

Foodpal

Support healthy eating habits for chronic dieters



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The exploration of this self-initiated project helps me gradually establish a new attitude towards food, diet, body image, and body shaming. It's time to move on with the scientific stuff. Hope you will get inspired by this project. :)

EXECUTIVE SUMMARY

Because of their over-concern with body shape and weight, chronic dieters may eventually damage their physical and mental health. Typical problems include hair loss, extreme hunger, depression, and food obsession. For the sake of their health, they have to get rid of chronic dieting and change their restrained eating behavior. This project will focus on chronic dieters who have been aware of the harm of a long-term restrained diet and are willing to change their current eating habits. Specifically, I will tackle the Chinese college female students who are in their 20s.

This project aims to develop a product that guides chronic dieters to counter their fear of eating and to finally formulate a personalized food ritual. Getting rid of restrained eating does not mean they will end up eating a lot of junk food and have a disastrous life. But they will be more mindful about the food they eat. Their focus will be shifted from calories or nutrition of food, and how food makes them gain weight to the essence of food and their internal feeling due to eating. In this way, they will receive positive experiences and memories that will confirm their decisions of giving up dieting to pursue a healthier lifestyle.

The result turns out to be a product that accompanies and guides the user to be more mindful throughout the eating journey. Foodpal is a product with a pair of chopsticks linked to a plant-growing app. The pressure sensor on the head of the chopsticks can monitor the user's eating speed, thereby affecting the growth of plants on the app. The interaction with the app encourages the user to be more mindful of the eating process. The growth of the plant on one hand is a metaphor for the recovery of the user's body due to eating. On the other hand, it is the reward for the user's courage to fight against their fear of eating and gaining weight, so that they can be motivated to keep eating in a new mindful way.

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INTRODUCTION

to the project

Design for Food & Eating Design Lab

This graduation project is a self-initiated research and design project within the scope of Design for Interaction Master's Program at Delft University of Technology. It has been conducted within a lab in the Faculty of Industrial Design Engineering. The Food & Eating Design Lab aims to bring together designers and researchers with stakeholders in agriculture, the food industry, the hospitality sector, health professionals, and any others who try to improve people's interactions with their daily foods.

Personal motivation

This project started with my interest in Design for behavioral change and the human-food relationship. Nowadays, a great emphasis is placed on body weight and body image ideals. Following a diet is popular even among people within a non-overweight BMI range. But diet does not bring health and beauty to everyone. Lots of people have experienced anxieties toward food and eating, tiredness, and decreased pleasure. Some even have physical symptoms like hair loss or stomachache. Their relationship with food is so poor that food becomes their enemy. They fear to eat. They feel guilty and anxious due to eating. Why do they end up in this situation? Can I, as a designer, do something for them? I found it a fascinating topic to further research and learned from it.

Problem definition

This project focuses on chronic dieters who have been aware of the harm of a long-term restrained diet and are willing to change their current eating habits. Chronic dieters are those who consistently restrict energy intake to maintain an average or below-average body weight. To be specific, I will tackle the Chinese college female students who are in their 20s. I define this research scope because lots of studies have indicated the popularity of diet and weight loss among Chinese college female students.

In this project, I will dig deep into the health problems they meet, their past experience that brings them to such a situation, the causes, beliefs, and mechanisms behind the problems, and their concerns and challenges in eating behavior change. The insights will enable me to define the intervention space and come up with strategies that re-frame chronic dieters' unhealthy relationship with food.

The outcome will be a product that guides chronic dieters to counter the fear of eating and to finally formulate a personalized food ritual.

Design phases

The design project used the "Double Diamond" model developed by the British Design Association in 2005. The integrated design process including four phases, discover, define, develop, and deliver. (Figure 0-1)

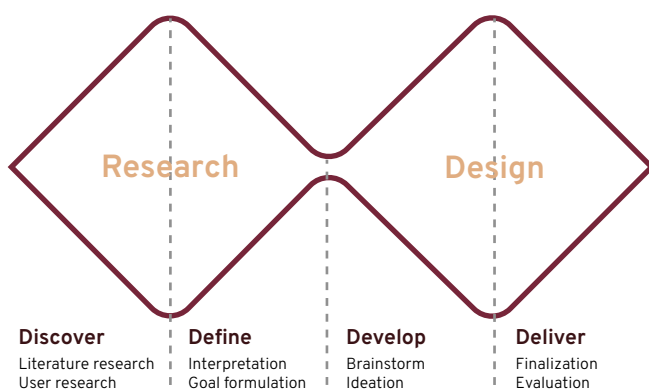


Figure 0-1: Double diamond framework

Report structure

Chapter 1 | Literature research

Literature research aims to understand the context of the project. This chapter will tackle topics including the definition and features of chronic dieters, the factors and problems of restrained eating, the causes of body image disturbance, and current strategies in the field of eating behavior change.

Chapter 2 | User research

User research aims to know about chronic dieters' experiences, beliefs, as well as current concerns and challenges in getting rid of restrained eating. This chapter will convey the purpose, scope, method, process, and outcomes of user research.

Chapter 3 | Design goal

The design goal is what I want to accomplish in my context. In this chapter, the target group is defined, a goal statement is formulated, and four design qualities are proposed.

Chapter 4 | Concept ideation

Concept ideation aims to find the concept direction for further finalization. The chapter communicates the design process includes brainstorming, ideating, and selecting concepts with the vALUE method.

Chapter 5 | Concept finalization

Concept finalization aims to bring forward the design that achieves the desired interaction. This chapter explains the iteration process and presents the final design.

Chapter 6 | Evaluation

The evaluation aims to test whether the final design achieves the goal and desired interaction. This chapter includes the purpose, process, and outcomes of the evaluation. Further recommendations and reflections are also included in this chapter.



F A T

1. LITERATURE RESEARCH

Literature research aims to understand the context of the project. Four main research questions are formulated at the beginning of this chapter, which are about four topics related to the project. They are the definition and features of chronic dieters, the factors and problems of restrained eating, the causes of body image disturbance, and current strategies in the field of eating behavior change. Finally, the conclusions answer the research questions, which are also the input for further user research and definition of intervention space.

1.1 Purpose

Literature research aims to learn about the status quo and consequences of chronic dieting, to understand the societal background and individual beliefs contributing to weight loss, and to find the current solutions to change people's eating behavior. The outcome will serve as the basis to formulate the user research and later designate intervention areas.

The following research questions will be answered by the literature research:

RQ1 People

Who are chronic dieters?

- What is the definition of chronic dieters?
- What health problems do chronic dieters have?
- What are the characteristics of chronic dieters who have been aware of the health problems?
- What is the status quo in China?

RQ2 Experience

How do people diet?

- What are the health effects of restrained eating?
- What are the differences between restrained and unrestrained eaters?

RQ3 Cause

Why do people engage in weight loss activities?

- What are the purposes of weight loss?
- How do they influence the behavior?
- Why do people with normal BMI want to lose weight?

RQ4 Solution

What are the current strategies and interventions for restrictive diet recovery?

- What is the definition of a healthy human-food relationship?

1.2 Chronic dieters

Introduction: In today's society, there is a group of people who place a great emphasis on body image ideals. They always feel pressure to achieve weight-loss goals. Therefore, they take a long-term strict food-restrictive diet. However, their obsession with pursuing a perfect body shape leads to psychological and emotional harm for them. In this project, I would like to focus on this group of people.

In this section, literature will be reviewed to define chronic dieters and figure out their health problems. In addition, the reasons for choosing a specific project scope will be indicated.

Definition

Chronic dieters are defined as individuals who consistently restrict energy intake to maintain an average or below-average body weight for more than 2 years. [1] Chronic dieting syndrome describes individuals who

- have a persistent overconcern with body shape and weight;
- restrict their food choices for 2 or more years;
- continually diet to achieve weight loss without success or with success but with weight regain. [1]

Chronic dieters have a different mindset from normal eaters, which is called the **diet mindset**. People with the diet mindset are often preoccupied with shape and weight. They usually put much effort and energy into dieting and pursuing body image ideals. They also have dysfunctional beliefs about food and exercise. [2] They believe that they can achieve their body image ideals as long as they eat right and exercise enough. A study by Mossavar-Rahmani found that when someone has a higher degree of inaccurate body size estimation, he/she will be more likely to diet.[3] Thus, dieting, body image cognitions, affects, and behaviors are fundamentally linked. A more detailed explanation of dieting behavior and body image cognitions can be found in section 1.2 restrained eating and section 1.3 body image dissatisfaction.



Health problems

Because of the long-term restrained eating habits, lots of chronic dieters have experienced some health problems to certain extents.

Typical physical harms include:

- poor energy and nutrition intake; [4]
- higher body weight; [4]
- lower resting metabolic and total daily energy expenditure; [4]
- poor exercise performance; [4]
- menstrual dysfunction in women. [4]

Typical psychological problems include:

- disordered eating behavior; [4]
- anxieties toward food and eating; [5]
- decreased pleasure and well-being; [5]
- preoccupation with food in thoughts and conversation; [6]
- concerns with finding food. [6]



Scope of the project

This project will focus on chronic dieters among Chinese, female, college students who are in their 20s. They have been aware of the harm of a long-term restrained diet and are willing to change their current eating habits.

To further explain who I want to tackle, the transtheoretical model of behavior change [7] can be involved. The model posits that health behavior change involves progress through six stages of change: precontemplation, contemplation, preparation, action, maintenance, and termination. (Figure 1-1) My target group is in the contemplation or preparation stage. Although they have taken their current eating habits as a problem, they need information and guidance in the process of formulating unrestrained eating habits. Meanwhile, they may still have concerns about gaining weight and changes in body image.

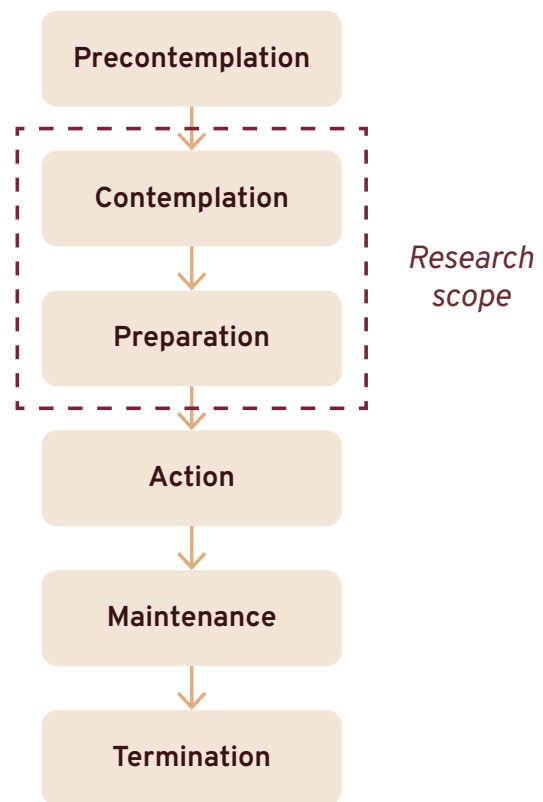


Figure 1-1: Transtheoretical model of behavior change

Status quo in China

With the development of Chinese society, people's living standards have improved and their values have changed, weight loss has become one of the passions of the majority of women. And this phenomenon also increasing appears among young people. At present, weight-loss behavior is very common among female college students. They are keen to change their body shape in various ways and pursue a more perfect body.

