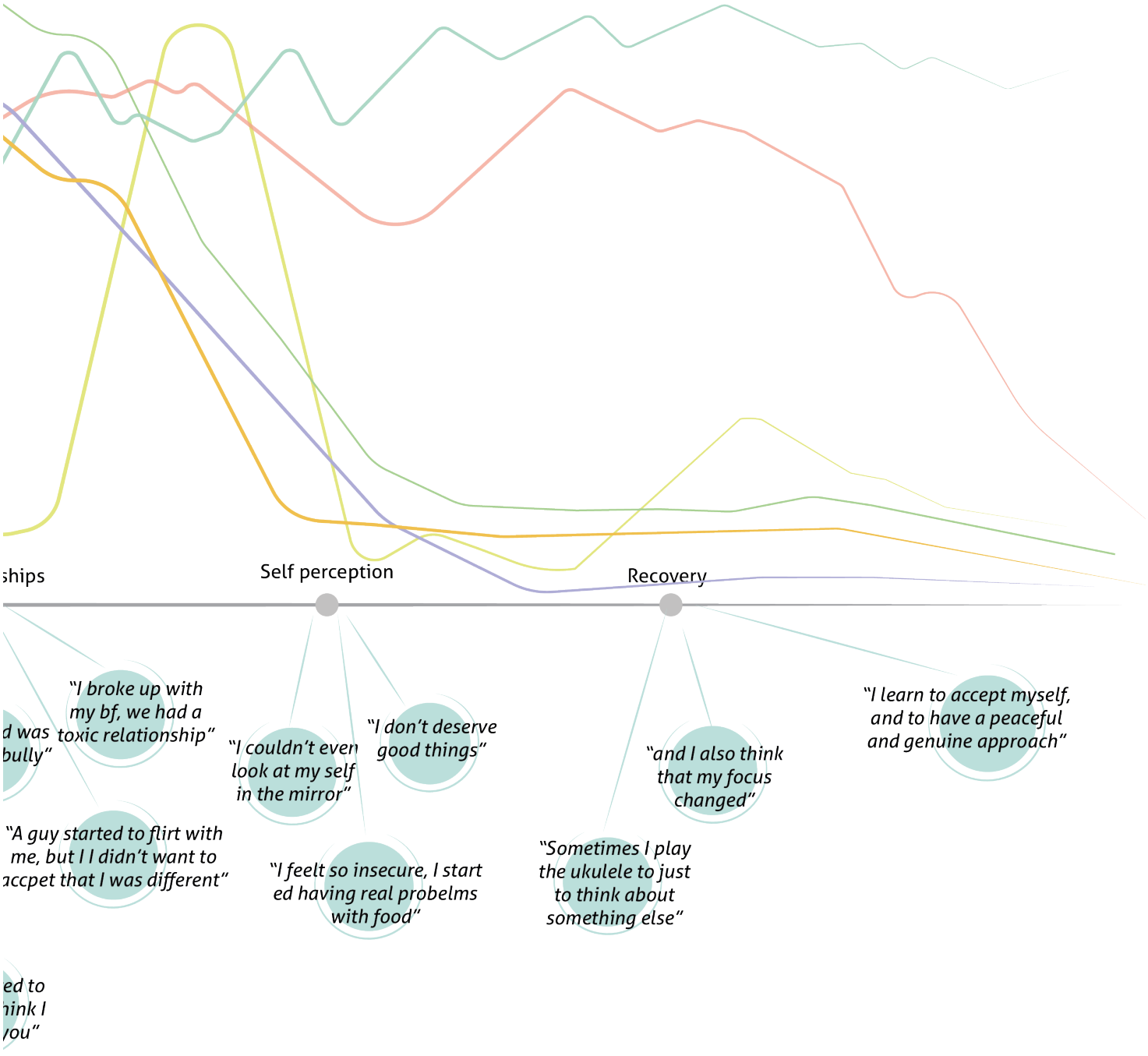


figure 18: Illustration timeleine participants

EARLY ADULTHOOD



realize is too late", "It's like a drop that keeps falling, and that's the food thought", "It's like a tiny obsession and at the end of the day you realised that you spent it thinking about food".

After talking about the triggers and situations in which those behaviors may arouse I started to ask them how they felt during the process, from when they start to binge eat to when they decide to purge. Once they realized that they have eaten too much, they all mentioned that they feel guilt and failure, "I feel so guilty, why didn't I stopped myself, I could have stopped", "I feel like I lost all the effort I put on losing weight", "After eating everything I feel that I failed, I even related some flavours to failure, like burger king". Losing their control is something that all participants mentioned and that is a feeling that makes them feel really bad and ashamed. " I feel weak, from a mental point of view, you stupid lazy, you did it again", "You want to control everything so bad that you can't control it anymore, it goes on his own"

On the other hand, 5 participants agreed that food makes them feel satisfied, it makes them feel happy (for short period of time), "First I feel satisfied, it's really pleasurable, you have many different flavors in your mouth", "Food makes me feel happy until I finish everything, then it's another story", "I want food to cuddle me it's like it's giving me a hug" and also, some participants mentioned that it was like feeling free " I feel sneaky, like breaking the rules, doing something that you are not supposed to do"

After binge eating, many emotions arouse and most of them are negative, and the outcome of that behavior is the necessity to purge, in means of excessive exercising, use of laxatives or throwing up which is the case in all the participants. Here again, I tried to analyze which were the emotions that the users feel while purging or after purging. All the participants agreed that they feel the need to get back the **control,** they need to undo what they have done "I felt so guilty afterward that I needed to purge", "I feel good, I feel like I'm in control again, it's like what I'm doing it's right, I'm motivated ". However, not everyone was able to recognize their emotions while purging, but they could recognize more emotions after purging, "I feel proud of myself, is the right thing to do", "I feel peaceful, is like everything makes sense", "I felt at ease, I could undo the damage that I caused to myself do to binge eating", "I got this".

Here I also visualized a timeline, based on "Holistic Experience Scan" (Desmet, 2017). This method is usually used to analyse micro emotions while using a product, in my case I wanted to analyse the microemotions during an specific event, more specifically a relapse episode. (see figure 21)

I reflected the emotions the participants feel at every stage. From the mood or emotion that triggers them to binge eat to the post-purge emotions.
After analyzing their individual experience, I also

figure 19: Bulimia episodes interview

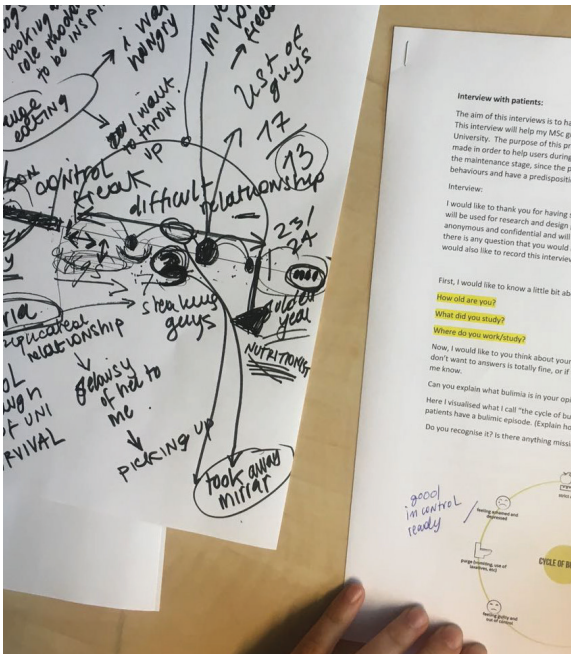
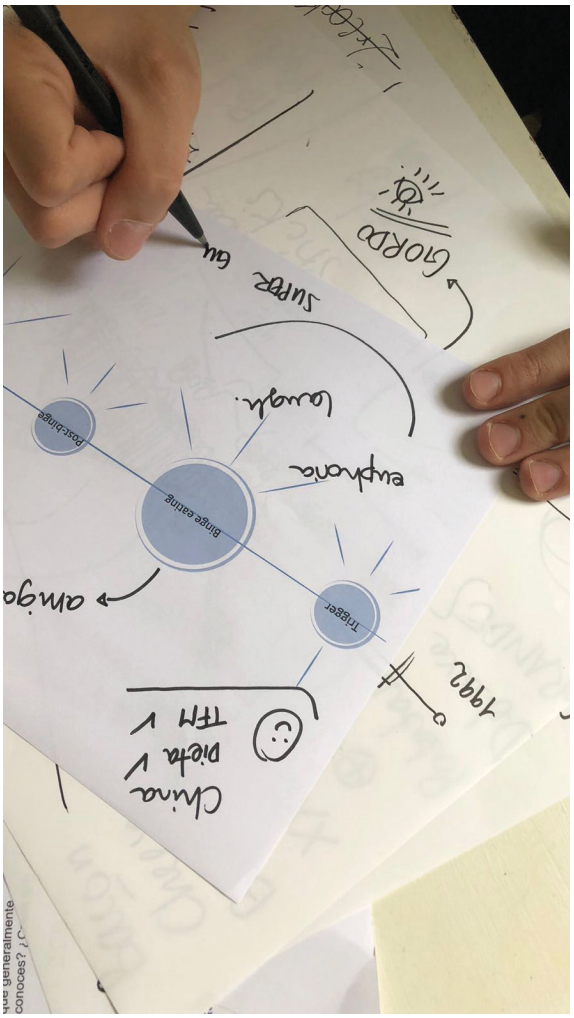


figure 20: Relapse episodes interview

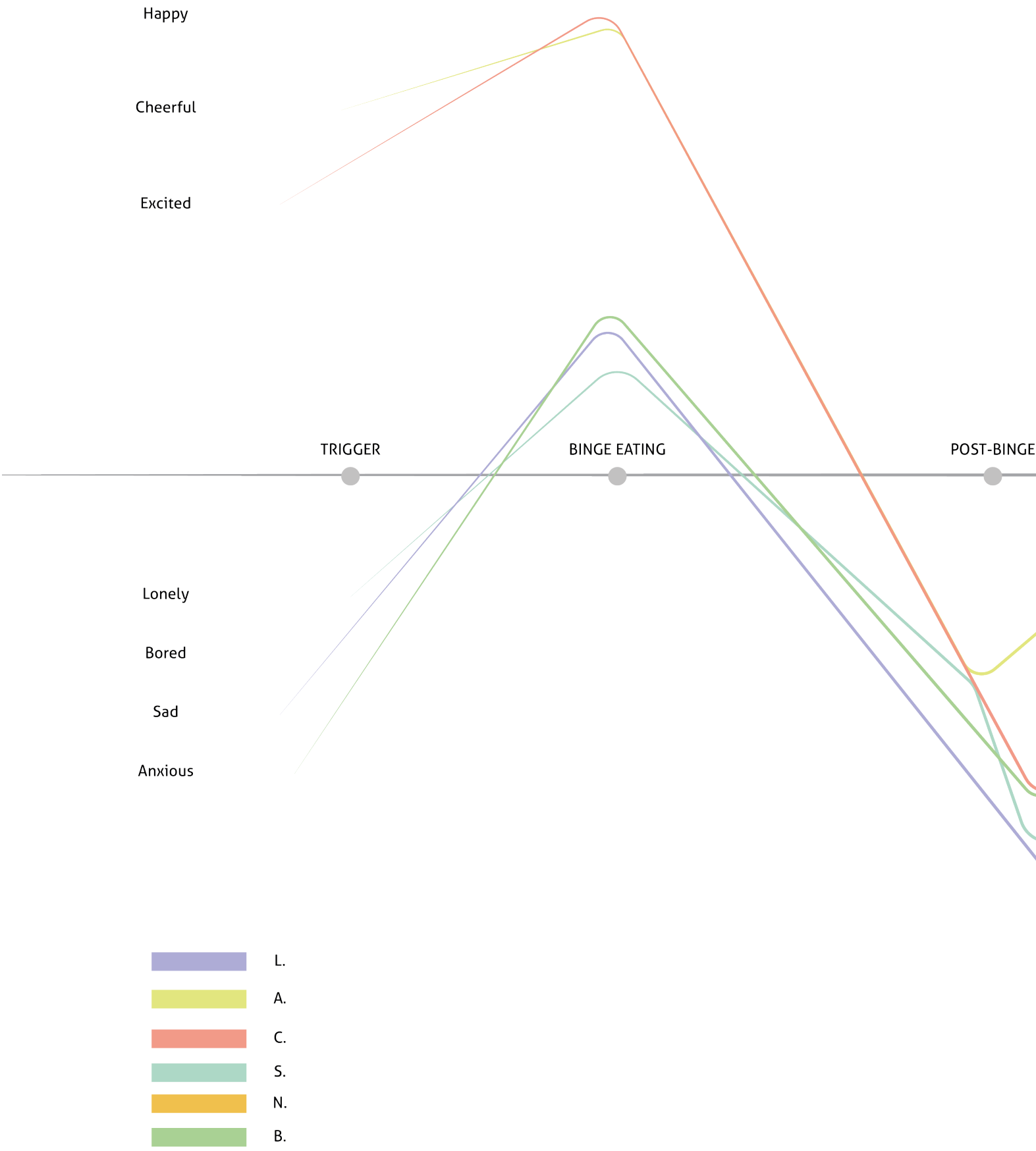


wanted to know what was the role of their relatives and beloved ones. And what their perception was towards sharing their food issues with others. As mentioned before, 2 participants went through treatment and one is currently following a treatment with a therapist. All these three participants have some similarities in sharing their problems with others. All of them seem to be a bit more open in sharing their problems with other people. They see the advantages or positives sides of talking with their relatives. “Showing the worst part of yourself and realize that you still have people in who you can trust is amazing” “ I shared it with a teacher, he understood me a lot, and I felt like I was not going to be judge, I didn’t want to hurt my parents”, “Now the relationship with my mum is much better”.

On the other hand, the other three interviewees didn’t like the idea of sharing their issues with food when they were going through it. In other words, while they were having maladaptive behaviors did not want to talk to anyone, they felt as they were weak, they felt like they should restrict their emotions, “I don’t like to show my weakness, my vulnerabilities, you never have to show or give someone the power of destroying you, I can handle myself”, “I don’t allow myself to get out of control, I’m too strict with myself, I should not show my emotions”.

Nevertheless, they all agreed that they would share their personal experience if it was going to help someone else and once they have overcome the problem, “I open up because I’m trying to help someone, I want her to get to the place where I’m at, which is beautiful”, “I share it because I overcome it”. Moreover, the 2 people who were in a mental health care hospital, appreciated being surrounded by people who were facing the same problems and liked as well to be able to support and help each other.

MOOD


Happy
Cheerful
Excited
TRIGGER
BINGE EATING
POST-BINGE
Lonely
Bored
Sad
Anxious
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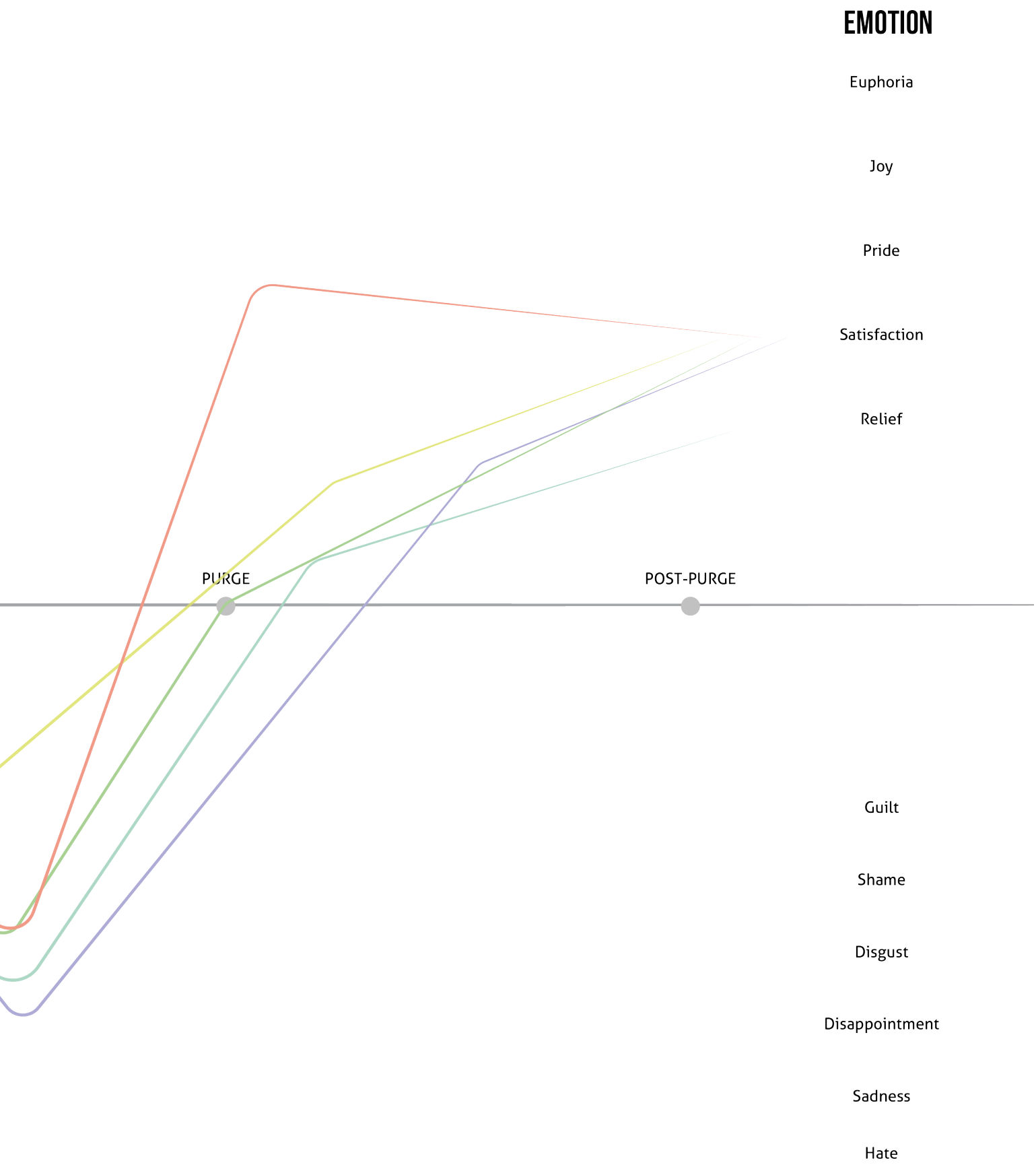
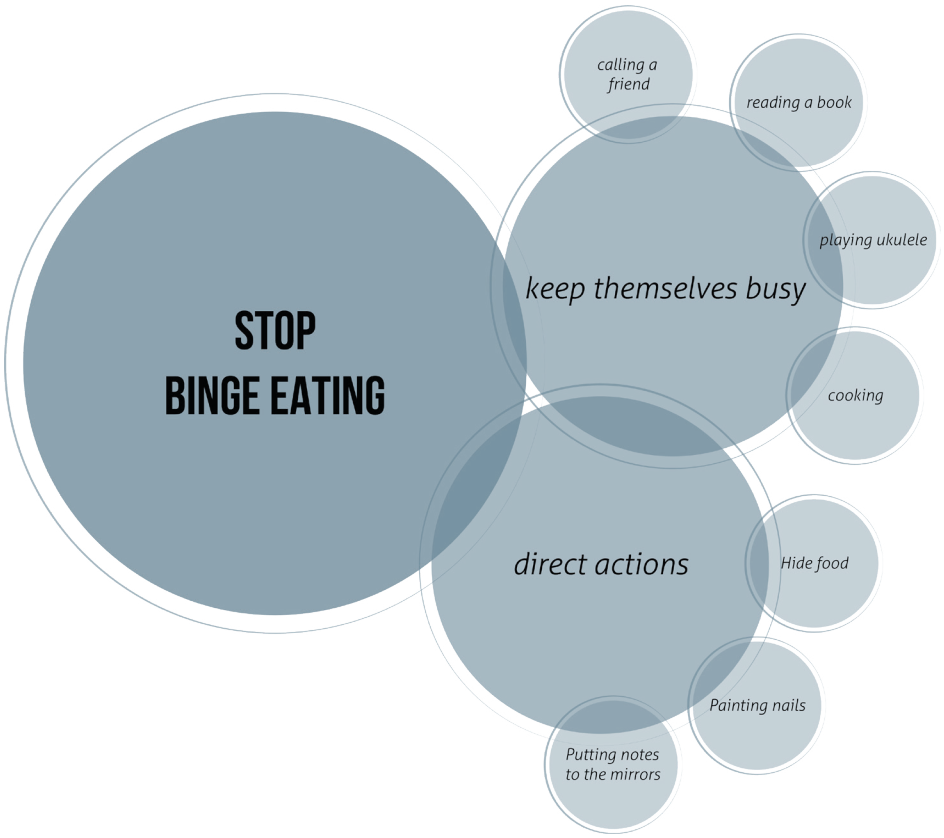


figure 21: Holistic experience scan for bulimic episodes



Finally, we talked about how they overcame their problems towards food and what actually their tricks are in order to have a healthy relationship with food. 4 participants mentioned that they succeeded in their recovery because they change their focus, meaning that they wanted to move on, some of them commented that they wanted to continue their studies and that they found out their way of dealing with their body and image by doing sport or following a healthy diet, "I started to develop a healthy relationship with food since I started University and I also think that my focus changed", "I had a clear goal, do my best at every project and getting recognition, at that time my focus was not on my weight", "I stared jogging, I think my mind changed". Another interesting finding is that 4 of the interviewees find music as a way to avoid relapsing episodes, "While I was at the hospital, I really liked music therapy", "Sometimes I play the ukulele to just to think about something else". One user mentioned some rational tricks in order to avoid throwing up, which I also found pretty interesting, "I paint my nails, I let them grow, and I also write notes on my mirrors like be aware that the reflection on this mirror might be affected by socially constructed beauty ideas".

Also, they all stated that they try to find a **balanced** lifestyle a **routine** and find some time for themselves and to take care of themselves, "It all starts by having a routine, waking up at the same time, eating healthy, going to the gym, have enough sleep, finding a balance...", "I learn to accept myself, and to have a peaceful and genuine approach", "I learnt to not become too obsessive with things, I don't allow myself to go back there", "I learnt to love myself more and to take care of myself"

Being able to interview people has given a better understanding and more insights about Bulimia Nervosa.

It can be seen that all the participants started to develop Bulimia Nervosa during their adolescence and it prevailed until their early adulthood. There's is not a clear reason behind the development of the disorder, but it seems to be a **set of events** or situations that have led them to develop the mental disease. It also seems that it became a habit, so users ended up relating certain emotions or events to binge eating and therefore, it became a necessity to purge in order to get back the control over themselves.

Another important point to take into account when designing is that they would not like to seek help when having an episode, they rather find the way out or solution themselves. It is pretty difficult for them to share their emotions or what most of them called "their weakness". Nevertheless, they are **aiming to help** once they think they have overcome the disease, but meanwhile, they rather keep it for themselves.

They all mentioned that need to have everything under **control**, and when they end up binge eating

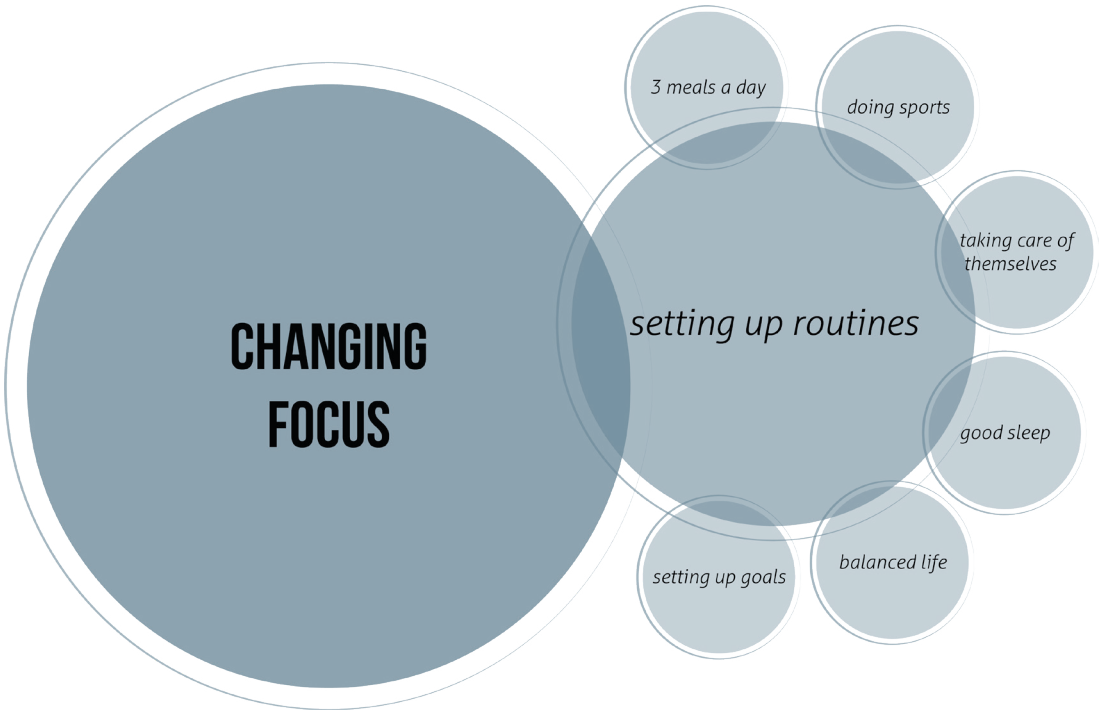


figure 22: Strategies to avoide binge eating

they need to get that control back.

The episode usually arouse when they have pretty negative emotions but also when they are really happy or even bored. The post-binge is the part where they feel the worst, they all end up having very negative emotions such as shame, disgust or disappointment. I think that it would be interesting and wise to try to avoid that situation.
Eventually, I also visualized and **clustered** the different strategies that the interviewees use to avoid binge eating (see figure 22). Most of them tried to avoid binge eating thoughts by keeping themselves busy in that exact moment. Also, some of them mentioned more direct strategies to apart from binge eating to avoid to purge. So both of this strategies are more focused on a specific moment and behaviors whereas the interviewees also mentioned that they try to have a more general well-being by setting up routines or focus on other things that help them cope with the mental disorder.

CONCLUSIONS

Getting to know the problem from a more personal perspective gives me a better overview of the causes of suffering from BN an how could the patients be helped.

First of all, it was interesting to get to know from the therapist perspective, that there is not an actual follow up after therapy, and even if there are still high probabilities for the patient to have relapse episodes, there is not much that the therapists can do. Also, from the patient perspective, it was interesting to know what could have been the main causes of their maladaptive behaviour, and their personal coping mechanisms to avoid binge eating. Also, the differences between the individuals who have gone through therapy and the ones who haven't. There is a more predisposition of sharing their issues with their beloved ones if they start a treatment, whereas the others prefer to keep it for themselves. Furthermore, they all agreed that sometimes they don't know how to react to overwhelming situations or emotions, and that's why they usually binge eat.

Finally, another interesting insight is that they wouldn't mind sharing their experiences with people who are currently suffering from BN.
In the next chapter, I will define the personas I would design for, define the problem and how and where I want my intervention to happen.

PHASE 2. DEFINE

This phase entails the desk and user research that needed to be done in order to understand the problem and the main target group. During this stage, eating disorders will be introduced together with all the elements that might influence the development of these mental disorders. Eventually, the report will focus on Bulimia Nervosa, its causes, the existing solutions and therapies that are used. To finalise this extensive research, the discovery phase will conclude with user research in order to better understand the needs and values of the intended target group.

4.0 USERS & PROBLEM DEFINITION

Target Group

Personas

Problem Definition

Creative Session

Interaction Vision

Conclusions

CHAPTER 4. SECTION 1

TARGET GROUP

After the research phase, all that information retrieved from the desk research and the interviews need to become tangible. First, the target group needs to be defined and afterward build up the personas.

The **target group** to whom the solution is aimed to will be people who are in between 20 to 30 years old, **young adults**. They are mostly studying or finalizing their degrees.

They are what I call "control freaks". For them is very important to have everything under control, and to show to everyone that they are almost perfect. For them is very **difficult** to show their **emotions** or their weaknesses, which in this case would be to have an eating disorder.

For them, it is also important to have a **balanced life**, they cannot allow themselves to lose control over their daily life. They are always aiming to help their friends and beloved ones but they won't tell anyone about their own problems, they prefer to solve and keep their own issues by themselves. Impulsivity is an issue for them, that is why everything needs to be under control, they don't like spontaneity.

They are also influenced by the beauty cannons, they all wanted to fit into what they considered their beauty stereotypes. However, not only beauty drives them to become obsessive about their appearance. Since they were kids they pursued activities that required a lot of effort, time and **perseverance.** That's what made them efficient, productive and really perfectionistic but they usually put too much pressure on themselves and it is very difficult for them to seek help. That is why they usually try to show the best part of themselves and can sometimes be a bit egocentric. Moreover, they usually put a lot of pressure on themselves which sometimes can affect them by means of their eating behaviors.

They care about their wellness, they discovered how important is to be **healthy**; mentally and physically. They all try to have a healthy diet and do sports. Even if they valueto spend time with their friends, they also have some time for themselves. They are people who are interested and appreciate art and culture, they like to **cultivate** not only their body but their mind. They are passionate about their studies or job and they usually excel at it. They try to focus on their careers or studies, and always do their best.

I used the onion model (see figure 23) to visualize the cultural practices and values of this target group. With the onion model (Hofstede, 2005) I explained what are the rituals or activities that characterized this target group.

Underlying the practices are the values. This target group value the hard work, **perfectionism** and to be in control, they don't allow themselves to fail and everything needs to be well though. Also, they do not allow their emotions to affect them, they try to tackle their problems **rationally**, hower this drives them to not be able to control or to **understand their emotions** under certain circumstances.

Based on those values, they developed some rituals,

they usually follow strict diets, they also are driving my setting goals and **planning** everything. Also, wellness is an important aspect of their life, they are aware that they have an eating disorder and caring about themselves and find a balance in their life is a pretty important thing.

Among their heroes or role models, they look up at people who stand by **excelling** in whatever they do, as they are also aiming for doing so. They might be musicians, artists, writers, it will depend on the interest of each user. However, they also are influenced by the people who surround them, they tend to compare themselves with their family and friends.

Finally, their symbols, as mentioned before they areperfectionists by all means in their life, and what is more, they want their work to be appreciated, that's why I used the award as a symbol, they not only want to be the best but also to be recognized as such.
I also used, the mirror, social media and the weigh scale as symbols. These people are pretty concern about what people think about them, they always try to show the best part of themselves and that is why they have ended up controlling their self-image, and therefore developing an eating disorder.

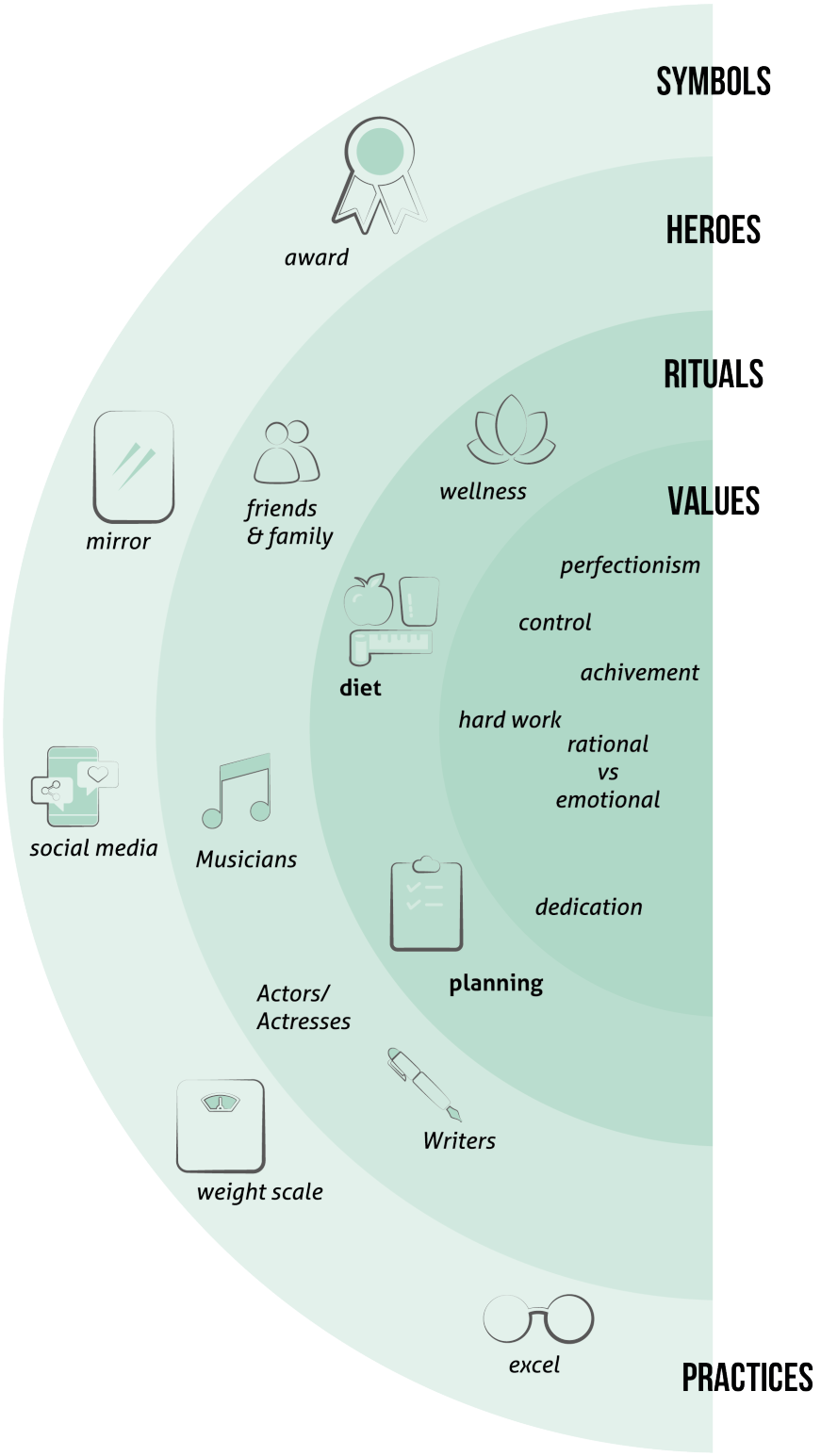


figure 23: Onion model

CHAPTER 4. SECTION 2

BUILDING PERSONAS

The aim of building up personas is to summarise and describe all my findings during the desk research and the interviews. It eventually will help me to ideate and conceptualize and even evaluate the future concept.

Based on all the interviews, I came up with two personas, both of them are females, as except from one, all the interviewees were females. Also, taking into account the information retrieved from my desk research, the main sufferers of bulimia nervosa are females. Designing personas helps to visualize to who I am going to design for, it makes it more real and helps empathize with the needs, behaviors, values and personality traits of the users.

Both of them come from southern countries, Italy and Spain, the reason why I made this decision is that, except for one interviewee, the rest of them were Italian and Spanish. They are both in their twenties, this also has a reason behind, all the interviewees that I talked with were that age and also because I want to focus on the maintenance stage, which usually means that these people have already been through the toughest part of the disease, which usually arouses during their teenagerhood.

Furthermore, apart from the demographics of the personas I also explained their education, job and gave a description of how they developed the mental disease and what were or are the coping mechanism they use to avoid binge eating as well as some of their personality traits.

ALESSANDRA

Age: 27
Education: Master in Fashion and Marketing in Paris, currently working for a fashion magazine.
Ethnicity: Italian, Milan
Family status: Single

Alessandra was born in Italy, she spent her adolescence there but afterward, she moved to Paris for starting her studies in Fashion and Marketing.

When she was a child she used to play ballet until she became 12, a moment in which had to decide to pursue her career as a ballerina or to go to a normal college. Ballet taught her to be constant, disciplined and very perfectionistic. For her, discipline is beauty and harmony.

She started to have issues with food when she left ballet, however not only ballet was the cause of her eating disorders. As she always says "Italian culture can be really mean", what is more, there were moments in her life when she felt insecure due to toxic relationships with her friends and a felt a lot of pressure in high school "School was crazy, only 15 people finished that year, the others failed, dropped out or went to another school". School was also pretty demanding and she never allowed herself to fail, so sometimes food made herself feel at ease and comfortable. Those episodes were pretty frequent, and they happened when she was alone at home during the afternoons.
After finishing school she decided to move to Paris and pursue her real passion; Fashion and Marketing.

In Paris, everything started to change, she started to feel more comfortable with herself, she even perceived herself prettier but she also became more

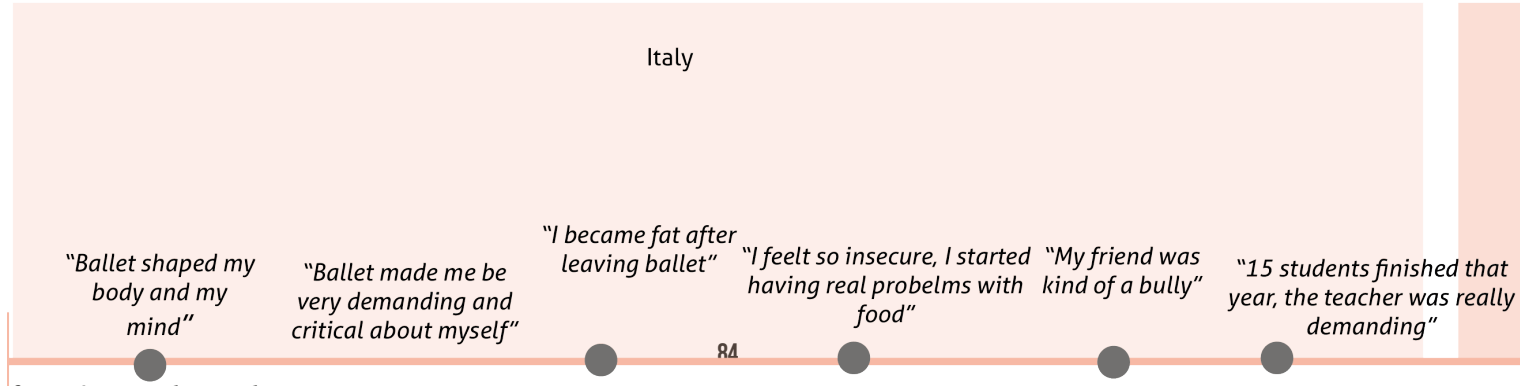


figure 24: Timeline with quotes

obsessive about her body. She started a pretty strict diet but there were times in which she couldn't anymore and started binge eating. These episodes started to happen at least twice a week, whenever she was alone at home. She never told anyone that she had an eating disorder until she accepted herself and what she calls her "weakness".
Alessandra never went to a specialist on mental disorders, she only started to go to a nutritionist in order to follow a healthier diet. What is more, only a few friends know about her eating disorder, as she says " I don't allow myself to be weak or to show my emotions, I'm a very well put together person"

Currently, she still has episodes, even though she tries to have a balanced life by means of eating healthy every day, do some sports and take care of herself. When she feels stressed or even bored she cannot control having an episode. However, after so many years struggling with the disease, she started to found herself and embrace her flaws. She is really happy with her job and tries to do her best.
She likes spending time with her friends, arrange amusing plans like going to museums, music concerts or trying new restaurants in Paris, Alessandra is the one proposing the plans to her friends, and she hates changing plans, there's nothing worse than changing what she already had in mind and planned.

Paris

"1 also became more obsessive about her body"

"I couldn't even look at my self in the mirror"

"IAfter talking with the nutritionist I tried to have a different approach"

"Now I don't allow myself to go back, eventhough sometimes I can't handle it"

CARLOTA

Age: 22
Education: Studying Sociology and History in Barcelona (Las ramblas)
Ethnicity: Spanish, Segovia
Family status: Single.

Carlota is a very charming girl, however, she has been struggling with bulimia since she was a teenager. She started dieting when she was 13 because she thought "It would be nice if I could be a bit less". It led her to become more obsessive with her image and started to have some bulimic episodes. After a while, those episodes started to happen at least four times a week. During that time she got involved in a relationship which didn't end up well and she thought that it was mainly her fault. After that, she decided to stop with those maladaptive behaviors, unfortunately, it was too late, it kind of became a habit. "I got used to it, it makes me feel comfy". She also has an older sister, they used to compare each other, her sister has always been thinner and better student, at some point those comparations made her push herself to become like her sister, she became obsessive and started to control whatever was on her hands to be more like her sister, even her weight.

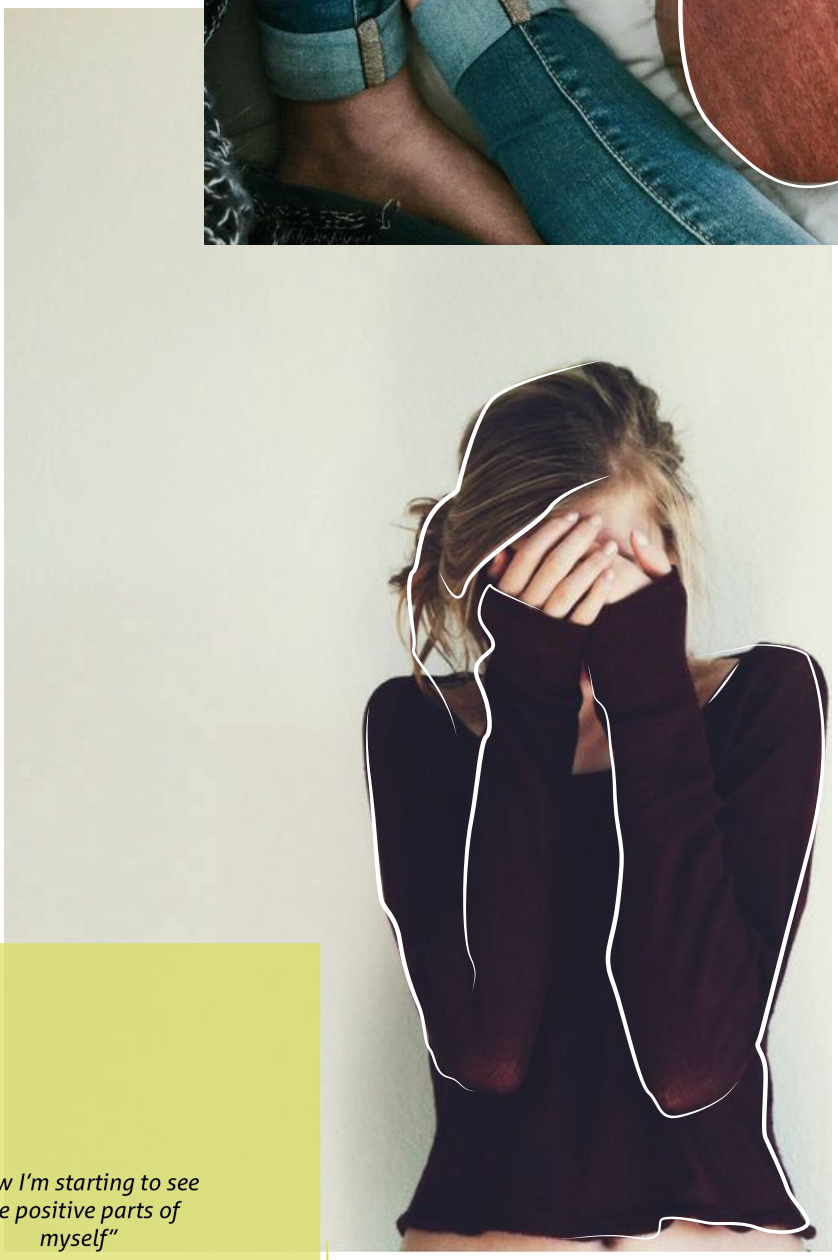
She didn't want to talk about her issues with food because she thought she was weak and that she shouldn't have those problems. "I felt stupid, those are not real problems, I didn't want to bother my family with my own problems". Carlota didn't know why, but she felt sad and like she didn't deserve anything good.
She is a very empathic person, she is always aiming to help everyone, but when it comes to herself, it can be pretty difficult for her to share her feelings and emotions.

figure 25: Timeline with quotes

She used to live with her parents in Segovia, but she moved 2 years ago to Barcelona to study Sociology and History. Now she shares a flat with a few friends. She never told them about her mental disease either.

A few months ago she decided that she couldn't handle it anymore, and she talked first with her brother and a friend. She felt much better once she accepted that she had a problem. She is currently under treatment, she visits a psychologist once every week and goes to the nutritionist once a month.

She loves playing the ukulele, and sometimes it works to keep her busy and not think about binge eating. However, not always works. Now she is focused on getting better and try to find tricks that can help her fight her eating disorder. Carlota is pretty positive nowadays, she is starting to embrace and accept herself.



Barcelona

sed to it, it makes feel comfy"

"Sometimes I play the ukulele to just to think about something else"

"Now I'm starting to see the positive parts of myself"

CHAPTER 4. SECTION 3

PROBLEM DEFINITION

In this section, after all the research done, I formulated the problem and what possible design direction can be taken in order to tackle this problem.

What is the problem?
Eating disorders are still a serious problem that concerns society. Even if there are therapies that help patients go through the recovery process, patients are left pretty **alone** once they are released from therapy. They have less contact with their psychiatrist and the chances of having relapse episodes are higher. What is more, there are also many cases in which people don't follow a treatment, and bulimic behaviors become a **habit**. The problem is that these behaviors have become a habit or a coping mechanism for certain situations. Binge eating affects them in a very negative way, it makes them feel **guilty, ashamed** and disappointed with themselves. Afterward, they feel the need to get back in control, to undo the damage they have done to themselves, and it is pursued by purging. Throwing up makes them feel in control, proud, at ease. Eventually, this situation becomes a habit, a very toxic routine that is very difficult to escape from.

Who has the problem?
People suffering from Bulimia Nervosa who have overcome the problem but they still have some bulimic episodes when feeling stressed, bored or sad. These people have might go through therapy but also there could be the possibility that they haven't gone to any type of therapy or specialist. The target group is people in between their early 20's and 30's.

What are the relevant contextual factors?
A stressful society driven by perfectionism, stress and anxiety, high beauty standards, social media influence and misleading healthy diets.
However, suffering from an eating disorder can vary for each user, therefore not everyone develops an eating disorder for the same causes. However, it is true that episodes can be seen as a combination of circumstances that at certain point or situation drive these people to binge eat.

What are the goals?
Prevent binge eating episodes by providing a healthier solution to their urges to binge. Reduce their triggers/cues that make them feel stressed or anxious. Build up a healthier lifestyle that prevents them from maladaptive behaviors.

What are the side effects to be avoided?
Postponing the urges, the solution should erase those feelings of binge eating forever and not just postpone the maladaptive behavior.

Possible directions

1. Building healthy eating habits by designing something that enhances the dining experience.

2. Avoid binge eating episodes by designing a tool/ product that keeps them busy in a specific moment, such as when they feel too stress, and they feel the urge to binge eat.

3. Help them cope with their emotions by releasing their stress and pain during their daily life and thus preventing them from binge eat, by designing a tool/ritual that makes them feel in control, secure, independent and proud.

4. Focus on the recovery process of the patients by designing something that keeps them connected and that makes them feel that they can still count on someone when feeling the urge to binge eat.

CHAPTER 4. SECTION 4

CREATIVE SESSION

I arranged a creative session in order to get more inspiration before starting to design the final concept. This session helped me to broaden my scope and to analyze other points of view that I did not consider before.

The creative session was carried out at IO faculty. There were 6 participants and all of them had some personal experience towards eating disorders. There were three people who had suffered from bulimia and still have some episodes. The rest of the participants had experienced the disease as a friend or relative of someone who is actually suffering from bulimia or had it in the past.

I started the by explaining the rules of the session: postpone judgment, dare to freewheel and that all ideas are good.
I also made a short introduction to the problem by defining Bulimia Nervosa, the stages in which the users usually face during the disease and in which stages I wanted to focus, action and maintenance. Afterward, I did a quick brainstorming or what is known in creative facilitation, a purge about what is bulimia for them. The aim of this activity was to start sensitizing all the participants about the topic and to warm up.

Next to that, I show them my personas and explained to who I am going to design for, in order to also put them in context and make them think about a specific target group. Following this, I used a tool called "The empathy map" in which the focus group has to define the persona they are going to design for, the aim of this exercise again was to sensitize the participants and to have a deep understanding of the topic and users' needs.

After that, I asked the participants to redefine the problem statement by using the WWWWWH (what, when, why, where,who and how) method to do so.

They eventually came up with this problem statement, *"We aim to help people incapable of handling emotions by realizing the stress and pain they encounter in their daily lives by giving them tools to deal with their need to binge eat" "We believe that we can empower them by creating a new tool, product or habit whenever/wherever they are"*

Once the problem statement was defined, it was time to brainstorm ideas that could solve it. For this part, I proposed the focus group to brainstorm with the 365 technique. This consists of writing or drawing 3 ideas on a worksheet within 5 minutes for 6 rounds. Eventually, I asked the participants to cluster all the ideas in different categories. These categories were: in-home products, stress relievers, empowerment, wearables, and community.

Last but not least, I told them to pair up, and pick some of the post-its from the categories and come up with a more finalized idea or concept.

The first concept was a pocket mirror that analyses how the user feels by using an integrated camera, and a by checking their pulse. If the user feels stressed it

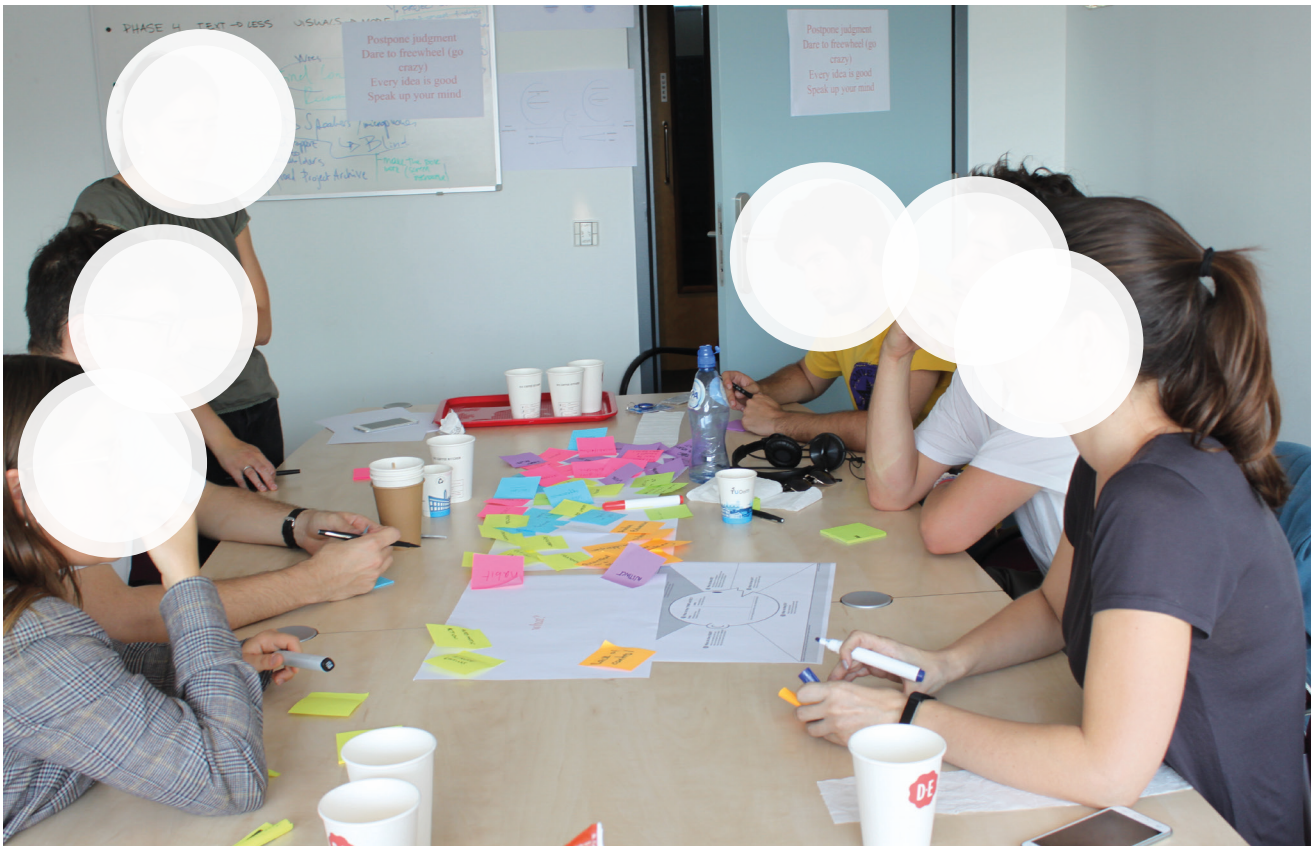


figure 26: Creative Session (diverging phase)

figure 27: Creative Session (convergin phase)

will show things that make the user feel better and proud of herself/himself.

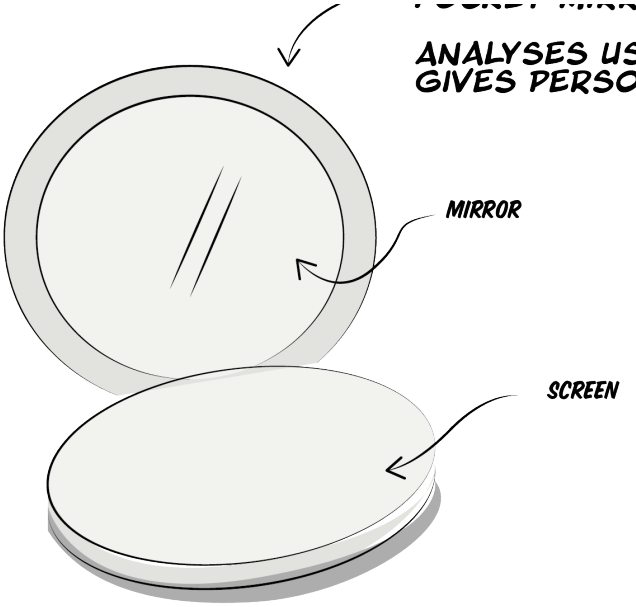
Another idea was an App that asks the user questions about herself/himself perception and also makes these questions to her/his beloved ones. Whenever she/he feels down the app will show the answers of how others perceive she/he. The main point was to change the self-perception of the one suffering from bulimia and to connect with the people that matter for she/he.

The last idea was to have a podcast App in which the users could listen to the voice of their role model or someone that she/admires by saying good things so she/he.

I visualised some of the most inspiring ideas that came out of the session (see figures 25 and 26.) It can be said that the aim of all the ideas was to change focus and to add positivity to the problem. Create awareness, find their inner talent, being supported by other people or even becoming a mentor for people with the same problem, were common features in most of the ideas. Also finding a way to relieve stress, feeling accompanied, motivated were also aspects that characterized the ideas.

I believe that this creative session helped me to broaden my perspective, but also be more specific about how I envision the features that the product should have and how the users should feel while interacting.

figure 28: Creative Session (brainstoming)


ANALYSES USERS MOOD
GIVES PERSONAL TIPS
MIRROR
SCREEN


YOU LOOK AMAZING
MAGIC MIRROR
GIVES COMPLIMENTS
QUOTES "DID YOU KNOW"


APP
CHANGES SELF-PERCEP-
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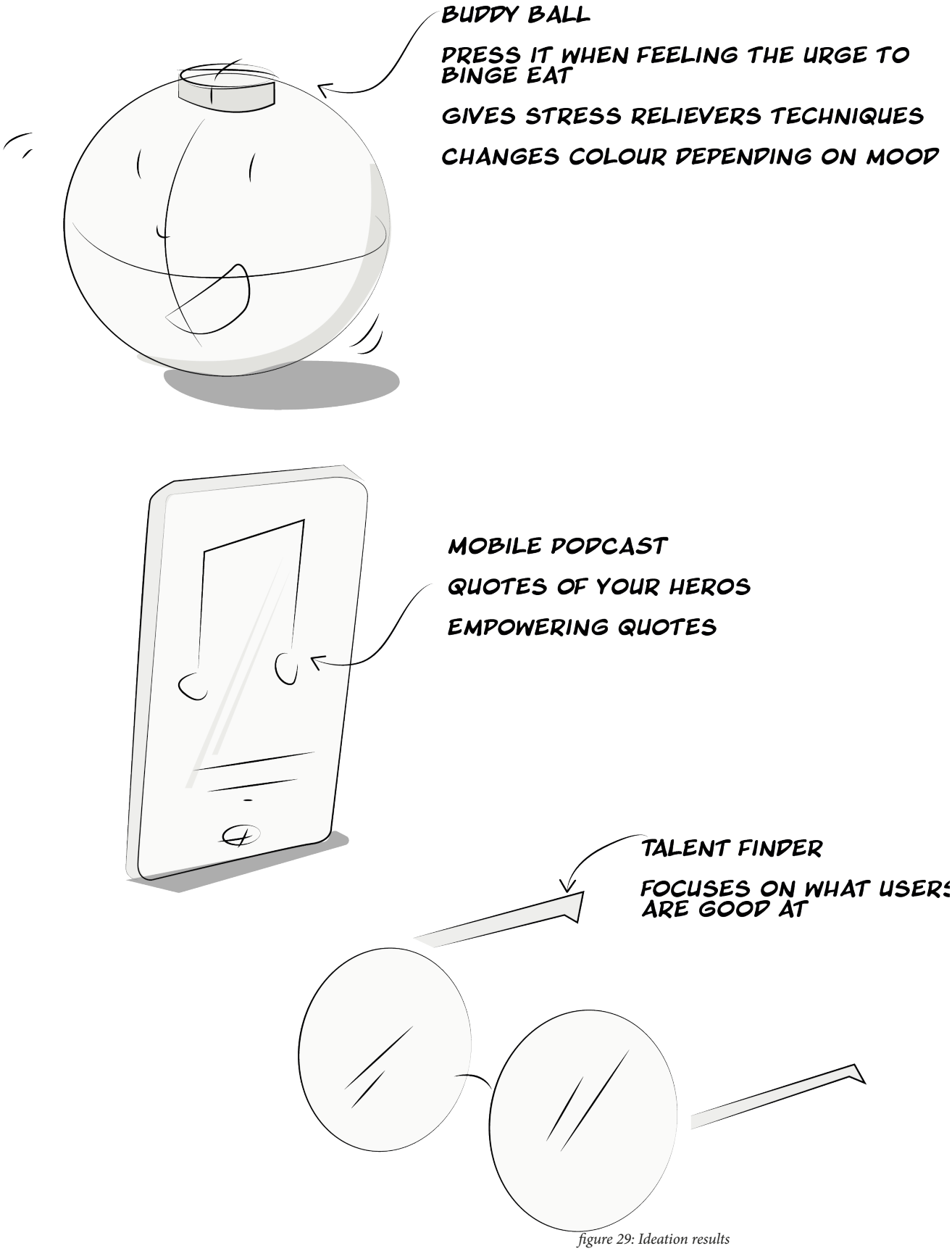
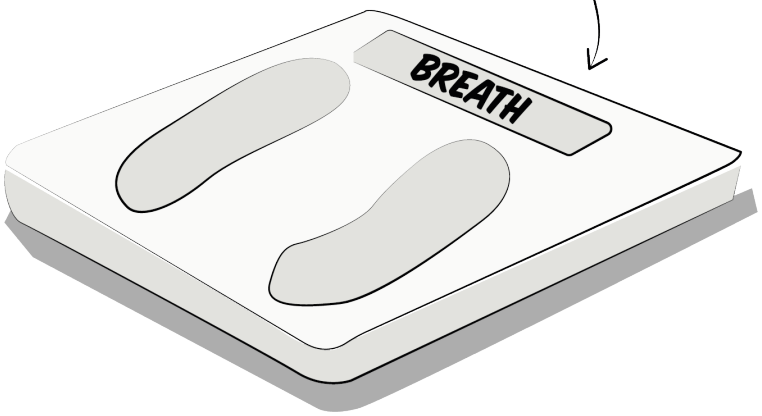


figure 29: Ideation results

RELAXING SCALE

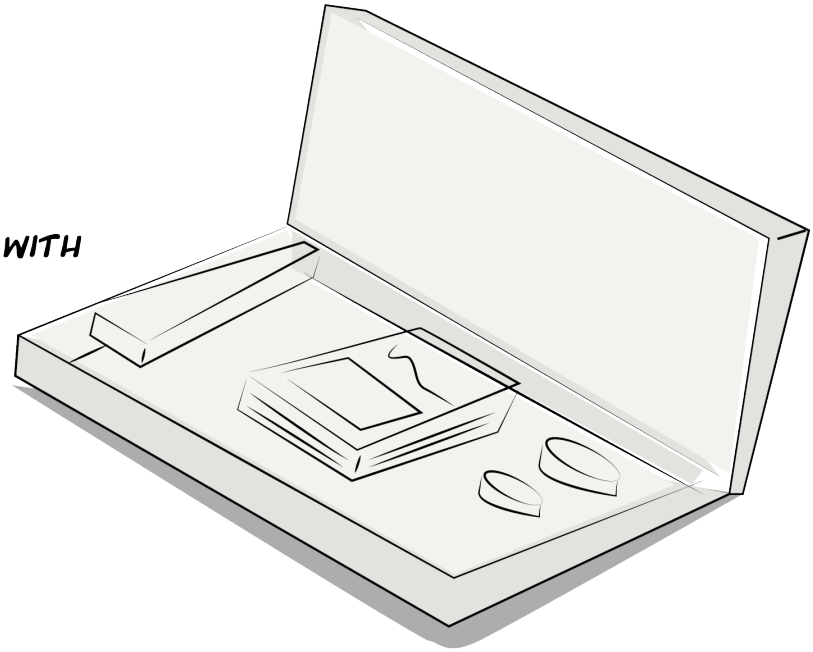
GIVES INSTRUCTIONS TO RELAX

SETS-UP TOUTINES



TOOL KIT

LEARN HOW TO DEAL WITH EMOTIONS

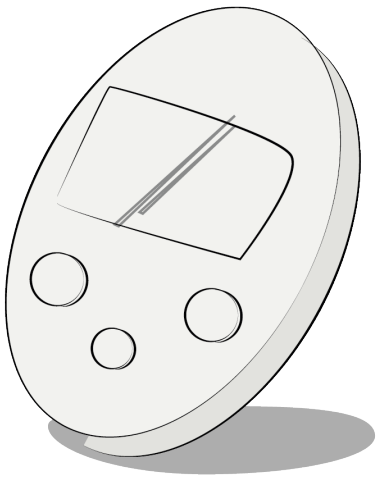


BUDDY

GIVES MOTIVATIONAL QUOTES

PERSONAL TRAINER

CONNECT WITH OTHER PEOPLE



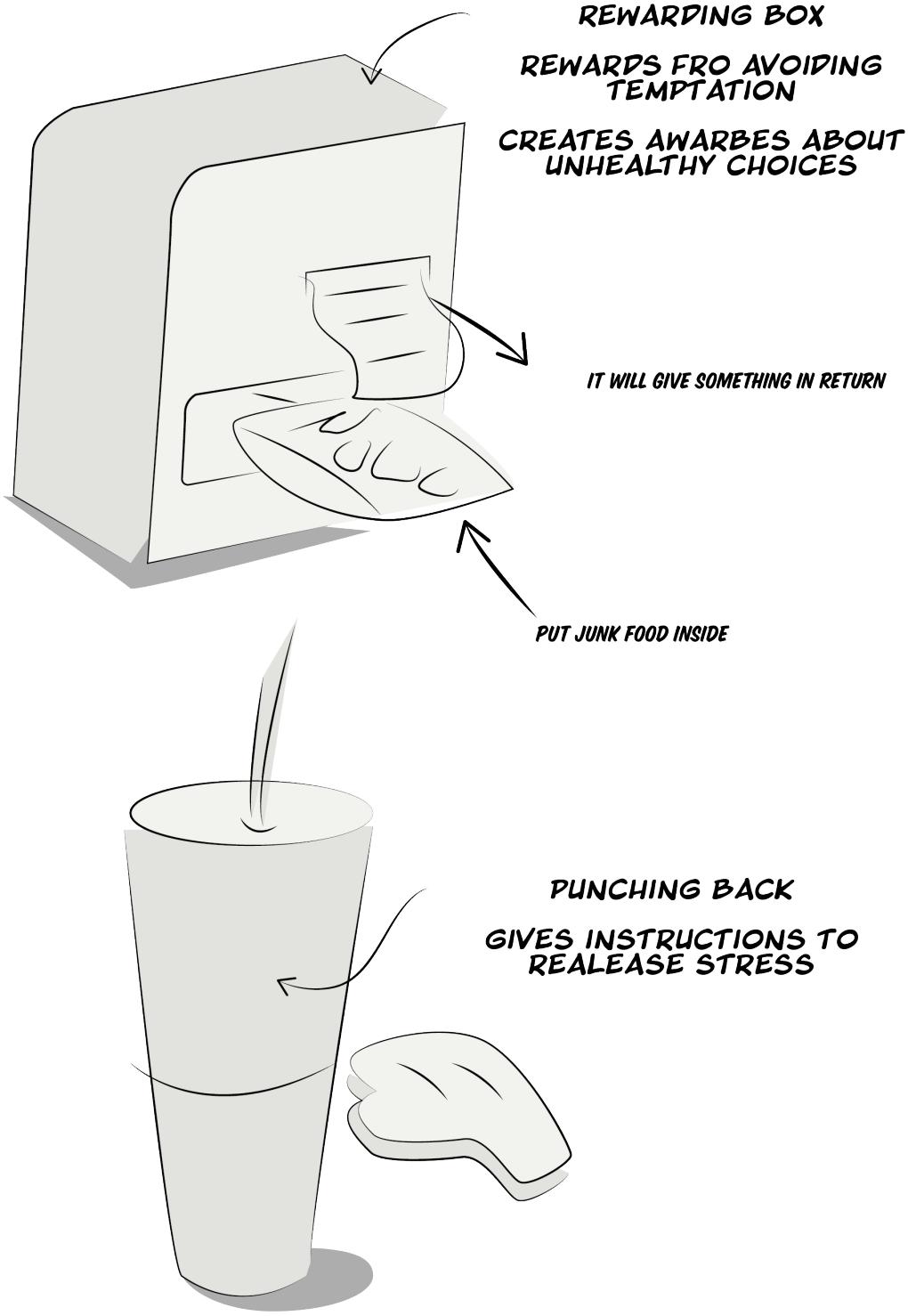


figure 30: Ideation results

CHAPTER 4. SECTION 5

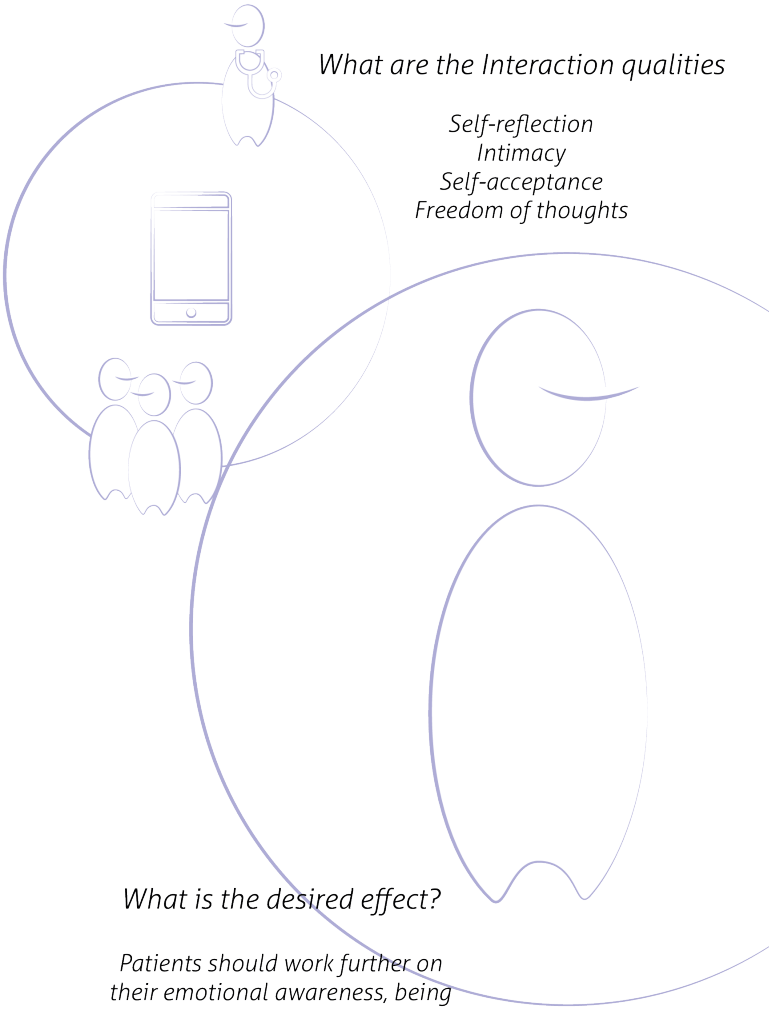
INTERACTION VISION

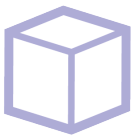
The aim of defining an interaction vision was to help me define the features of the product and the interaction between product/servie, and the users.

In order to do so, thanks to the research phase, the interviews and the creative session I the desired effect that I want to achieve, which is helping the patients regulate their emotions by embracing and accepting them.

I described how I want the users to feel while using the product, in other words, the interactions qualities that the product/service should have. I want the patient to experience a moment of self-reflection, intimacy, self-acceptance and freedom of thoughts. The reasons behind these qualities are, on one hand, retrieved from the interviews, users usually feel ashamed of their emotions and sometimes tend to avoid them, which at some point can be the cause of a binge episode. Furthermore, I believe that offering a self-reflection moment in which all thoughts are allowed, no matter if they are negative or positive, it could also be beneficial for them. Making a ritual in which users need to take their time to think about how they feel, will also reduce their stress levels and anxiety.

Therefore, the design goal is to help people suffering from bulimia to have healthier behaviours making them, feel in control and at ease during their daily life"





What is the interaction vision?

I want patients to have a self-reflection moment like "when admiring a piece of art or a beautiful landscape"

The design goal is to help people suffering from bulimia to have a healthier behaviour making them feel in control and at ease during their daily life"

figure 31: Interaction Vision

CONCLUSIONS

Here I make a sum up of all the findings during this first phase and explain which are the ways that should have further exploration and development. I visualize the two possible combinations for the future product.

On one hand, one solution could be to design a product/service that would be used at home. The positive aspects of having a product at home are that users would not need to carry it during their daily lives, it would become a more intimate and less obtrusive object. I also believe that having a product at home can also be supported by an app, which will give the user the support she/he needs whenever and wherever they are.

On the other hand, having a wearable or product/ service that can be with the users during their whole journey, could also be helpful in critical situations. They might also develop a more personal attachment to it or even create a nice community sense around the product. The challenge here would be to design an aesthetically pleasing product that user would feel attached and attracted by the idea of wearing it or bring it with them. This type of product could also help them to create more awareness about eating disorders and normalize the topic.
During the next steps I will explain what is the final direction to design an intervention. Also, thanks to all the research done I will conclude what the main characteristics of the final outcome should have and eventually find out a solution that fulfils the needs and requirements of the target group.

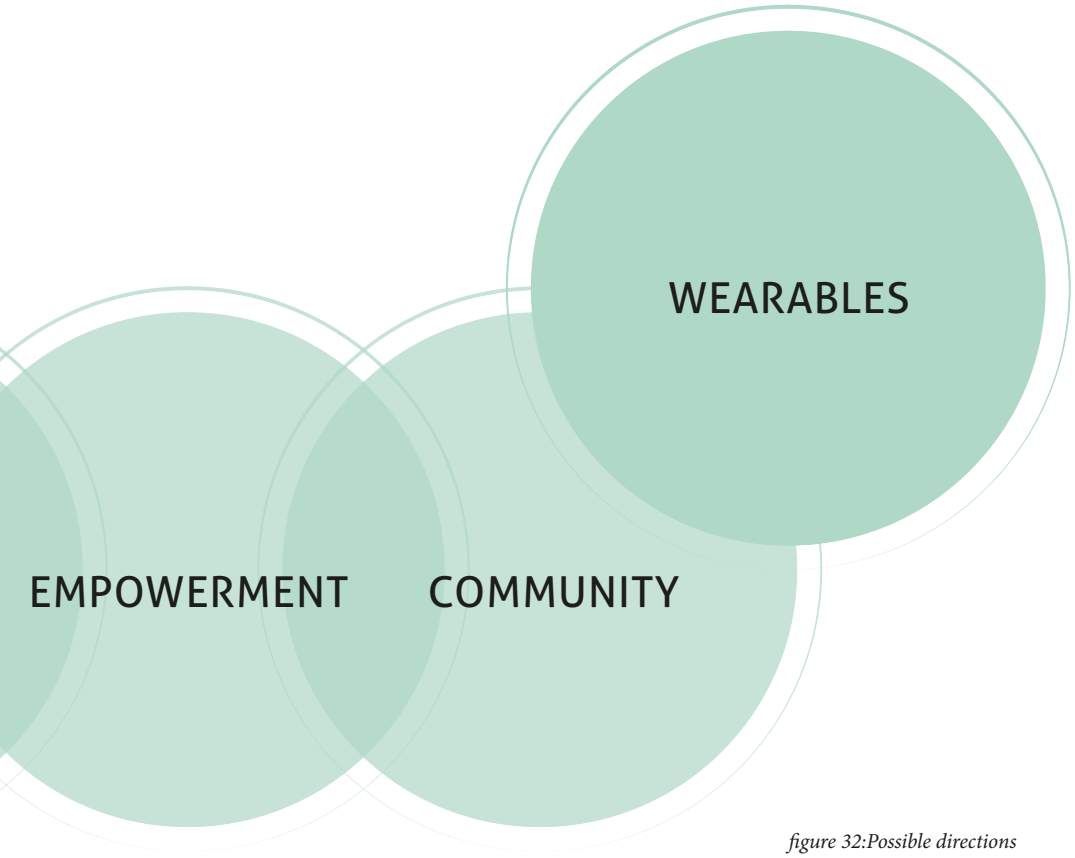


figure 32:Possible directions

5.0 DESIRED EXPERIENCE

Final direction

List of requirements

Product experience

Inspiration by memes

Conclusions

CHAPTER 5. SECTION 1

FINAL DIRECTION

Based on all the research done and on the knowledge gained during this whole design process I decided to design an in-home product.

It could be discussed that both directions, the in-home product and the wearable, have some limitations as well as some benefits, however, based on the target group: people who have already been through therapy, and are trying to get back to normal life. I believe that designing an in-home product would fulfill the necessities of this specific target group.

However, before making any decision I also asked my users. I interviewed again three of my former users. During this informal interview, I asked them about both directions. One one hand, having a **wearable** could be useful when having a critical moment or an urge during their daily life and activities, however, they were pretty concerned about having to carry it with them. Users were not sure if they would feel comfortable wearing something that reminds them about their condition, and also they were not comfortable with having to explain to everybody what was the wearable meant for. I realized that this kind of product could increase the **stigma** and would not release the stress or the anxiety that users usually suffer.

Nevertheless, they were pretty positive about having something at **home**, a product that they would put wherever they feel more **comfortable** and share it with the people they care and trust.

What is more, having the possibility to **connect** with other people such as other users or specialists was something that they mentioned and that would be nice to have. Also, the fact of being able to have a connection with the product while being away from home was something that they appreciated. This will be achieved by designing an App that keeps them connected and in touch with the product, specialist and the whole community of users.

All in all, I believe that designing an **in-home product** would be the most suitable option for this target group. We should take into account that these people are aware of their eating disorder and have the predisposition of changing those behaviors and have a healthier lifestyle. The aim of this product is to fill the existing gap when a patient is **out of therapy** and needs to deal with the real world by her/himself. This would be the starting point of the conceptualizing phase and will be followed by the analysis of the product experience which will help me to define and develop the future in-home product.

figure 33:Final direction

CHAPTER 5. SECTION 2

LIST OF REQUIREMENTS

AESTHETICS

10. The aesthetics of the product must not be stigmatising
11. The style of the product must blend into the home environment
12. The aesthetics of the product must be gender-neutral
13. The design lines must be clear and simple

UI/UX

1. The product must be a bridge or transition between the therapy phase and the patient starting to recover by her/himself
2. The product/service must keep the patient connected to the therapist
3. The product must create emotion awareness
4. The product needs an app that keeps track of the patient emotions
5. The app must give personalized feedback to the user
6. The product/service must encourage patients to have healthier behaviours
7. The product/service must encourage users to use it every day
8. The product/service must promote a community feeling
9. The App must keep track of users thoughts (as a diary)

SET UP

18. The product/service must be set up by the patient and the therapist
19. The settings of the product must be synchronised with the App

TECHNOLOGY

14. The product needs to be connected to the electric current
15. The product needs to be connected to the App via Bluetooth
16. The product needs to use the IoT to give more personalised feedback

WISHES

20. The product could have wireless charging
21. The App could build a database based on the new user's new coping mechanisms
22. The App may connect users with other users dealing with the same problems
23. The App may connect the users with their beloved ones
24. The product could be placed on the walls
25. The parts of the product could be designed in a way that encourages recyclability
26. The product system could use IoT to understand their behaviours and give a more personalised feedback.

CHAPTER 5. SECTION 3

PRODUCT EXPERIENCE

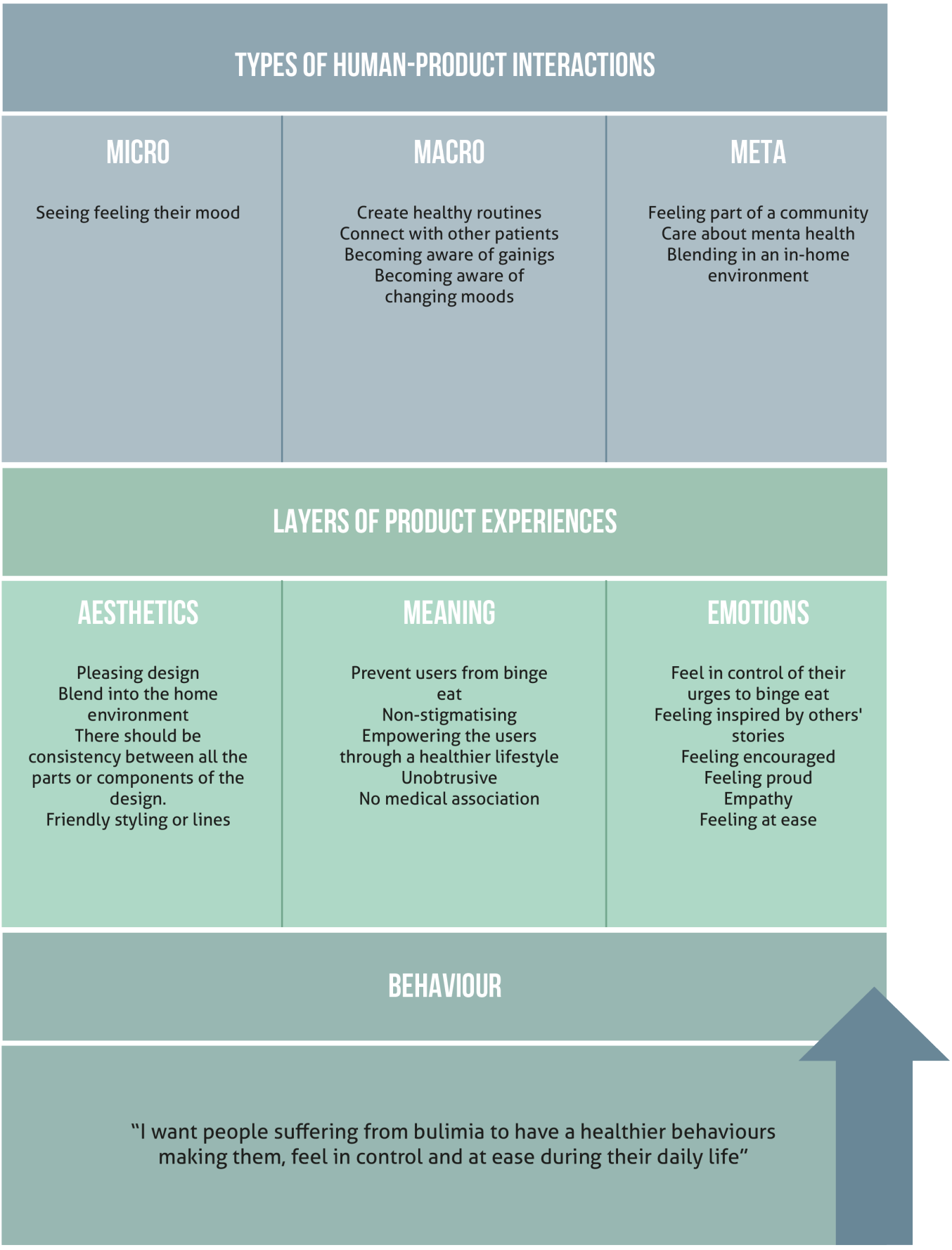
During this phase, I will define the product/service by using some product experience tools such as the Product experience framework and the Nine moments of product experience.