A growing number of researches in China indicate the popularity of weight loss among female college students. This group of people has an inaccurate weight perception. Most of them are under or at the right weight, indicating that they are trying to lose weight. In a survey conducted in 2008, about 40 % of a sample of 1614 female college undergraduates had tried to lose weight. Among them, 77.89% of them lost weight just because they were

not satisfied with their body image. Similarly, research in 2013 with a sample of 222 female college students showed that 35% had tried to lose weight. Among them, 61.2% of them perceived themselves to be normal weight but 75.2% of them were normal weight. 22.5% of them perceived themselves to be overweight but only 3.2% of them were overweight. Another survey in 2020 reported that 72% of a sample of 285 female college undergraduates had tried to lose weight. However, only 17% of female undergraduates were overweight. (Table 1-1)

It is a typical measure for students with the purpose of weight loss to restrain food intake. The survey in 2008 indicated that about 40% of students restrain the amount of food they eat and about 26% of students adjust their diet structures. Besides, another survey in 2020 showed that 30% of students had tried to lose weight for more than 2 years and 15% of students had done more than 1 year. (Table 1-1)

	Year	Sample size (female college students)	Percentage of students who tried to lose weight	About body image disturbance	About Dieting behavior	Percentage of students who successfully lost weight
1	2008	1614	40.09%	13.94% of them were overweight. 77.89% of them lost weight just because they were not satisfied with their body image.	39.30% of them restrained the amount of food they eat and 25.90% of them adjusted their diet structures	14.22%
2	2012	222	35%	61.2% of them perceived themselves to be normal weight. But 75.2% of them were normal weight. 22.5% of them perceived themselves to be overweight. But only 3.2% of them were overweight.	27% of them restrained the amount of food they eat and 30% of them adjusted their diet structures	17.22%
3	2020	285	72%	Only 17% of female undergraduates were overweight.	30% of them has tried to lose weight for more than 2 years. 15% of them have done more than 1 year. 75% of them tried restraint eating.	/

Table 1-1: Statistics of researches among Chinese female students

There are reasons why **Chinese female college students** are especially worthy of being studied:

1. **China's education system has led to college as the period when female students have the most time and energy to lose weight.** In China, the score of the National College Entrance Examination will decide which college major a student can choose. This exam is scheduled to take place in June all over the country once a year. So for most people, they only have one chance in their lifetime. Therefore, before students take this exam, most of their time and energy is spent on studying. They live with their family or some in the school dormitory and have a similar fixed daily routine. However, when students enter college, they move out and are flexible with time management. Topics like appearance come into girls' minds. Female students get the chance to attempt to lose weight in college.

2. **People from east Asia are more strict in body shape.** Here is an informal study telling the difference in body shape preference between Eastern and Western countries. [31] They sent an original picture to people in different countries and asked them to photoshop it to so that the result would fit their ideal body shape. (Figure 1-2) Although this cannot represent the preference of every Chinese people, the portrayals of an unattainable skinny body image are pervasive and welcome on Chinese social media. Female college students, as a group of people who are exposed to such images, may have a more negative body image and feel pressure to achieve weight-loss goals.

3. **China has its own food culture.** A girl with a traditional Chinese appetite will prefer hot food, like rice and noodles. But most of the knowledge of weight loss comes from Western countries. When this girl conducts a diet, she probably will first choose a salad or a low-cal sandwich. When she wants to give up, maybe she will go back to eat traditional Chinese food. Or she may want to develop new food combining Western and Eastern food. Therefore, food culture will influence the design outcome.



Figure 1-2: An informal study about the body shape preference

Characteristics and behaviors

What deserves further attention is that there existed body image dissatisfaction and weight-loss inertia or immobility among chronic dieters, which can be interpreted as an indisposition to change. For example, their overconcern with body shape and weight contribute to continual efforts to lose weight regardless of their actual body weight and health status. Due to the ineffectiveness of chronic dieting, another side effect, losing and regaining weight again and again, might have negative health consequences (physical and psychological). [1]

More importantly, even for those who have realized the problems of chronic dieting, it is not easy to simply get rid of it. **They count calories or label food as healthy or unhealthy unconsciously**, which makes it hard to change the behavior at the beginning.

As the statistics of previous research showed, **female college students who are trying to lose weight are actually underweight or about the right weight.** A study done by Lara in the USA indicated that Individuals in this group were significantly more likely to be in a fraternity/sorority, have a lower body mass index, engage in regular vigorous physical activity, exercise and/or diet to lose weight, and engage in unhealthy weight-control behaviors. [8]

However, the characteristics and behaviors especially of Chinese students might be to some extent different due to context and culture, which needs to be figured out in this project.

Summary

Who are chronic dieters in this project?

Year of dieting	<i>>2 years</i>
Diet behavior	<i>Consistently restrict energy intake;</i>
Gender	<i>Female</i>
Age	<i>20+</i>
Career	<i>College student</i>
Nationality	<i>Chinese</i>
Stage of behavior change	<i>On the contemplation or preparation stage</i>
Characteristics	<i>Underweight or about the right weight; With diet mindset; With body image dissatisfaction; With weight-loss inertia.</i>

1.3 Restrained eating

Introduction: In an effort to control body weight, women usually intentionally restrict dietary intake. However, this may lead to lots of problems. (Figure 1-3)

In this section, literature will be reviewed to understand what restrained eating is and its effect on health. Specifically, I would like to learn about calorie restriction, a typical way of restrained eating, Orthorexia nervosa, an extreme condition of restrained eating, and disinhibitors, a typical behavior due to restrained eating.

Definition

Restrained eating is defined as the tendency to restrict food intake consciously in order to maintain body weight or to promote weight loss.[9]

There are two typical behaviors of restrained eating. They are counting calories of food and labeling food as healthy or unhealthy. However, whatever restrictive diet people choose, they may face some health problems. (Figure 1-3)

Calorie restriction

Calorie restriction is a typical way of restrained eating. It used to intend for weight individuals who are at risk for health problems. However, nowadays it has been incorporated into the sociocultural drive for thinness and internalized by many who are not at

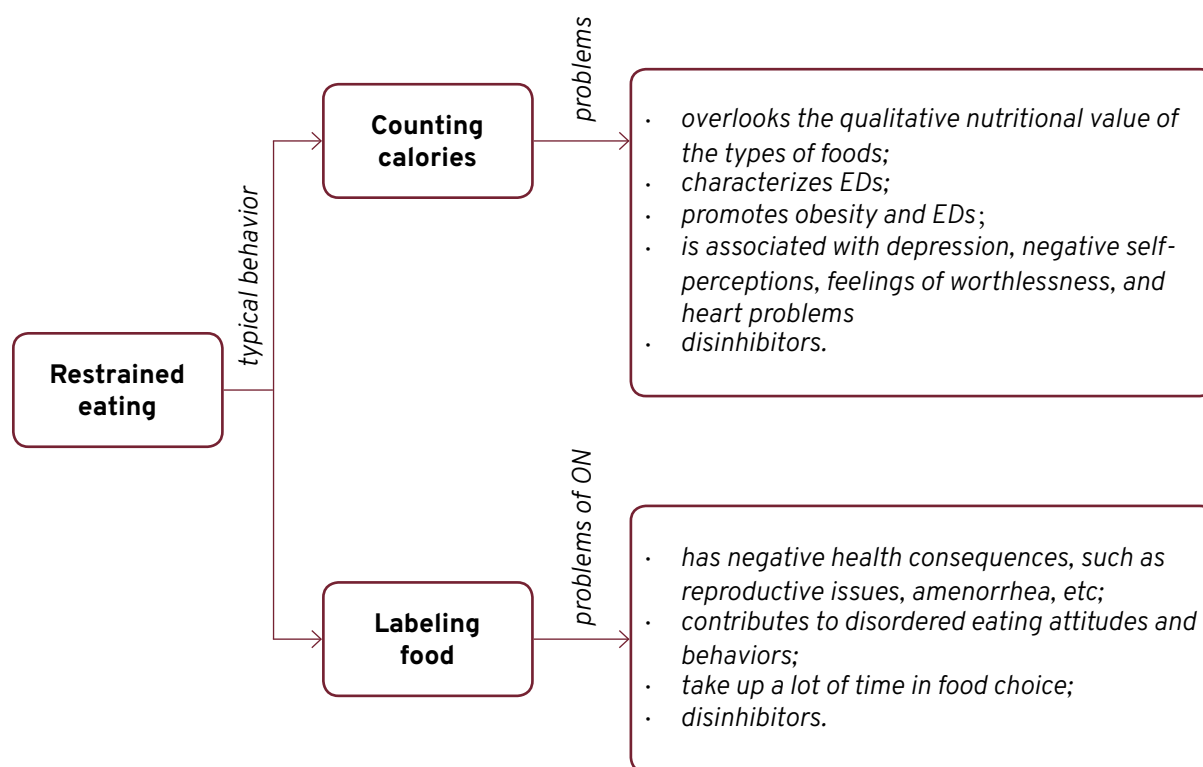


Figure 1-3: Problems related to restrained eating

risk for weight-related health problems, but who are at risk for poor body esteem, obsessive dieting, the development of eating disorders (EDs), and diet-induced weight gain.[5]

The quantitative focus of counting calories and adhering to specific arithmetic calorie goals **overlooks the qualitative nutritional value of the types of foods individuals consume**. When the focus falls on counting calories, higher-fat higher-calorie foods that preclude weight gain (e.g., avocados, nuts, fatty fish) can be overlooked in place of lower-calorie, synthetic substitutes (e.g., artificial sugars, refined grains). [10]

Frequent calorie counting also **characterizes EDs**. It is common for Individuals with EDs to calculate and monitor their dietary intakes so that they can ensure adherence to self-set caloric limits. when energy deficits are maintained, binge eating and other ED symptoms commonly arise. Consequently, encouraging calorie counting can be considered prescribing a symptom of debilitating health condition.[10]

Further, there are studies showing that limiting caloric intakes to levels recommended in obesity treatment guidelines (women: 1200-1500 kcal/day; men: 1500–1800 kcal/day) **promotes obesity and EDs**. Individuals who restrict their caloric intakes often experience increased fatigue and hunger which, in turn, translates to elevated food consumption. Repeated weight losses and gains frequently arises, which leads to adverse health and well-being and ED symptoms. In addition, dieting more generally **is associated with EDs, depression, negative self-perceptions, feelings of worthlessness, and heart problems**.[10]

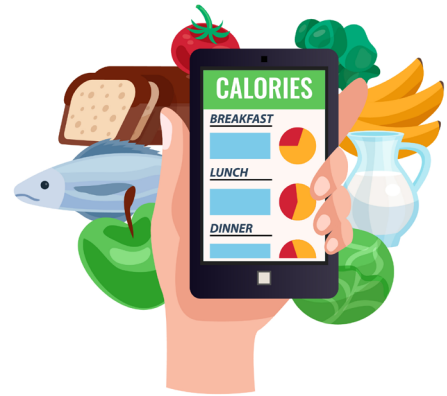


Figure 1-4: Nutrition facts label

Orthorexia nervosa

Simply labeling food as healthy or unhealthy, which leads to an obsession with a healthy diet, has transformed from a solution to part of the problem. The extreme clean eating is described as Orthorexia nervosa (ON). It is a new concept about eating behaviour disorders and is composed of pathologic obsession for biologically pure foods, which can cause substantial dietetic limitations and which is able to lead to obsessive thoughts about foods, affective dissatisfactions and intense social isolation. [11]

ON is potentially risky in several ways. First, extreme clean eating could **have negative health consequences that resemble those of an eating disorder**, such as reproductive issues, amenorrhea, osteoporosis, bone fractures, irregular heartbeats, difficulties concentrating and depression. The National Eating Disorders Association in United states cautions that the health consequences of extreme fixation with 'healthful' eating resemble those resulting from anorexia nervosa.