Since this project is mainly focused on changing the unhealthy behaviors of people suffering from Bulimia Nervosa, it could also be said that the approach to tackling this problem is through applying **user-centered design techniques**. Now that it is clearer what are the main triggers of the behavior of the users, their needs, their cultural values and the interaction that should be achieved by the use of the product/service and the users, it is time to think about the main characteristics of that experience.

Based on this, a product experience analysis has been carried out. Therefore, the Product Experience Framework (P. Desmet, P. Hekkert, 2007) has been used. This framework (see figure 34) is defined by three different levels of product experience: **aesthetic** pleasure, attribution of **meaning** and **emotiona**l response. "The entire set of effects that are elicited by the interaction between the user and a product, including the degree to which all our senses are gratified, the meanings we attach to the product and the feelings and emotions that are elicited" (P. Desmet, P. Hekkert, 2007). According to Desmet and Hekkert, the experience of a product is defined by the characteristics of the users, their cultural values, personality and also by the product itself, its texture, shape, materials, and functionality.

Taking into account the characteristics, cultural values, the personality of the target group and the personas developed in the former chapter, and the envisioned interaction and characteristics that the

figure 34: Product Experience Framework



product/service should have the Product Experience Framework has been developed.

I started defining the Framework by the desired behavior defined through the interaction vision . What I wanted to achieve with this intereaction was to focus on the general **well-being** of the user, and put less attention to their eating behaviours. Since they are already aware of their conditions and have the predisposition of staying healthy, the interaction between product and users should enable users to be more **aware** of their **emotions** and analyse them.

The connection between the product and the service (App) would be very important to influence the user's behavior and have a positive experience while interacting with both of them. For the design of the product/system, it will be very important to take into consideration the emotions of the users and to turn them into a **positive experience**. That is why aesthetics will be an important aspect of the product. It should not be stigmatizing and at the same time, the users should feel **encouraged** to change their behaviors. In order to do so, the product should have a pleasing design which should blend into the home environment, that way we prevent users from feeling ashamed of their condition and feel at ease. It should also be friendly and not have a medical association, in order to engage the user with the product/service and encouraging them to have a healthier lifestyle. What is more, users should feel in control over their binge eating behaviors, also feel **inspired** by other's **stories** and by doing so feeling encouraged and proud of their improvements. Furthermore, empathize with others and feel at ease with themselves. These emotions are based on the desk research, the interviews and the Holistic experience scan that carried out during the interviews.

Together with the **Product experience Framework**, the Nine moments of Product Experience matrix has also been analyzed (E. Özcan, 2016), which relates to the aesthetic, meaning and emotional design features with the three different levels of human-product interactions (micro, macro, and meta).
On the **aesthetic** level, the users should perceive the smoothness and unobtrusive lines of the product which goes in line with having a friendly product that prevents users to feel ashamed and that blends into their home environment. As the target group is Millennials, they would also appreciate having a novel product, something that goes in line with their aesthetic values, such as a minimal and gender-neutral design. Even if the desk research and the interviews showed that most of the sufferers are females, it could be argued that a more neutral and minimal design would also be aligned with the design and aesthetics trends that define Millenials.

On the **meaning** level, the product/system should be perceived as playful, something that users feel engaged and are aiming to use and also non-stigmatizing. This is a very important quality that the product/system should have, as mentioned in

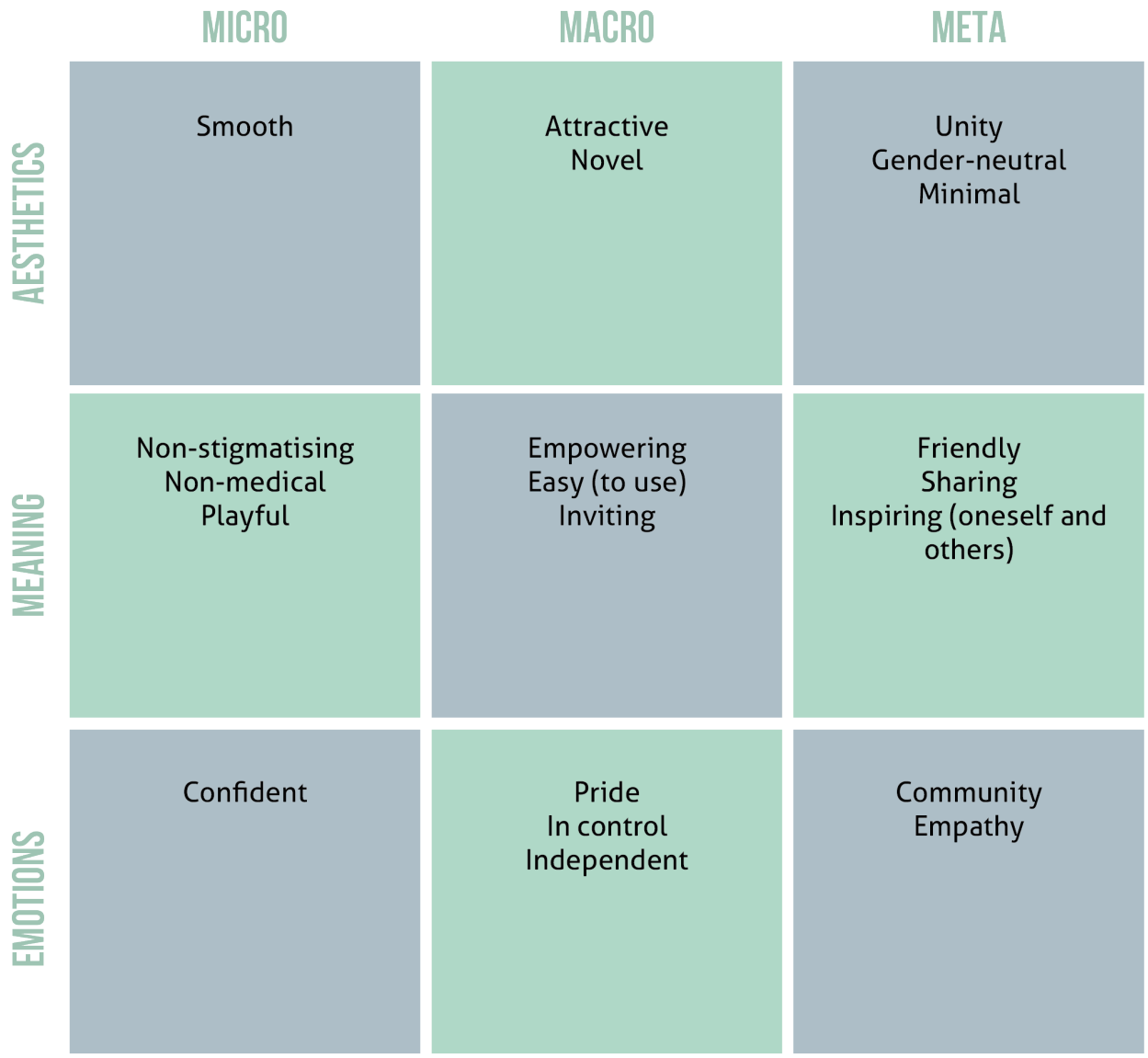


figure 35: Nine moments of Product Experience matrix

previous chapters feeling ashamed and guilty are one of the main emotions that users feel about themselves and their behavior. The interaction between the product/system should also empower users to improve their behaviors and aim for a healthier lifestyle. Also, the product and app should be easy to use and be inviting, features that will assure the engagement of the users as well as being perceived as a friendly product/system.
As mentioned before, the aim of the product should be on one hand modify the unhealthy behaviors of the users and also **embrace** their **emotions** and try to understand them. Inspired by the Holistic experience scan and based on the envisioned product interaction, on the **emotional** level users should feel confident about themselves. Furthermore, by using the product they should feel proud and in control over their condition as well as feeling part of a community, they should know that they are not alone and that being helped or help others would be beneficial for them. This should be one of the features that the App should have, showing them their improvements and connecting them with experts and other users will also assure and help them to change their behaviors.

In conclusion, the aim of making this two frameworks is to start to translate all the data gathered into something more tangible that will help in the further development of the final product/system.

CHAPTER 5. SECTION 4

INSPIRATION BY MEMES

Following the former chapter and trying to make it clearer for the reader to understand what I want to achieve with the future product/service, I translated all those emotions, meanings and aesthetic purposes into something more tangible.

Following the former chapter and trying to make it clearer for the reader to understand what I want to achieve with the future product/service, I translate all those emotions, meanings and aesthetic purposes into something more tangible.

In order to do so, I used memes as a source of inspiration. **Memes** have been compared to genes, however, the difference between them is" that the competition of the genes drives the evolution of the biological world, whereas memes compete for towards the evolution of the mind" (Blackmore, 1999).

Memes are "units of cultural information, cultural evolution or diffusion" (Bruens, 2011) and they can go from **rituals**, **behaviours**, **trends**, art, expressions and even language. They are stored in our brains and passed to other people's brain by imitation. According to Dennet, human consciousness itself is a product of memes, there is a competition between memes to get into our brains which lead us to be the creatures we are.
Culture is what defines a group of people, what makes them special and unique. It comprehends their values, rituals, and beliefs. The use and the meaning of certain products it also depends on culture and it can evolve and spread into others cultures. In other words, the evolution of a product not only depends on its shape and aesthetics but in its **context** and use as well.

Taking into account how powerful memes can be while designing, I illustrated the emotion, meaning and aesthetics values envisioned in the product experience framework and in the nine moments of experience. I illustrated them by using collages. The aim of these colleges is to help myself envision the aesthetic lines and interaction that I want to achieve while using the product/system.

Memes can help the final result to have a more powerful meaning and enrich the whole experience towards the product, they are the building blocks or DNA of the final outcome or design. They can enhance or improve a product/service acceptance as well as provide new directions of the aesthetics and functions. Memes help designers to understand users and to come up with a final outcome that fulfils their needs, aesthetically and functionally talking.

Taking into account how valuable memes can be, I represented what I want to achieve with my product with a set of collages.

On one hand, I represented the character and **emotive** references that I want my product to portray. These colleges represent the **feelings** I want to evoke and how the ambience will look like.
On the other hand, I used other collages to represent the memes, in other words, the **look**, the **form**, colour, material, and **interaction** of the future product.

Hence, I used two collages (see figure 36 & 37) for the emotional level, the reason behind using two is due to the fact that the final interaction would have a tangible product and also a service or app. Even if both are linked the situations and the use of them will differ. One one hand, I want the product to give a sense of **confidence**, **independence** and strength the patient will be by her/himself after therapy, and it is important for them to feel that even if there is still a path to follow towards recovery, they are still able to do it.
On the other hand, I also believe that feeling part of a **community**, and to be able to get some support when needed is also important for the patients in order to recover.

Figure 38 represents the meaning of the product/ service. What I envision is a moment of **intimacy**, a moment of reflection and in a place where the patients feel safe and at ease while using the product.

Finally, figure 39 represent the aesthetic lines of the product, this refers to the more tangible aspects of it. The aim of using this collage is to achieve the interaction I want to create by the aesthetic means of the product, which I think it also plays an important role.

Creating a connection between the user and the product, as well as creating a **meaningful** product/ service that fulfils users' needs and values is one of my main objectives in this project.

Pride
Confidence
Strong
Independent

figure 36: emotive references

Kindness
Community
Supported

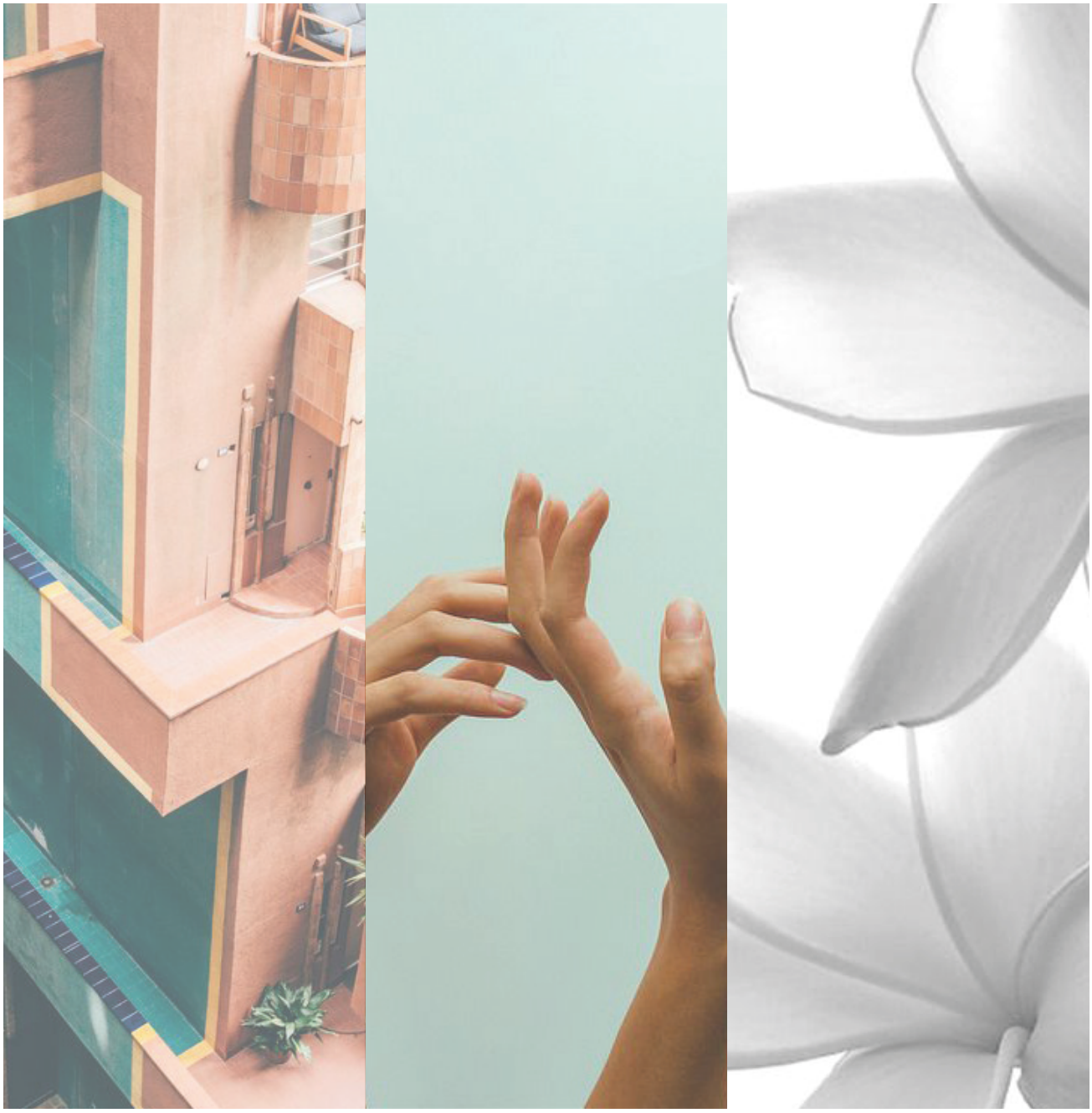


figure 37: emotive references

Intimacy
Cozyness
Personal space

figure 38: meaning references

Clear lines
Blending into environment
Smooth lines
Contrast
Friendly

figure 39: memes/aesthetic references

CONCLUSIONS

In the define phase, the design goal will be developed. This involves a detailed description of the target group by defining the personas. It also describes the envisioned experience by describing the interaction vision, the list of the requirements and by the use of memes. Here, all the aesthetics, emotive and meaning details will be defined in order to further develop the design intervention in later stages.

PHASE 3. DEVELOP

During this phase, some ideas and concepts have been developed and evaluated with the intended target group. Eventually, based on all the information gathered during this whole project, a full description of all the technical details and the final interaction of the final solution is presented.

6.0 CONCEP-TUALIZATION

Concept develpment

Refinig the concepts

CHAPTER 6. SECTION 1

CONCEPT DEVELOPMENT

After defining all the characteristics of the product/ service and the envisioned interaction. I started to conceptualise the product with all the features that I believe will help my target group.

The direction I took for the final concept, was as mentioned before, an in-home product. Therefore, I started to ideate what were the possibilities and what could I offer to the users in order to enhance their eating habits and their wellbeing in general.

Summing up all the information gathered during this whole process, I realized that it was almost impossible to generalize or to find a commonality in the ways that users cope or behave towards certain situations. Nevertheless, I went back to basics, the base of many mental disorders and especially for eating disorders, **emotions**. As mentioned in previous chapters and after talking with all my users, I realized that they have issues with r**ecognizing, admitting** and **reflecting** towards certain emotions

Before starting with the design I asked myself, how can I make users think, analyze and reflect on their emotions? How can I show them the value of doing this exercise? What should be the trigger for them to use it daily?. Well, I first started with a pretty raw idea and went directly to ask my users about it, trying to find the positive aspects of it and how could it be improved.

This idea is what I called the **"Jar of emotions".** It has a plate where many semispheres are placed, each semisphere represented one emotion, so what users had to do is to match two emotions and click them together. Afterward, they would have to put that sphere created out of two different emotions inside of the jar. The aim of this idea was to first analyze their emotions, make them think how the felt in that exact moment and by putting them every day inside of the jar, they would be able to see how their emotions will change throughout their week.

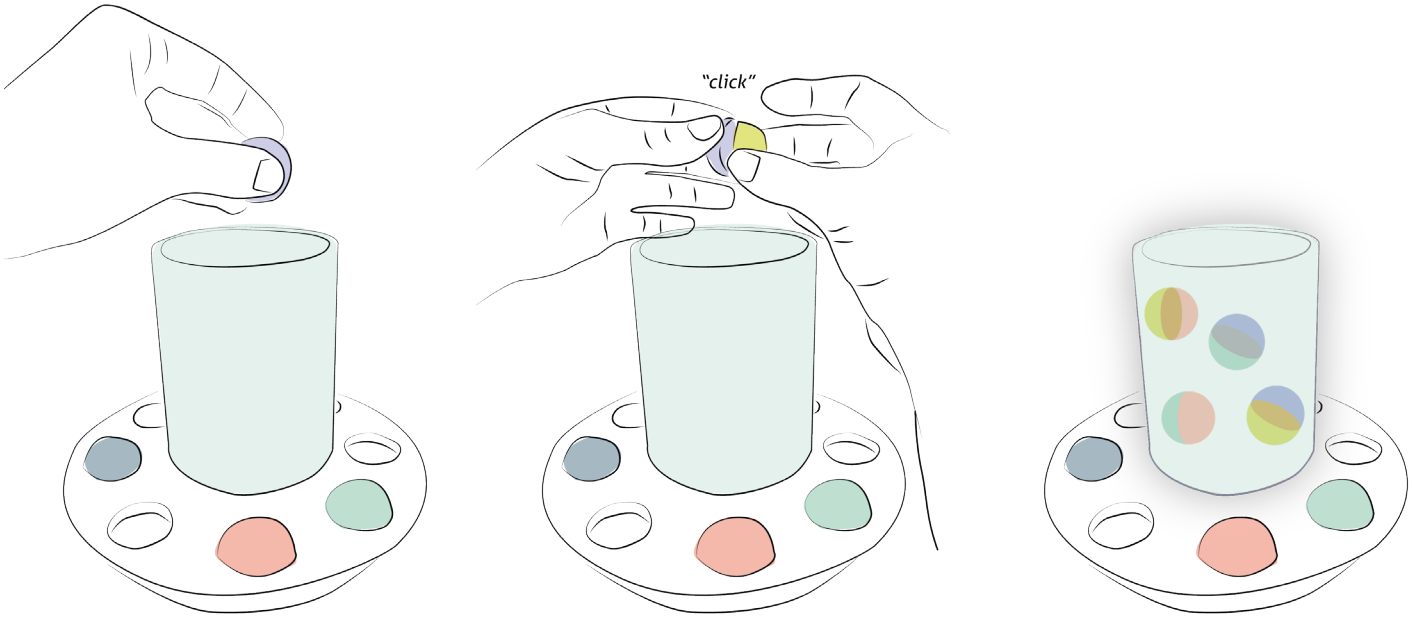


figure 40: Jar of emotions

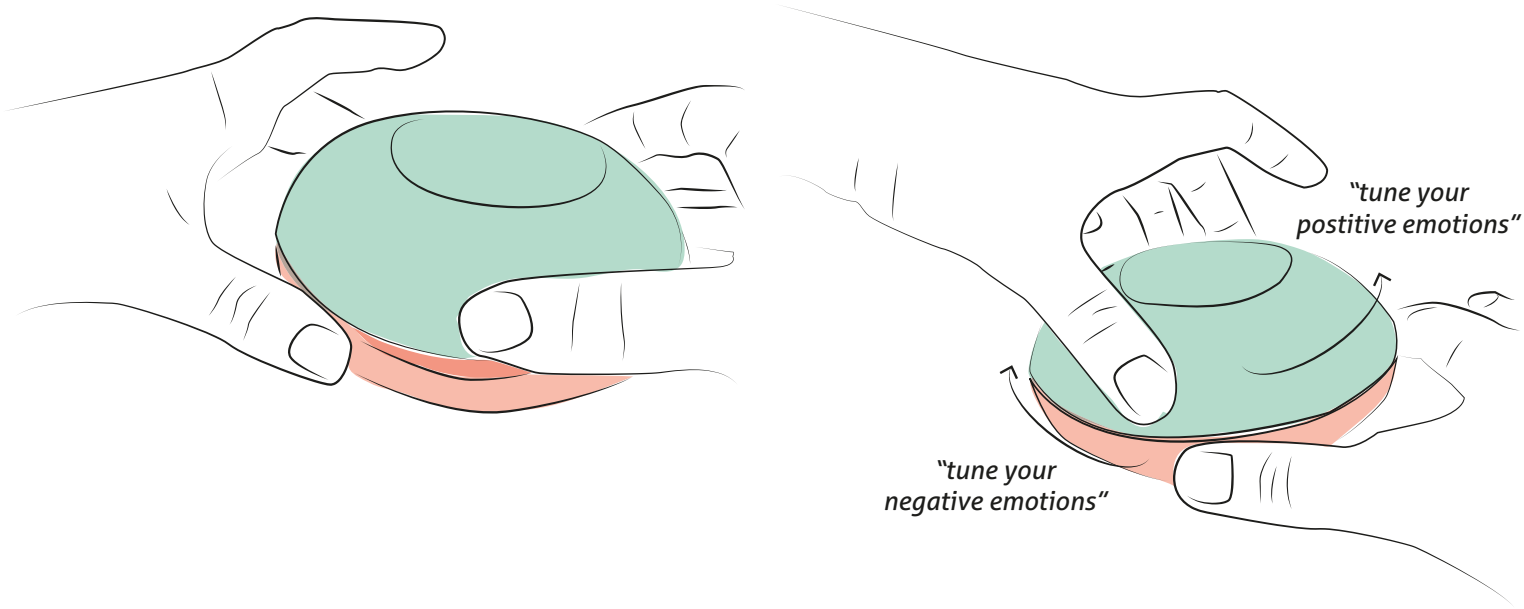


figure 41: Ying-Yang of emotions

From this initial idea, I came up with a second one which I called **"The ying-yang of emotions".** Also, based on the same principle, but these time I solved the problem of having too many semispheres and too many items. The meaning of this idea was that each part would represent on one hand the positive emotions and in the other hand the negatives. Users would have to tune their emotions according to how they would have felt in that moment and from that analysis, the product should give something in return. Here is where I asked my self, what type of information or interaction should happen after they have analyzed their emotions? At that moment I realized that my users should help me to figure this out.

Both ideas seemed interesting, but still had some flaws, that is why I decide to send a booklet to two of my users. They had to fill it in for five days and answer some questions after they would have finalized to fill it in.

The aim of sending this booklet was to check whether if my initial idea of analysing individuals' emotion would be a solution for my target group. The reason behind this idea was that emotion regulation is actually an issue for the patients, however, I needed to figure out if this activity could be embedded in their daily life or routines

Here is an example of the booklet (see figure 42) and (Appendix B), I asked them to fill it in twice a day.

One during the morning and another one during the night. The reason behind this was that since it was going to be an in-home product, they should use it before leaving the house. Therefore, they had to fill it in by writing down two emotions, explaining why di they felt like that and what could be the cause of it. I also asked them if they could think about personal or some coping mechanisms that could be helpful for them to face or behave towards those emotions. Finally, I also asked them to check in which moment of the day they were filling in the booklet, in order to check whether there was any preference to do it.

At the end of the booklet, I also made some questions that I wanted to be answered by them (See Appendix C). The purpose of this was to first clarify if my idea of thinking about their emotions could be a possible solution and see what could be the possible feedback that they would like to have after analyzing their emotions.

Several interesting insights were obtained after interpreting all the data collected from the booklets.

The first conclusion I can make out of this is that again, talking with the users and ask them about the idea was the best way to assure that it was a good starting point.

Regarding the best timing to use the product, I discovered that it is up to the users to decide when to use it. They all mentioned that the moment they would use it would be a moment in which for themselves, they need to feel comfortable and aiming to think and reflect on their mental state, "It should be a moment of concentration, reflection, without any confusion or distractions, you really need to listen to yourself and analyze what you feel". So, before leaving the house and once they are back would be ideal, they will just need to decide the perfect timing.

Also, they mentioned that it could sometimes be difficult to write about their emotions especially the negative ones " It's difficult sometimes because you need to recognize them first, admit to yourself what is going on and find the words to communicate that". However, they also mentioned that they saw the positive aspects of doing that, they felt that it was somehow **helpful** to take a moment and think about themselves, **"Understanding what you do and what happens to you, affects your emotions and your behaviors and it's something that I should do more often",** "It's pretty useful, because sometimes we are just confused, as an example, sometimes you could think that you are hungry, but maybe you're just thirsty or bored, so it's the same but with emotions". Also, becoming aware not only about the negative emotions but also about the positive emotions, it was something that they perceived as interesting, "**I thought I didn't need coping mechanisms for positive emotions, but now I believe that I do, since they also generate an impact on me,** especially when they are very strong, but I'm not aware of it"

Another aspect I wanted to retrieve from this booklet were the coping mechanisms that they use and see if there were any commonalities between the users. I

confirmed once again that their coping mechanisms are very personal, and that not everyone responds the same way to certain emotions. Some of them said that when they were lonely they would talk to their family, whereas some other they rather avoid that emotion or try to keep themselves busy with other activities such as reading a book or playing an instrument, "Anyway, I have a lot of things to do today, so I need to find the strength to face this weird and cloudy Sunday", "I prepared a breakfast that I love, chai latte, as a cuddle to myself, and also listen to some music to calm me down", "I did a to-do list and got out from home early", "I kept myself busy to not react to those emotions by binge eating, I'm actually reading a book that I love and can't stop reading it". My conclusion is that giving straightforward tips to them will not really help them, it is up to them to discover what it works for them in each situation.

Finally, I was also interested in how would they felt as if they would be able to share their feelings with other people (specialists and other users). Here I had different opinions towards this topic. One of them was really against sharing it at least a community of users " There's no way I will do that. In fact, it has been already quite complicated to write some emotions here a few days taking into consideration that you are my friend and I'm participating in your project, which is only for you. So, to a whole 'community' of 'people with the same problem' as me? I will never share anything." On the other hand, the other users mentioned that it could be somehow useful to share their experience with other people and talk about who really understands them "The community could be as a second family that accepts you when you feel ashamed talking about your problem with a friend or family", "I'd like to share it if somehow it could help someone else, as well as if somebody else could be good for me". What can be concluded is that users should also be able and control what they want to share and with who they want to share this data.

"It should be a moment of concentration, reflection, without any confusion or distractions, you really need to listen to yourself and analyze what you feel".

"The community could be as a second family that accepts you when you feel ashamed talking about your problem with a friend or family"

"Anyway, I have a lot of things to do today, so I need to find the strength to face this weird and cloudy Sunday",

MORNING

This is where your journey starts, here I would like you to think about how do you feel at this moment, and how are you going to act towards those feelings. It's okay if you feel full of positiveness, or a bit down, you can choose whether to write down two positive emotions, two negatives or one for each type.

POSITIVE EMOTIONS

Kindness
Admiration
Joy
Hope
Energized
Pride
Confidence
Relief
Satisfaction
Fascination
Worship
Other

NEGATIVE EMOTIONS

Disgust
Sadness
Disappointment
Shame
Anxiety
Frustration
Loneliness
Guilt
Insecurity
Confusion
Other

Personal coping mechanisms (tips & tricks that you use to ,if needed, cope with your emotions)

Why do you think you feel like this? (try to explain what are the triggers of those emotions, could be situations, events, people etc, feel free to express yourself)

Personal coping mechanisms (tips & tricks that you use to ,if needed, cope with your emotions)

As soon as I woke up | *Before breakfast* | *After breakfast* | *Before leaving the house*

Morning

Psst, don't forget to go to page 18 and fill it in

figure 42: Booklet

CHAPTER 6. SECTION 2

REFINING THE CONCEPTS

After defining all the characteristics of the product/ service in this phase, I went deeper into the first ideas I had and came up with the final solution which is based in all the knowledge gained during this whole process, and the one that best suits user's needs and values.

Hence, I started developing the idea of helping users be more aware of their emotions on a daily basis in order to create a **ritual** of **acceptance**, reflection and **intimacy**.

Before developing the former ideas, some further research on the topic of analyzing emotions had to be conducted. Even if sending a booklet to the users already confirmed some of my thoughts and also gave me a deeper understanding on how the product should interact with the target group, I also wanted to make sure that this direction was in fact, a solution that could give confidence to the users and build up healthier behaviours during their daily life.

"The diversity of an ecosystem is important for its balance and strength. The more diverse and abundant, the more flexible and resilient the ecosystem is. The same happens to our emotional ecosystem". (Quoidbach et AL., 2017).

The purpose of this research was to validate the positive aspects of being aware of emotions and to reflect on them based on daily activities or events. Here I would like to introduce the term **"emodiversity".** Emodiversity is used to refer to the variety and relative abundance of the emotions that humans experience (Quoidbach et AL., 2017) and it can be linked with the mental and physical health of human beings. According to the research of Quoidbach et Al., being able to differentiate specific emotional states such as anger, shame or sadness, rather than just experience a more global state like feeling sad, can contribute to people's **wellbeing**. This is because being capable to differentiate between the nuances of certain emotions provides more insights and hence, richer information about which behaviour fits better in that specific situation. They believe that instead of generalizing our state of mind, it is preferable to try to **disclosure** and distinguish exactly what we are actually feeling. Go beyond bad/ good or sad/happy.
"Propensity to experience a greater diversity of negative emotions seems to predict better mental and physical resilience than a tendency to experience a limited range of only positive ones" (Quoidbach et AL., 2017)

Following this topic, and as already mentioned in former chapters, people who suffer from bulimia have also some emotion dysregulation, (See chapter 2 section 1) which combined with a lack of confidence makes it the best scenario to develop an eating disorder.

Therefore, it could be said that reflecting on emotions can give some more clarity to people suffering from bulimia. It will help them to be honest with themselves and embrace those emotions that might affect them in a negative way and boost their confidence by embracing both positive and negative emotions.

Nevertheless, it will also be interesting to discuss

whether people are able to feel more than one emotion at the same time. Here is where I would like to introduce the term **"bittersweetness"** or what it is also known as mixed feelings. There have been many studies trying to explain the possibility of human beings to feel both positive and negative emotions at the same time. According to Braniecka et Al. "experiencing mixed emotions seems to be beneficial for stressful situations because even if it's impossible to avoid negative emotions, it helps to mitigate them". Confronting adversity and finding meaning in life's stressors, might actually be beneficial for people and make them feel better.
Nevertheless, Oceja and Carrera described that mixed emotions can be experienced in different ways.
It can be **sequential**, which means that one emotion appears first and afterwards, is being replaced by the opposed emotion.
Another possibility is that the individual experiences both emotions at the same time but with different intensity, this is what they called **prevalence**.
The **inverse** is when the intensity of one of the emotions increases and the other one decreases.
Finally, the last pattern is known as highly **simultaneous** which is when both emotions are experienced at the same time.

Having confirmed that people are able to feel more than one emotion at the same time, and it is actually beneficial to reflect about emotions and find the nuances of our mind state. Therefore, I believe that designing an in-home product that helps individuals to analyze their emotions and create more self-awareness will be beneficial for their wellbeing and to boost their confidence.

The aim of this in-home product is to help people suffering from bulimia nervosa. It has already been said that this eating disorder causes a lot of negative emotions and one of the biggest ones is "shame". This is one of the main reasons for the product to be a more personal item that individuals can use in a more private ambience.

What this product will do is to help users reflect on their emotions based on upcoming or past events. It will create a moment of self-awareness and reflection, trying to find a restorative state that will allow users to put down their burdens and embrace their emotions.

Therefore, what users should do is to use the product at least once a day. They will need to reflect on how do they feel towards the upcoming or past events or situations and think how these situations affect them

Moreover, as can be seen in all three concepts, they are all based on the same starting point, tunning emotions according to how users feel and afterwards based on that input, the product will give feedback in return to them.

Also, based on what I learned from the user's, it is

usually, if the patient goes to therapy, pretty clear what kind of activities or coping mechanisms they have to do in order to deal with certain emotions or situations. Nevertheless, after leaving therapy there are still some probabilities for the patients to have relapse episodes, which if it is not well controlled in an early stage, patients must go back to therapy and start over with treatment.

So the solution should, on one hand, **encourage** patients to have healthier behaviours and to also help them **accept** and **reflect** on the emotions, no matter if they are positive or negative, it is just a matter of **embracing** how they feel.

CONCEPT 1/ QUOTES

The main characteristic of this concept was that the users will receive a **quote** every time they would analyse their emotions. This quote should be based on that two emotion combination. Also, to make it more personal the product/service should use the IoT to understand users taste, values, behaviours and hobbies, based on their social media and use of the internet. The aim of this quote was to make them reflect on what they actually feel and think of ways of how to accept and cope with the emotions. Therefore, the product would first analyse the two emotions given by the users and then find a quote that would be meaningful and valuable for the user. It would then create a sense of **storytelling** through users emotions, these quotes could be retrieved from philosophers, writers, artists, musicians or even their therapist, but always based on the user's values and interests.
Furthermore, these quotes should not always be the same, that's is why the use of the IoT, the product/ system should learn from the behaviour of the user and give more personal and meaningful output.

Though this concept seemed interesting, there were many restrictions that did not convince the target group. Some of them mentioned that they were not sure if they would like to have a quote every day because they were afraid it will not inspire or help them reflect on their emotions. "Well, what if I don't like what it tells me? I wonder how precise it will be...", Others mentioned that they rather have a song that helps them cheer up, or what if they could hear comments from other patients. Therefore, I concluded that on one hand, it was very difficult to inspire people with just a quote, that not everyone

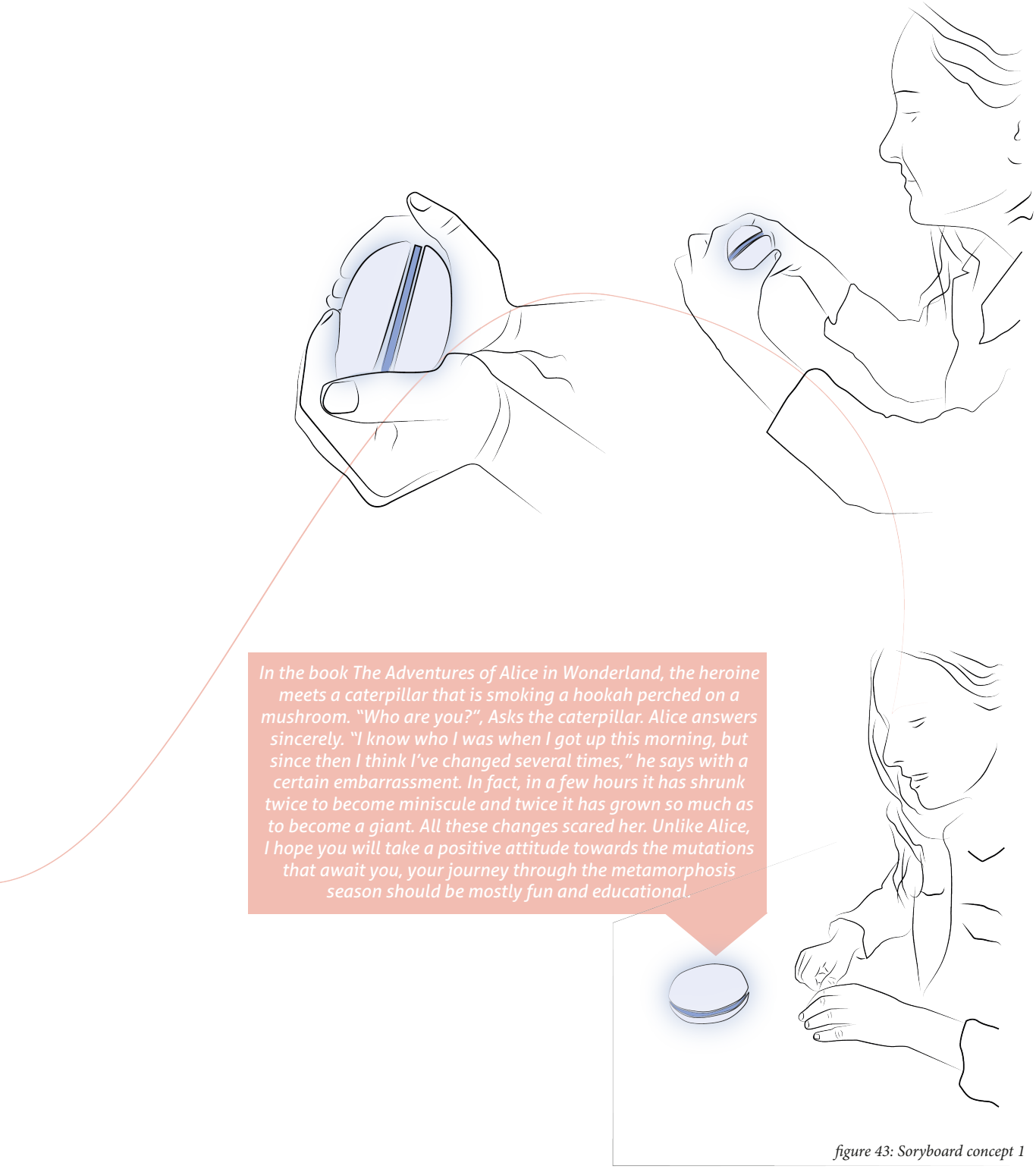


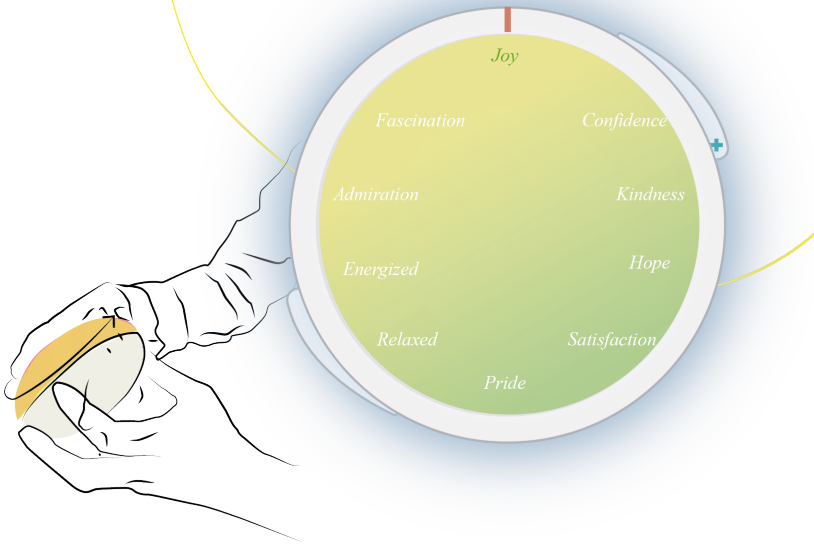
figure 43: Soryboard concept 1

CONCEPT 2/ TIPS

likes to hear quotes and that it could be really challenging to adapt the quotes even if using the IoT.

This second concept does something similar to the previous one, but instead of giving a quote as feedback, it will tell what kind of activity fits how the user feels. The feedback is based on a research made by the Yale Center of Emotional Intelligence, in which Lori Nathanson researcher at Yale Center for Emotional Intelligence, developed a framework for emotions and studied what type of **activities** are suitable for certain emotions and what type of activities are suitable to switch to other emotions.

This framework is called the "Mood meter" and it is aimed to develop the emotional intelligence of prekindergarten through high school students. "Educators may also use the Mood Meter to teach students to evaluate whether their current feeling is ideal for what they are about to learn, and develop emotion regulation strategies to help them either maintain or shift their feelings to optimize learning." (Nathanson, Yale Center for Emotional Intelligence, 2016). The four-quadrant framework represents two dimensions of core affect: valence (unpleasant to pleasant, represented by the X-axis) and arousal (low to high energy, represented by the Y-axis);
Based on this idea, the users would have to choose one emotion that describes how they feel, positive or negative, which will be displayed on a screen and also will help users understand the emotion they are looking for, by relating them with colours.



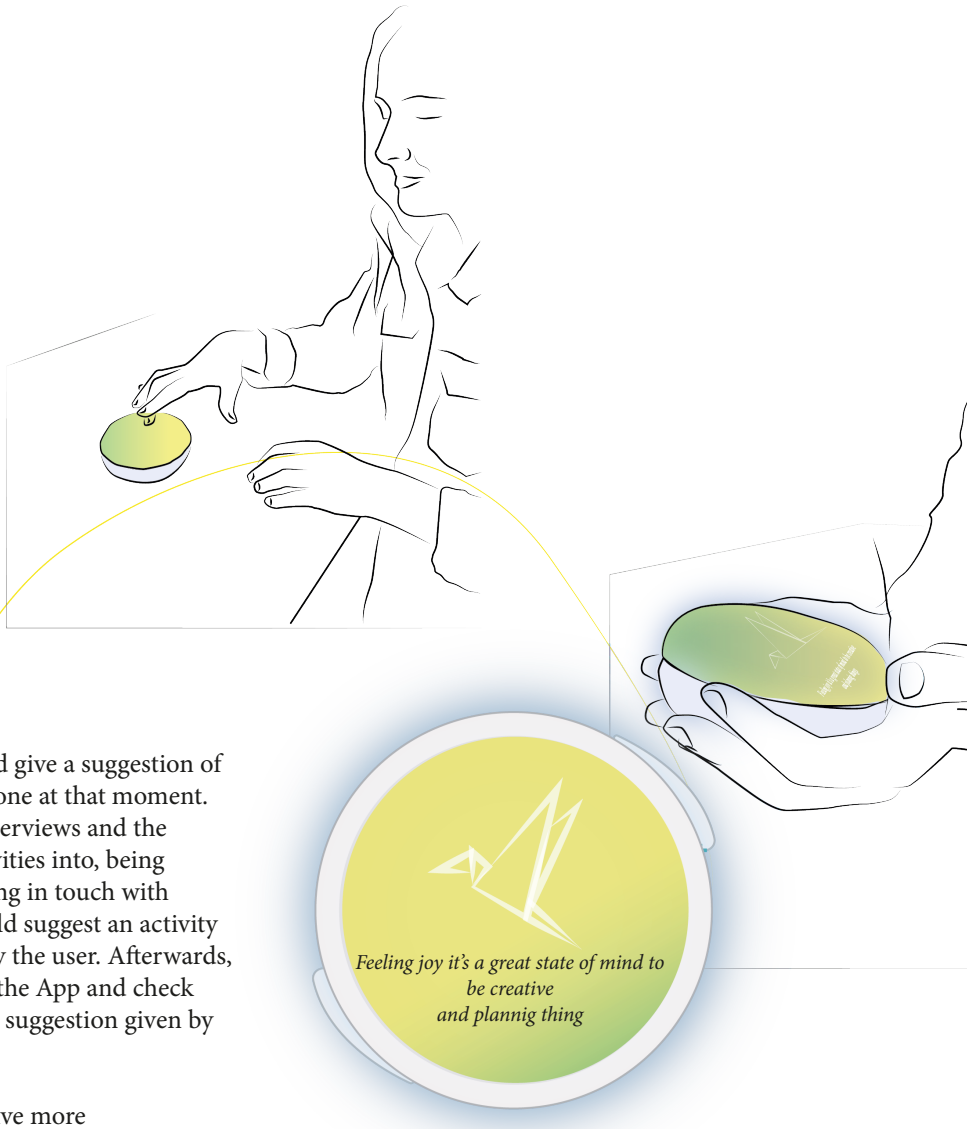


figure 44: Soryboard concept 2

Afterwards, the product would give a suggestion of what kind of activity can be done at that moment. Furthermore, based on the interviews and the booklet, I clustered these activities into, being creative, being mindful or being in touch with someone. So the product would suggest an activity based on the emotion given by the user. Afterwards, the users would have to go to the App and check which activities belong to that suggestion given by the product.

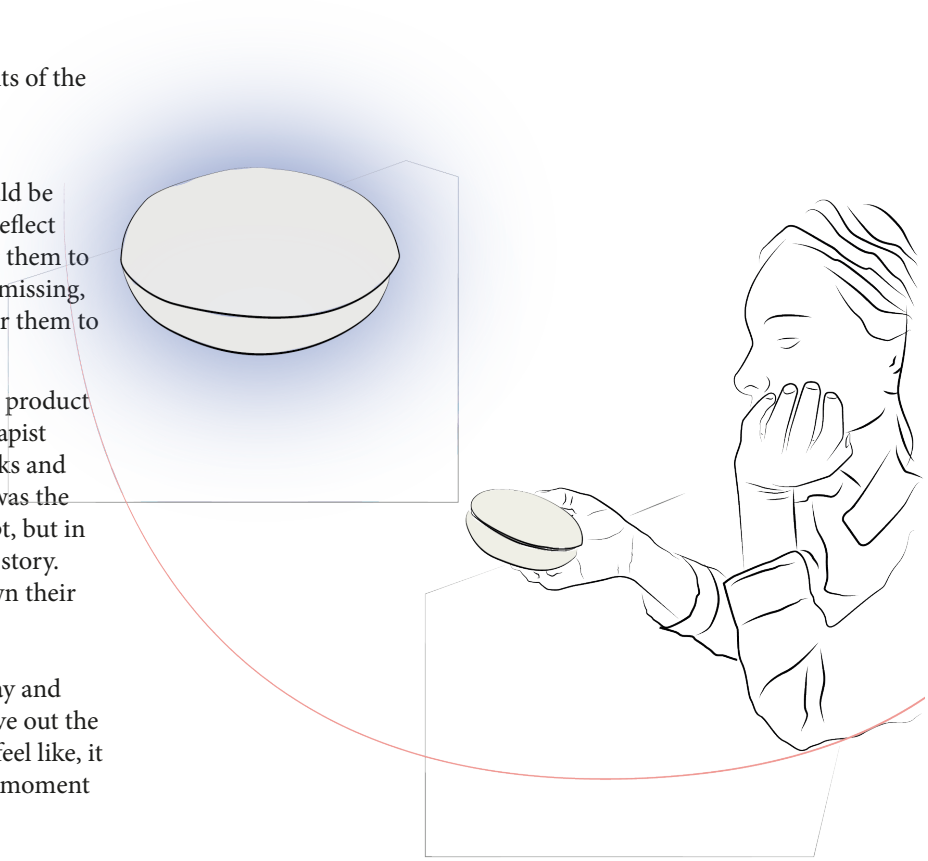
Moreover, since I wanted to give more personalisation to the feedback given by the product/service, and also use the product as a bridge between therapy and the patient being by her/himself, the product should be set up by the patient and the therapist. That way, it becomes a tool that is given by the therapist and seems more as a continuity of the whole recovery process.
The aim of doing so, was also to give the chance to the patient to set up the product based on her/his coping mechanism and also to introduce it into her/his daily life in a more smooth way.

Even if this idea could work and indeed some users seem to be positive towards it, some of them mentioned that it was not very innovative and that they could see themselves getting bored after a while, " What if I already know what to do when I feel certain emotion? It would be great if I could somehow see my improvements or something like that", "It is cool, but I don't know if I will use it every day, I lack something that encourages me to analyse my emotions". I also realised that it was also missing a feeling of ownership and personalisation. Therefore, even if giving tips could be a solution, it also has to be taken into account that these users have already been working towards their own coping mechanisms and another type of feedback to go use the product/service.

CONCEPT 3/ FLOWER

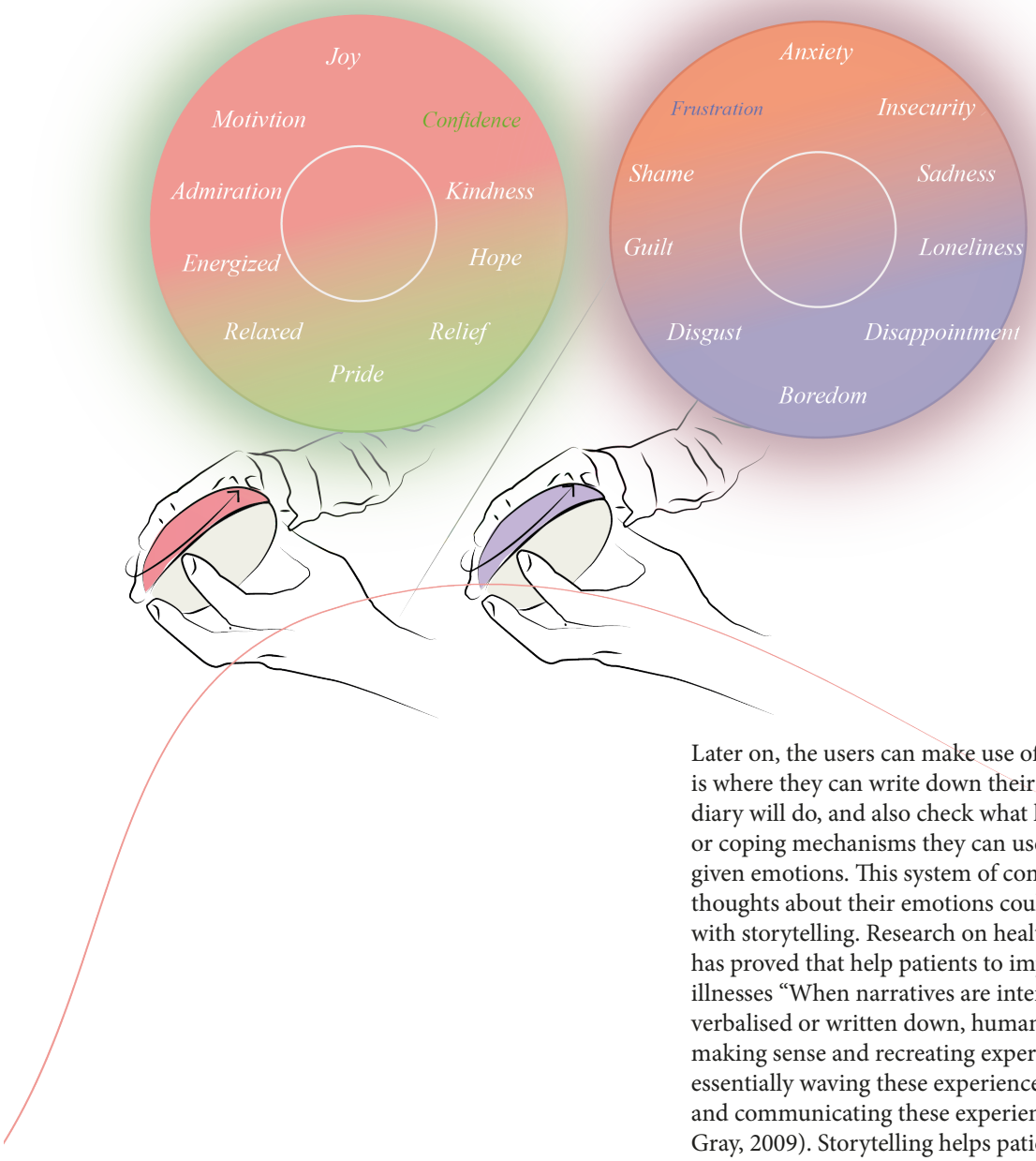
This concept merges many of the good points of the previous concepts.

The purpose of this concept was to create a more meaningful **ritual** in which users would be encouraged to do every day. It is clear that reflect and analyse users' emotions is beneficial for them to recover, however, there was still something missing, a quote or a tip was not enough inspiring for them to make use of it every day.

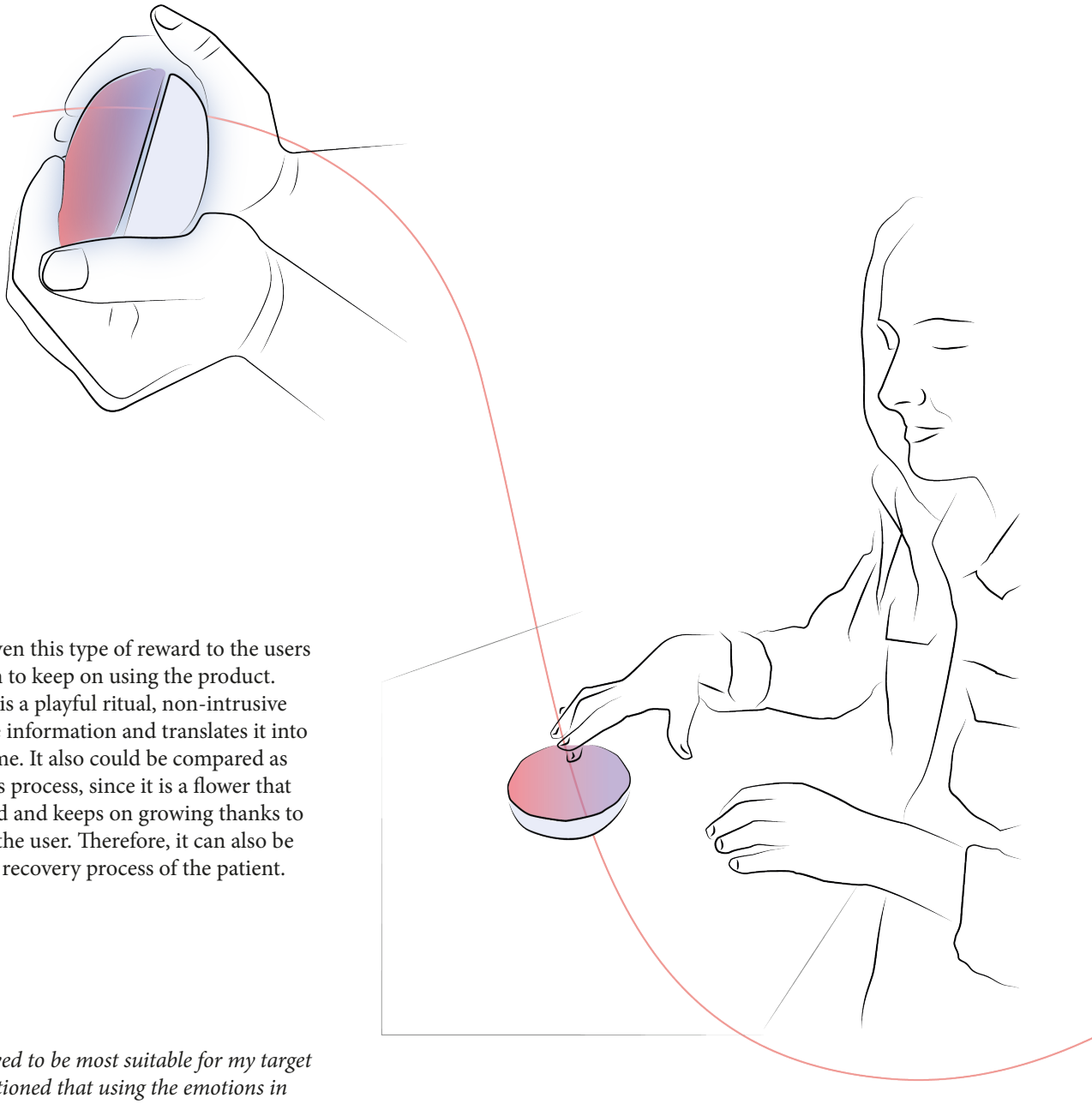


However, a good starting point was that the product should be set up by the patient and the therapist together, in order to understand how it works and to personalise it. Also, another good point was the storytelling characteristic of the first concept, but in this case, the users will be the ones telling a story. Therefore, users should be able to write down their thoughts about their emotional state. Nevertheless, the challenge was still how to encourage them to use the product every day and design a ritual that makes something positive out the input of the users, doesn't matter how they feel like, it is about reflecting, embracing and having a moment for themselves.

Finally, I came up with a solution which uses a **flower** as a metaphor. Patients will have to tune their emotions with the product, doesn't matter if they are positive, negative or a mix of both, the important point here is that they reflect on their emotions. Afterwards, the product will display a flower, that will actually grow thanks to their emotions.



Later on, the users can make use of the App, there is where they can write down their thought, as a diary will do, and also check what kind of activities or coping mechanisms they can use based on the given emotions. This system of compiling their thoughts about their emotions could be compared with storytelling. Research on health and storytelling has proved that help patients to improve their illnesses "When narratives are internally formulated, verbalised or written down, human beings are making sense and recreating experiences and essentially waving these experiences into their lives and communicating these experiences to others" (J.B Gray, 2009). Storytelling helps patients to understand what they are feeling and accept themselves, "Narratives inspire reflection", "Writing about illness experiences has been shown to reduce stress and improve psychological and physical well-being" (J.B Gray, 2009). This would be a way to also inspire and persuade other people facing the same eating behaviours and also to encourage them to keep a healthy lifestyle. Nevertheless, keeping a diary of their own emotions will also help therapists to understand their patients and to have a follow up of their wellbeing. It would be a way to stay in touch with them and to keep track of their recovery process.



I believe, that given this type of reward to the users encourages them to keep on using the product. What is more, it is a playful ritual, non-intrusive that retrieves the information and translates it into a positive outcome. It also could be compared as a metamorphosis process, since it is a flower that starts from a seed and keeps on growing thanks to the emotions of the user. Therefore, it can also be compared to the recovery process of the patient.

Conclusions

This concept proved to be most suitable for my target group. They mentioned that using the emotions in order to grow something was really inspiring for them, "It's really beautiful, I feel like I'm the flower and however I feel I will blossom anyway", "I would like to see my garden full of my blossoming flowers". I also asked whether they thought it was useful to compile their thoughts in a form of a diary, relating those thoughts with their emotional state, " Well, sometimes it's difficult to say things, but saying things out loud helps you realise what's happening and reflect on it".

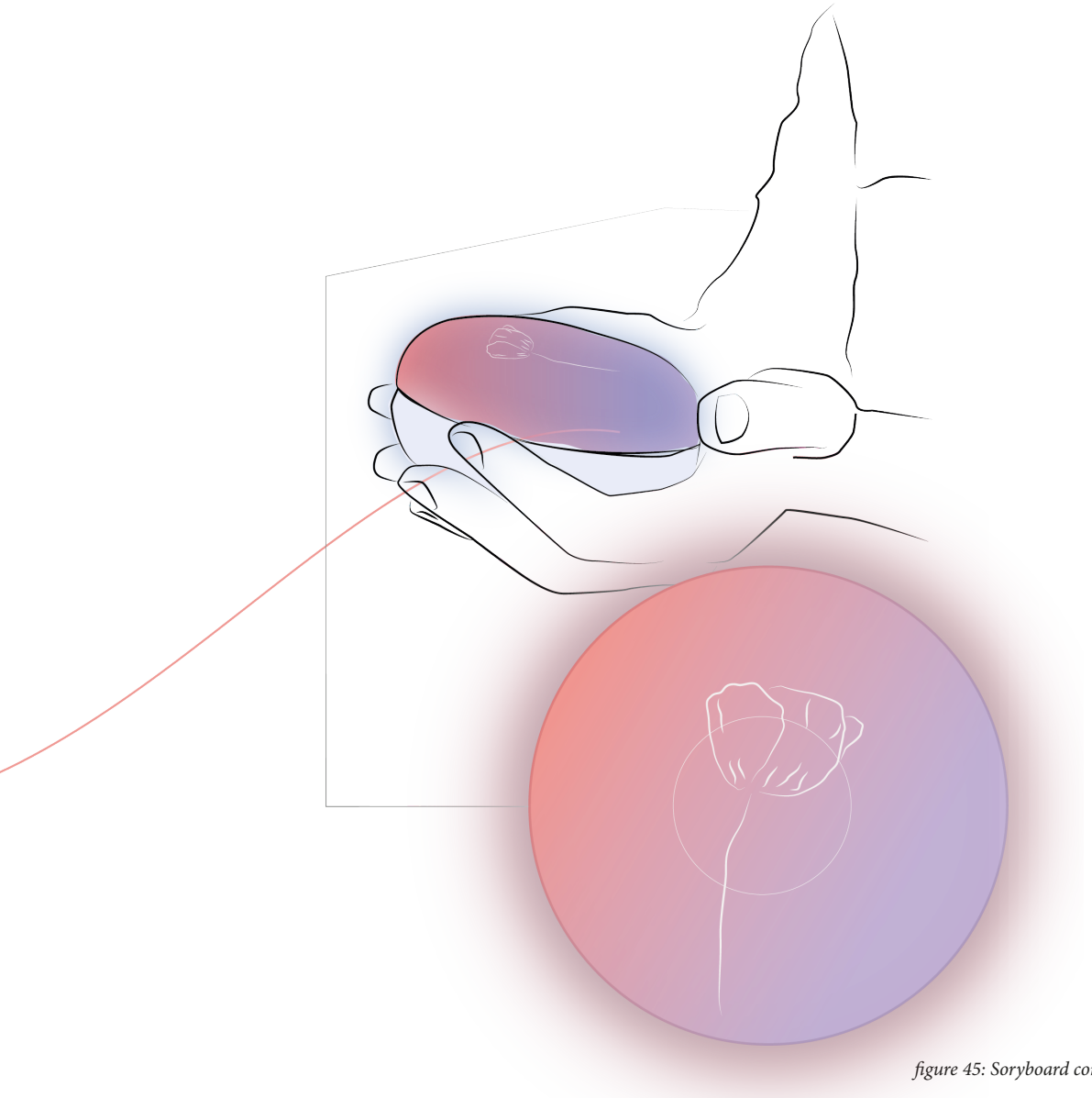


figure 45: Soryboard concept 3

CONCLUSIONS

In this chapter, I have explained the final direction of the design intervention and also developed the first ideas into three final concepts.

Finally, I decided to develop the concept that takes the metaphor of growing something out of the patients' emotions. This idea fulfils all the requirements and aspects that I wanted the patients to experience while using the product/service.

The next step would be to finally develop the concept together with the App. Also, a validation of the concept and the App would be needed in order to further detail and fulfil the needs of the target group.

Finally, the technical development of the product iteself will also be needed. Here is were I will start prototying, and testing not only the interaction with the product but also the materials and electronics needed to make this concept real.

7.0 ANIMA

Anima

UI/UX

Scenario

Prototyping and interaction test

Future patient journey

CHAPTER 7. SECTION 1

ANIMA

In this chapter, I will introduce Anima, the final outcome based on all the intensive research that has been done during this whole project. Here all the details, such as the interaction, and the technicalities are explained.

Anima is a new product service that aims to help people suffering from B.N during the **maintenance** stage. This means that once the patient is out from therapy, there are still some chances of having a relapse episode, that is why a solution to keep a **balanced** and healthy lifestyle is needed.

It is an in-home product that the user should use on a daily basis, in order to stay balanced. This product will help the user be more emotionally aware and help her/him regulating and embracing her/his emotions during her/his daily life. The noun Anima means "soul" in Catalan, and that's what I wanted to evoke with this product, what is actually inside of people suffering form bulimia. Embracing their emotions and their feelings is the main purpose of this product/service.

Anima is the outcome of all the research that has been done throughout this project. Starting with the trends, such as the need for being more aware of our health not only physical but mental. Also being more mindful about our lifestyle in general, the influence of social networks into our society and how stressful lifestyle can derive to an unstable mental health. Focusing more on Millenials and how they way they lead towards their studies or job, seeking of perfection and instant gratification can sometimes lead to serious mental disorders. In this case, eating disorders such as Bulimia Nervosa.

Also, this product could not have been come true

figure 53: Anima in context

without all the interviews done to specialists on eating disorders and also without the specific target group, young-adults suffering or who have suffered Bulimia Nervosa.

How does Anima work?

It is a device that helps users to be more **emotionally aware** and to control their emotions in certain situations. Anima will be given to the patient in one of the last therapy session inside of a box (see figure 54). Inside of that box the user will find the device, the carging post, a set of instructions and a booklet. (see appendix F)

The target group should use at least once a day, and select two emotions, it could both positive (see page 162, scenario), both negative or mixed emotions, it will be up to the user to and how do they feel at that moment to select the emotions they give as an input (See apendix E).

Therefore, the device will give something in return, it had to be something that would make a meaningful and positive ritual.

In this case, the device will display something that **grows or evolves** throughout the week thanks to the emotions of the users. It doesn't matter how they feel, it will grow anyway. In this case, I used the metaphor of growing a flower or a plant.

Afterwards, the user will be able to track their daily

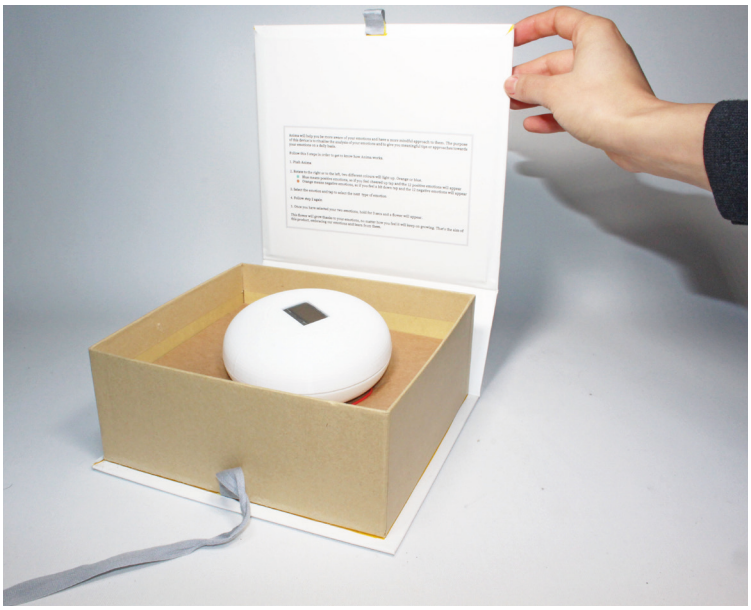


figure 54: Packaging

data with the App. The App is the digital way to store their data and to get some further tips towards the specific emotions the users may feel at certain moments. The App will suggest **activities** that the users can do in order to embrace emotions or to shift towards other emotions. This activities and coping mechanisms will be tailored for each user. This will be done once the therapists give the device to the patient and together they will need to set up the system. Also, it will be used as a diary, so the target group will be able to write down why do they feel certain emotions and also to help them reflect on it.

Another benefit of the App will be that the therapists and the patients can be in touch, so the specialists can get more insights and keep **track** of the patient's **recovery** process and **wellbeing**. From the patient perspective, she or he will feel less lonely and also this system could prevent patients from having severe relapse episodes, the fact that they can get in touch with their therapists makes it easier for them to reach them in case of emergency.

The style and the size of Anima are meant to blend into the in-house environment. Also, one of the most important requirements was that it should not be stigmatizing and it should be able to be used in a personal and cosy environment. Somewhere, where the user feels at ease, relaxed and able to reflect on her or his emotions for a moment.

As can be seen, its shape is aimed to be held by the user, this also increases or improves the ritual, in the sense that the emotions of the users are becoming a bit more tangible and actually encourages them to think and reflect about how they feel. Since it is a product that the user will need to hold and touch, I also wanted to create some contrast between the top and the bottom part in order to differentiate each part.

For the top part, ABS will be used, the reason behind this decision is that this plastic has strong resistance to corrosive chemicals and/or physical impacts. What is more, it is also a rather cheap material which also allows moulding almost any shape. ABS is being used in a large number of applications such as in the medical field, it is also easy to machine, sand, glue and paint and it can also be relatively easily coloured. For the top part, the material will need to be semitransparent or have a "frosted" finish in order to let the light coming from the display and the LEDs go through the material and see the projections on it. The manufacturing process chosen for this part is injection moulding.

Injection moulding is a versatile, efficient and reliable method. It allows designing complex shapes or geometries which can also be easily manufactured. This process is quicker than other manufacturing processes which makes much more cost-effective and efficient. Furthermore, this method has a good quality finishing of the pieces, so it generally doesn't need too much work on refining the final

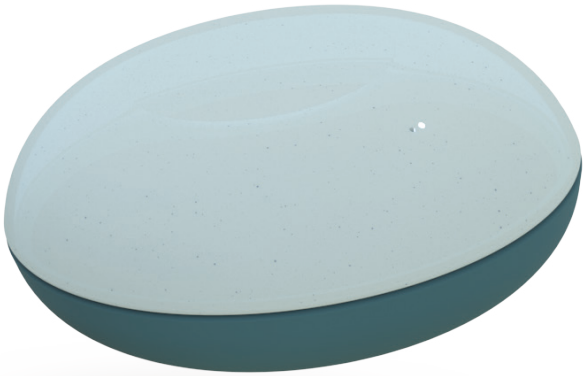


figure 55

result. Finally, but still very important, another advantage of this manufacturing process is that is pretty environmental-friendly. The remaining parts or plastics can be reused, so very little waste is generated.
For the bottom part, also injection moulding will be used, but in this case, it will be co-injection moulding. The difference of this method is that it can inject two different material at the same time. The reason to use this manufacturing process is that the bottom part will be made out with silicon. This material creates a contrast between both parts, top and bottom but also to make it easier for the user to grip it or hold it. The fact that silicone is a softer and warmer material also enhances the interaction between product and user.
Co-injection moulding consists of first the injection of the skin material, in this case, the silicone and afterwards, the core plastic is injected, which will give shape and strengthen the part, in this case, it will also be ABS.

Nevertheless, the product is not totally finalised, there might be some iterations that due to the fact of lack of time will not be developed in this project. However, in order to have a finalised product, some testing and model modifications might need to happen. For this situation, the above-mentioned manufacturing process will no be the most cost-effective solution. Injection moulding is a manufacturing process that is suitable when the product is going to be done in large scales and the cost can range between $10,000 and $100,000. Therefore, since Anima is still in an early stage of the engineering and manufacturing process, another cheaper solution to produce the first batch of products needed to be found.
For low-run injection moulding, there is an existing solution that reduces the costs and makes it feasible to produce a small scale of a product. Therefore, 3D injection moulding will be the most suitable solution for this case. This solution still allows high-quality accuracy and finish and it will also help to improve the final outcome in a more efficient way, enabling modification and verification of the design of the mould, preventing extra cost and economic risks of investing in an expensive mould. (3D Hubs, n.d)
As mentioned before, these 3D printed moulds are suitable for applications where the batch are low between 50-100 pieces and where are also some probabilities of modifications and iterations. There are two ways of producing these moulds. One is to insert the rigid mould into a rigid aluminium frame. This one is one of the most common procedures because it offers pretty accurate parts. The other method is the "stand-alone moulds", which does not use an aluminium frame and needs cooling 3D printed cooling channels to be integrated into the mould. This technique needs more 3D printed material which increases the price and the time of production.

Furthermore, each mould can be used for approximately 30 to 100 runs, depending on the material that is being injected.

For this case, an injection moulding ABS parts with SLA 3D printed mould will be used. The reason to choose these option is that it provides a high level of accuracy that is best suited for low-level production series.

Anima is composed of two parts. The top part is the that will display the emotions and outcome of those emotions, a flor or a plant. In this part, many of the components will be there. The main reason is that since that part needs to rotate, many of the components need also to be there, so we prevent entangling the cables that need to be used for the whole system.

The product needs a display to actually display the flower or plant. The adisplay is a 1,3" OLED Display Weiß SH1106 128x64 I2C Modul Arduino Raspberry Pi.
It also needs a 24 LED ring to light up the 24 emotions, 12 positive and 12 negative emotions, the one that is used in this case is a NeoPixel Ring - 24 with a 66mm outer diameter-

Another important piece is the rotary encoder to rotate the top part of the device and to select the emotions. The benefit of this piece is that it can rotate and at the same time it can be pulsed, which is a pretty important movement to select and switch emotions.

On the bottom part, the battery will remain, in this case, it will have a wireless battery or Qi wireless receiver, so the product will not need any cables to be charged. Also, the main reason of using this type of charging is due to the fact that the users will need to hold it every time they use it, so it will be more convenient to have such a solution for charging it.

Therefore, the production costs of the first batch of Anima based on Excel Sheet developed by Erik W .Thomassen in 2015 (see Appendix K), would be 79 EU. This price would be much lower once the final product is ready to be launched to the market. The fact that the batch is done on a small scale is what makes the costs to be that high. Nevertheless, we need to think that once all the technicalities such as the electronic components and the manufacturing process switch to injection moulding and produce in a bigger scale the price will drop considerably. Therefore, I also estimated what would the final price of Anima once all prior mentioned improvements are done. It will eventually cost around 115 EU, which if compared with healthcare products (see Appendix L) it has an average and affordable price.

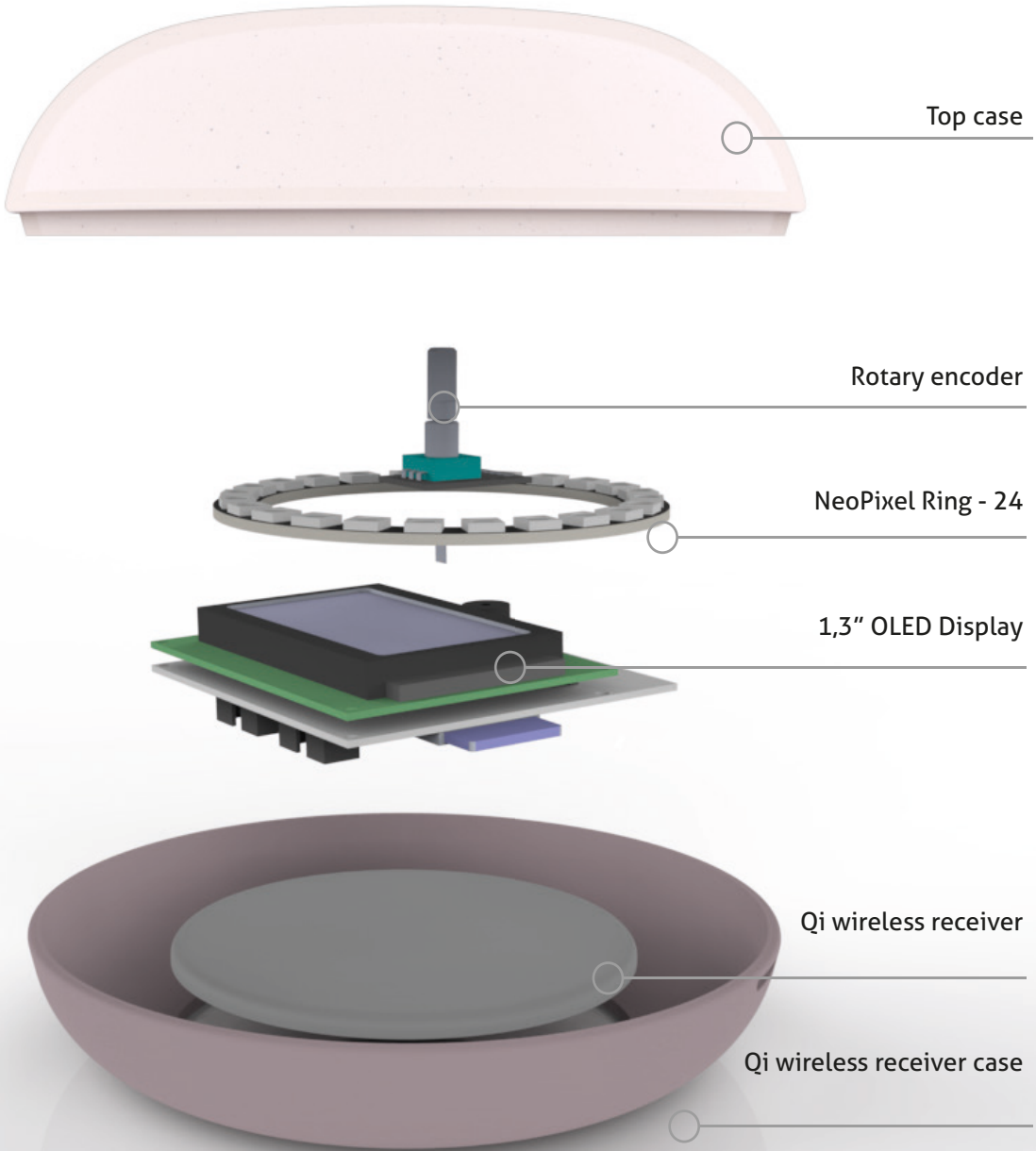


figure 56: exploded view

CHAPTER 7. SECTION 2

UI/UX

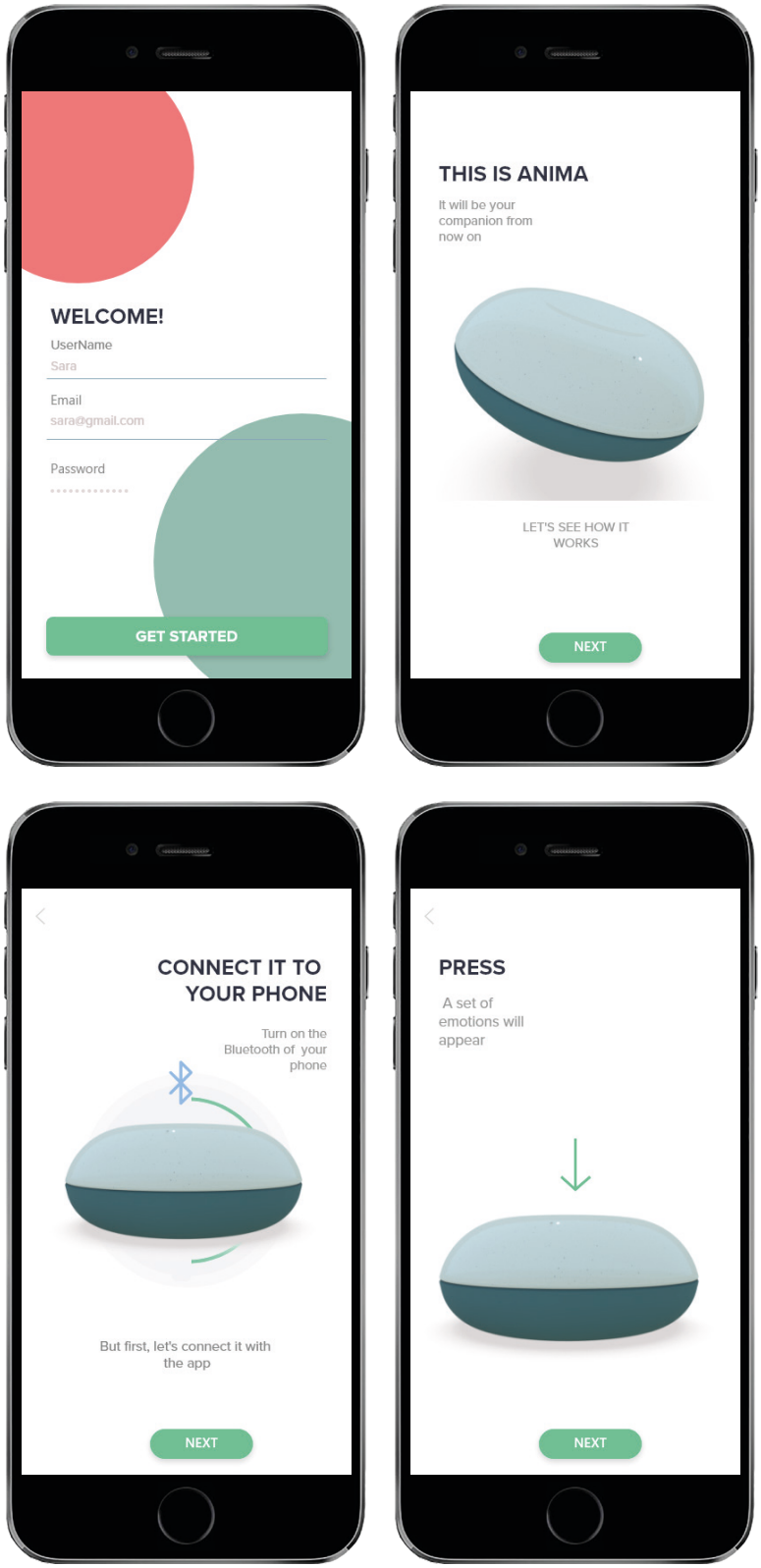
Anima consists as mentioned before, of a smart device and an App, both depend on each other, the whole experience could not be achieved without one of them. The tangible product enriches the ritual of becoming more emotionally aware and also reinforces the moment of reflection that the target group needs in order to have a more balanced life. The fact that the user needs to use the device to tune their emotions helps to have this moment of intimacy, self-reflection and freedom of thoughts, which only with an app would not be the same. Users need to make data more tangible in order to have a more meaningful experience.