Second, promoting extreme views such as "sugar is the enemy" and the need to omit certain food groups without justification may **contribute to disordered eating attitudes and behaviors**. [12] People with orthorexia are likely to shun foods which may contain unhealthy fat, too much salt or too much sugar even when they crave for such food in their mind. The methods of preparation and materials are also part of the obsessive ritual. **The configuration of the day-to-day diet takes up a lot of time**. [11]



Disinhibitors

The presence of disinhibitors is common among people who chronically restrict their food intake. It is a perception of having overeaten, alcohol or stress.[13]

In fact, in a large population-based study, restrained eaters report that they were more likely to **overeat** than unrestrained eaters. A series of studies have shown that inducing restrained eaters to eat high calorie, “fattening” foods in the laboratory will cause them to eat greater amounts of any palatable, tempting food they are served next. Even just perceptual exposure to attractive foods seems to cause restrained eaters to increase their intake. [14]

Many attempts have been made to determine variables that distinguish between dieters who are prone to overeating, and those who are able to exert more enduring restraint. It was found that **individuals high on a disinhibition scale were found to be more prone to use such dietary practices as counting calories, eating low-calorie foods, and avoiding certain foods, whereas those scoring lower tended to take smaller portions, and ate more slowly.** Compared to those less prone to disinhibition, disinhibited eaters also felt guiltier after overeating.[15] They are more distressed or uncomfortable when they eat more than other people do or when they exceed social norms of appropriate amounts to eat. [14]

Summary

How do people diet?

When people want to lose weight, they usually consciously choose to restrict food intake.

Typical behaviors of restrained eating include counting calories of food and labeling food as healthy or unhealthy, both of which have proven to have harmful impact on psychological and emotional health for some groups.[5, 11]

Several investigations have shown that restrained eaters consistently show a tendency to overeat under several experimental conditions, including the preloads of food, ingestion of alcohol, and reaction to dysphoric moods. This phenomenon is related to the disinhibition of cognitive control of eating behaviour, and has been regarded as an experimental analogue of binge eating.[9]

1.4 Body image dissatisfaction

Introduction: The main purpose of dieting is to change people's appearance. Their reasons can be divided into the society ones and the individual ones. (Figure 1-4)

This section will first compare the behavior and outcome of people's diet for the purpose of appearance and health. Further research will be done in the group of people who diet for appearance in the perspective of society and individuals. Finally, two misunderstandings about

Purpose for diet

Two typical purposes for individuals to diet are changing their appearance and improving their health. The dieting behavior and outcome of the two groups of people are different. **Individuals who diet for appearance were more likely to use drastic dieting strategies, and to score higher on measures of disinhibited eating, or lapses in restraint.** On the other hand, dieting driven by health concerns was associated with fewer negative sequelae. These results show that not all eating behaviors labeled as "diet" are equally harmful, and the driving force behind dieting is a factor that needs to be considered more than dietary restriction itself. [18]

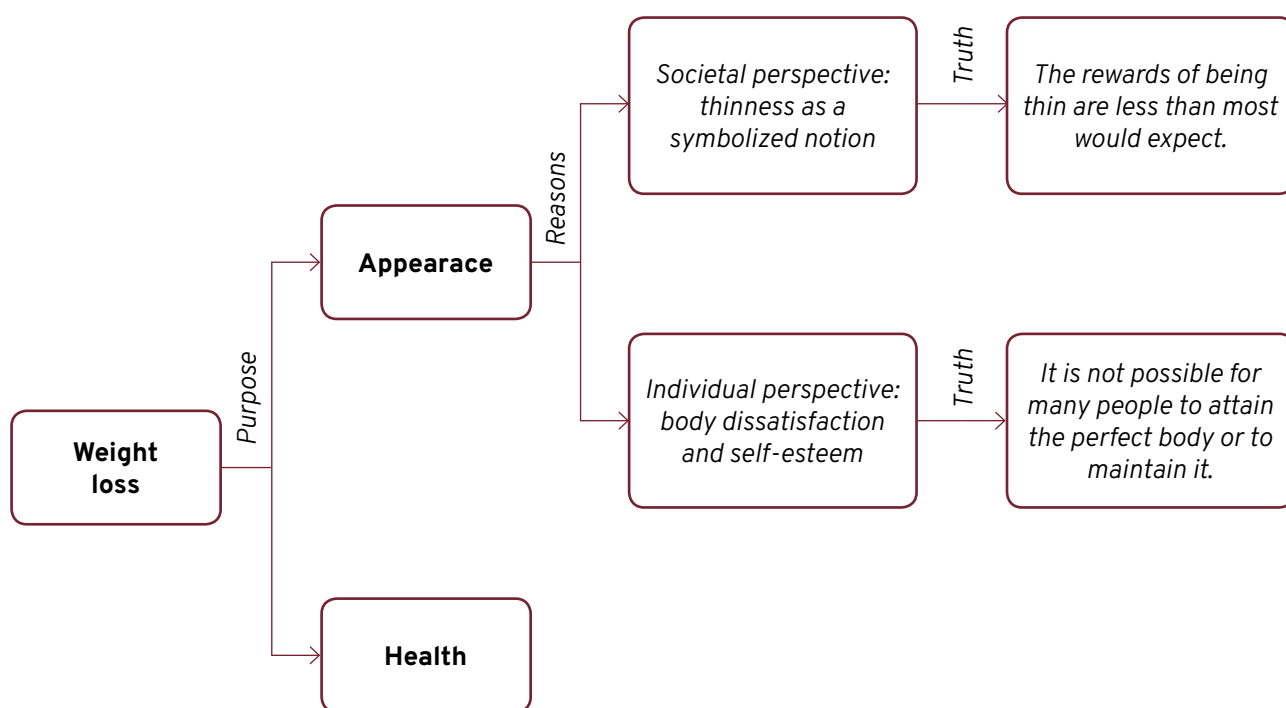


Figure 1-4: Reasons and truths to weight loss for appearance

Societal perspective: thinness as a symbolized notion

It is common knowledge that obese people are encouraged to lose weight so as to prevent the diseases associated with obesity, which include diabetes mellitus, coronary heart disease, certain forms of cancer, and sleep-breathing disorders.[19] However, even people with a non-overweight BMI want to lose weight. It can be attributed to the cultural values in slim body shape. Many factors provide evidence to the obsession with slimness in society, including the number of low-calorie diets on the market and the many establishments for losing weight, as well as the massive increase in the articles and advertisements on dieting and slimming in social media. Thinness has many symbolized notions in our society. **It can represent self-discipline, control, sexual liberation, assertiveness, and competitiveness, as well as affiliation to higher socioeconomic classes.**[20] These combined with traditional values of attractiveness and fashionability have resulted in weight loss becoming a cultural preoccupation, Nylander [21] points out that women's dissatisfaction with their body weight is highly prevalent, reaching its peak around adolescence. This has been confirmed by other studies on female student populations [22].

Individual perspective: body dissatisfaction and self-esteem

Self-concept theories in the Jamesian tradition propose that dissatisfaction in a particular domain will have an impact on overall global self-esteem to the extent that the domain is central to the individual's self-definition. [23] Initial self-esteem can be used to predict later eating concerns and disorder problems.[24] In addition, weight satisfaction was also found to be antecedent to self-esteem. Thus people who are low on weight satisfaction may be particularly vulnerable to developing lower self-esteem. [25]



Misunderstanding

Regarding weight and body type, there are two general assumptions. One is that the body is infinitely malleable, and that every person can reach the ideal with the right combination of diet and exercise. The second is that vast rewards await the person who attains the ideal. [17]

Studies have shown that biological variables, especially genetic factors, have a large impact on the regulation of body weight and body shape. Hence, the extent to which a person can change is limited. This places culture in conflict with physiology. [17]

In addition, people who pursue the perfect body expect real and symbolic rewards. These rewards include success, happiness, a fuller life, and a positive relationship with the opposite sex. Studies generally do not support these notions. The perfect body symbolizes control. In a culture that values self-control, hard work, and the delay of gratification, having a desirable body signals the outside world that the individual is in control. It shows control over impulses to eat and to be inactive, and reflects hard work. [17] But in fact, we all know this is not the truth. There is even substantial evidence that fear of being fat is a powerful motivator. Anorexia nervosa and bulimia are the most pathological outcomes of excessive dieting. [17]

Summary

Why do people engage in weight loss activities?

Purpose for dieting can be different according to different people. Dieting for appearance is the most common one.

Body image dissatisfaction, especially among women, has become so prevalent that it is commonly termed a normative discontent. Negative body image may be caused by the individual's internalization of the culture's over-valuing or objectification of a thin body ideal, which in turn may increase feelings of body shame and decrease awareness of internal bodily states (ie, hunger and satiety cues).[1]

In addition, low self-esteem women are most susceptible to perceive themselves as overweight and dissatisfied with their body image. [16]

However, studies showed that it is not possible for many people to attain the perfect body or to maintain it. In addition, the rewards of being attractive are less than most would expect. Pursuing ideals and failing to reach goals can have serious consequences, some of which are psychological, while others are physical (for example, increasing the health risks of weight cycling) [17]

1.5 Current strategies

Introduction: In this section, a healthy human-food relationship will be first discussed. Then, current strategies and interventions in eating behavior change will be reviewed, including intuitive eating, mindful eating, and reverse dieting.

Healthy human-food relationship

Food has different positions in our lives. Basically, food intake is how our body gains energy. In some circumstances, food can soothe our negative emotions and pain. On some social occasions, food can bring shared joy to everyone present. In general, food has three aspects in our lives, which are physiological, psychological and societal aspects. Therefore, the definition of a healthy relationship to food differs from person to person. But it is certain that when the meaning of food is extremely biased to one aspect, this person's relationship with food is unhealthy.

Intuitive eating

Intuitive eating (**an anti-dieting, hunger-based diet**) has been promoted as a viable method of healthy weight management. Previous research has found that intuitive eating is significantly associated with lower body mass index, lower triglyceride levels, higher high-density lipoprotein levels, and improved cardiovascular risk. An educational intervention to increase intuitive eating found that as individuals who increased intuitive eating behaviors also increased anti-dieting and intrinsic eating styles, while decreasing emotional eating and dietary restraint. In addition, with the increase in intuitive eating, the individual's self-esteem and physical self-esteem have also been improved. [5]

Mindful eating

Mindful eating consists of **making conscious food choices**, developing an awareness of physical or psychological hunger and satiety cues, and eating healthfully in response to those cues. It is conceptualized as being aware of the present when one is eating,



paying close attention to the effects of food on the senses, and paying attention to the physical and emotional feelings of eating. There is no universal definition of mindful eating but these principles are consistent in the literature. Mindful eating has been proved to change eating behaviours by increasing awareness of internal physical cues, internal emotional cues and external cues. Previous research suggested strong evidence for the efficacy of mindfulness in reducing the frequency and intensity of binge eating symptoms. In addition, mindfulness is also effective in raising the awareness of hunger and supporting improvements in body dissatisfaction. [26]

is not sustainable for long-term health, well-being, and body function. [27]

Although practice shows reverse diet can help people increase calories intake with minimal weight gain, to slowly increase food intake, reverse diet still needs people to count their calorie intake and weigh themselves to keep track of the eating experience, which makes it improper to people who have psychological eating problems.

Reverse diet

Although the term cannot be found in any dictionary, reverse diet is a term used within the bodybuilding and competitive weightlifting communities to describe a period of time after a calorically restricted eating protocol during which people slowly work to **increase calories back to a maintenance level**. With this strategy, and by assessing progress weekly and tracking the increase in body fat compared to lean muscle mass, athletes can restore their metabolism and increase calorie intake with minimal increase in body fat.[27]

The most common reason for implementing a reverse diet is to bring calories back up to a healthy and sustainable level after a long-term weight-loss diet. A reverse diet can be implemented in order to slowly increase food intake to a maintenance level. For the majority of individuals, maintaining an extremely low-calorie diet

Summary

What are the current strategies and interventions for restrictive diet recovery?

Although there are some existing strategies and interventions used by dietitians and psychologists in the field of eating behavior change, no experimentally feasible method has been raised for getting rid of restrained eating. However, those strategies and interventions are still able to inspire further design.

1.6 Conclusion

RQ1 People

This project will focus on **chronic dieters among Chinese, female, college students who are in their 20s. They have been aware of the harm of a long-term restrained diet and are willing to change their current eating habits.** The **diet mindset** will influence their determination to get rid of restrained eating. The mindset includes preoccupation with shape and weight, perceived deprivation, and dysfunctional beliefs about food and exercise. To change their eating behavior, I need to figure out how to tackle the diet mindset.

RQ4 Solution

Although no acknowledged method has been proposed for getting rid of restrained eating, both intuitive eating and mindful eating might be helpful in intervention development, which needs to be validated in this project. A healthy relationship with food differs from person to person. The intervention should allow people to explore their own definition of a human-food relationship.

RQ2 Experience & RQ3 Cause

To work with chronic dieters, I need to **be aware of the factors that precipitate body image dissatisfaction and to explore with my target group how these issues may affect food choices**, ie, dietary fat restriction for weight loss, increase in binge eating, or decrease in awareness of internal bodily states [1]

A shift in focus from losing weight to healthy living regardless of size may prove beneficial by providing an option to chronic dieting, thus alleviating inertia or immobility and possibly increasing the likelihood for positive behavior change. The intervention may assist in diverting health promotion efforts away from weight loss and towards achieving healthful lifestyle behaviors, which has been shown to decrease morbidity and mortality and improve body image. Additionally, **the promotion of positive body image** has been established as enhancing the quality of life.[1]



2. USER RESEARCH

User research aims to know about chronic dieters' experiences, beliefs, as well as current concerns and challenges in getting rid of restrained eating. These aspects are formulated as research questions at the beginning of this chapter, following by the scope, method, process, and outcomes of user research. The conclusions, in the end, answer the research question.

2.1 Purpose

To understand the contextual and personal factors related to eating behaviors of chronic dieters, the following questions need to be answered by the user research:

RQ1 Problems

What type of diet will cause problems to dieters?

- What is their current dieting behavior?
- How do they feel about their eating behavior? And why?
- What kind of diets have they taken in the past?
- How do they feel about them?

RQ2 Experience

What contextual factors and individual beliefs will influence people to choose a problematic diet?

- What is their diet history?
- Why do they diet?
- What are their attitudes toward their body image? How does this influence their eating behavior?
- When/ how often do they experience disinhibitors?
- How do they feel about disinhibitors?
- What are their current strategies to deal with disinhibitors?

RQ3 Beliefs

Why do they want to give up dieting?

- What does a healthy relationship with food mean to them?

RQ4 Behavior change

What concerns and challenges do they have when giving up dieting?

2.2 Scope

*This project will focus on chronic dieters among **Chinese, female, college students who are in their 20s**. They have been aware of the harm of a long-term restrained diet and **are willing to change their current eating habits**.*

(Check section 1.2 Chronic dieters for reasons.)



2.3 Method

Introduction: Two methods, individual interviews, and a study in a social media group, were chosen for user research, both of which will be explained in this section.

Individual interview

Goal

Not every dieter meets such severe physical and mental problems that make them decide to give up dieting. I want to understand what kind of diet may cause problems, and what past beliefs and ways of decision-making lead to their choice of such a diet. To achieve the goal, I conducted individual interviews with 10 people with different dieting experiences.

Study set-up

Participants filled the sensitizing booklets for one weekday and one weekend. After completion, each booklet was reviewed by me to prepare individual questions. Online individual interviews were done with zoom or WeChat. They were informed that the interview would be audio recorded for transcription purposes.

Study material & process

The participants were first asked to finish a digital sensitizing booklet, which was a file of slides. (See Appendix 2.1)

The booklet was a food journal for two days. Participants can pick one weekday and one weekend that suit them. On those two days, they were asked to finish the following activities:

- take photos of the food you eat;
- collect your emotions and thoughts before, during, and after you eat;
- fill in the roadmap;
- answer a few questions at the end of each day.

The booklet aimed to help people start thinking about their current eating behavior and relationship with food. It was also a conversation starter for the individual interview.

Each interview took about 45 minutes, including the stage of welcoming, asking questions, and ending the session. (See Table 2-1) Different questions were prepared for individuals who were still dieting and those who had given up dieting. Questions mainly focused on the changing process of individuals' feelings, beliefs, and dieting behaviors. (See Appendix 2.2)

Participant recruitment

As the purpose of the individual interview is to map out what kind of diet may cause problems, and what past beliefs and ways of decision-making lead to their choice of such a diet, participants should have different diet experiences. Therefore, although all of them are Chinese females in their 20s, not all 9 recruited participants are chronic dieters who have decided to give up dieting. Among them, 2 participants have already given up dieting. 2 have dieted for less than 1 year. The rest of the 5 participants have dieted for more than 2 years and have already met some problems to the different extent. Among those, 2 have just decided to or started to give up dieting.

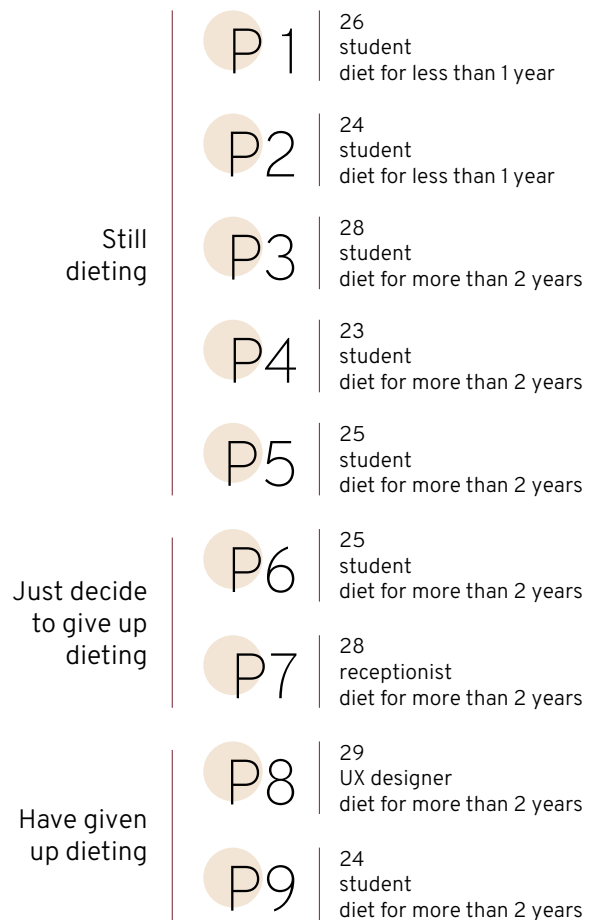


Figure 2-1: Overview of demographic information of participants

Take...	Stage	Activities	
5 min	Welcome & Introduce	<ul style="list-style-type: none"> Introduce myself and the project Explain the goal of the session Welcome the participant Ask permission for recording 	
40 min	Ask questions	With those who are still dieting: <ul style="list-style-type: none"> Current eating behavior Diet history Purpose of diet Diet mindset Disinhibitors Behavior change 	With those who have given up dieting: <ul style="list-style-type: none"> Difference between current and past eating behavior Purpose of eating Diet mindset Behavior change
2 min	End the session	<ul style="list-style-type: none"> Ask the ending question Thank for participation 	

Table 2-1: Session procedure

Data collection

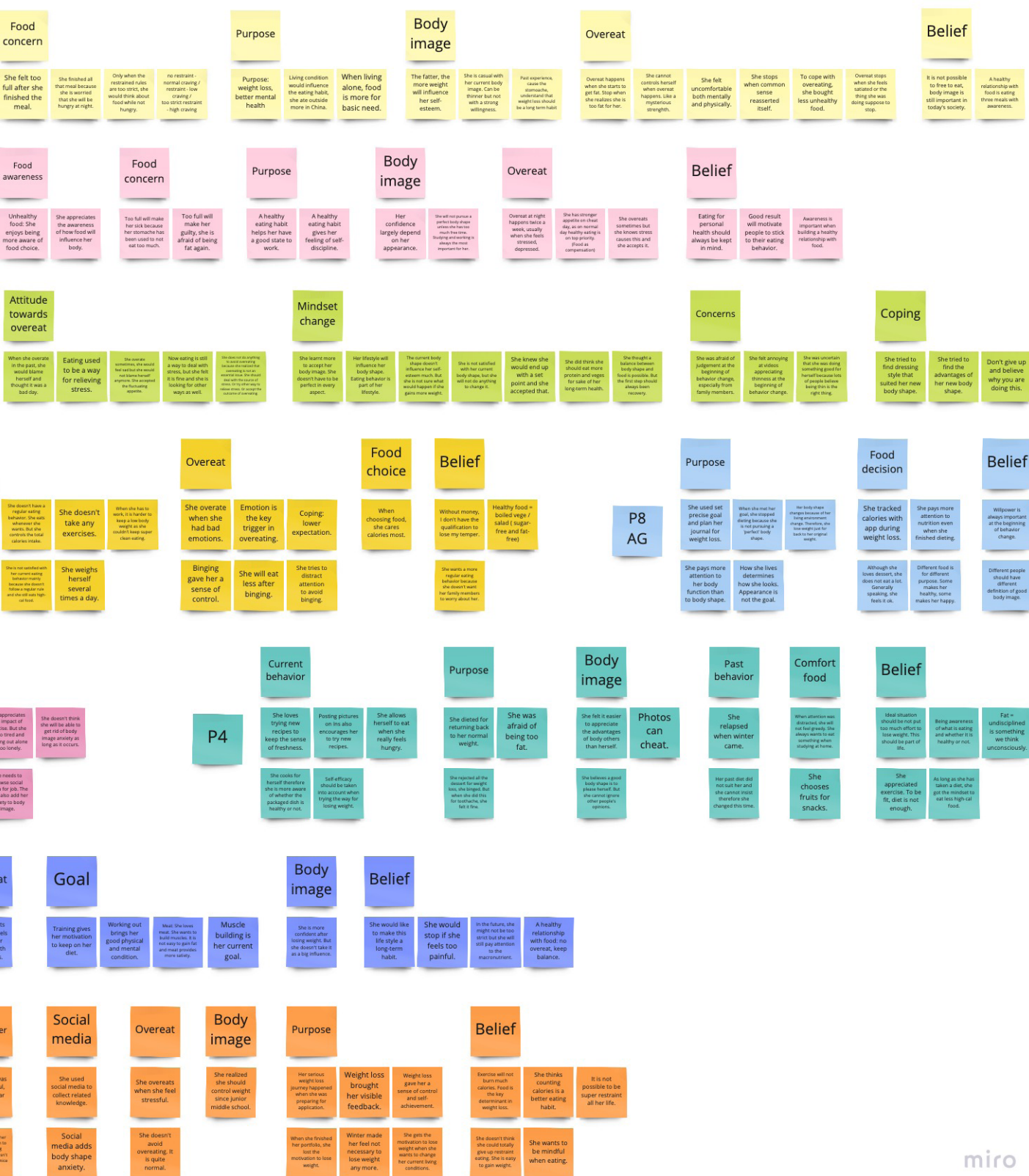
Exploratory qualitative research was conducted, including 2-day sensitizing booklets and laddering interviews, with nine participants to gain an understanding of participants' feelings, beliefs, and behaviors of dieting. Context photos were asked to be taken from participants while filling the sensitizing booklet in order to have an understanding of the environment. While doing so, the Contextmapping method was a guide I referred to. This method elicits the tacit needs of the user and reveals the connections of context elements. [28]

Analysis

The three-phase structure was applied for generative data analysis.[28] Interview transcripts and sensitizing booklets were reviewed. The important quotes were first annotated and highlighted. Such quotes were recorded on the post-it. (Figure 2-2) Meanwhile, I wrote down all the impressions and insights. By organizing and reorganizing all the annotations and the data, I was able to find patterns and create an overall view.