On the other hand, the App has many functions which complement and make the whole ritual compact and meaningful.

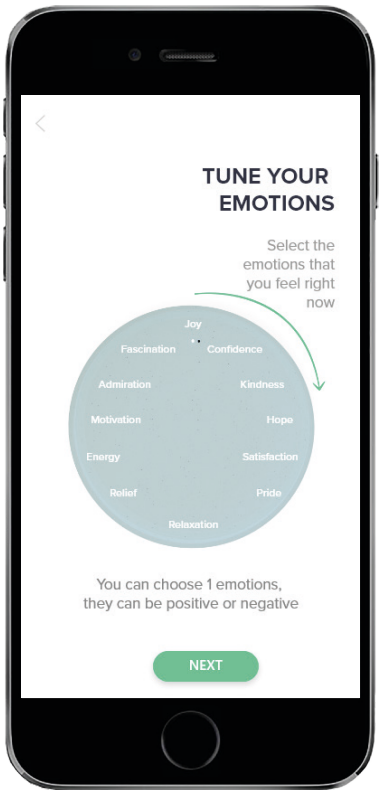
The App has three important aspects or parts. First of all, as the Anima will be given to the patient on one of the last days of therapy, and in order to give a more personalised and meaningful feedback, the patient together with the therapist will set it up. Here is where the onboarding part of the App takes place. This section will help the user to understand how Anima works and to have a more personalised feedback while using the App.

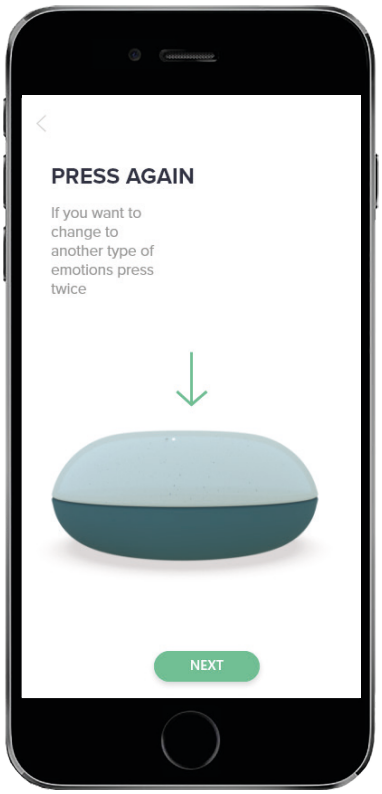
The user will have to first login into the App, then the App will start showing how they can start the device and connected with the App. Once they are done getting familiar with Anima, the App will ask some questions about personal hobbies or activities that the user enjoys doing. This way the App can give more personalised feedback when needed.

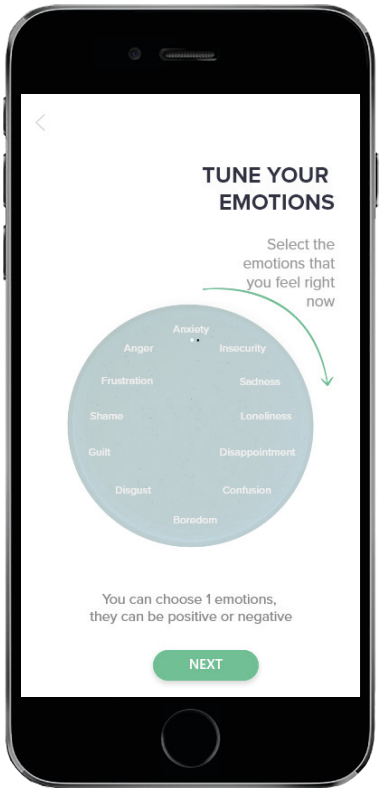
After the user has set up the app she or he will be ready to start using Anima.

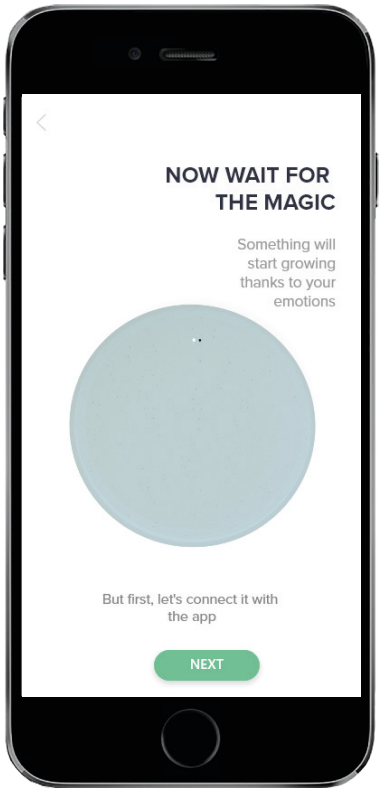


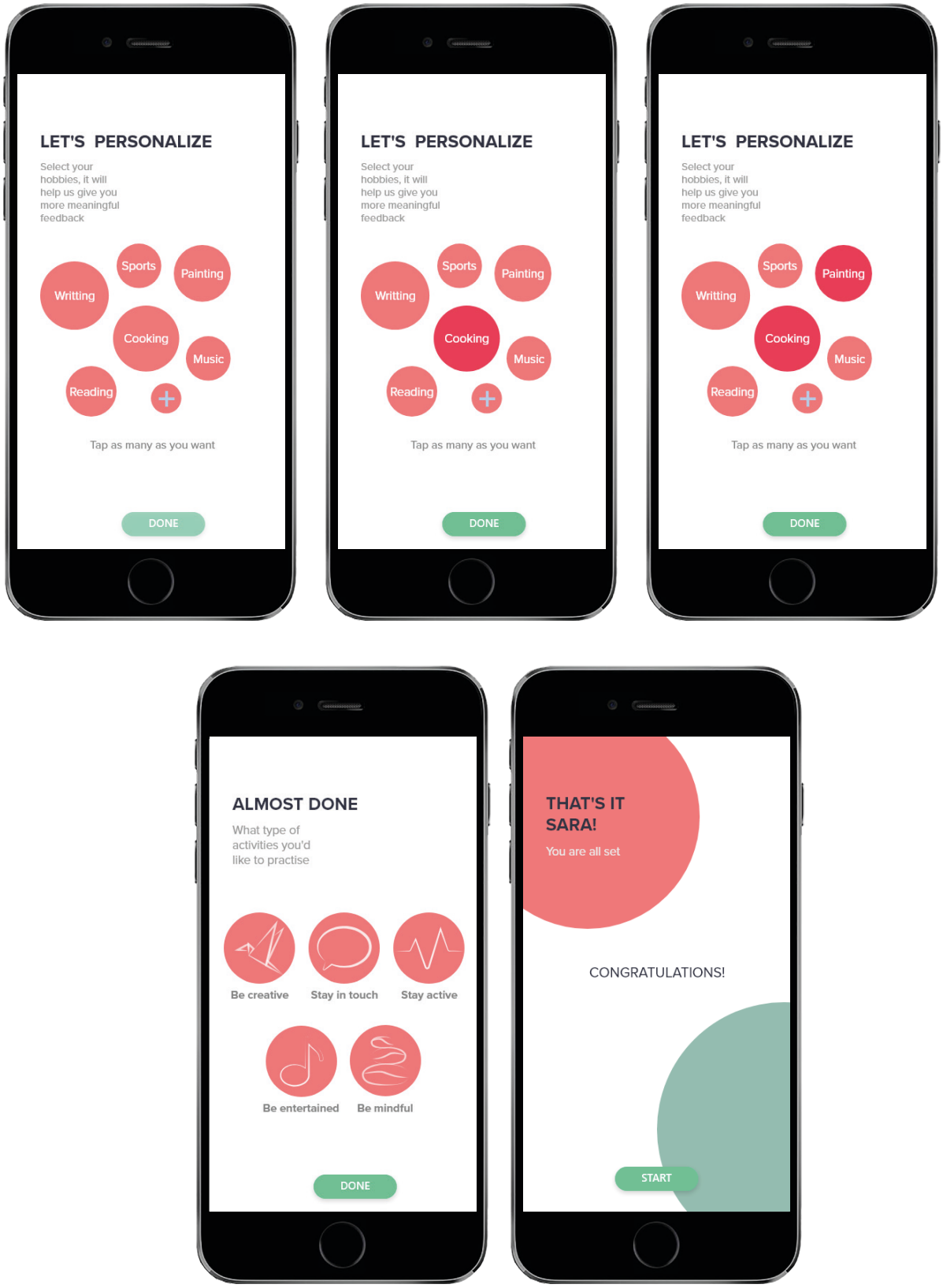
Onboarding of the APP, intoduction to the product and its use


TUNE YOUR EMOTIONS
Select the emotions that you feel right now
Joy
Fascination
Confidence
Admiration
Kindness
Motivation
Hope
Energy
Satisfaction
Relief
Pride
Relaxation
You can choose 1 emotions, they can be positive or negative
NEXT

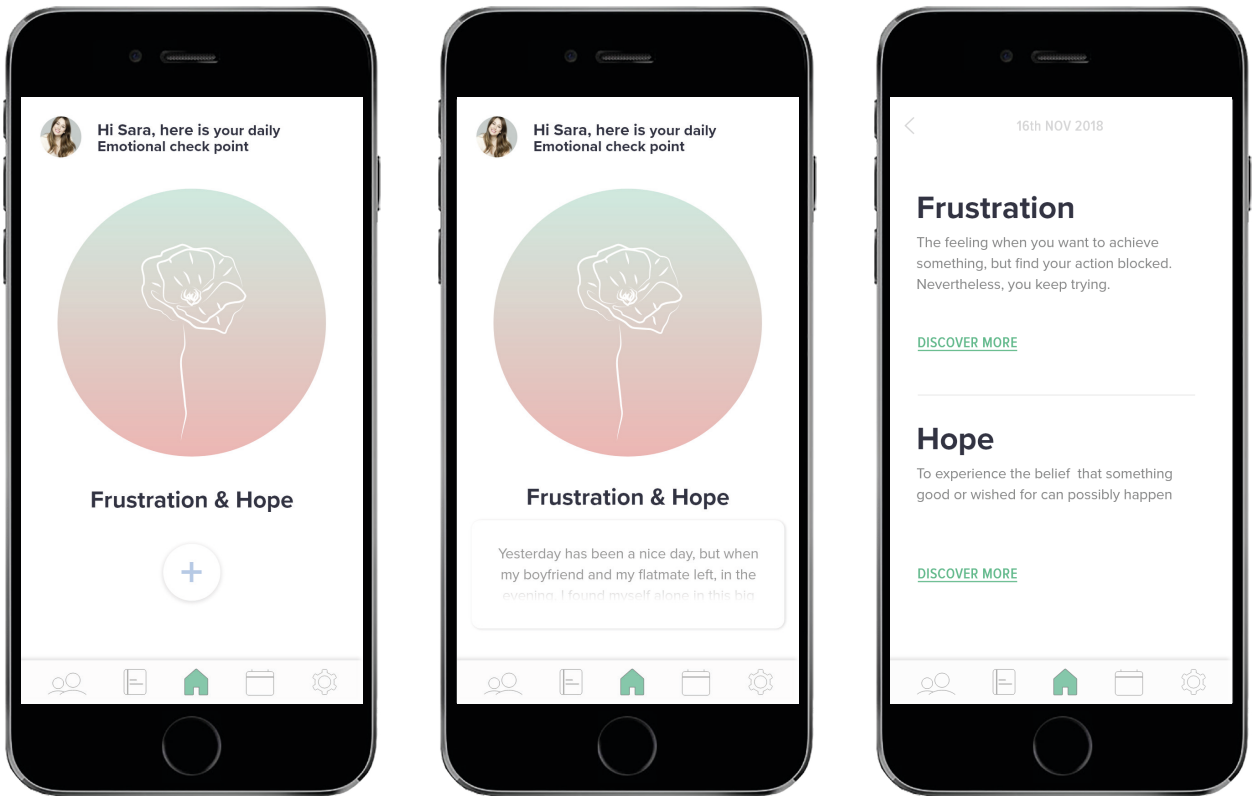

PRESS AGAIN
If you want to change to another type of emotions press twice
NEXT


TUNE YOUR EMOTIONS
Select the emotions that you feel right now
Anxiety
Anger
Insecurity
Frustration
Sadness
Shame
Loneliness
Guilt
Disappointment
Disgust
Confusion
Boredom
You can choose 1 emotions, they can be positive or negative
NEXT

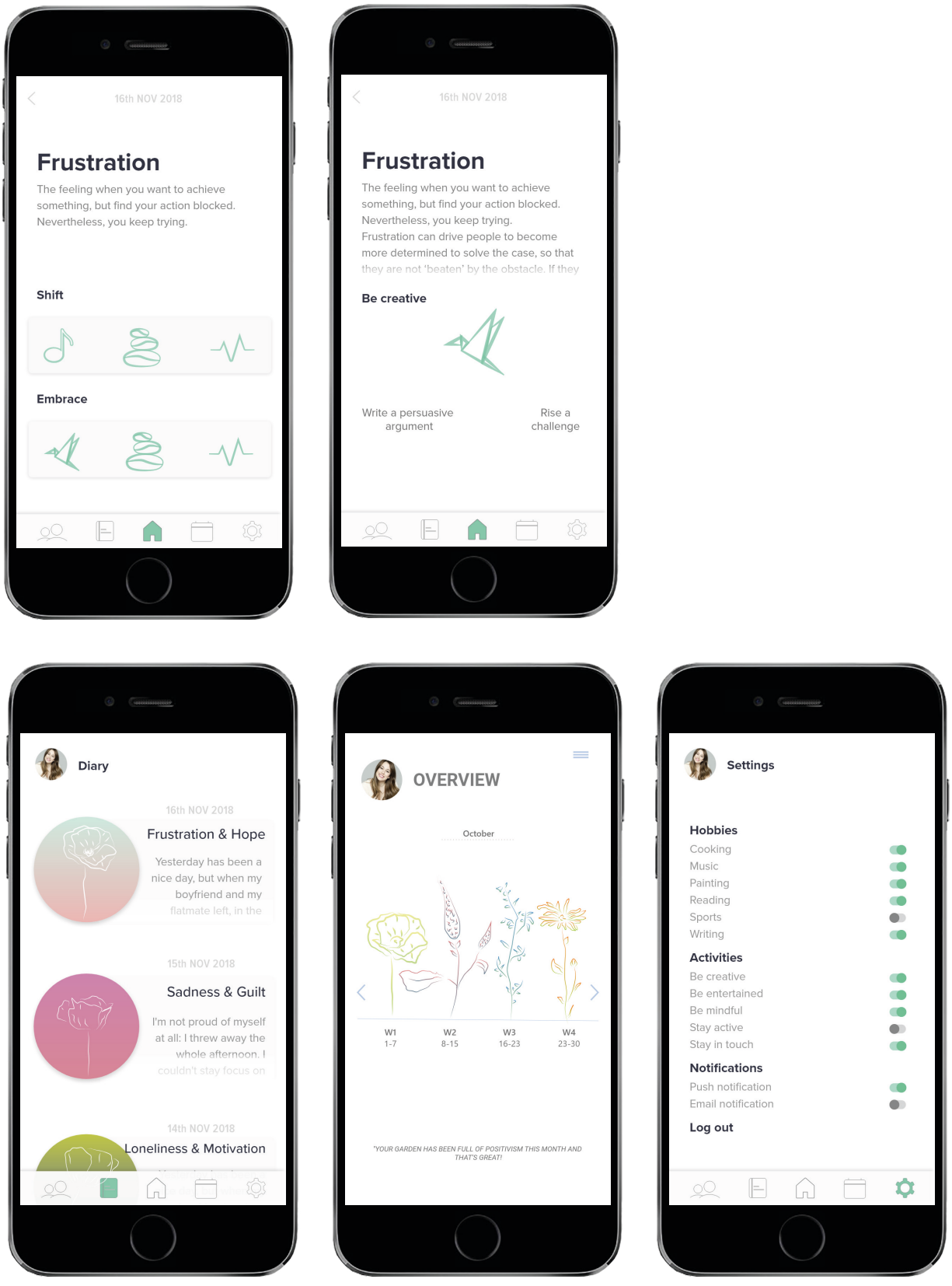

NOW WAIT FOR THE MAGIC
Something will start growing thanks to your emotions
But first, let's connect it with the app
NEXT



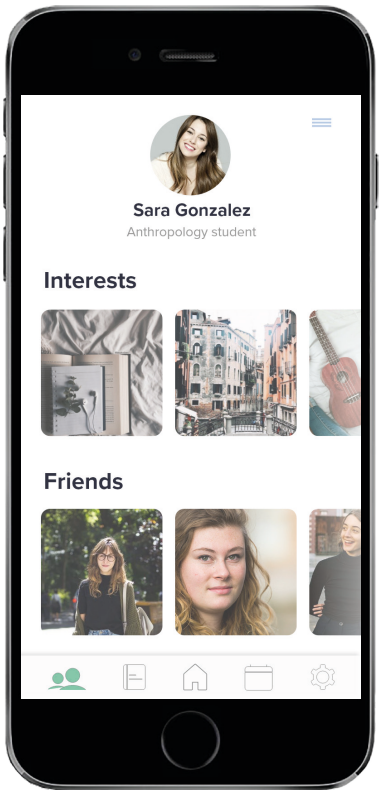
Setting up the user's preferences

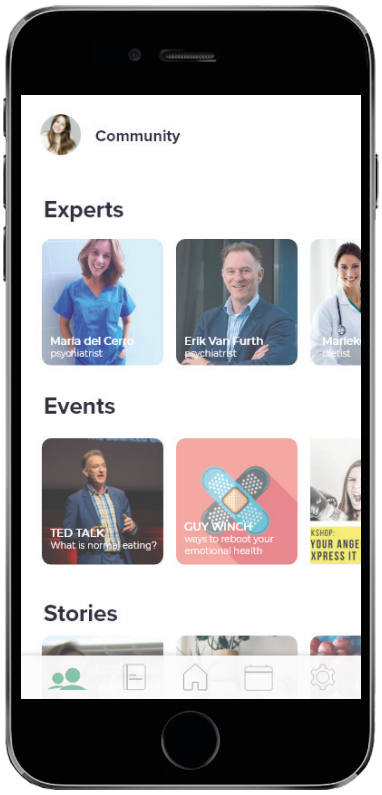


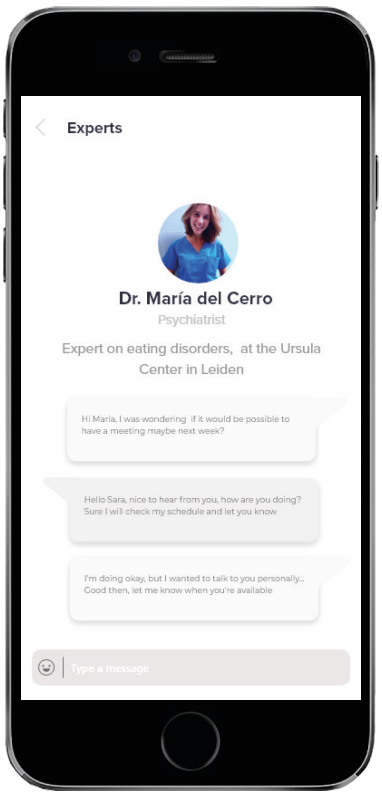
The App has two main functions, the more personal and **individual** side and the community side.
On the personal part, the users will be able to see their **daily** emotions which have been selected with the tangible device. Furthermore, they will have the possibility to write down their thoughts about those emotions, situations people or event that affect them or have driven them to feel that way. This little act of tracking their emotions as a kind of diary helps them reflect and focus on themselves, makes them more aware of their actual emotions. Also, based on those two emotions, the users will be able to have a more deep understanding of them by having an explanation of each emotion followed by a set of activities that they can pursue if they feel like embracing that specific emotion or to rather change to another mindstate. These suggestions will be based on their personal hobbies, taste , which have been selected on the onboarding phase of the App, mentioned above, and also the **doctors** would be abe to give feedback if needed. , Furthermore, the app keeps track of the emotions and reflections of the users, so they will be able to look back at them whenever they want, and also have an overview of how they have been feeling on a weekly and a monthly basis.

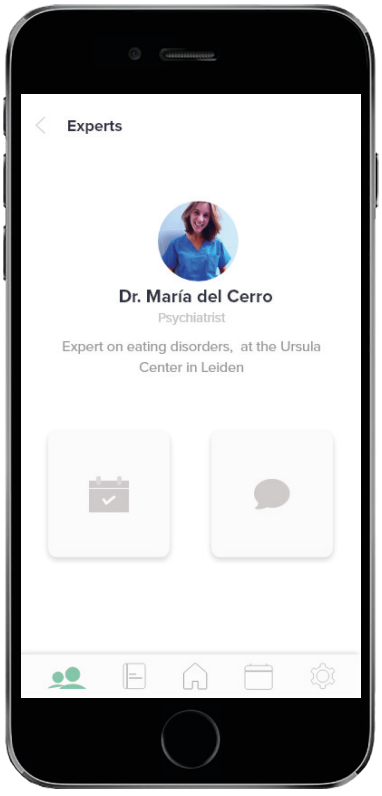


Personal part of the App









Community part of the App

Finally, it was also very important to give the feeling of belongingness, that is why the App also has a community section. Within this part, the user can get in touch with her his therapist, this was also a very important function that needed to be embedded into the service. As mentioned before, during this recovery phase it is still important to have the feeling of not being alone and to feel **supported**, that way we also prevent patients from having relapse episodes, or to give faster **feedback** in case of emergency. Moreover, there will be a section of events, and inspiring **stories** about eating disorders but also about healthy lifestyle and people who have been through similar mental disorders and have recovered. This is also important for the user to see that again they are not the only ones suffering the same issues and that it can also be overcome.

figure 57: Anima in context

CHAPTER 7. SECTION 3

SCENARIO

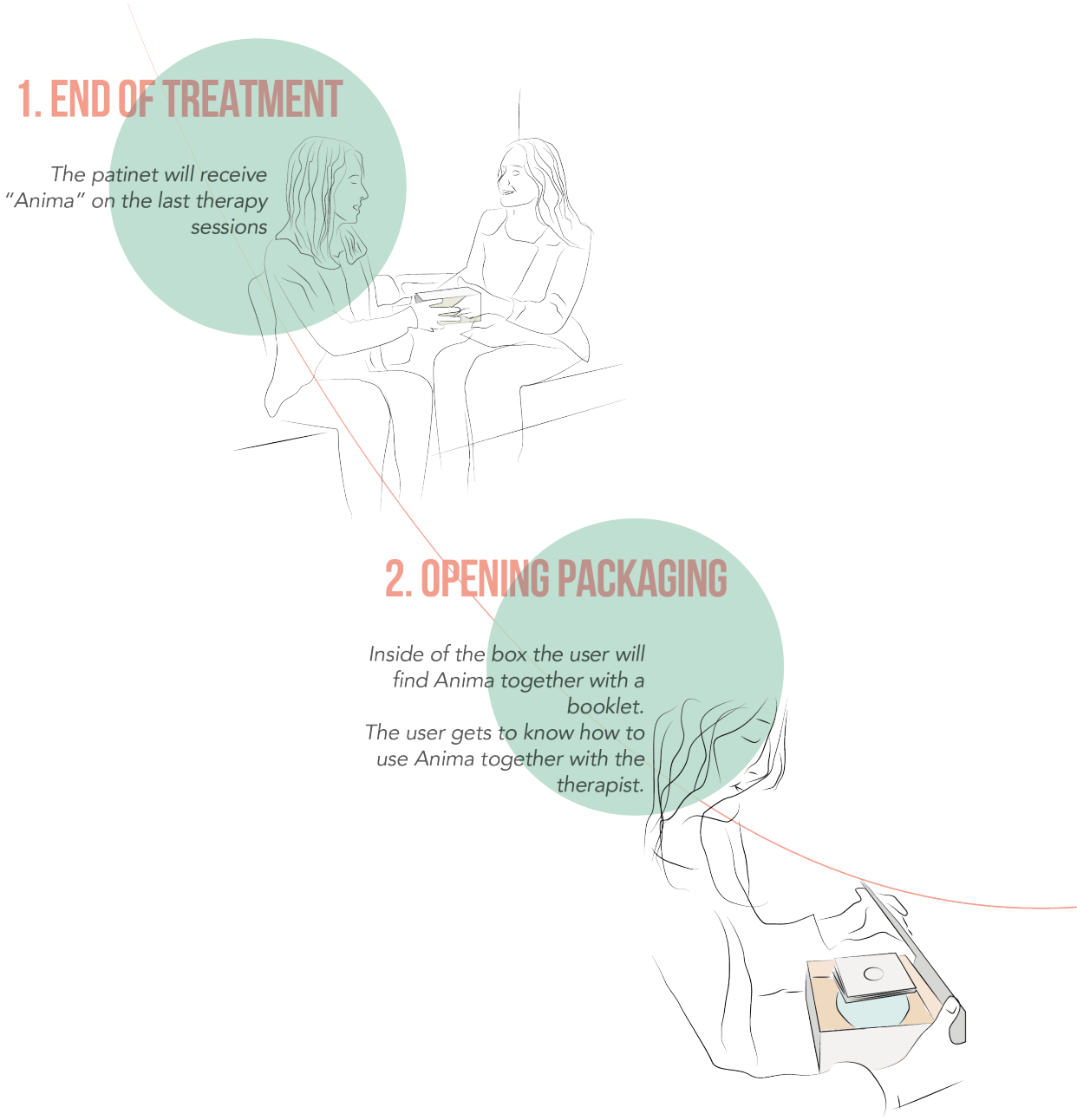


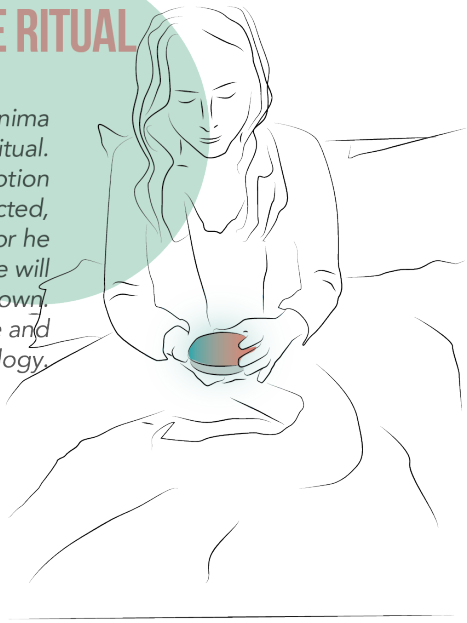
figure 58: Scenario

5. EMOTION TYPOLOGY

Once the emotion typology is chosen, the user needs to select an emotion that represents the way she or he feels at that moment.

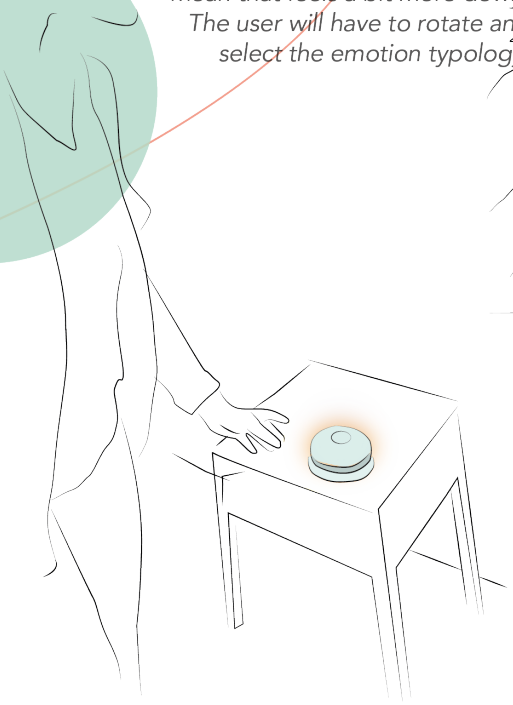
4. STARTING THE RITUAL

The user needs to hold Anima and press to start the ritual. Afterwards the emotion typology needs to be selected, blue will mean that she or he feels positive and orange will mean that feels a bit more down. The user will have to rotate and select the emotion typology.



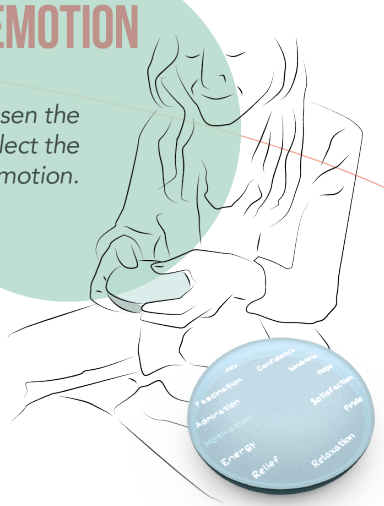
3. AT HOME

When the user is nearby Anima it will glow to encourage the user to use Anima.



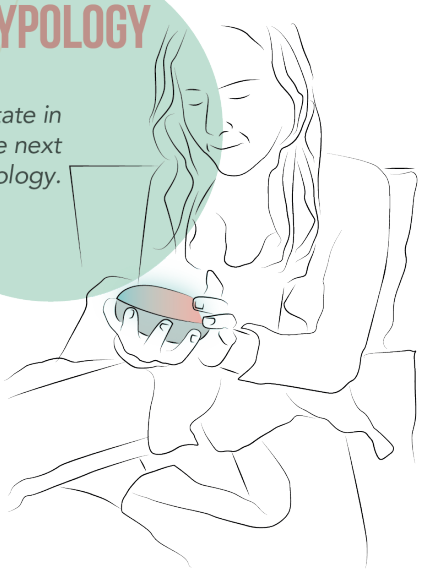
6. SELECT EMOTION

Once the emotion is chosen the user needs to press to select the second emotion.



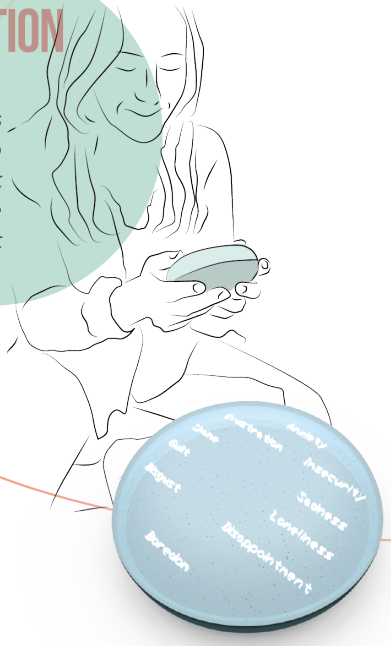
7. EMOTION TYPOLOGY

Again the user needs to rotate in order to choose the next emotion typology.



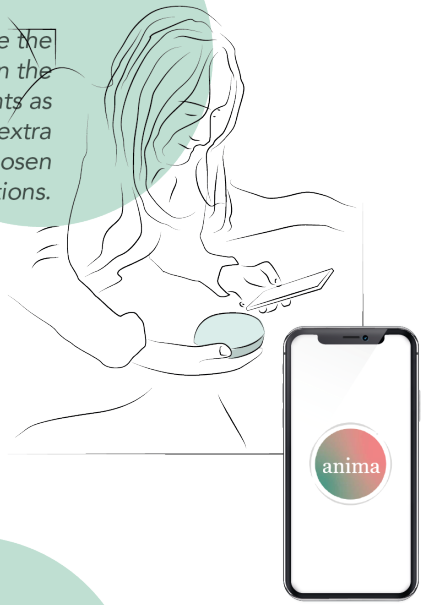
8. SELECT EMOTION

Once the emotion typology is chosen, the user needs to choose the second emotion that represents the way she or he feels at that moment



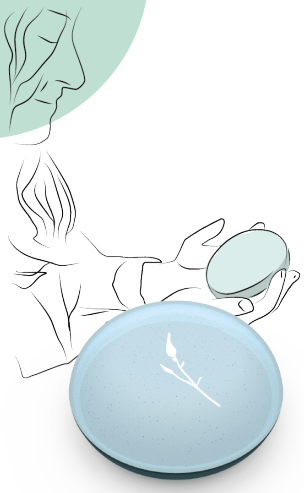
11 APP

Finally, the user will complete the ritual by writing down in the Anima app her or his thoughts as well as have some extra information about the chosen emotions.



10. REWARD

Anima will display a flower, that will keep on growing every time the users analyse her or his emotions.



9. CONFIRM

Once the emotion is chosen the user needs to press to select the second emotion.
The user confirms by pressing for 3 secon that those two emotions represent the way she or he feels.

CHAPTER 7. SECTION 4

PROTOTYPING & INTERACTION TEST

The aim of conducting an interaction test was to validate the product and check whether it needs some adjustments for further developmen

In order to conduct the test, many prototypes were done prior to coming up with the final working solution (see appendix H). Most of the prototypes were 3D printed, the aim of using this technique was because it is fast and I let me test check the dimension and shape of Anima. Eventually, once the final shape was finalized, all the electronic components were inserted inside of the product. Prior conveying the final test, some things needed to be changed, such as the dimensions of the Oled screen and the way the emotions had to be displayed. On the final design the emotions are placed horizontally, but on the prototype, they neede to be placed vertically. This is because the Oled display was too small and not powerful enough to project them on the top part of the device. Therefore another solution had to be found, in this case, the words were laser cut on a black paper, and by using the LED ring they could be finally be displayed.

Finally, test was conducted with some former users who have suffered from B.N and also with some other users who don't have any eating issues. The reason behind this was that in order to test the usability of the product it did not really need to be tested with people suffering from B.N. However I still asked to two of my interviewees to also test Anima.

First I showed them the instructions of how the working mechanisms of Anima, and let them follow them. Afterwards, they had to fill in a questionnaire (see appendix I) together with and open-question conversation.

The questions made during the questionnaire are based on the values that were described while designing the product experience (nine moments of experience)

The conclusions of this test are as follows (see appendix I to see results):
The instructions were not very clear for some participants, few of them mentioned that it would hev been nicer to have some drawings explaining the working principles of the product, "I think it would have been easier if you would have put some drawings". Also some of the words used such as "push" or "hold" were not very clear, all the participants had issues understanding how long they should push or hold "I miss the information about how long I need to press the prototype". Therefore, this should be changed in order to make it understandable for the end user.