Figure 2-2: Data analysis of interviews



Informal study in a social media group

Goal

I also did an informal study in a social media group. This group, named 'have a good meal', is for those who are giving up dieting. In the transtheoretical model of behavior change, most of them are in the action stage. By asking questions in this group, I can have a deeper understanding of their reason for giving up the diet, their concerns and challenges of behavior change, and their ways of coping.

Study set-up

The study was conducted by asking questions in the social media group, 'have a good meal'. There were 455 members in this group. 51 members participated in the discussion. (Figure 2-3) The group members were informed that their answers would be used for research purposes. The following questions were asked in the group chat one by one:

- Why did you choose to give up dieting?
- What are your concerns and challenges?
- How did you cope with those concerns and challenges?

The group members shared their answers, thoughts, and stories regarding those three questions.

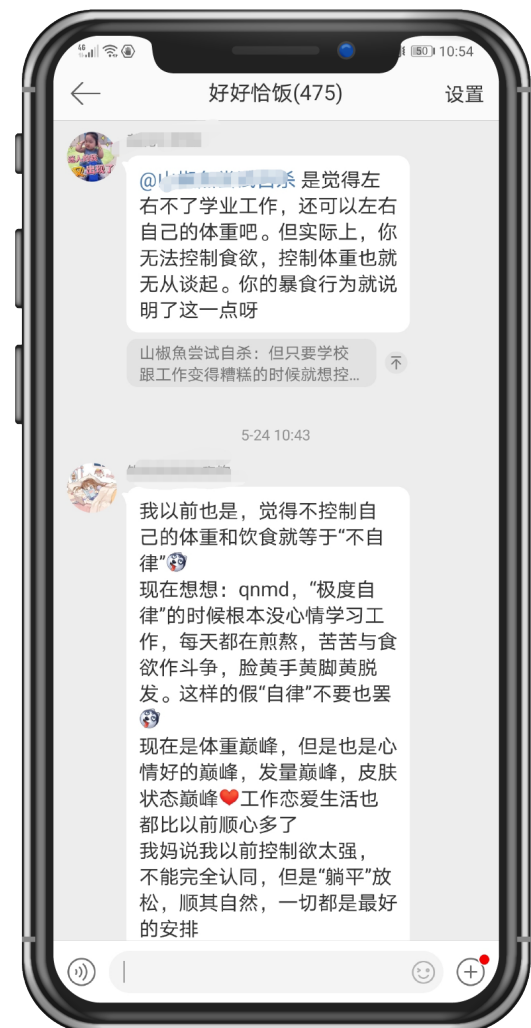


Figure 2-3: Screenshot of the informal study in a social media group

2.4 Finding

Introduction: WWWWWH method was applied to summarize the results of the explorative study. [29] by asking myself a multitude of questions, I was able to deconstruct the problem systematically. The WWWWWH method typically includes questions: Who are the stakeholders? Who has the problem? Who has an interest in finding a solution? What is the problem? What has been done to solve the problem? Why is it a problem? Why is there no solution? When did the problem occur? How did the problem come about?

In this context, the following questions were selected to be answered as research findings:

- *What problems do they have?*
- *How do they come to this stage?*
- *Why do they meet those problems?*
- *What are their concerns and challenges?*

What problems do they have?

Chronic dieters may decide to get rid of restraint eating for different reasons. But almost all of them meet the following problems to some extent.

Physical problems

- Amenorrhea / menstrual disorder;
- Hair loss;
- Stomach disorders;
- Frequent bingeing;
- Extreme hunger;
- Tiredness.

Mental problems

- Stress;
- Depression;
- Food obsession in mind;
- Lack of concentration.



Figure 2-4: Answers to the question: why do they give up dieting

How do they come to this stage?

Journey

The past diet experience of chronic dieters can be concluded into five stages:
(Check the next page for detailed explanations)

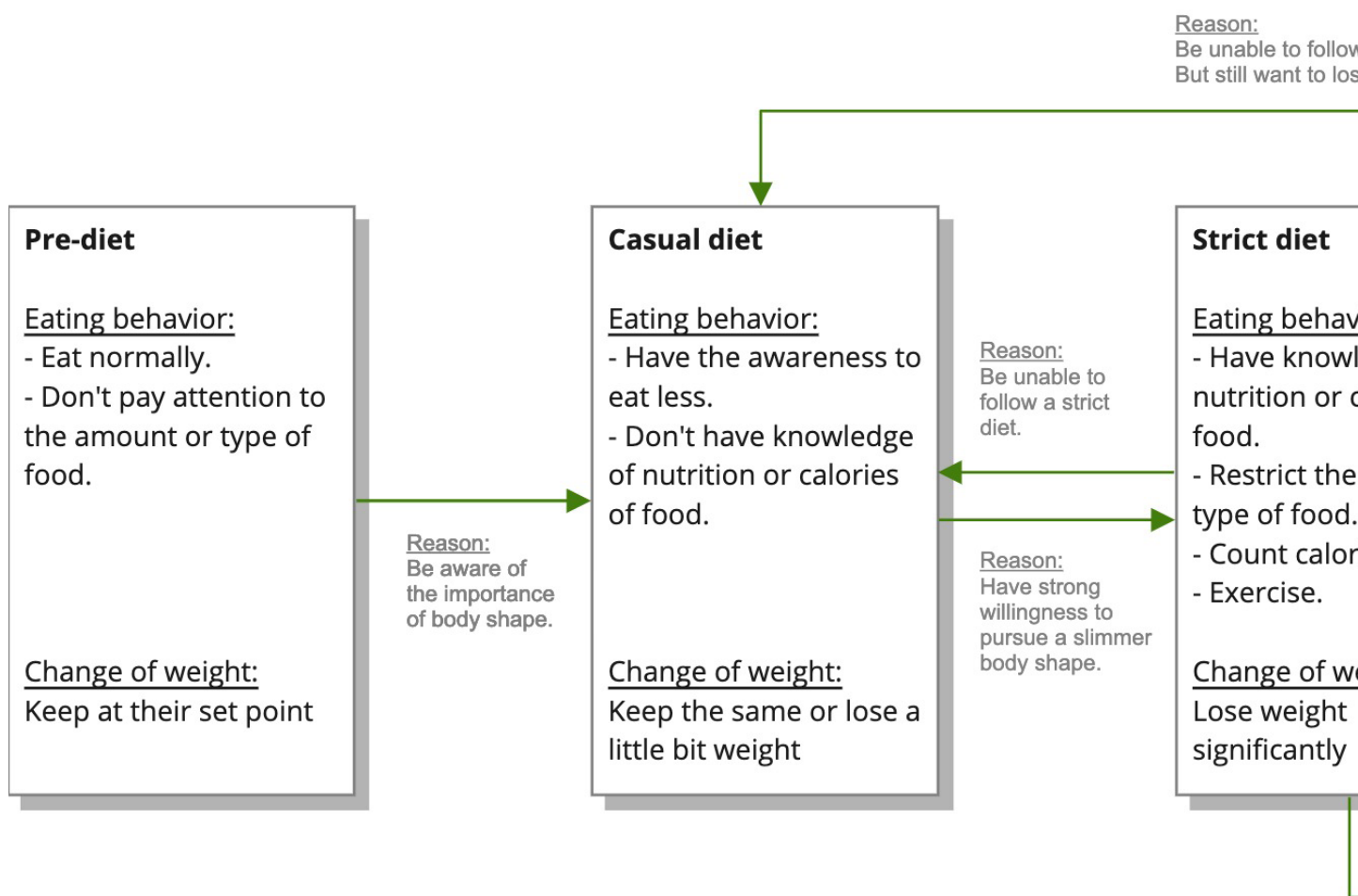
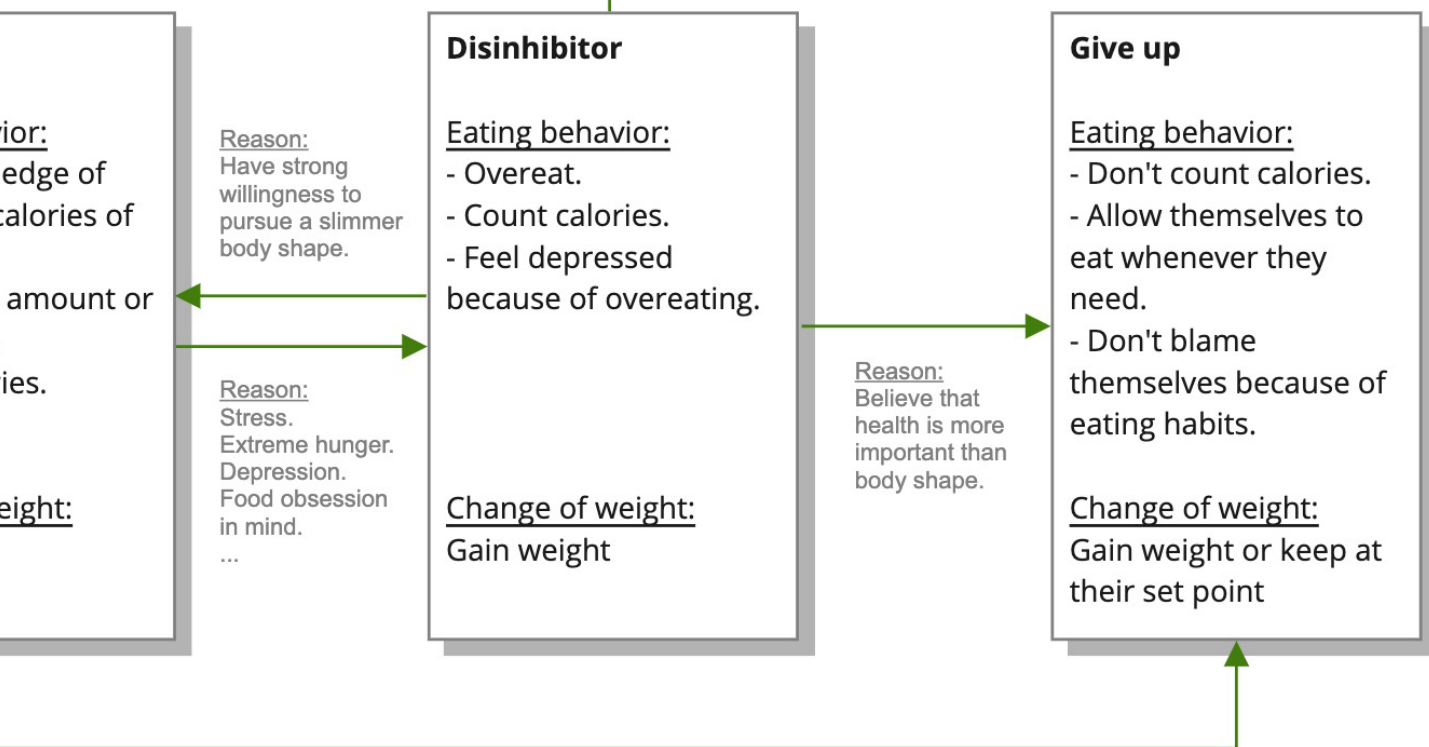


Figure 2-5: Journey

by a strict diet.
lose weight.



-
1. **Pre-diet:** Nobody is born as a dieter. The first stage is always Pre-diet. As diet culture is not popular in most traditional Chinese families, people eat normally, whatever their family prepares for them. In the stage of Pre-diet, they do not pay any attention to the amount of food or type of food. They keep their body weight at one specific number.
 2. **Casual diet:** When girls grow up, they start to care more about their appearance. They might get the information from the media or from fellow students. They are aware of the importance of body shape. Here comes the second stage. Although this stage is named as casual diet, there are no clear rules for eating. People just have the awareness to eat less unhealthy food. But they will not avoid all of them. So for most people, their body weight will not change a lot.
 3. **Strict diet:** When the willingness to pursue a slimmer body shape becomes stronger, they will go to the stage of a strict diet. The eating behavior in this stage is different from person to person. Most of them will get the knowledge of nutrition and calorie. They will restrict the amount or type of food and count calories. Some will do exercises. In this stage, they will lose weight significantly. However, a strict restrained diet might cause physical or mental problems. Some feel they are not able to follow such a strict diet, so they will go back to a casual diet.
 4. **Disinhibitors:** Some people conduct a strict diet for a longer time. When they experience severe stress, or depression, or extreme hunger, or just food obsession in mind, they might experience disinhibitors. In this stage, they overeat but still cannot help counting calories. Normally, they feel depressed and guilty because of overeating. They will gain weight. Some of them realize that a strict diet doesn't suit them, so they go back to a casual diet. However, those who have a strong willingness to pursue the ideal body shape will follow a strict diet again. There appears a diet-disinhibitor loop.
 5. **Giving up:** For my target group, whatever stage they used to be in, they decide to give up for several reasons. Some individuals have experienced physical problems. For example, amenorrhea, hair loss, stomachache, or frequent bingeing. Also, generally, they feel stressed, depressed, and can't stop thinking about food. **The most important thing is, they get the belief that health is more important than body shape.**

Insights

A tortuous diet journey makes the decision of giving up harder to make: Although lots of people might realize that restrained eating influence a lot their daily life, the willingness to change is not strong. Weight & good body image has been one of the most important things in their past lives. How can they simply give it up? Like a long-term relationship, if you put much affection into that, it is always quite difficult to go through the breakup.

They put too much attention to the external voices, but overlook their internal feelings: Chronic dieters have experienced several slight problems when they are dieting. But most of them ignored the problems and kept dieting until they met the severe physical problems, or the mental problems have largely influenced their daily life. In their dieting experience, too much attention had been put into the external voices rather than their internal feelings.

They treat the symptom instead of the problem: Even when they had experienced disinhibitors several times, most of them did not think diet or restricted eating was a problem but they did think bingeing was a serious issue. Society and social media values thinness. That's why all their effort was put into treating the symptom, which was bingeing, rather than the problem, which was restrained eating.

Why do they meet those problems?

Beliefs in food and body shape will lead to diet behavior. Meanwhile, when people are dieting, they tend to believe pursuing thinness is the right thing. Therefore, both their original beliefs and their dieting behavior intertwine together and cause the final problems they meet.

Belief influences behavior

Not every dieter meets those problems. Usually, a stricter, less healthy, and longer-term diet will cause more severe problems.

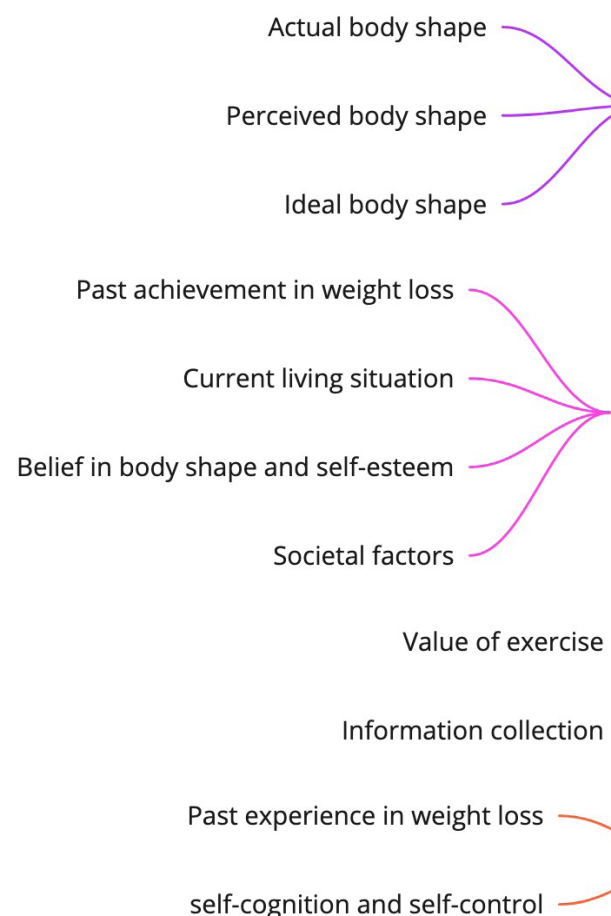
Whether a person chooses to conduct such a diet is influenced by lots of aspects. First is the purpose. Not all people diet for appearance. Some diet for better exercise performance. For example, they eat more carbohydrates and proteins to lift heavier weights in the gym. Some diets for better mental state. One participant told me she ate fewer carbohydrates in the morning so that she could be less sleepy for work. A paper named *Does the Reason for Dieting Affect Dieting Behavior?* mentions that compared to individuals who diet to improve their health, those who were motivated to change their appearance through dieting were more likely to use drastic dieting strategies, and to score higher on measures of disinhibited eating, or lapses in restraint.[18]

For those diet for appearance, there are still lots of factors that can influence the dieting behavior:

1. **Satisfaction with their current body shape:** Chronic dieters' perceived body weight can be higher than their actual body weight. Meanwhile, some of them

have unrealistic ideal body shapes. Therefore, the dissatisfaction of current body image leads people who are in or even below-normal BMI to conduct a strict diet to lose weight.

2. **Motivation to pursue the ideal body shape:** Motivation can be influenced by whether a person has successfully lost weight in the past. Those who used to achieve the goal bodyweight usually have stronger motivation to be back to that weight. Some people lose weight



in order to participate in an important occasion with a better body shape. People who believe body shape will strongly influence their confidence and self-esteem, or poor body shape will be judged by others also have stronger motivation.

3. **Belief in food and body shape:** If the information people collect is that diet is the only or most efficient way to achieve a good body shape, they will overestimate the value of food and eating and

underestimate the value of exercise. When they see successful examples of a specific diet, they will also have a strong willingness to try it regardless of whether it is healthy or not.

4. **Self-efficacy to conduct a strict diet:** People who have successfully lost weight are more possible to believe they can conduct a strict diet. So do people who are more self-disciplined have a stronger ability of self-control.

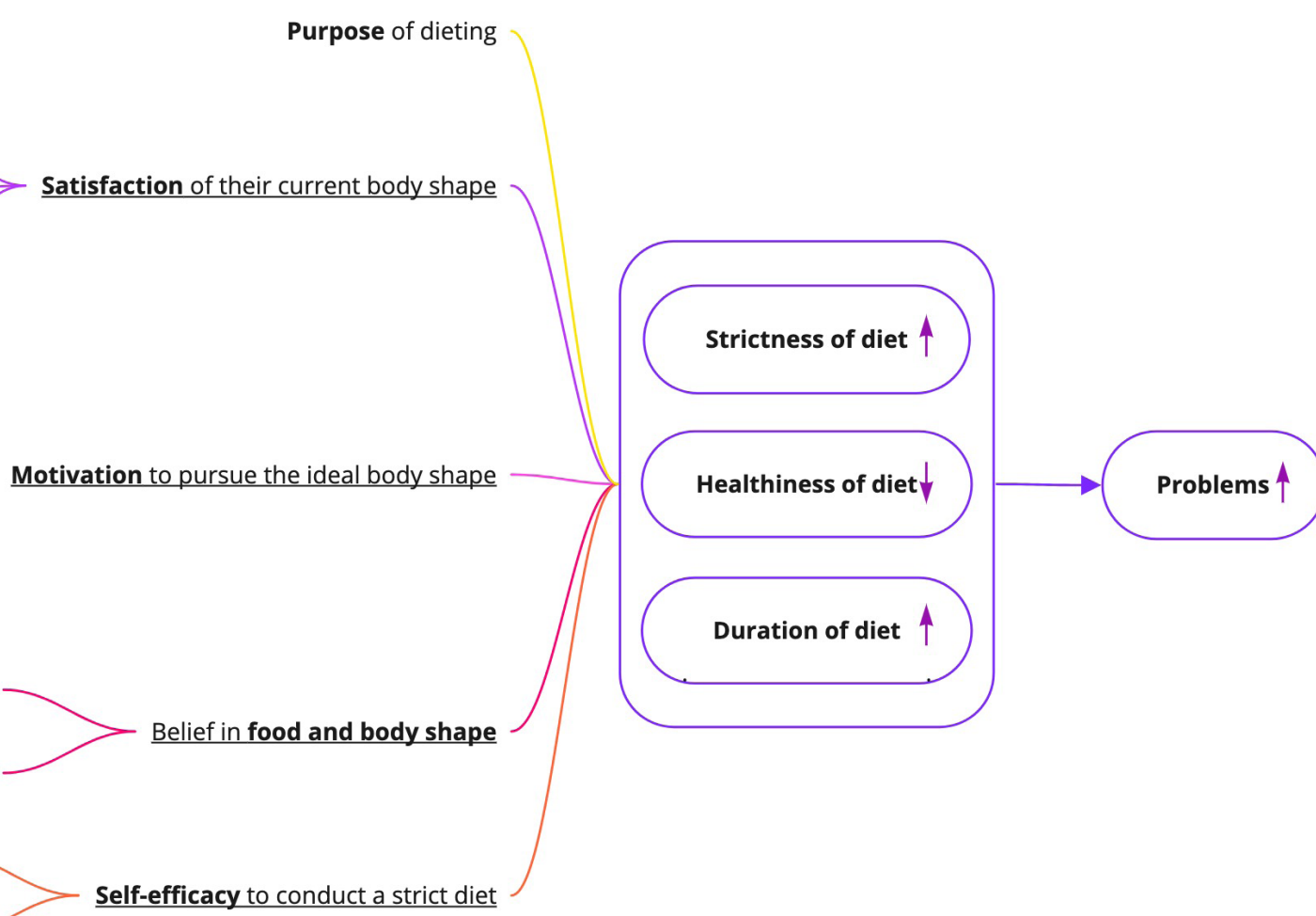


Figure 2-6: Mindmap to show how belief influences behavior

Belief influences behavior

Those who are dieting are more likely to believe that pursuing thinness is the right thing because this mindset will make them feel that what they do is reasonable.