Also when I asked about if the colours red and blue represented the emotion typology, negative and positive emotions respectively, most of the users agreed on those colours, however, one user mentioned that it could be great if he could choose the colours based on its own taste. Actually, it could also be taken into account and test it in further steps. Colour perception is a pretty personal and cultural

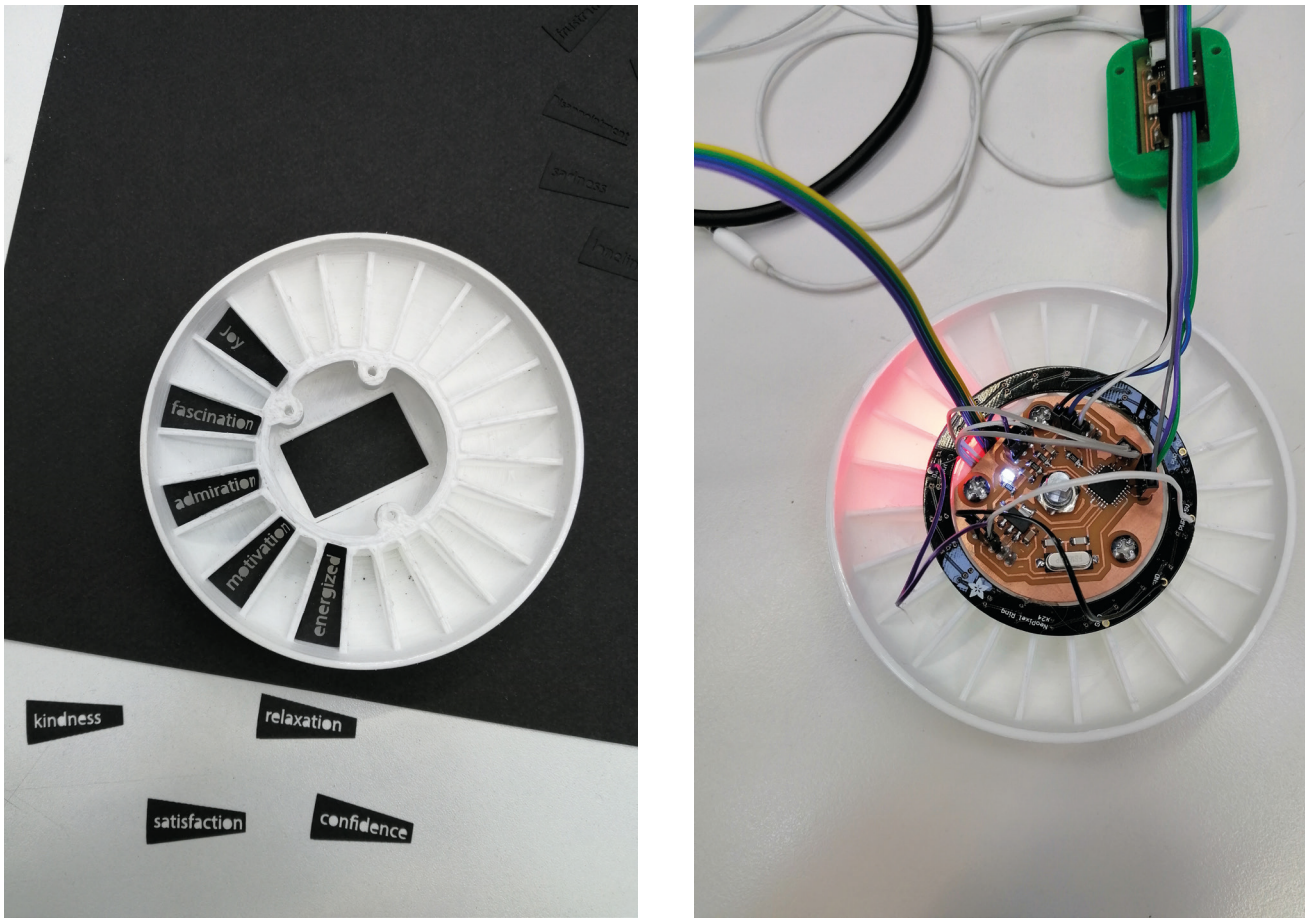
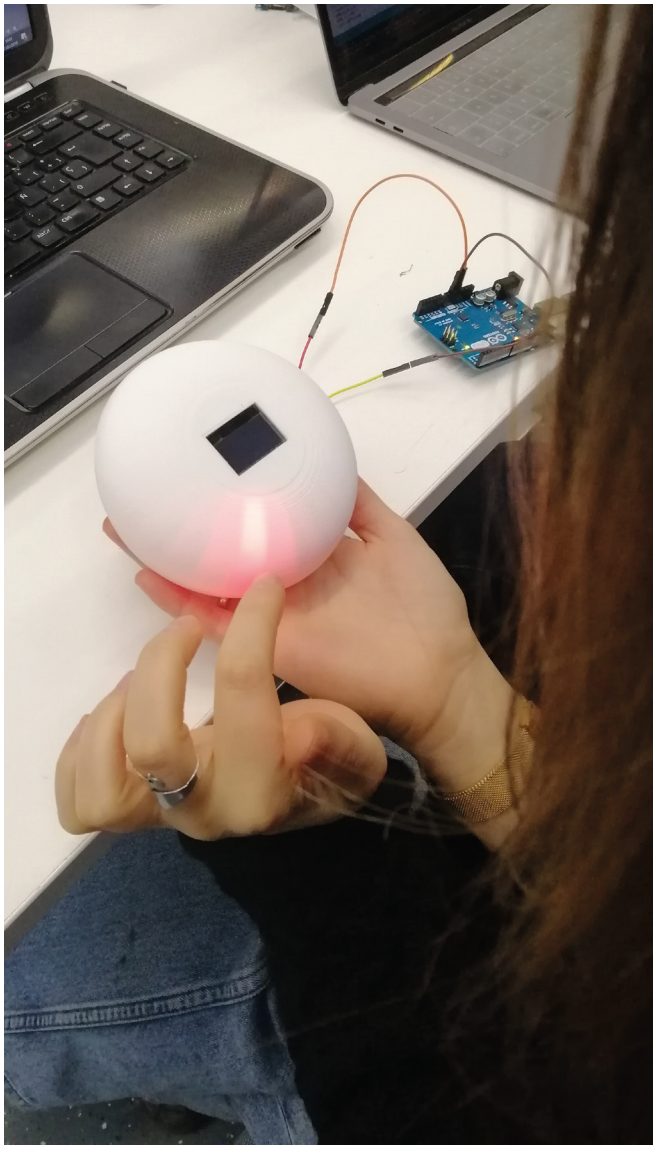


figure 59: Prototyping

characteristic that not everyone shares the same taste towards them. Nevertheless, when asking about the whole interaction, all the user were quite positive towards it. They all mentioned that turning and clicking the device was pretty fun and that the fact that the product didn't have any button made it very easy to use. "Once you understand what pushing and holding are, is very nice that I only need to rotate and click, I really like that it does not have any buttons that confuse me". They also mentioned that the shape was very interesting and creates a lot of curiosity to them, "It has sucha simple shape, that drives me to discover what is t for and how does it work".

In overall, this test was very useful to further detail and improve the final interaction as well as validate it. It can be concluded that all the users thought that it was a very nice experience and that actually it was a product that not only people with B.N should use, but everyone should take a moment for themselves.



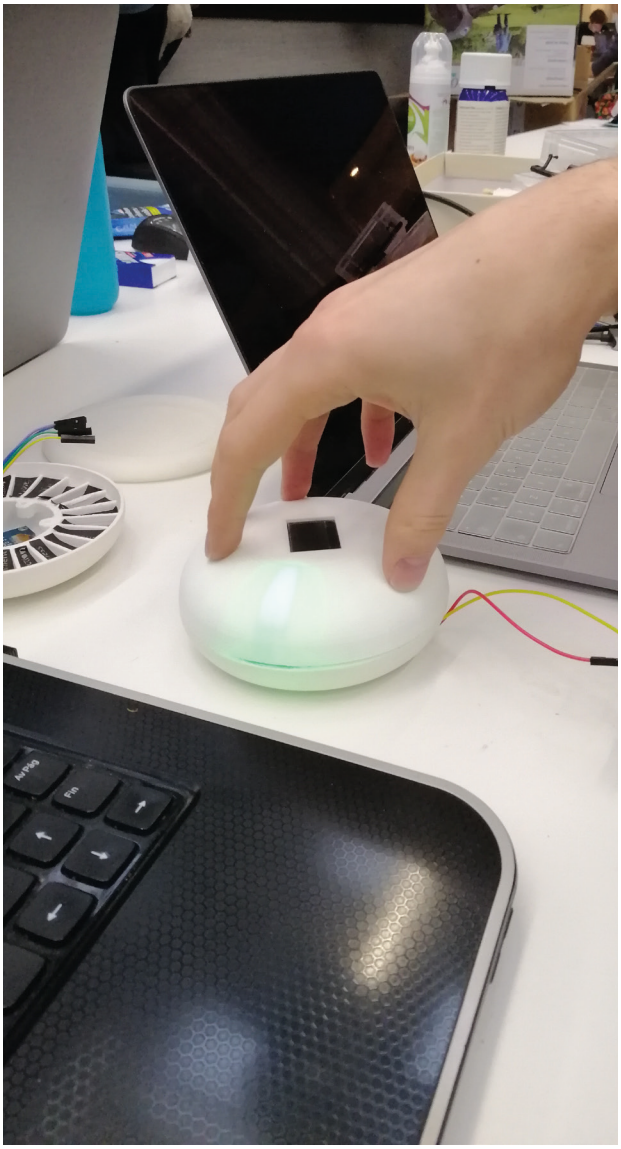


figure 60: Testing

CHAPTER 7. SECTION 3

FUTURE PATIENT JOURNEY

Here I visualised how the product should be introduced into the patient's daily life. The aim of this patient journey is to show and evaluate whether it makes sense to introduce the product to the patient during one of the last session of therapy.

As mentioned in former chapters, the product/service should be a bridge between therapy and the patient released from therapy. The reason behind this decisions was that there are still some probabilities for the patient to have relapse episodes and even if they are released from therapy, it does not mean that they are 100% recovered. Actually, it is important to remember that eating disorders or mental disorders, in general, are pretty difficult to overcome. Therefore, solutions should aim to keep a balanced life, encourage patients to follow healthy behaviours that will help them keep their mental and physical wellbeing.

I believe that this idea of introducing and setting up the product/service during therapy helps the patients get used to it, getting to know how it works and personalise it. Also, it fills the existing gap between therapy and the patient being by her/himself. This product/service will create a ritual of intimacy and reflection for the patient as well as connect with the therapist or a community of people.

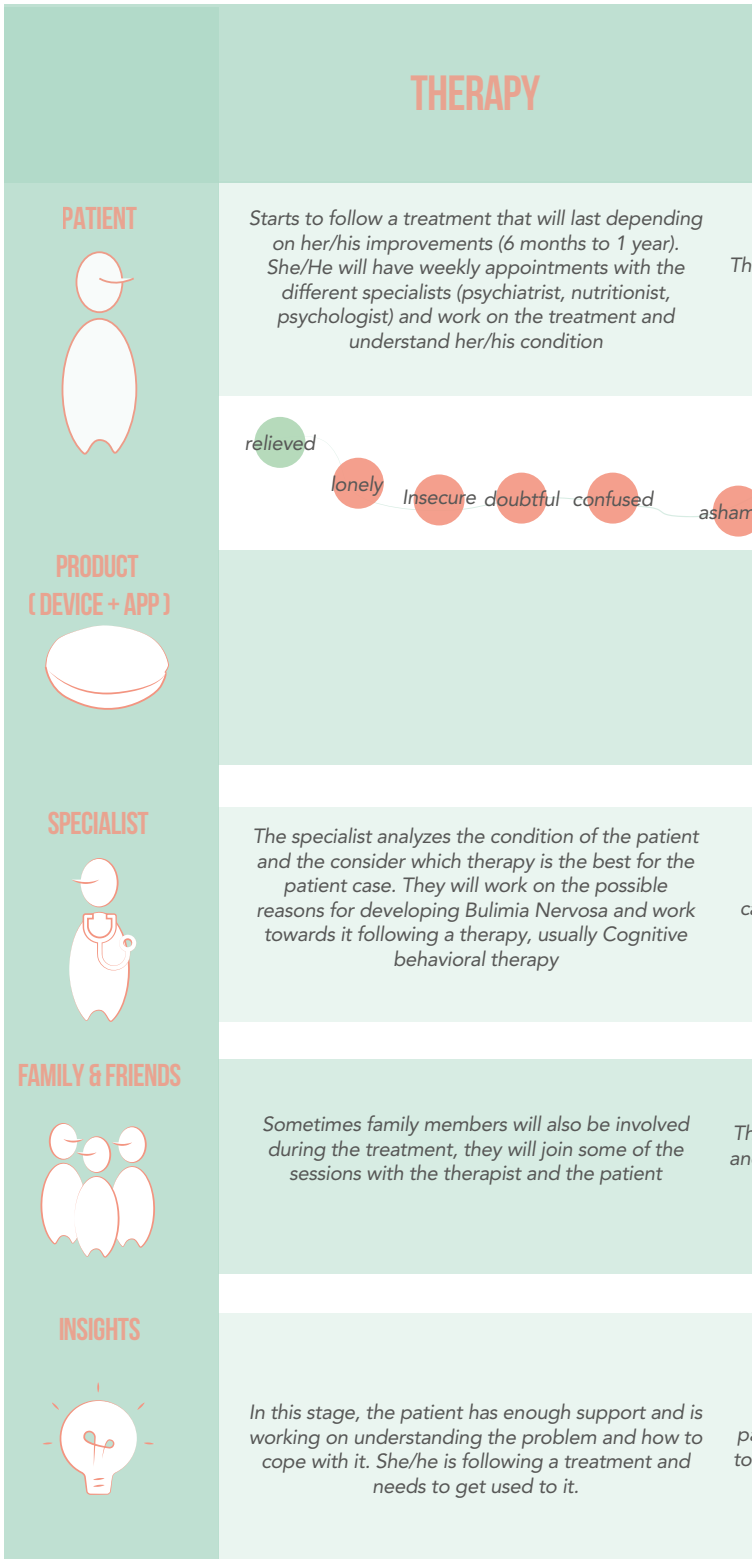


figure 61: Patient journey

TIPPING POINT	SETTING UP PRODUCT	PATIENT OUT OF THERAPY
e patient understands and knows how to behave in certain situations and understands her/his condition.	*The patient together with the therapist sets up the product that will encourage her/him to stay healthy one she/he is out of therapy.*	*The patient is more independent, has few appointments with the specialists but the product gives the support that might need to avoid relapse episodes.*
		
	The patient together with the therapist sets up the product that will encourage her/him to stay healthy one she/he is out of therapy.	*The product gives the needed support to the patient during her/his daily life by checking her/his emotions and by giving personalized feedback*
The specialist evaluates whether the patient is apable to work towards recovery by her/himself	*The therapist helps the patient to set up the product based on all the learnings during therapy and the patient's hobbies.*	*The therapist has a few meetings with the patients but can keep track of her/his evolution thanks to the product/app.*
he family understands the situation of the patient d also has a better understanding of how to help her/him		*Family members are a bit more involved during the recovery process thanks to the product/app*
Based on the conclusions of the therapist, the atient is ready to start a more independent path wards recovery. Nevertheless, she/he feels still a bit insecure if she/he will manage to do it by her/himself.	*The product gives the security and the encouragement to the patient to stay healthy and keep on working towards recovery.*	*The patient can work towards recovery more independently with the support of the product/app that helps them during her/his daily routines and by being in touch with the specialists, the family, and beloved ones.*

CONCLUSIONS

In this chapter, the final outcome is has been presented. Anima has been developed thanks to all the intensive research that has been carried out during this whole project.

The technical specification together with the interaction of the device and App have been presented. Anima has proved to be an innovative solution for people who have suffered from Bulimia Nervosa. This solution has proven to be feasible, hower some further steps need to be carried out in order to be ready for the market.

Next, to this chapter, a small business proposal is explained, in order to understand how Anima should finally be further developed to launch it to the market.

8.0 BUSINESS PROPOSAL

Roadmap
Busines model Canvas

CHAPTER 8. SECTION 1

ROADMAP

With this roadmap, I intend to give a better explanation of how Anima has been developed and give further suggestions of the future steps that need to be taken in order to launch Anima to the market.

A roadmap was visualised figure 62 in order to make the reader understand in which stage Anima is. Since this project needed extensive research and the outcome or solution for this problem was unknown, Anima is a developed concept that it will still need some last iterations before being ready to be launched on the market. However, I took into account which should be the next steps in order to have a finalised product. As mentioned before, once I finish with the last user tests and modifications, the product should be tested on a bigger scale, with more users in order to verify its usability and feasibility.

One possibility could be to involve private clinics that could also use Anima to marketing themselves. These would be a win-win situation because it will help improve the product and do some marketing but also the clinics could offer this as a special and innovative treatment that they offer to their clients. Once this first batch has been tested, one of the lastest stages will come. Here is where the final manufacturing and interaction details will be done in order to produce the product in a bigger scale and with a manufacturing process that is more suitable for this phase, in this case, injection moulding as mentioned before. Also, some changes might need to happen to the business plan or marketing strategy. Some other possibilities such as starting to sell in other places such as psychiatric hospitals or eating disorders associations.

Eventually, the product will be ready to be launched to the market with all the details and technical specifications finalised. What is more, thanks to the previous test in a smaller scale with private clinics, if Anima proves that it can actually improve the patient's lifestyle, it could also be launched in a bigger scale such as hospitals or pharmacies. Furthermore, it could also be thought that this product might help to heal other mental diseases such as anxiety disorders. Here is where a new cycle of design with some iterations should be done in order to adjust the product to the needs of this different target group.

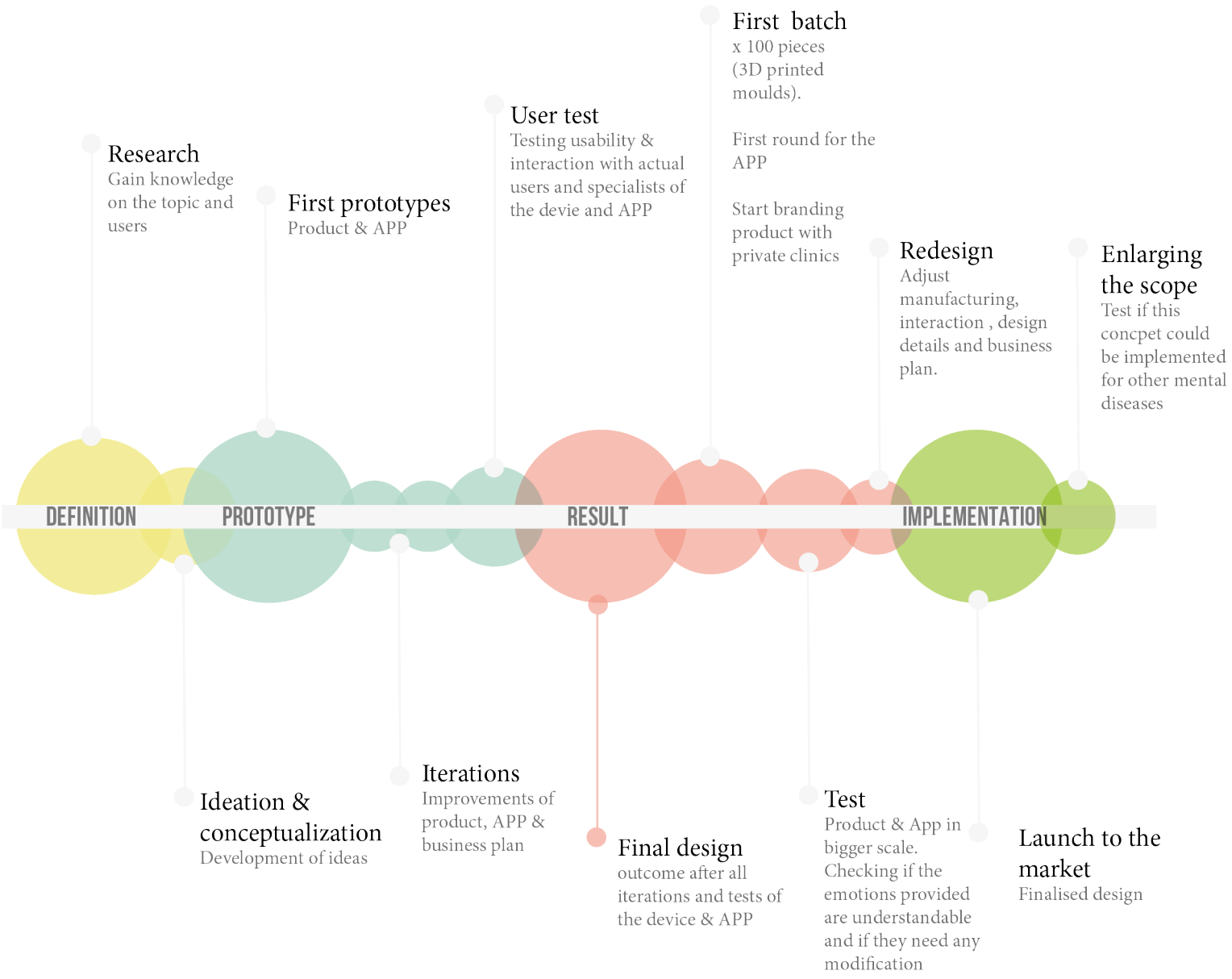


figure 62: Roadmap

Key partners	Key activities	Value propositon	Cutomer relationship	Customer segments
Pschyatric hospitals E.D associations E.D clinics	maintenance production promotion? **Key resources** -specialists on E.D -programmers (APP) -maintenance personel (product)	-Transition between therapy phase and independent life -helping patinets with E.D during the recovery process -avoinding relapse episodes -avoiding extra costs to the healthcare ystem on pschyatrists or specialists on E.D	-Email - APP -Phone - Therapists **Channels** -clinics -E.D websites -psychiatrists websites -social mdia	-People suffering from B.N or people who have suffered from B.N -Clinincs

Cost strucuture	Revenue streams
-personel to whom be in touch on the APP (nutritionists, pschyatrists, etc) - personal pschyatrist (in charge of giving "anima") -maintenance personel (APP & device)	-The price of Anima will be included on the price of the therapy. The cost of Anima is 115 EU so the amount the patient will need to pay will differ on her/his insurance contract

figure 63: Roadmap

CHAPTER 8. SECTION 1

ROADMAP

In order to evaluate how this product could be introduced to the market, and what are the strong points of Anima and what are the opportunities for this product/service, a Business model canvas was developed.

In order to do this Business model canvas see figure 63 I started evaluating the "raison d'être" or value proposition of Anima. One of the most important points and actually the goal of this project was to build a bridge or set up a transition between the therapy phase and the actual real world or individual self-care. The main reason to develop such a product/service was that after the therapy phase, there are still quite some probabilities for the patient to have relapse episodes. If with Anima these rates can be lowered down, it will make an impact on the healthcare system, it will reduce the costs of the extra treatments caused by these relapse episodes.

Also, it would be important to consider the internal parts of this business, who is actually involved in order to make Anima work. The key partners would be at the beginning private clinics as mentioned already on the roadmap but afterwards, some other partners could also be associates such as psychiatric hospitals and eating disorder associations. Nevertheless, in order to promote, maintain and produce Anima other resources are needed. In this case some specialists on E.D, programmers that are able to develop and support the APP together with some maintenance personnel to produce and maintain the actual product.

The customers to whom Anima is aimed, are people who have suffered from Bulimia Nervosa and they are now in a more stable phase of the recovery stage, aiming to stay healthy. As mentioned during the whole project, Anima will help people who are discharged from the therapy to the self-care phase. The channels that will be used to reach these customers will be E.D clinics, E.D websites, psychiatrists websites and social media. Finally, the relationship with the customer will be via telephone, email and the App in case the customer has some issues with the actual product, but if the patient needs some special care, the therapist will be in charge of that.

Eventually, the finances of Anima also needed to be drawn. First, this product service will need some investment and costs on personnel to whom be in touch on the APP such as nutritionists and psychiatrists. Also,
the personal psychiatrist or the clinic that will be in charge of offering Anima to the patient and finally, some maintenance personnel for the AAP and the device.

Regarding the revenue streams, the best case scenario would be if the healthcare insurance would take care of the whole cost of the product. However, these type of healthcare products are usually co-paid between the patient and the insurance and this amount of money will also depend on the type of insurance that the patient might have.

CONCLUSIONS

The previous business proposal aims to serve as a basic guideline to further develop Anima.

As mentioned before, prior to launch Anima to the market, some detailing referring the technical, usability and marketing aspects need to be addressed. In this chapter, I wanted to highlight those aspects by using a roadmap that explains where Anima is now and what furthers steps need to be done.

Together with this I also visualised a business model canvas in order to show how Anima should be put into the market. Since Anima is a solution that aims to build a bridge between the therapy phase and the individual care, it is important that it is given at the end of therapy. That should be the starting point to sell Anima, and afterwards, some other channels might be considered.

PHASE 4. EVALUATION

The evaluation phase entails some recommendations that should be taken into account for further improvement and development of the final solution. Furthermore, it also includes and self-reflection of the final outcome.

9.0 FINAL SUGGESTIONS

Reflction
Recommendations

CHAPTER 9. SECTION 1

REFLECTION

As already mentioned at the introduction of this report, the purpose of this project was to help Millennials suffering from Bulimia Nervosa to build healthier habits.

Based on this problem, many questions needed to be answered prior to developing a design intervention. First of all, deep comprehension of what Bulimia Nervosa is, its causes and the profile of the people who suffer from this eating disorder. Furthermore, research on the existing solutions and treatments had to be done.

This project started by conducting extensive desk investigation on eating disorders, afterwards, it was decided that this project will only focus on Bulimia Nervosa. During this phase, many insights were deduced. One of the most important were the causes of developing Bulimia Nervosa. It can be said that there are many factors, such as culture, personality traits, society, family and friends that can contribute to the development of this eating disorder. However, there is a characteristic that most of the patients have in common, their issues regulating their emotions. Also, after this research, it was concluded that the design intervention should happen after the therapy phase. Once the patient is discharged from therapy, she or he might still need some support and that is when the solution should be used.

Afterwards, in order to verify all the data gathered from the desk research, many interviews were conducted. Two psychiatrists specialised on eating disorders and Six people who have suffered Bulimia Nervosa were interviewed.

Eventually, after carrying out all this investigation on Bulimia Nervosa and the target group, the problem was determined by defining the main qualities of the interaction of the design intervention. The objective of this project was to provide meaningful and valuable feedback to the patients. As can be seen, during the whole project the user has had an important role to develop the final outcome. It was essential to understand their values, needs and behaviours in order to eventually design something that would be meaningful and appealing to them. They have been involved in every phase of this project to evaluate, select and justify every decision that has been made.
This user-centred approach has been key to develop a solution that can be considered meaningful and useful for the main users.

Furthermore, even if this product does not stand out for its innovative technology, it can be said that it is actually an innovative and simple solution. This design intervention has been designed based on the envisioned interaction, and the aesthetic, meaningful and emotional values. Afterwards, the available technology has made this solution tangible and feasible.

Besides, a product strategy has also been developed

in order to have a real vision and understand in which phase Anima is now and what are the steps that need to be done in order to be launched to the market. All these steps have been explained by using a roadmap. In this roadmap, the technology, the users and the marketing have been taken into account.

Together with the roadmap, a possible business plan has been defined, explaining how the product should be implemented in the market and analysing the possibilities of making this feasible.

I believe that Anima has proved to be a meaningful and feasible solution that helps Millenials suffering from Bulimia Nervosa to build up healthier behaviours. Furthermore, it is an innovative solution that differs from the existing products or services that are aimed to help people with Bulimia Nervosa. It goes beyond the eating patterns of the patients and ritualises an important activity for this target group, regulates and understand their emotions. Anima creates an intimate and self-reflective ritual, it helps users embrace and understand their emotions in a more mindful approach.

CHAPTER 9. SECTION 2

RECOMMENDATIONS

Anima is an innovative solution that has proven to help Millennial suffering from Bulimia Nervosa. However, there are still some aspects that need some further development and improvement in order to launch it on the market.
Therefore, a set of recommendations have been listed below:

DESIGN:

- Optimize the led part. Now the top part has 24 ribs that help drive the light from the Oled ring. It would be better if a separated part from the top part is designed, in order to make the manufacturing process easier.

- Improve and optimise the connecting system in order to avoid the cables to get tangled.

-The interior elements that support all the electronic elements should also be optimized.

- The tolerances of the case of Anima should be studied and redesigned in order to be able to manufacture the product.

- Find better and powerful screen so it can display the emotions and the flower all at once. Also, it would be better if this screen is a circle instead of a rectangle.

-Test and evaluate the final design regarding security and feasibility of the materials and electronic components.

- Evaluate the overall dimension of Anima once all the final components like the screen and the battery are selected.

TESTING:

-Test the final design of the device with a larger scale of participants, in order to verify and evaluate the interaction.

- Evaluate if the feedback given by Anima (the flower) is meaningful enough and seek for other alternatives that can also be displayed.

- Evaluate if the displayed emotions match the values and needs of the target group.

- Test and evaluate the interface of the App with a larger scale of intended users.
-Test and evaluate the light coding for the two types of emotions with the target group.

MARKET STRATEGY:

- Development of further marketing strategy in order to find the best market gap where the product could be sold.

- Verify and test the Business model canvas. It seems promising but more special attention should be put to the revenue streams and key partners.

- Perform a complete marketing mix and financial overview. Nevertheless, the designed business model canvas should be taken into account.

- Get a better estimation of the final costs. Taking into account the pre-launching phase and the final launch of the product to the market.

ACKNOWLEDGMENTS

Here is where I conclude this amazing adventure that started 3 years ago. This project would not have been real if I would not have come to TU Delft and meet all the people along this journey. Now that I look back, I see myself in a place where I really wanted to be, I grew up and mature as a person and as a designer, and I could not be more grateful for that. That is why I also need to thank some people that have been part of this journey.

First, I wanted to thank my two teachers that have been supporting me and believed in this project since the beginning. Thanks for all the inspiring meetings and advice. I actually needed such a team in which I could trust and talk every time I needed it.

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APPENDICES

APPENDIX A

Interview specialists

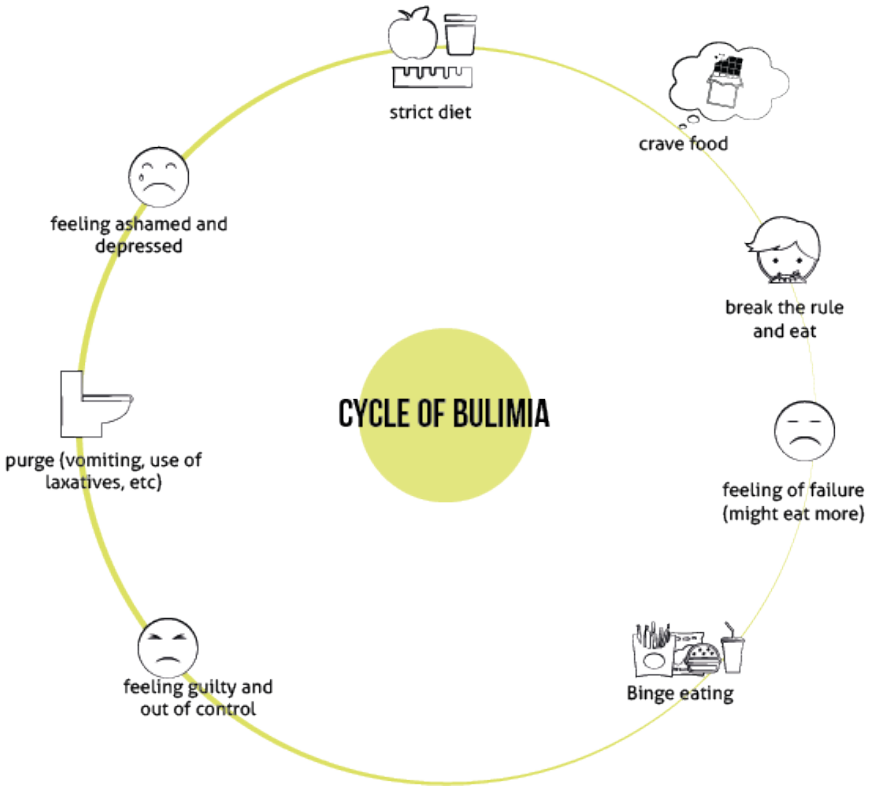
Introduction
The aim of this interviews is to have a better understanding of patients suffering from bulimia. This interview will help my MSc graduation project in Integrated Product Design at TU Delft University. The purpose of this project is to find out where a design intervention could be made in order to help users during their healing process. Moreover, I would like to focus on the maintenance stage, since the patients are already aware of their maladaptive eating behaviours and have a predisposition of getting better.

Interview
I would like to thank you for having some time to do this interview. Also, all this information will be used for research and design purposes, all the information provided is totally anonymous and confidential and will only be shared with people related to this project. If there is any question that you would not like to answer is totally fine. Finally, if you agree I would also like to record this interview and take some notes.

- First, I would like to know what your background is and which is your medical specialization.

General questions about Bulimia Nervosa
I'm focusing on patients that are actually young-adults which have suffered or are suffering from bulimia. I would like to make some questions about their behaviours and patterns (if existing) during the rehabilitation process.

- Could you tell which are the main reasons these people suffered bulimia?
    - (family environment, dramatic experiences, anxiety/stress).
- Could you define their personality?
- Is there any pattern that can define their behaviours?
- Why did they ask for help?
    - What was the main reason they wanted to see a therapist?
    - What was the tipping point to ask for help?
- Do you usually offer individual or group sessions?
    - Why?
- Do you think they value to have a community feeling?
    - (Sharing thoughts, feelings with other people might help them?)
- What are the steps you take when a new patient comes to you?
    -Is there any therapy that is mostly used for helping them? (If CBT why do they use it, what are the main steps and rules to follow?)
    - If there is another which one and why?
- Here I visualised what I call "the cycle of bulimia" based on what usually happens when patients have a bulimic episode.
    - Do you recognise it?
    - Is there anything missing?



Questions focusing on relapse episodes

- How often do patients have relapse episodes once they are in the "maintenance" stage?
- What do you think are the main reasons/causes of having a relapse episode?
    - (why and what makes them behave like that?)
- What do you do to follow patient's recovery process?
- Do you think patients might need some more attention while in the recovery/maintenance stage?
- Do you think therapies are enough?
    - What do you usually do when a patient is almost recovered but has still some possibilities of a relapse?
    - (Tips, therapy, activities that can be recommended)
- If there is a relapse episode, what are the steps to follow?
- Do they visit/ask for help when they have a relapse episode?
- How do they feel after a relapse episode?
- How do usually family, friends couples get involved during the rehabilitation stage?
- How important do you consider is to have some family or friends support?
    - In which stage do you think is more important?
    - Young adults live by themselves, have less control from their families and friends, how do they usually cope with the eating disorder?

Suggestions for patients' interviews

Finally, I would like to do some interviews with patients:
- Are there any guidelines/protocol that I should know beforehand?
- I there any question or topic that should be avoided?

Is there anything that you wild like to add?

Again, thanks for your patience and your help, this interview was very important for continuing with the project and having a better understanding about Bulimia Nervosa and the patients.

Interview patients

Introduction

The aim of this interviews is to have a better understanding of patients suffering from bulimia. This interview will help my MSc graduation project in Integrated Product Design at TU Delft University. The purpose of this project is to find out where a design intervention could be made in order to help users during their healing process. Moreover, I would like to focus on the maintenance stage, since the patients are already aware of their maladaptive eating behaviours and have a predisposition of getting better.

Interview

I would like to thank you for having some time to do this interview. Also, all this information will be used for research and design purposes, all the information provided is totally anonymous and confidential and will only be shared with people related to this project. If there is any question that you would not like to answer is totally fine. Finally, if you agree I would also like to record this interview and take some notes.

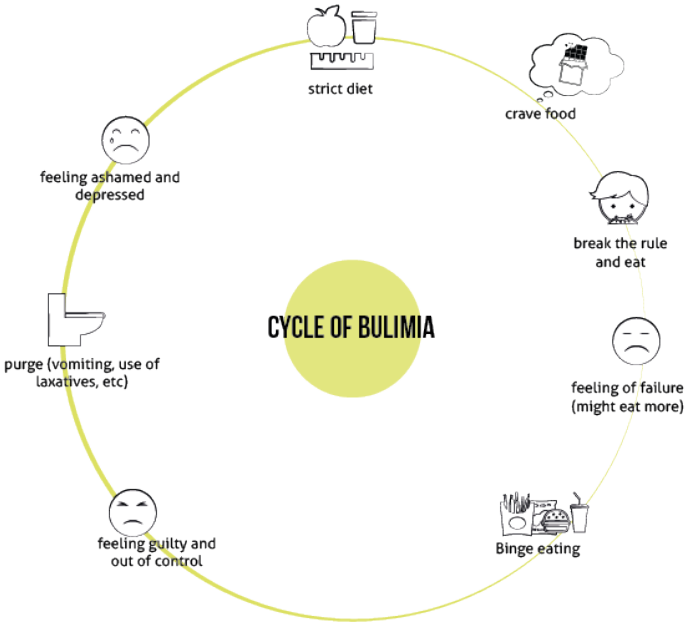
- First, I would like to know a little bit about yourself
    - How old are you?
    - What did you study?
    - Where do you work/study?

General questions about Bulimia Nervosa

Now, I would like to you think about your issues towards food, if there is any question that you don't want to answers is totally fine, or if there is anything that you don't understand just let me know.

- Can you explain what bulimia is in your opinion?
    - What does it mean for you, personally?
    - Can you explain how did you developed it with this timeline (situations, family, friends, school...)

- Here I visualised what I call "the cycle of bulimia" based on what usually happens when patients have a bulimic episode.
    -(Explain how I see myself and then let them talk)
    - Do you recognise it? Is there anything missing?



Role of family and beloved ones

- What role does your social environment play?
- Who is/was your biggest support?

Treatment

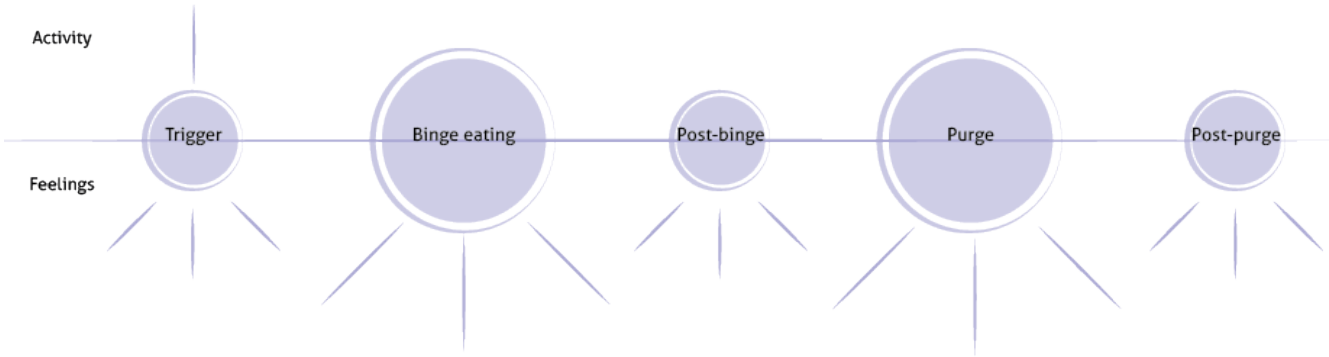
- Did you go to a therapist?
    - For how long?
    - What type of exercises did you usually do?
    - Individual or collective sessions?
    - If both, which one did you like the most?
- How do you feel towards the treatment?
    - Do you think it worked?
    - How did you feel after finishing the treatment?

Daily life and coping mechanisims

- How do you maintain a healthy relationship with food?
- Tell me about your daily life?
    - Do you follow any routine?
- Is there any specific moment in which you feel more tempted to binge?

I want you to think a specific moment in which you remember you have a relapse episode

- Tell me about a relapse episode using this timeline



- Can you remember what was the trigger of binging?
- Can you remember how did you feel before deciding to binge?
- How did you feel while binging?
- How did you feel after purging?

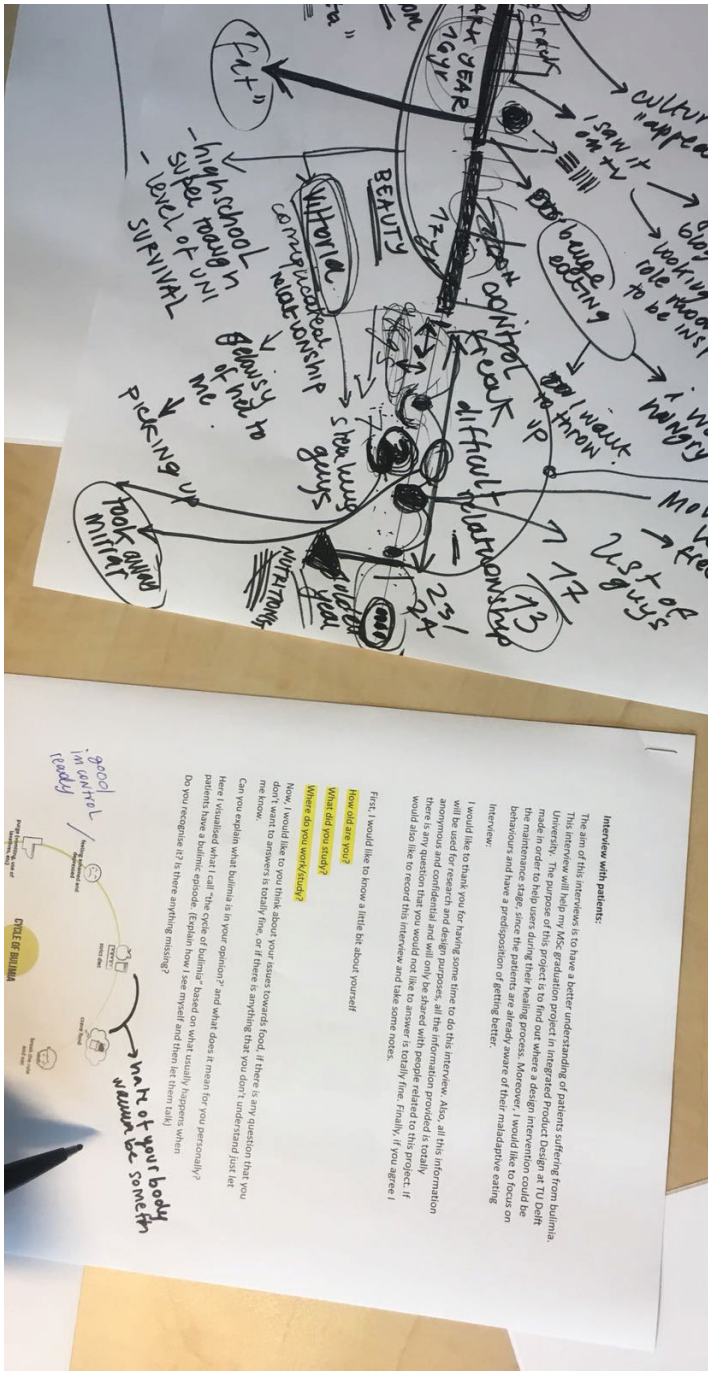
If no more relapse episodes

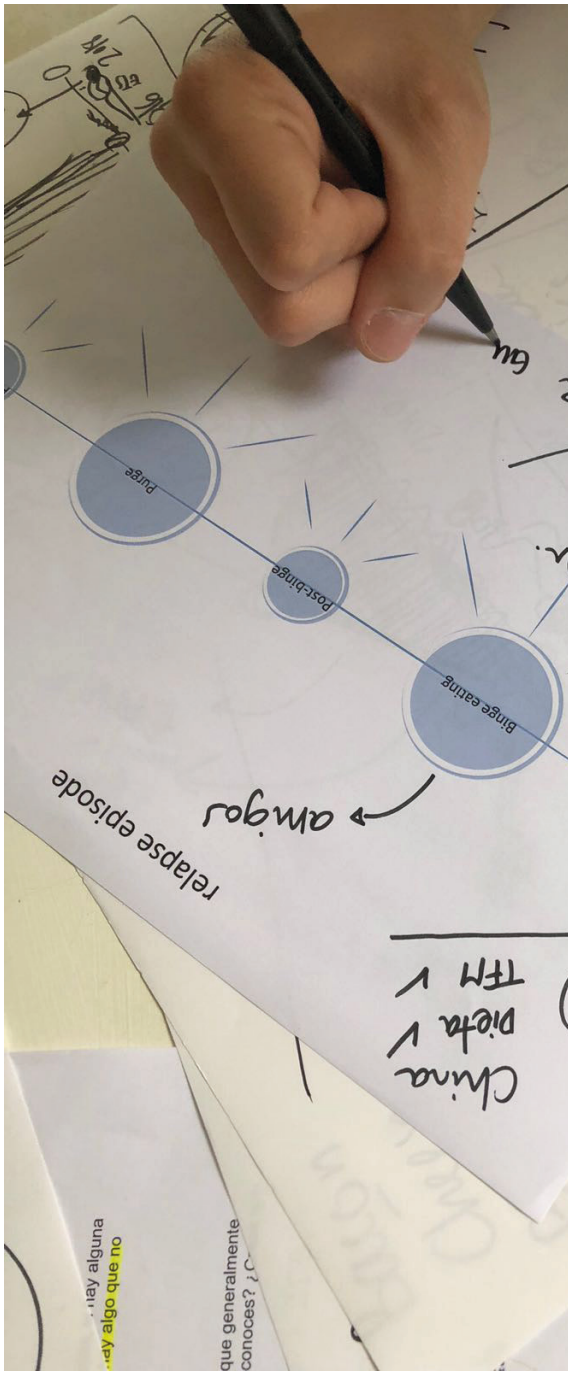
- Why do you think you don't have any relapse episode?
- Do you have any technique/trick to cope with a relapse episode? / What do you do to keep you relapse-free?

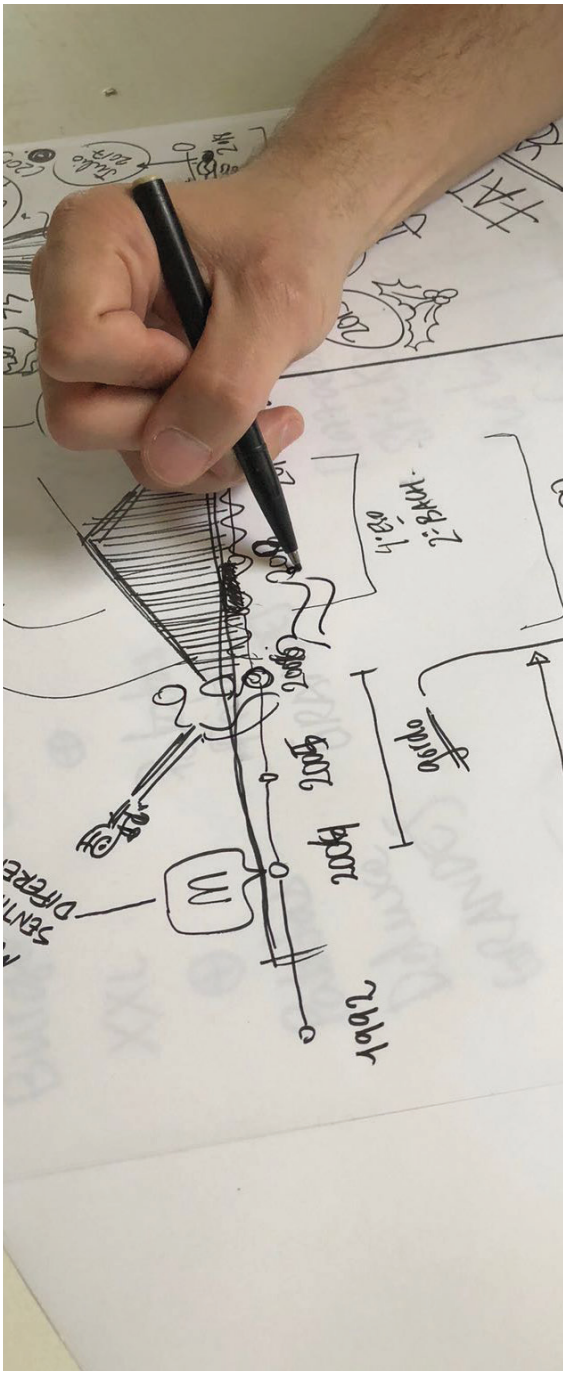
- If you were to write a letter to your past self what would you say to yourself?
- What positive experiences do you take from this? What would you advise to other people suffering from bulimia and their families?
- Would you like to add something else?

Thanks a lot for your time.

Images interviews with patients & cluster of information







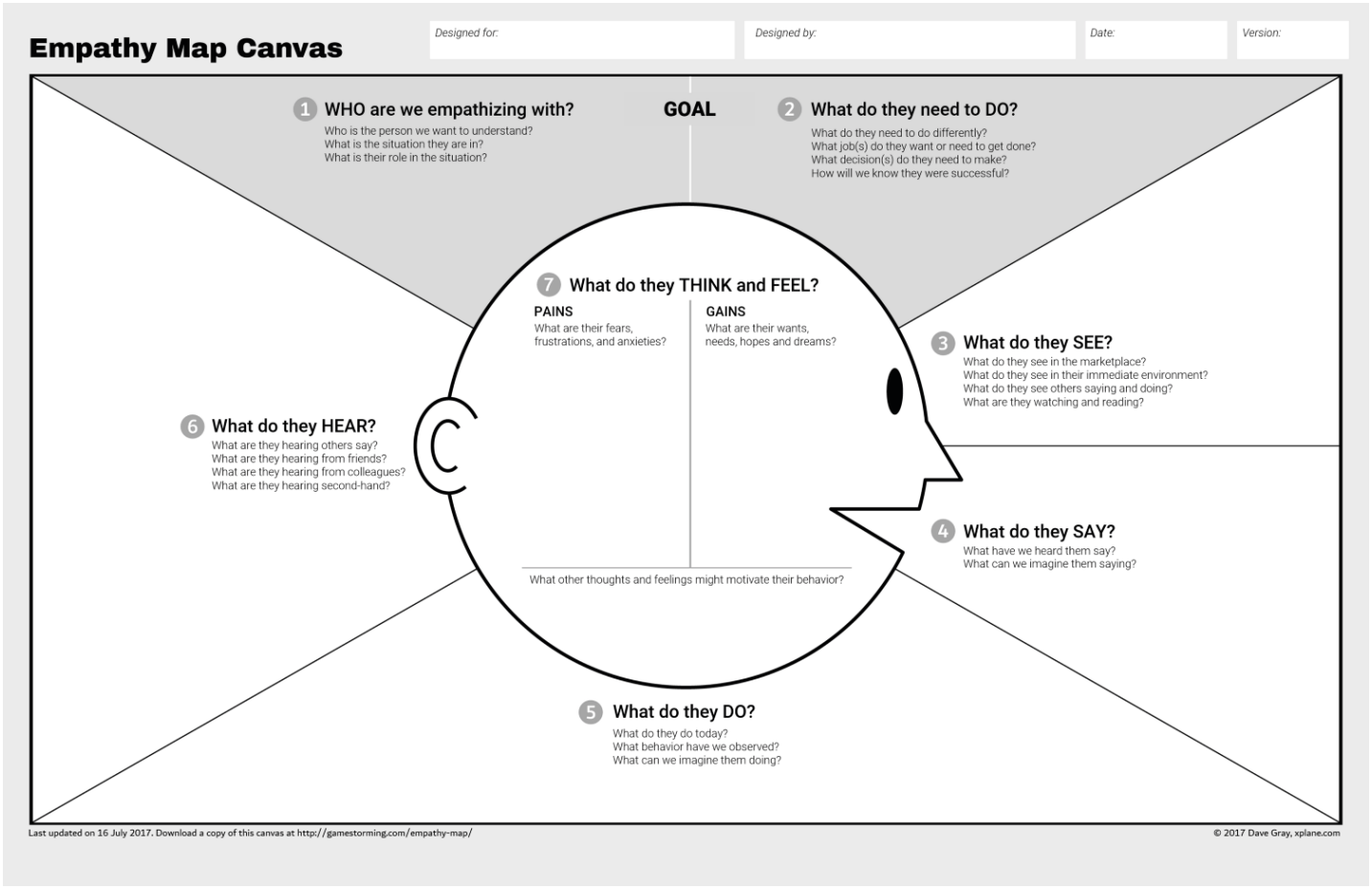
APPENDIX B

Creative session

Session Planning

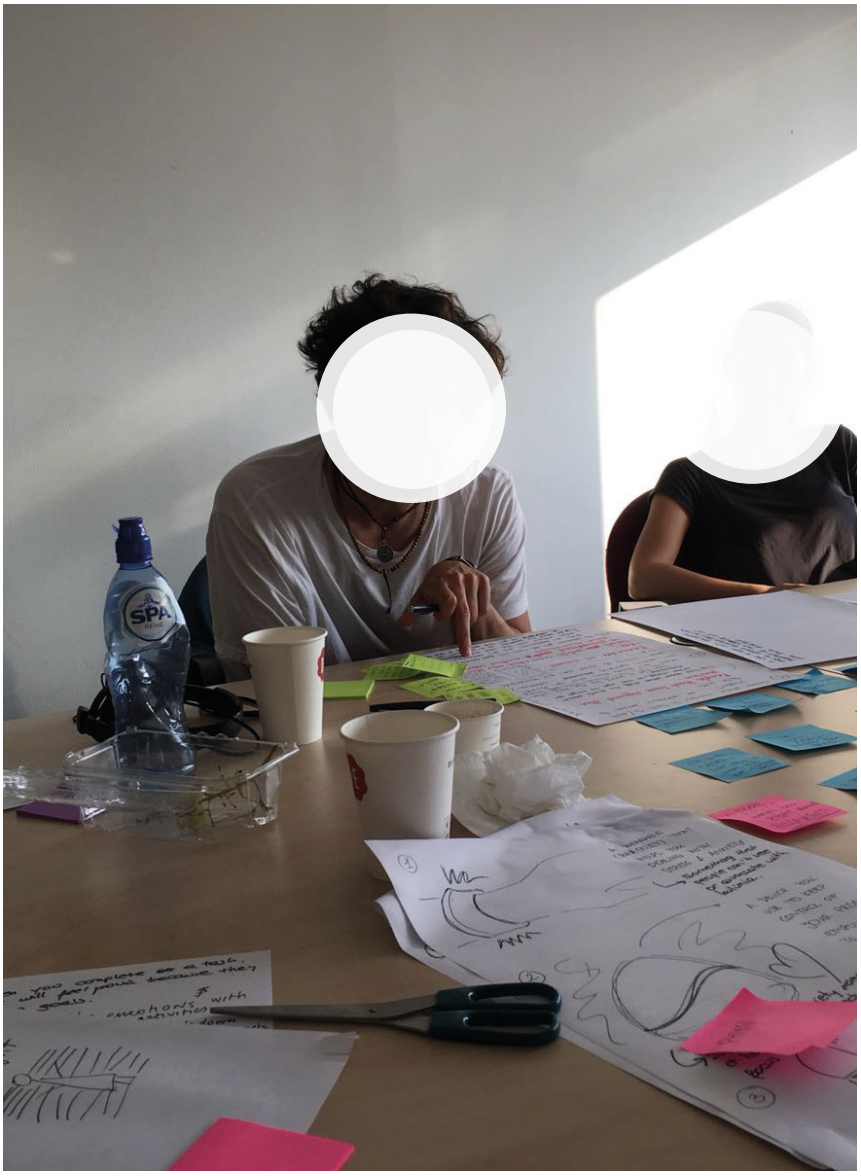
takes..	stage	Facilitator (Angeles)	Buddy ()
15 m	**Preparation**	-prepare table & material -write wwwwh -write rules Pick big post its	- prepare table & material
5 m	**Introduction**	-Brief introduction to the problem -Rules of the creative session -Write down names on the stickers	- - give markers
5 m	**Icebraker**	-	
5 m	**Short talk about the problem**	-What is bulimia? Definition -Stages (Where I'm focusing)	
7m	**Flower association**	What is bulimia for you?	
15 m	**Who is my target group?**	-Show personas -make empathy map	
10 m	**Define problem: WWWWH**	-Explain what to do: write down words related with (what, when, where, why, how) -Change the flip overs every 1 min aprox.	
10m	**Group the best words and redefine problem statement**	-Tell the group to cluster the words they thinks are most relevant Ask them to redefine the problem statement H2…..	
30m	**635**	-Tell them to stand up and change flipcharts	
10m (5 min break + energizer)	**Energizer**	1. Tell group members to silently think of their favorite animal. 2. Then tell group members that without talking, they need to arrange themselves from largest to smallest animals. 3. Group members can only make gestures and the noise of their animal. 4. After they have finished, have group members go around and say the animal they were supposed to be to see if it was accurate	
20	**Cluster**	Make categories (with metaphoric names) Choose the best ideas (gut feling) -Develop the 3 best ideas	

Materials

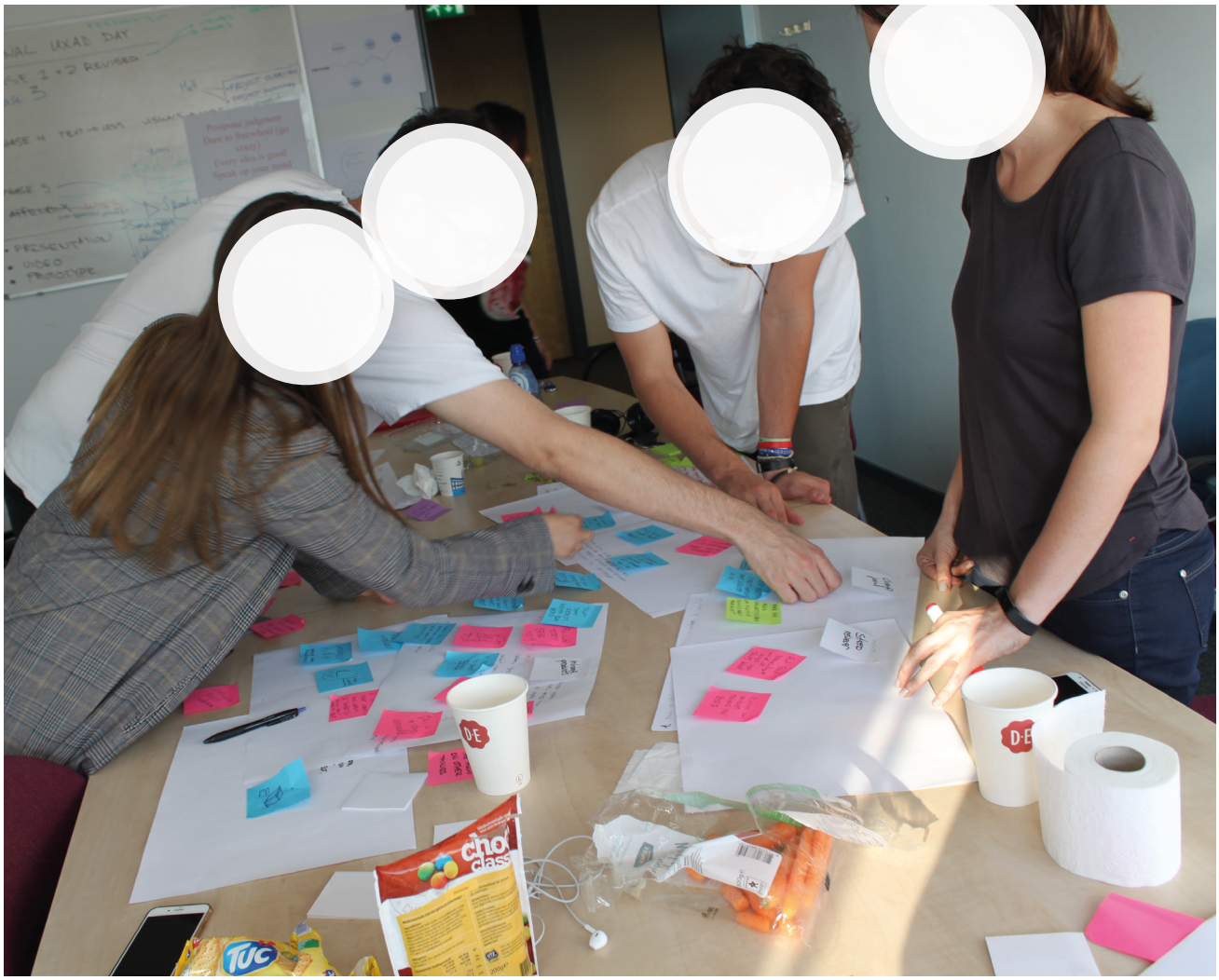


Idea:	
Positives	**Negatives**
Intriguing	**Concerning**

Creative session




AN APP THAT TALKS TO YOU WHEN YOU
FORCAST WITH SOMEONE YOU ADMIRE TO ENCOURAGE YOU
WEARABLE 4-7-8
TOILET FOR HANDLING STRESS WITH SMALL ACTIVITIES
INSERT WEARABLE
A SCALE TO CALM DOWN
DILDO
Inhaler products
Fluffy teddy BEAR cuddly
A ESCAPE ROOM WHERE YOU FIGHT AGAINST FILAMENTI
Desire to stay connected
CHEWING GUM. (valerian)




what?
habit
stressed
when?
BAD DAY
END OF THE DAY
Loose Control
Lack of control
Afraid ask for help
anxiety "crisis"
GOOD DAY

APPENDIX C

Booklet

This booklet belongs to ...

XXX

Hello!

Again I need your help in order to verify one of the concepts I designed for you :)

After some research, I discovered that sometimes people who suffer from bulimia have some issues under dealing with their emotions. This concept is based on analyzing and make a reflection about your own en the ways you deal with them.

So what I ask you to do is to fill in this booklet for 5 days and afterward give me some feedback about it. express yourself and be critical towards this idea.

The main idea is to think about your emotions first in the morning and afterward during the night, it's up which moment you fill it in.

I will first ask you to choose from each column an emotion, on the left side you will find a list of positive e on the right side a list of negative emotions. Also, you are allowed to write only positive or negative emo up to you and the way you feel in that moment. I will ask you to write down the name of each emotion ins two circles, then explaining why do feel like that and if you know any coping mechanism (tips and tricks) them.
As mentioned before, I will ask you to this exercise twice a day, one as morning ritual and the other one a ritual.

Last but not least, I will also ask you to fill in the page number 18 and to write down the emotions you ha At the end of the week, I will also ask you to make a reflection about all those emotions you had during th

Finally, before sending the booklet back to me, you will have to answer some questions about the whole e and again be critical I need your help to offer the best experience I can to people who are going through experience as you.

P.S this is an interactive pdf, so you just need to type and click when needed. Also, don't forget to save it a done with your daily tasks. Let me know if you have any issues with it :)

Thanks a lot for your help!

Ángeles

DAY 1

MORNING

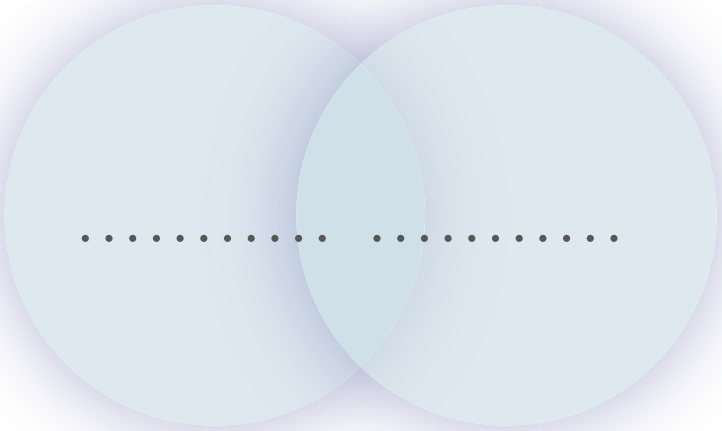
This is where your journey starts, here I would like you to think about how do you feel at this moment, and how are you going to act towards those feelings. It's okay if you feel full of positiveness, or a bit down, you can choose whether to write down two positive emotions, two negatives or one for each type.

POSITIVE EMOTIONS

Kindness
Admiration
Joy
Hope
Energized
Pride
Confidence
Relief
Satisfaction
Fascination
Worship
Other

NEGATIVE EMOTIONS

Disgust
Sadness
Disappointment
Shame
Anxiety
Frustration
Loneliness
Guilt
Insecurity
Confusion
Other



Personal coping mechanisms (tips & tricks that you use to ,if needed, cope with your emotions)

Why do you think you feel like this? (try to explain what are the triggers of those emotions, could be situations, events, people etc, feel free to express yourself)

Personal coping mechanisms (tips & tricks that you use to ,if needed, cope with your emotions)

As soon as I woke up | *Before breakfast* | *After breakfast* | *Before leaving the house*

Morning

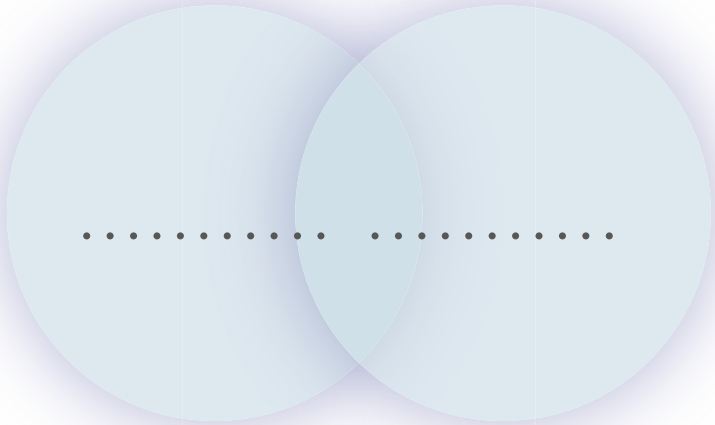
Psst, don't forget to go to page 18 and fill it in

NIGHT

This is where your journey starts, here I would like you to think about how do you feel at this moment, and how are you going to act towards those feelings. It's okay if you feel full of positiveness, or a bit down, you can choose whether to write down two positive emotions, two negatives or one for each type.

POSITIVE EMOTIONS

Kindness
Admiration
Joy
Hope
Energized
Pride
Confidence
Relief
Satisfaction
Fascination
Worship
Other



NEGATIVE EMOTIONS

Disgust
adness
ppointment
Shame
Anxiety
ustration
oneliness
Guilt
security
onfusion
Other

Why do you think you feel like this? (try to explain what are the triggers of those emotions, could be situations, events, people etc, feel free to express yourself)

Personal coping mechanisms (tips & tricks that you use to ,if needed, cope with your emotions)

As soon as I rrived home | *Before dinner* | *After dinner* | *Right before going to sleep*

Night

Psst, don't forget to go to page 18 and fill it in

QUESTIONS

Please, now take some time to think and answer to this questions, your feedback will be really valuable to further develop this concept :)

How did you feel by filling in the booklet twice a day?

When do you think is the best moment to analyse and reflect about your emotions? why?

How many times a day do you think you should make this type of analysis?
Why?

How helpful do you think is to become more aware of your own emotions and try to find a coping mechanism for them?

How would you feel if you could put in practise those coping mechanisms with a product that enables that? Why?

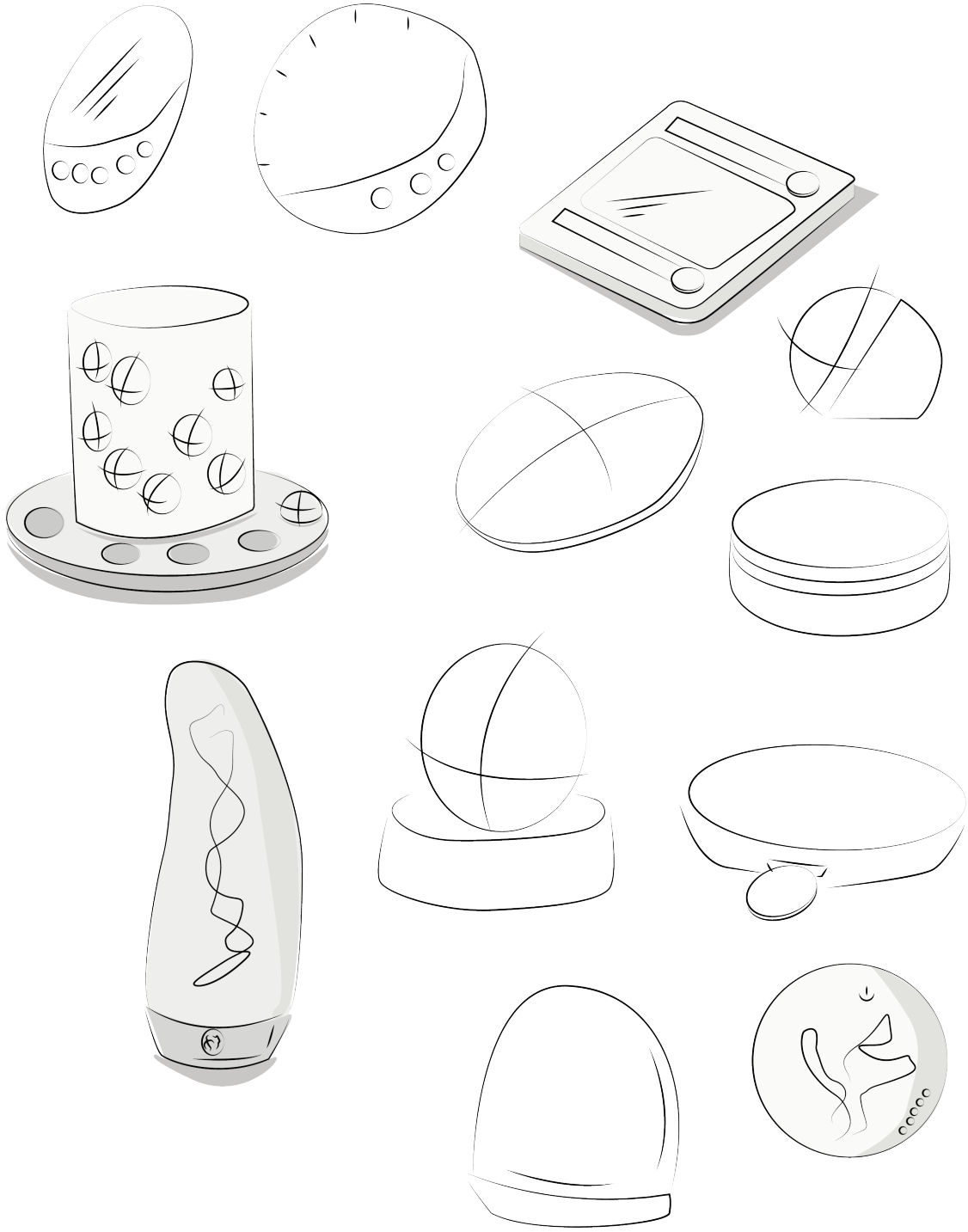
What type of feedback would you like to receive once you have analyzed your emotions?

Would you rather do this analysis in another moment of the day? elaborate your answer

How would you feel to share your weekly overview with a community of users and experts?

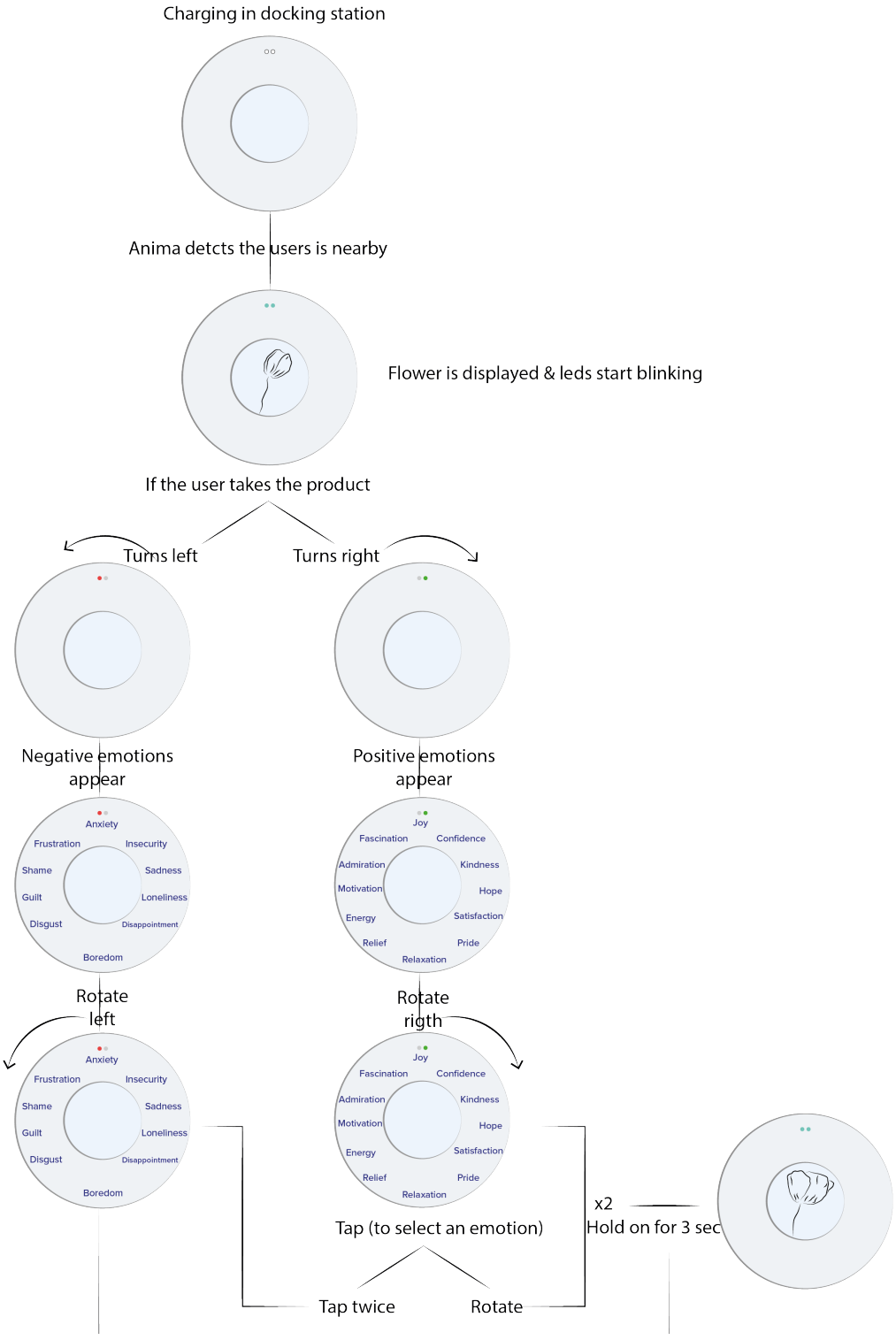
APPENDIX D

Devlopment of concepts



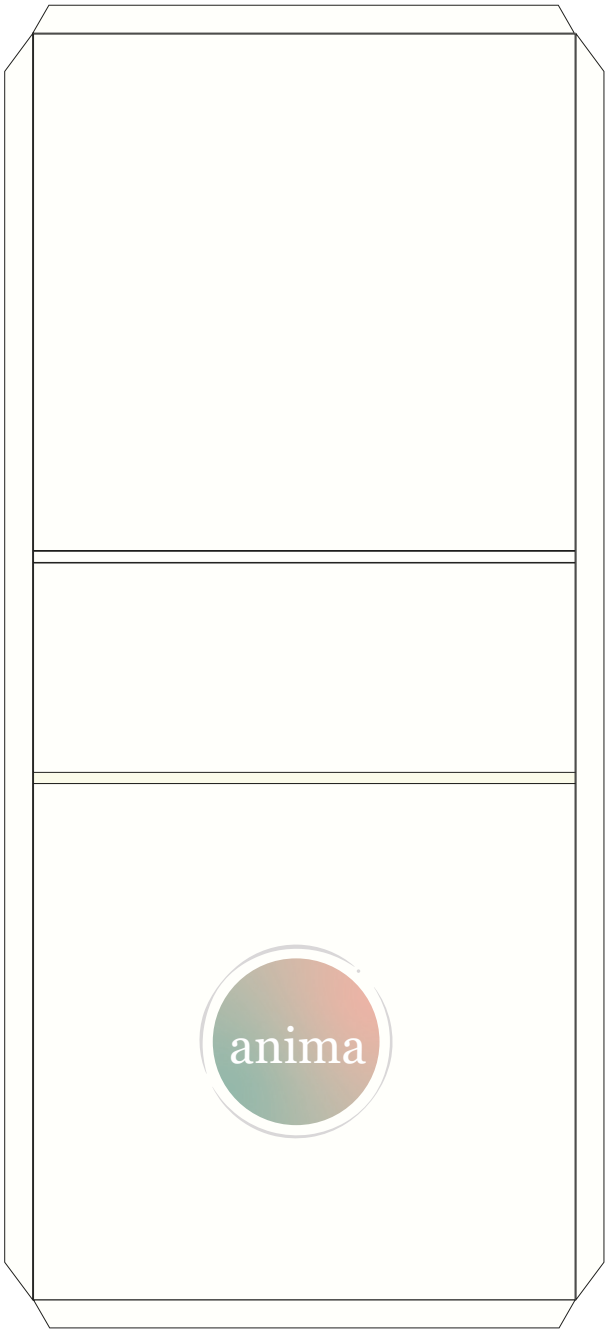
APPENDIX E

Device workflow



APPENDIX F

Box and booklet



Hello!

Anima will help you ritualise your emotion regulation skills in a more mindful approach. The aim of Anima is to embrace your emotions and do not fear how do you actually feel. The fact that we feel different types of emotions is what makes us human beings.

This is a booklet that will give you a better understanding of what are positive and negative emotions.

Here you will find short definitions of the 24 emotions that you will see in Anima. The purpose of this is to help you define what you feel and help you reflect on those emotions.

These 24 emotions are based on the research of the Delft Institute of Positive Design

Let's start embracing our emotions!

Be reflective. Let the emotions exist. And be encouraged that, with time we can all get to a better place.

Positive emotions

Positive emotions broaden our attention and thinking. They also boost our general health so let's welcome them to our daily life!

JOY
To be pleased about (or taking pleasure in) something or some desirable event

HOPE
To experience the belief that something good or wished for can possibly happen

KINDNESS
To experience a tendency to protect or contribute to the well-being of someone

SATISFACTION
To enjoy the recent fulfilment of a need or desire

PRIDE
To experience an enjoyable sense of self-worth or achievement

ENERGIZED
To enjoy a high-spirited state of being energized or vitalized

RELIEF
To enjoy the recent removal of stress or discomfort

ADMIRATION
To experience an urge to prize and estimate someone for their worth or achievement

RELAXATION
To enjoy the recent removal of stress or discomfort

CONFIDENCE
To experience faith on oneself or one's abilities to achieve or to act right

COURAGE
To exeperience mental or moral strenght to persevere and withsand danger or difficulties

FASCINATION
To experience an urge to explore, investigate, or to understand something

Negative emotions

Negative emotions might seem unpleasant. However, this is not always the case. Negative emotions can have several benefits for us.Don't be afraid of them.

FRUSTRATION
The feeling when you want to achieve something, but find your action blocked. Nevertheless, you keep trying.

CONFUSION
The feeling when you get information that does not make sense to you, leaving you uncertain what to do with it.

ANGER
The feeling when someone did something bad that harmed or offended you

ANXIETY
The feeling when you think about bad things that could happen to you.

INSECURITY
The feeling when you are uncertain about your ability to do something or to measure up to a certain standard.

BOREDOM
The feeling when there is nothing interesting or engaging for you to do.

SADNESS
The feeling when you lost something that was important to you. You have the urge to withdraw and to seek comfort.

DISGUST
The feeling when you encounter something that you don't want to get into contact with in any way because you expect it is bad for you.

LONELINESS
The feeling when you think there is no one who cares about you.