Therefore, not only people's beliefs will influence their behavior, but their behavior itself will also reconfirm their original beliefs.

Insights

Body image disturbance is normal among chronic dieters: Even if they are in or below a normal BMI range, they can only look at the imperfect part of their body. This causes an endless weight loss journey. However, as a human being, it is not possible to be perfect all the time. They may be able to achieve their ideal body shape for a while, but they cannot maintain it for a long time. It even will cost their physical and mental health.

Giving up dieting makes them feel lose a sense of self-control: For chronic dieters, it can seem that there are no other ways rather than restriction because it's what the world has told them. This whole time they have to restrict. They have to control their body. They can't trust their body. When they experience disinhibitor, It feels so scary when they are feeling so out of control like they have some mental disorder when really it is just the restrictiveness.

“

I expected thinness would bring me confidence, but actually not. Even though, I am still dieting. Maybe because weight loss is something always right in our society. (P7)

”

“

If you cannot control your body weight, how can you control your life. (P1)

”

What are their concerns and challenges?

Fear is the keyword regarding their concerns and challenges in getting rid of restrained eating. (Figure 2-7)

Concerns and challenges in the behavior change

Fear of unhealthy food: When I asked people to give a score to their current eating behavior, whatever number they gave, their reason was they still ate ‘unhealthy food’. Here comes a question: is it good or possible to never eat that food? In fact, even dietitians believe a moderate amount of unhealthy food is good for long-term health. Then, why do they judge their eating behavior because of their consumption of unhealthy food? When they only take food as an energy producer and food only means calories and nutrition, they ignored their internal pleasure of eating.

Fear of overeating: Most of the moments that chronic dieters unrestrained the food they eat are actually disinhibiting. Although it seems that they did eat a large amount of

“

I give an 8 to this day's eating behavior because I still ate some chips for snack. (P3)

”

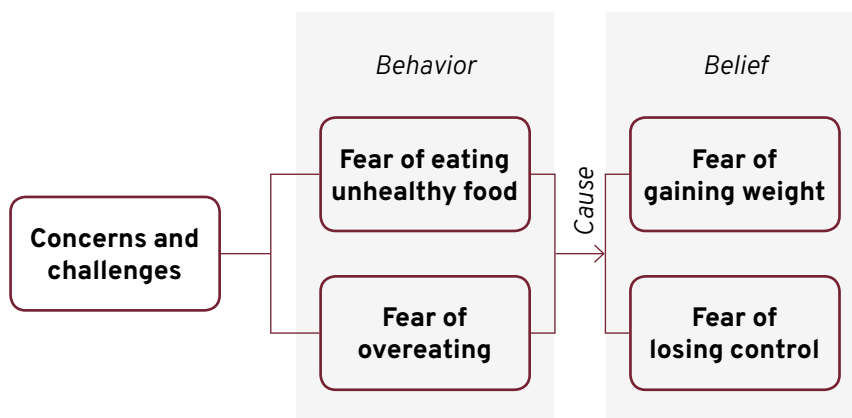


Figure 2-7: Concerns and challenges of getting rid of restrained eating

food, they were actually struggling to stop in their mind. It's like telling a naughty boy not to play computer games. Their minds would be full of computer games. Therefore, the permission of eating in mind needs to be built first. Besides, chronic dieters also reported that they were unable to feel full/satiated, which would also cause over-eating. This is a signal from their body that they need to eat more as their body is in deficit for so long time. At the beginning of eating behavior change, eating a larger amount of food is unavoidable.

“

Everytime I allowed myself to eat, I felt that I could eat tons of food. (P6)

”

Concerns and challenges in the belief

Fear of gaining weight: The biggest challenge in getting rid of restrained eating is weight gain. Most participants mentioned the worry about body shaming from others. Their courage to sacrifice body shape for long-term health should be appreciated. They cannot help judging their new body image as the mindset that thinness equals beauty has been there for many years. The preference for thinness happens unconsciously. However, the awareness of avoiding body shape stereotypes is still valid. To change their subconsciousness, they need to be more patient.

“

I realized I should ignore what other people say and what the social media tells me. But it is harder than I thought. (P7)

”

Fear of losing control: Chronic dieters are so used to controlling eating and their body weight. Stop restrained eating will make them feel out of control. However, the obsession with controlling is destroying their life. They can simply trust their body signal in the topic of eating no matter it is a hunger cue or emotional trigger. Besides, there are lots of other ways that can provide them with a feeling of control. Setting new goals can also distract their attention from body shape to other meaningful things.

Insights

The joy of consuming food needs to be aroused: People usually interpret it as wrong to eat unhealthy food. However, it is impossible and unnecessary for most people to eat only healthy foods. Helping those people be more aware of the pleasures of eating is more important than judging whether they are eating healthy food.

Their courage needs to be appreciated: Although it is hard to avoid body-shaming from others, their courage to sacrifice body shape for long-term health should be appreciated. The design could keep encouraging them in a positive way or helping them fight against the negative shaming voices.

Positive feedback as rewards might encourage patience: To change their subconsciousness that thinness equals beauty, the design needs to help them be more patient. Therefore, the design should provide some positive feedback as rewards in the change of mindset, which can also provide them with another sense of self-control.

Guidance may help at the beginning of behavior change: The feeling of losing control contributes to their unfamiliarity of eating according to the hunger cue and the satiety signal. Providing moderate guidance will help them learn eating in a new way.

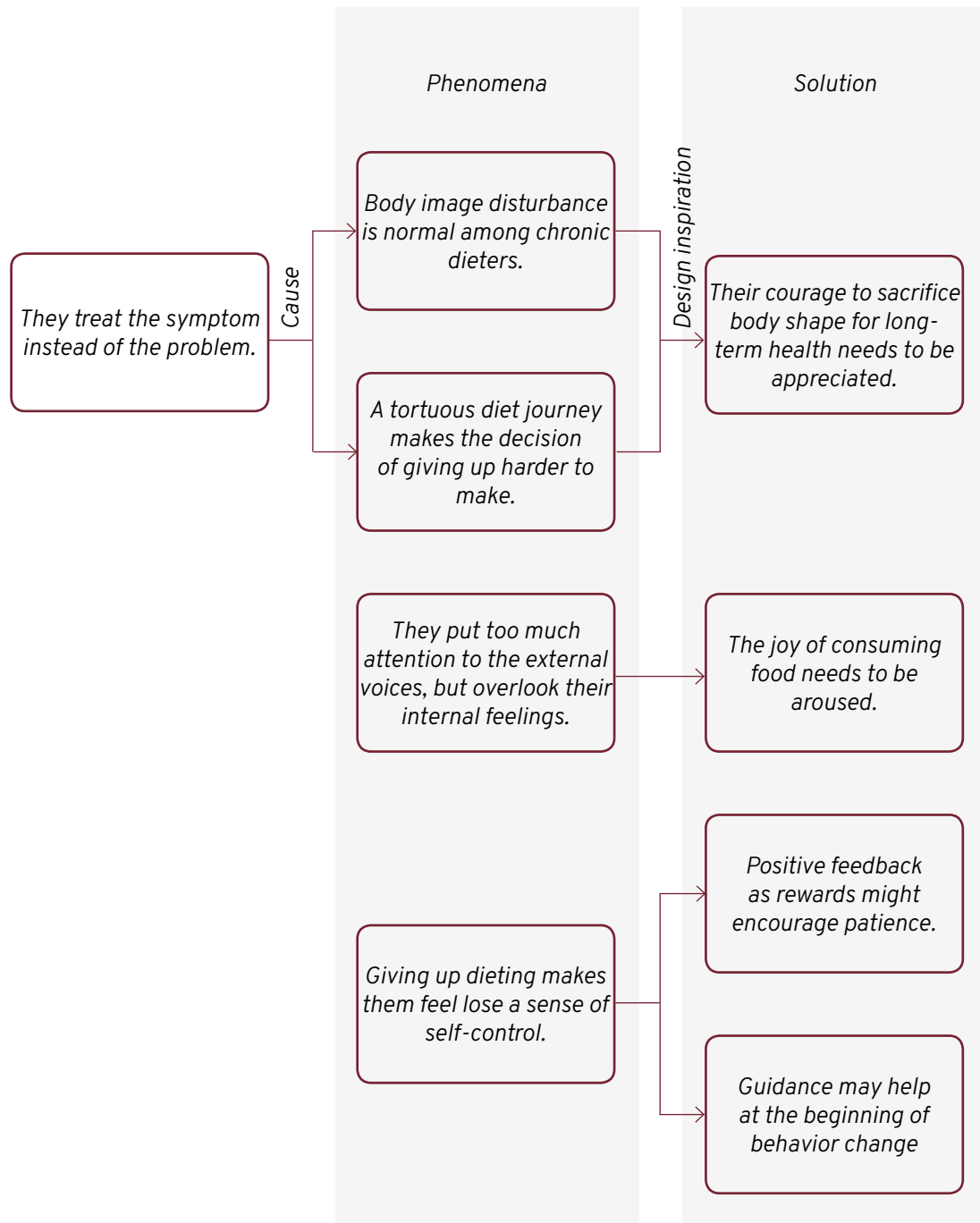


Figure 2-8: Summary of insights from the user research

2.5 Conclusion

RQ1 Problems

Extremism leads to physical and mental problems of chronic dieters.

An extreme diet will cause problems for dieters. Extremism means no flexibility. No matter only eating healthy food, or do not allowing themselves to eat beyond the calorie limitation, or endless long-term dieting without any slack are all problematic eating attitudes and will lead to physical and mental problems for dieters.

RQ2 Experience

Obsession with controlling is the most toxic mindset for chronic dieters.

Most chronic dieters are obsessed with controlling their body shape. Their identity becomes so wrapped up in maintaining that smaller body. They don't believe that they can define themselves by others instead of how they look. They don't realize that the more they try to control food, the more food controls them. Giving up dieting, in another word, eating according to what their body tells them is a process of getting rid of the toxic obsession with controlling and trusting their own body.

RQ3 Beliefs

Active and passive reasons both contribute to the decision of giving up dieting.

People may have different reasons for giving up dieting. Some individuals are forced to give up because of physical problems, such as amenorrhea, hair loss, stomachache, or frequent bingeing. Others experience mental problems. They feel stressed, depressed, and can't stop thinking about food. The most important thing is, they realize that health is more important than body shape.

RQ4 Behavior change

Fear is the emotion mentioned most in getting rid of restrained eating.

The fear to eat an unhealthy or larger amount of food is derived from their fear of weight gain and loss of control. The lucky thing is they have developed a critical view of their past diet experience. How to soothing the fear in this context is the key problem to solve in building design interventions.



3. DESIGN GOAL

The design goal is what I want to accomplish in my context. In this chapter, the target group is defined with the method of persona, a goal statement is formulated, and four design qualities are proposed as inspiration for concept ideation.

3.1 Target group

Introduction: People with different dieting experiences are motivated to give up dieting for different reasons. Generally speaking, they can be divided into two groups.

In this section, two personas are presented to represent the different personalities and different reasons for giving up dieting of two groups. Both personas were created based on real user's stories from contextual research insights.

Passive persona: Lily

The first group of people is forced to give up dieting. (Persona Lily) They still believe thinness equals beauty and would bring them confidence. However, the symptoms like amenorrhea and hair loss are



"My body has so many problems because of weight loss. I have to stop now."

signals that remind them of the dysfunction of their body. They have to give up dieting to treat their body. Although they also experience some mental problems like depression or food obsession in mind, they choose to ignore them.