GUILT
The feeling when you think you have done harm to someone

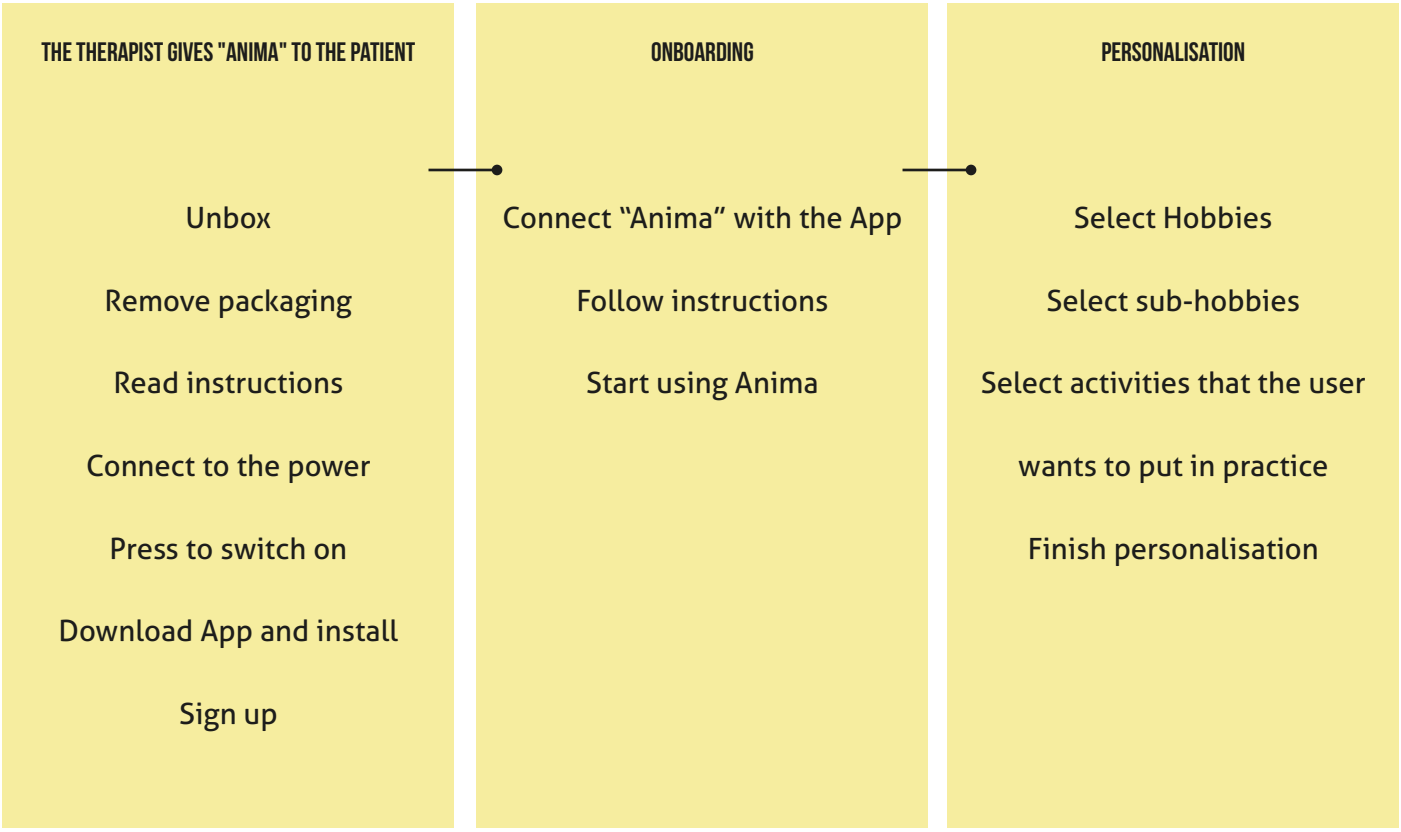
DISAPPOINTMENT
The feeling when you find out that something you had hoped for has not happened.

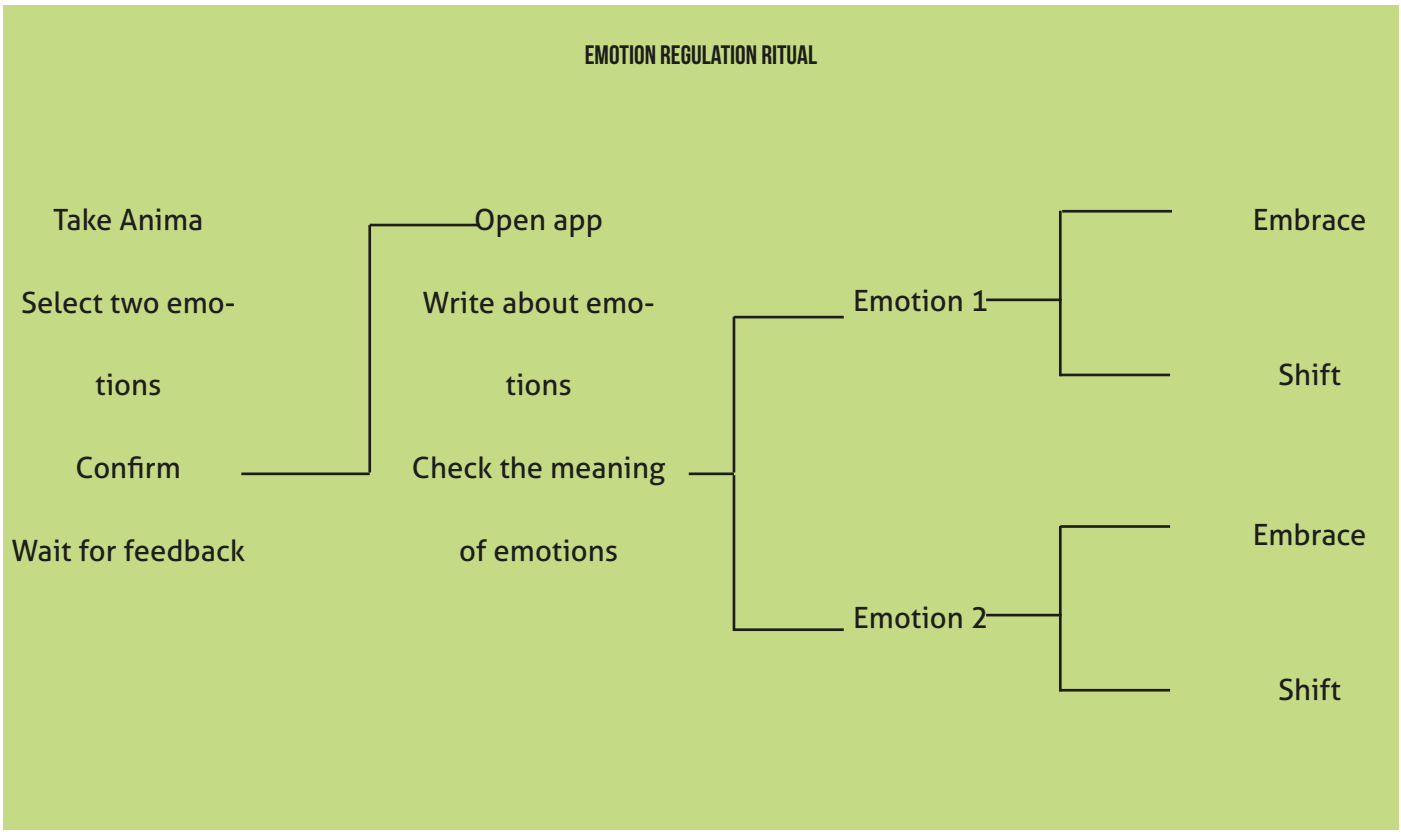
SHAME
The feeling when you think that other people know something bad about you.

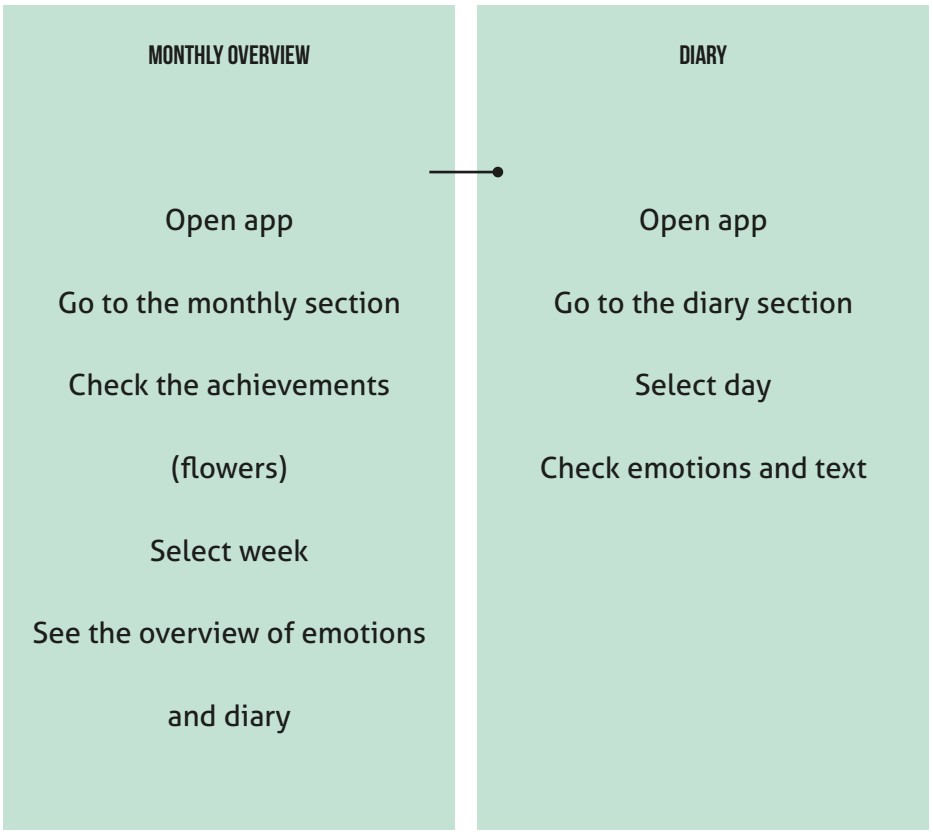
Delft Institute of Positive Design

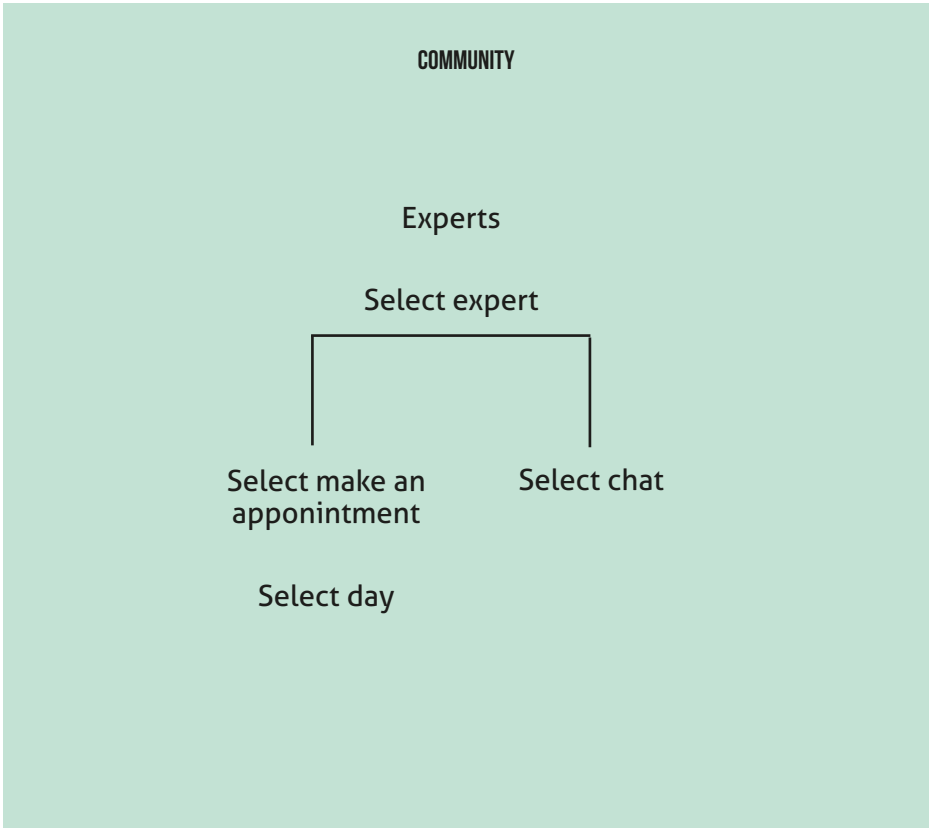
APPENDIX G

APP workflow



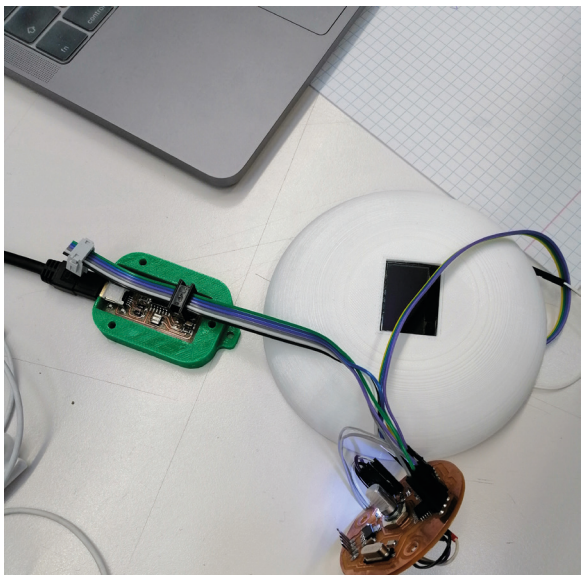

EMOTION REGULATION RITUAL
Take Anima
Select two emo-
tions
Confirm
Wait for feedback
Open app
Write about emo-
tions
Check the meaning
of emotions
Emotion 1
Emotion 2
Embrace
Shift
Embrace
Shift

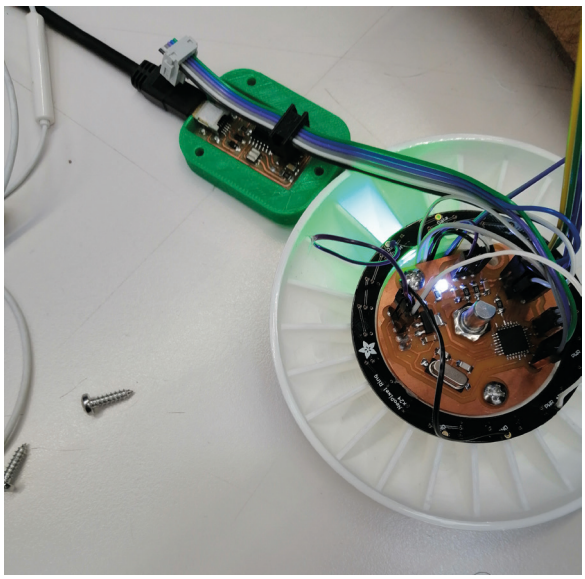

MONTHLY OVERVIEW
Open app
Go to the monthly section
Check the achievements
(flowers)
Select week
See the overview of emotions
and diary
DIARY
Open app
Go to the diary section
Select day
Check emotions and text


COMMUNITY
Experts
Select expert
Select make an
apponintment
Select chat
Select day

APPENDIX H

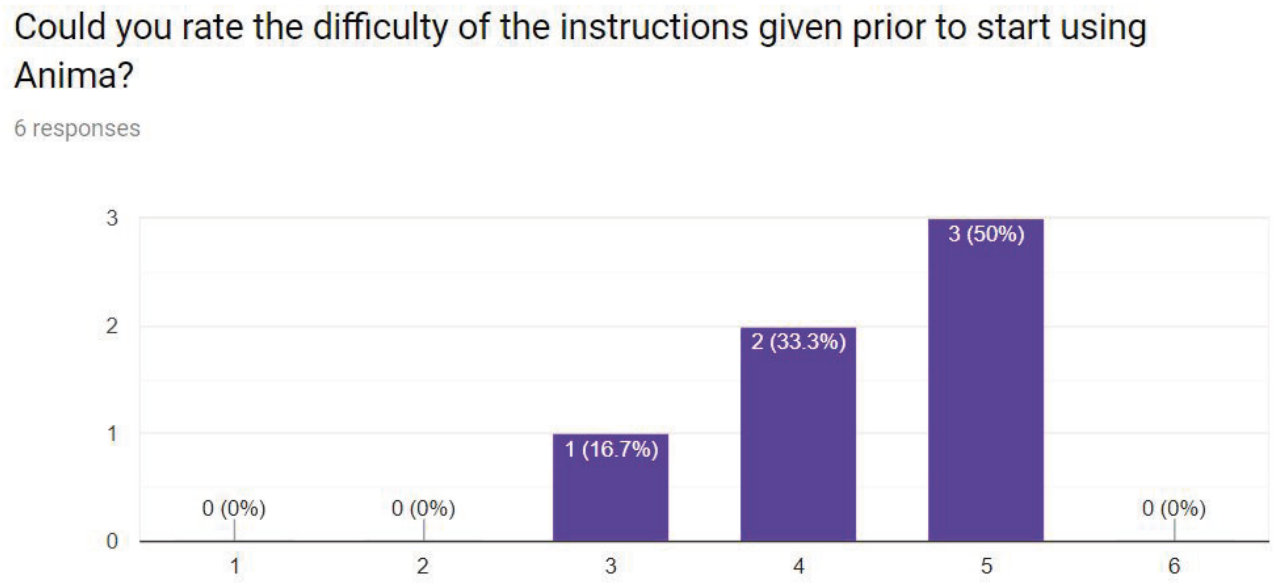
User test interaction with device

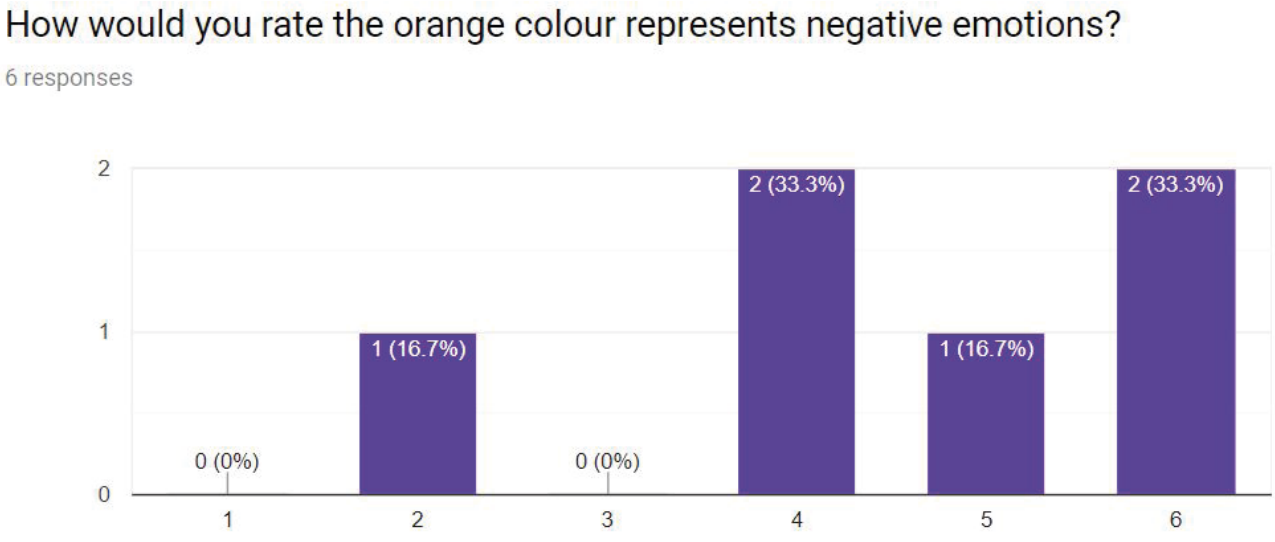




APPENDIX I

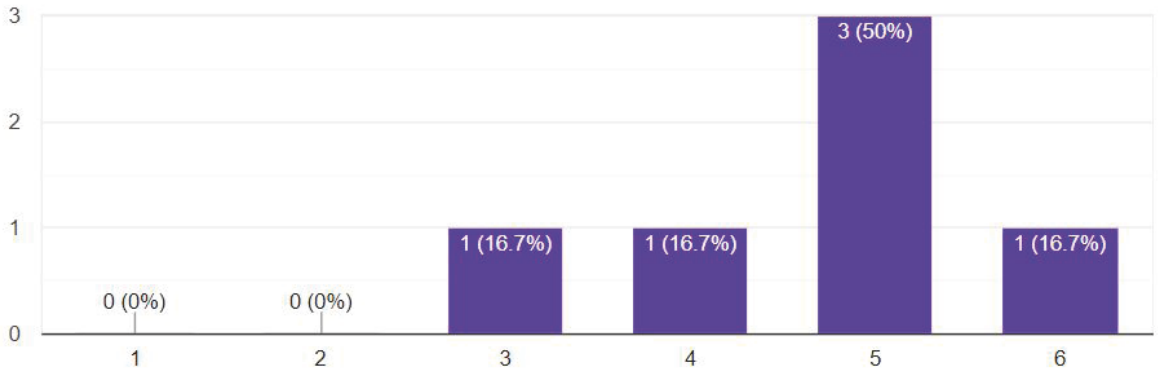
User test interaction with device





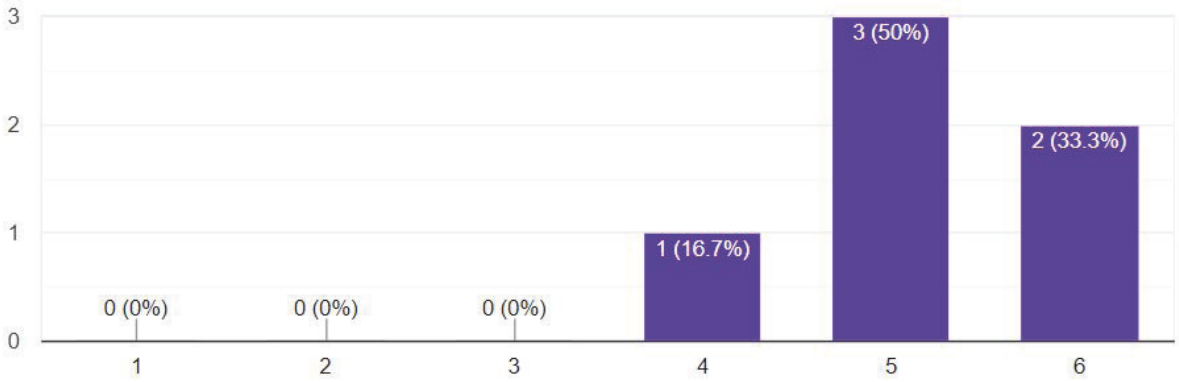
How would you rate the blue colour represents positive emotions?

6 responses



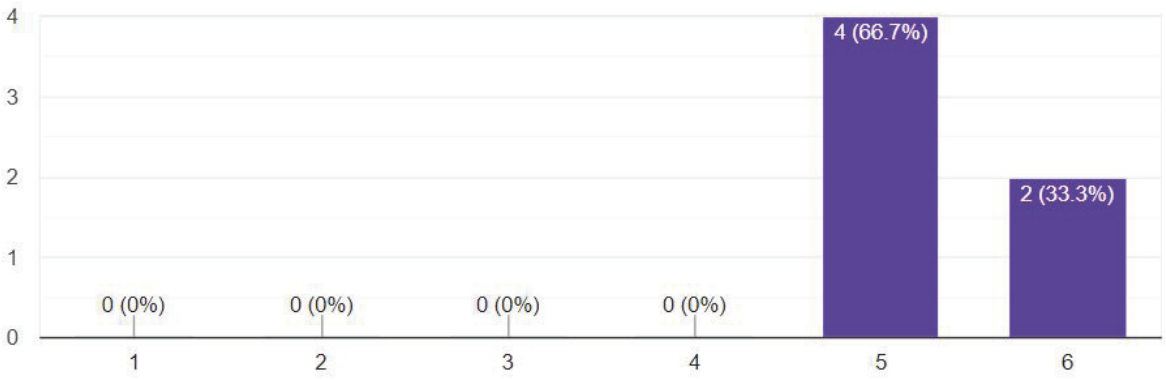
How would you rate the usability?

6 responses



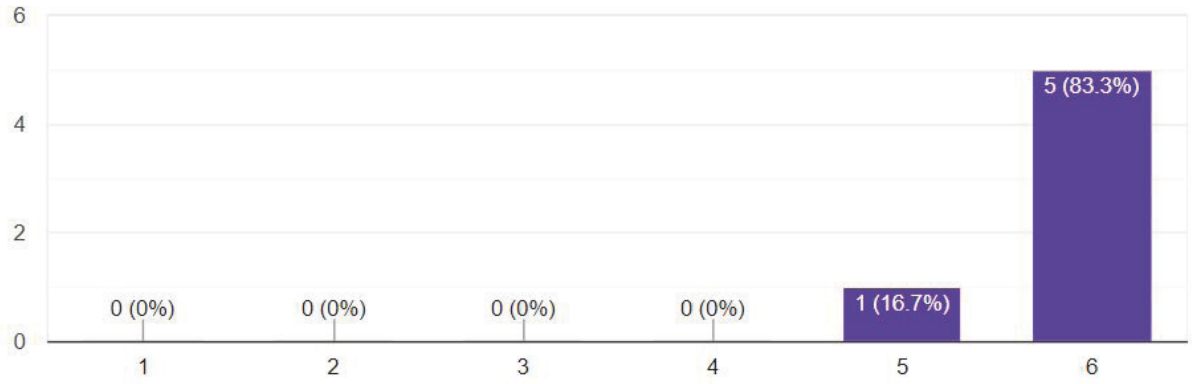
How would you rate the overall experience?

6 responses



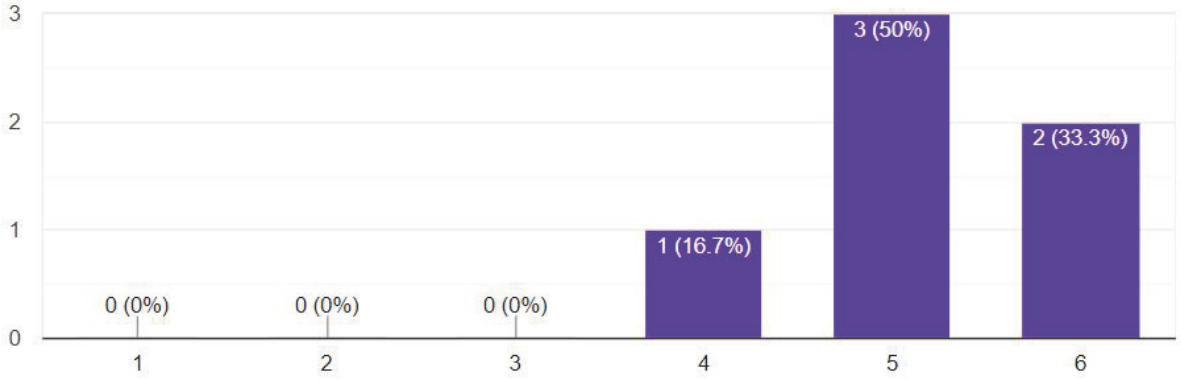
How would you rate the overall experience?

6 responses



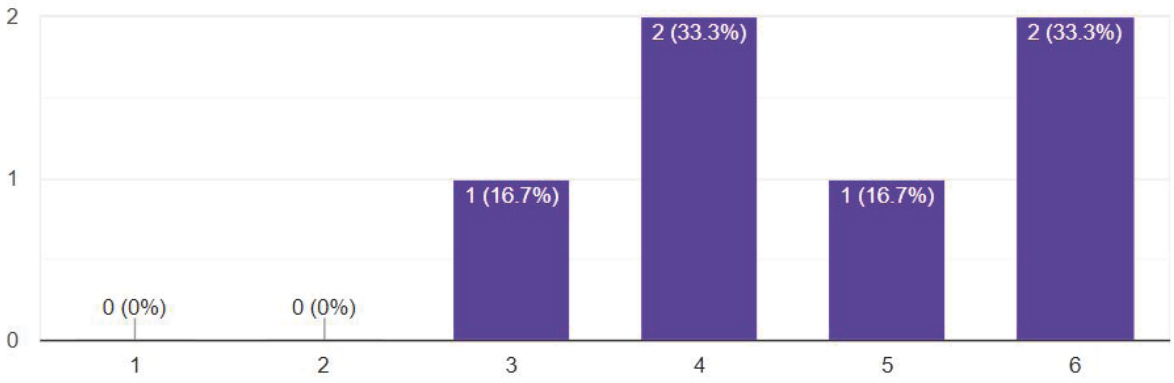
How would you rate the overall experience?

6 responses



How would you rate the overall experience?

6 responses



Anima will help you be more aware of your emotions and have a more mindful approach to them. The purpose of this device is to ritualise the analysis of your emotions and to give you meaningful tips or approaches towards your emotions on a daily basis.

Follow this 5 steps in order to get to know how Anima works.

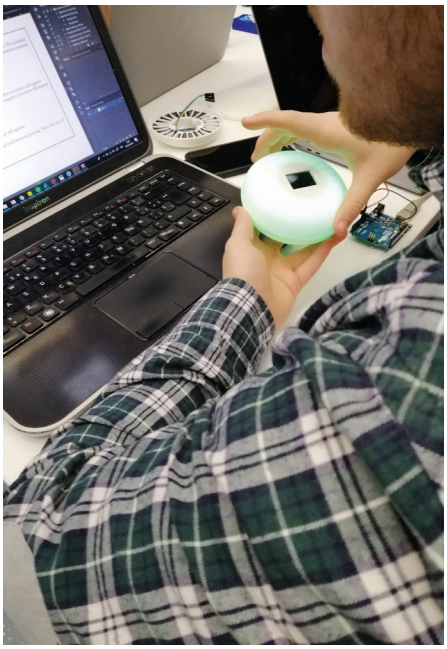
2. Rotate to the right or to the left, two different colours will light up. Orange or blue.
   - Blue means positive emotions, so if you feel cheered up tap and the 12 positive emotions will appear
   - Orange means negative emotions, so if you feel a bit down tap and the 12 negative emotions will appear

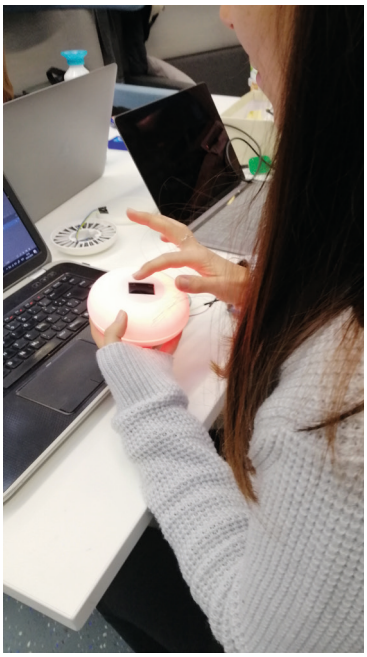
3. Select the emotion and hold to select the next type of emotion

4. Follow step 2 again

5. Once you have selected your two emotions, hold for 3 secs and a flower will appear.

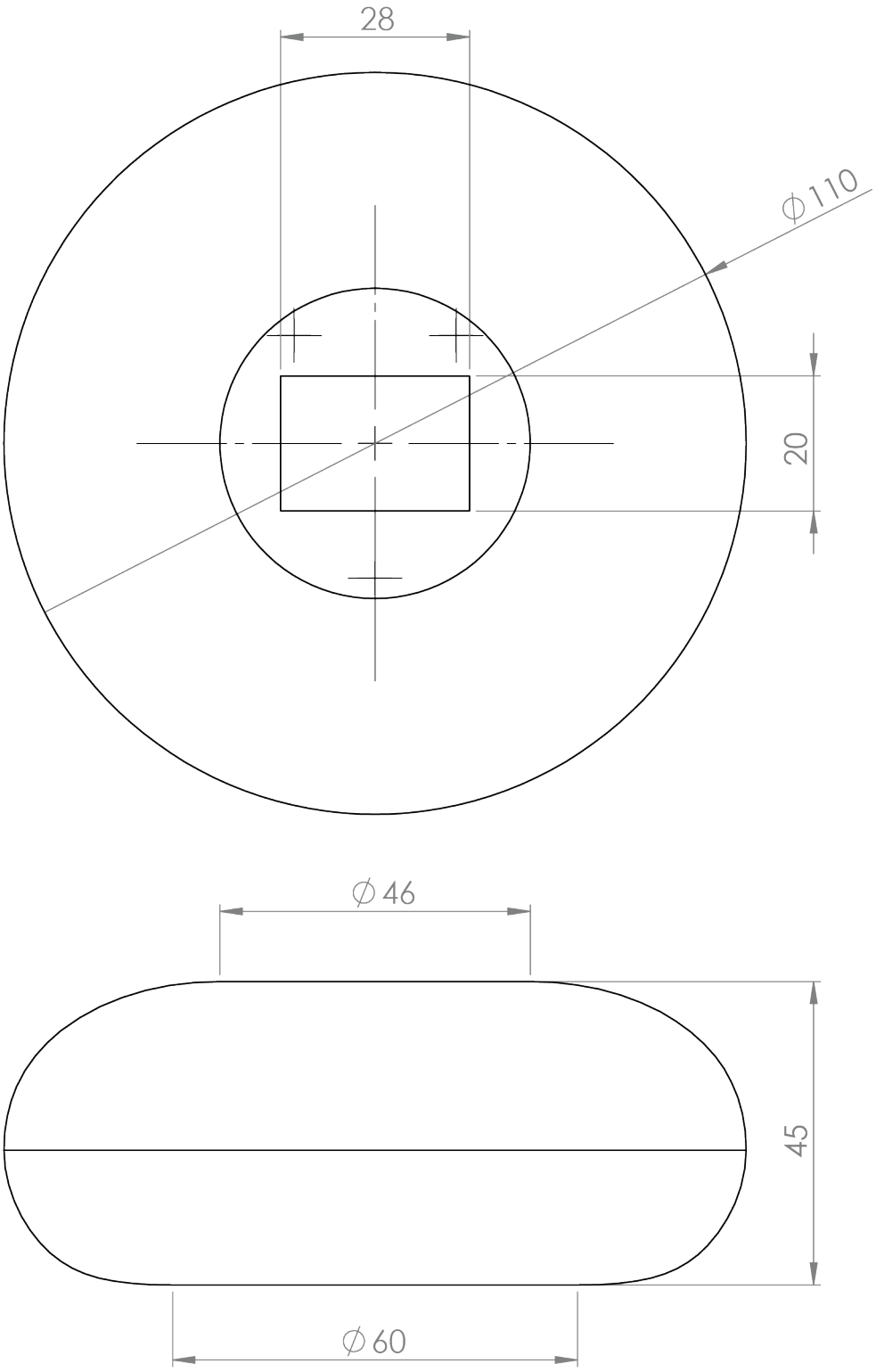
This flower will grow thanks to your emotions, no matter how you feel it will keep on growing. That's the aim of this product, embracing our emotions and learn from them.





APPENDIX J

Dimensions Anima
Scale 1:1



APPENDIX K

Production costs & final cost

Opbouw van de fabricagekostprijs van een compleet product (vgl. Kals)

Product	Anima					
						price per product
In-house production		**price/piece**	**pieces/product**	**price per product**		
Top case		0,0143	1	**€ 0,05**		
Bottom Case		0,0093	1	**€ 0,03**		
Charger Case		0,0357	1	**€ 0,12**		
Mold top case			1	**€ 1,48**		
Mold bottom case			1	**€ 1,48**		
Mold charger			1	**€ 1,41**		
					total production costs	**€ 4,58**
Purchases		**price/unit**	**unit/product**	**price per product**		
Rotary encoder	€	4,950	1	€ 4,95		
NeoPixel Ring - 24 LEDS	€	19,950	1	€ 19,95		
1,3" OLED Display	€	8,450	1	€ 8,45		
Wireless Charging Module	€	10,290	1	€ 10,29		
				€ 43,64	**totaal inkoop**	**€ 43,64**
Assembly Costs			**assemblyseries**	100		
		capacity [piece/u]	**machine hours**	**hourly rate**		
electronic assembly		1	**0,33**	**€ 20,00**	**€ 660,00**	
prodcut assembly		3	**0,2**	**€ 20,00**	**€ 400,00**	
packaging		12	**0,0833333**	**€ 2,50**	**€ 2,08**	
					total machinecosts	**€ 1.062,08**
above	**labourers/machine**		**hours**	**hourly rate**	**labour costs**	
electronic assembly	1		100,00	€ 20,00	€ 2.000,00	
product assembly	1		33,33	€ 20,00	€ 666,67	
packaging	1		8,33	€ 20,00	€ 166,67	
					total labour costs	**€ 2.000,00**
					total assemblycosts	**€ 3.062,08**	**€ 30,62**
K_{ft} Production costs for assembled product for internal calculations:					**Production Costs Anima**	**€ 78,84**

* production costs of the first batch

Opbouw van de fabricagekostprijs van een compleet product (vgl. Kals)

Product	Anima					
						price per product
In-house production		**price/piece**	**pieces/product**	**price per product**		
Top case		0,0143	1	**€ 0,05**		
Bottom Case		0,0093	1	**€ 0,03**		
Charger Case		0,0357	1	**€ 0,12**		
Mold top case			1	**€ 0,01**		
Mold bottom case			1	**€ 0,01**		
Mold charger			1	**€ 0,04**		
					total production costs	**€ 0,28**
Purchases		**price/unit**	**unit/product**	**price per product**		
Rotary encoder	€	1,090	1	€ 1,09		
1,3" OLED Display	€	5,490	1	€ 5,49		
Wireless Charging Module	€	2,490	1	€ 2,49		
				€ 9,07	**totaal inkoop**	**€ 9,07**
Assembly Costs			**assemblyseries**	10.000		
		capacity [piece/u]	**machine hours**	**hourly rate**		
electronic assembly		1	**0,2**	**€ 20,00**	**€ 400,00**	
prodcut assembly		3	**0,2**	**€ 20,00**	**€ 400,00**	
packaging		12	**0,0833333**	**€ 2,50**	**€ 2,08**	
					total machinecosts	**€ 802,08**
above	**labourers/machine**		**hours**	**hourly rate**	**labour costs**	
electronic assembly	1		10.000,00	€ 20,00	€ 200.000,00	
product assembly	1		3.333,33	€ 20,00	€ 66.666,67	
packaging	1		833,33	€ 18,00	€ 15.000,00	
					total labour costs	**€ 200.000,00**
					total assemblycosts	**€ 200.802,08**	**€ 20,08**
K_{ft} Production costs for assembled product for internal calculations:					**Production Costs Anima**	**€ 29,43**

* production costs final product

	Voorbeeldberekening voor de winkelprijs op basis van de fabricagekostprijs (bron: Erik Thomassen).		
K_{Ft}	Production costs for assembled product for internal calculations:	**Proefset Goûteur**	**€ 29,43**
F_{OB}	Overheadfactor operating costs*	15%	
F_{OV}	Overheadfactor sales costs	5%	
F_W	Profitfactor	25%	
	Total factor = product of (each factor+1) minus 1	50,9%	**€ 14,99**
K_V	Fabrication price finished assembled		**€ 44,41**
	Margin supply chain (for example: importer, distributer, wholesales)	25,0%	**€ 11,10**
	Wholesale price		**€ 55,52**
	Margin retail	70,0%	**€ 38,86**
	Netto sales price (ex. taxes)		**€ 94,38**
	Taxes**	21,0%	**€ 19,82**
	Verkoopadviesprijs, normale winkelprijs		**€ 114,20**

*) The overheadfactor regarding operating costs entails additional production costs such as prototyping, user research, certification, patents, etc.

**) determine tariff of taxes (differs per country)

* final price

APPENDIX L

Price comparison with healthcare products

Body cardio

Wi-Fi Smart Scale with Body Composition & Heart Rate

- Heart health: Assess overall cardiovascular health with heart rate measurement

- Full body composition analysis: Monitors weight (kg, lb., st lb.),
- Automatic synchronization: Data from every weigh-in appears in the Health Mate app via Wi-Fi

149.95 EU

Sleep

Sleep Sensing & Home Automation Pad

- Advanced sleep tracking: Sleep cycles (deep, light & REM), heart rate and snoring.

- Personalized coaching: Dedicated in-app coaching program to help reduce fatigue & improve health.

99.95 EU

Thermo

Smart Temporal Thermometer

- Quick & easy: Ultra-fast measurement with color-coded fever indicator

- Sanitary: Non-invasive measurement

- Automatic synchronization: Data from every measurement and health advice appear in the Thermo app automatically

99.95

Fitbit Alta HR

HEART RATE + FITNESS WRIST-BAND

slim heart rate wristband that tracks activity, sleep and exercise, displays notifications and sends Reminders to Move.

99.95

Spire

stress reliever wearable

monitors your breathing all-day and guides you to calm.

$79.00

Muse

Muse is an EEG device widely used by neuroscience researchers around the world. It uses advanced signal processing to interpret your mental activity to help guide you

€171


TUDelft