Lily

Age 20 years old (Sophomore)
College Shanghai University
Major Chinese language and literature
Condition Live in dormitory

Bio

Lily used to be laughed at in high school because of her body shape. She started to lose weight when she entered college. She first tried to eat very little food per day. But it was hard to sustain. Therefore, she learned to control the calorie intake. Every day, she allowed herself to eat 1300 kcal. As time passed, although she lost 10kg, her period became irregular. Her hair lost more than ever. And she always felt hungry and cold. For sake of her health, she decided to give up dieting.

Motivations

Fear Health Happiness

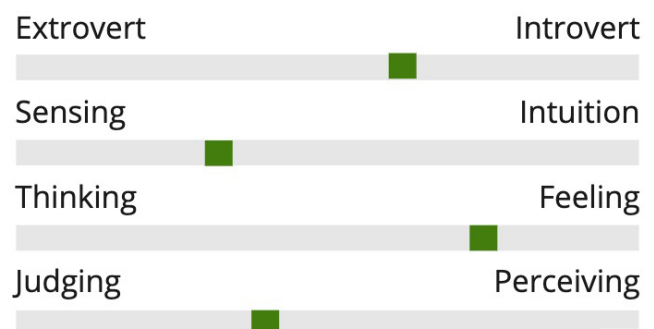
Wants & Needs

- She wants to find her personal eating ritual.
- She wants a healthier body.
- She wants to ignore the body judgment from others.

Frustrations

- She doesn't know how much amount of food will make her feel full.
- She is not easy to feel full or satiated.
- She is afraid of being laughed at because of weight gain.
- She feels a lack of support.

Personality



miro

Active persona: Stephanie

Another group of people takes the initiative in giving up dieting. (Persona Stephanie) They have been aware of how dieting hurts their body and influences their life. They realize that putting so much effort into pursuing an unrealistic body shape is not worth it. They understand their identity becomes so wrapped up in maintaining that smaller body. They can actually define themselves by what they want to do instead of how they look. They give up dieting as a way to fight against the wrong voice from society.



"I am tired of thinking about food all the time.
I want more freedom in food and eating."

Stephanie

Age 22 years old (Senior)
College Tsinghua University
Major Architecture
Condition Live in dormitory

Bio

Stephanie started to lose weight in the sophomore year. To pursue a perfect personal image, she learned the knowledge of calories and nutrition. She ate a lot of protein, very few carbs, and fat. She also did exercise every day. Although she succeeded in being fit, she realized that she spent lots of time choosing food and she was thinking about food all the time. Recently, she is busy making a portfolio and looking for a job. She feels so stressed that she decides to give up dieting.

Motivations

Growth Achievement Happiness

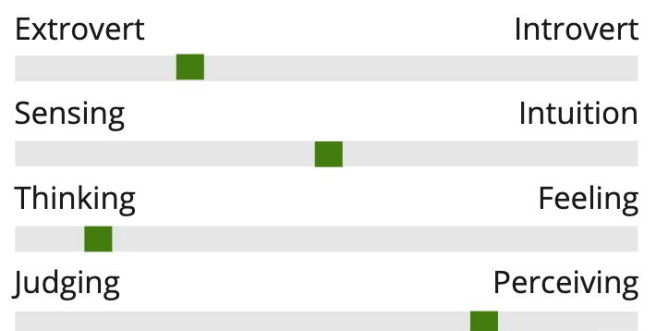
Wants & Needs

- She wants to develop a new eating ritual that supports her busy life.
- She wants to accept her new body image.
- She wants to ignore the societal ideal body shape.

Frustrations

- She feels it difficult to accept herself as imperfect.
- She doesn't know her suitable dressing style when she gains weight.
- She experienced stress eating a lot.

Personality



miro

3.2 Design goal

In the user research , I found that Fear is the emotion mentioned most in getting rid of restrained eating. Chronic dieters fear to eat. They cannot help thinking about calories and nutrition when eating. For them, eating means gaining weight. Gaining weight means being less charming and being judged by others. Therefore, to counter the fear, I formulate my design goal as

I want to make chronic dieters
who have decided to get rid of restrained eating
feel **safe** to eat.

3.3 Design quality

Based on insights of user research (Figure 2-8), four design qualities have been defined as inspiration for concept ideation.

The concept may

Evoke positive feelings

The intervention may change people's attitudes towards getting rid of restrained eating from negative to positive. They are not giving up a diet because of incompetence. But they are critical to what a good body shape is and are pursuing a healthier lifestyle.

Arouse the awareness

The intervention may support them to be more aware of how they feel. Chronic dieters pay too much attention to the voice of others or our society, the numbers of scale weight, the calorie of food. They ignore their internal feelings when they try their best to lose weight.

Provide a sense of control

The intervention may make chronic dieters feel in control in a new way. They don't have to control their lives by controlling their eating behavior. They can trust their body. Eating can be as simple as listening to their body.

Provide guidance

The intervention may guide chronic dieters to formulate a personalized food ritual. They have cared about the calorie and nutrition of food for so long time. At the beginning stage of getting rid of restrained eating, guidance will provide valuable information and a sense of support.

To make chronic dieters feel safe when eating;

To help them find a balance between body shape and eating;

To encourage the positive attitudes towards the weight gain process

To provide a sense of control when they stop restraint eating

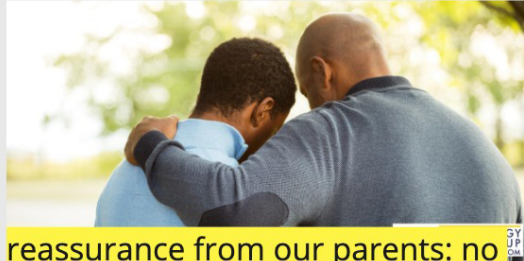
Evoke positive feelings

Arouse awareness

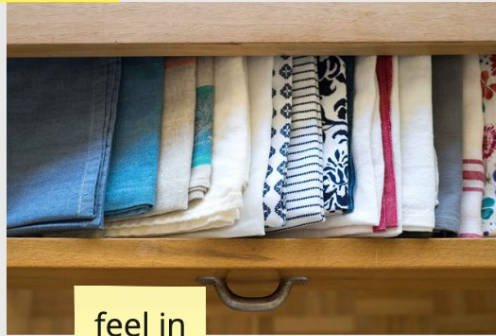
Provide a sense of control

Provide guidance

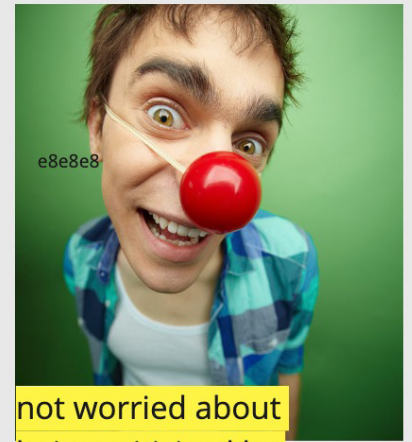
Be for personal use



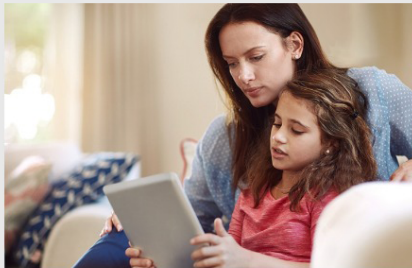
reassurance from our parents: no matter how horrible your life was going, you would eventually not just be ok, but thrive.



feel in control

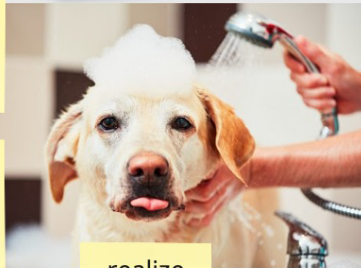


not worried about being criticized by those surrounding you.

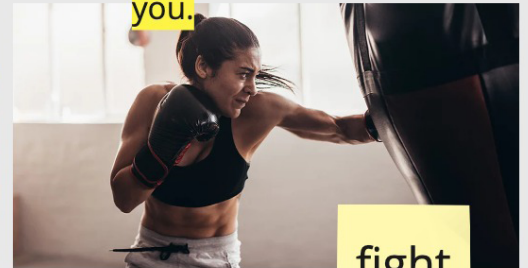


nourishing yourself

take care of yourself



realize what you have



fight

Feeling wanted leads to feeling safe.



a hug



hourd food



supportive

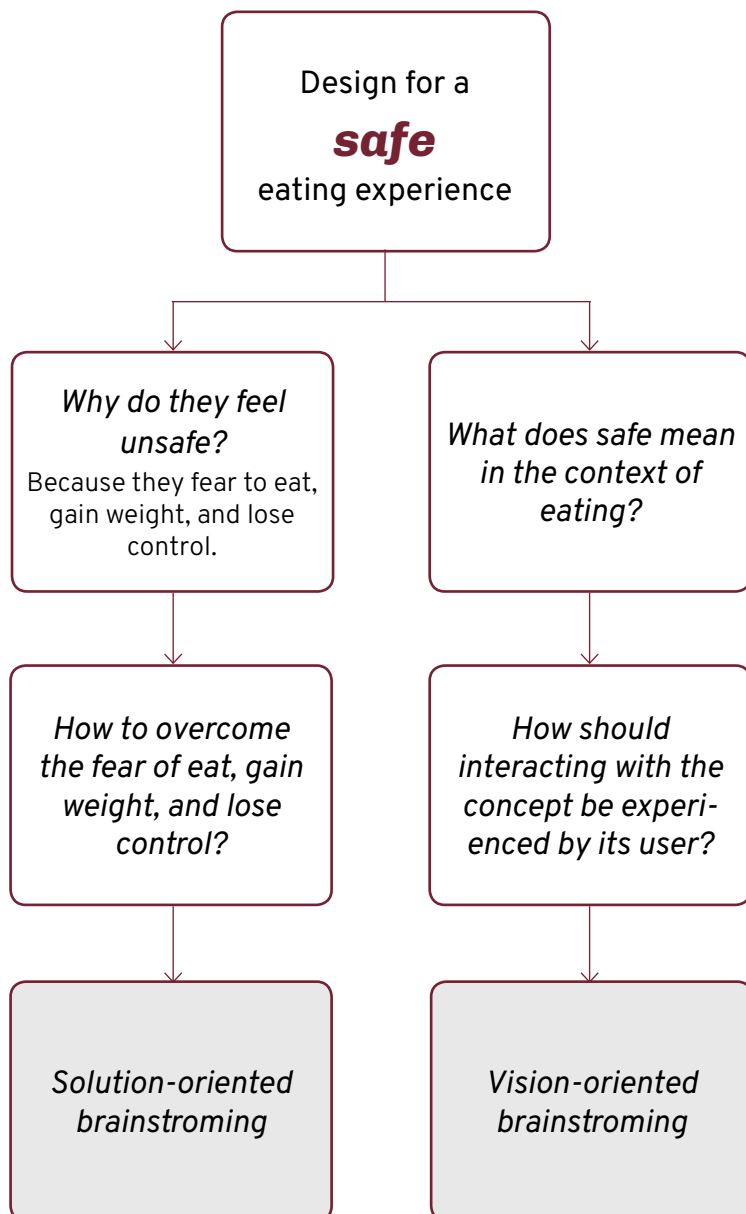


protected

4. CONCEPT IDEATION

Concept ideation aims to find the concept direction for further finalization. The chapter communicates the design process includes brainstorming about current strategies and interaction visions, ideating, and selecting concepts with the vALUe method. The conclusion at the end of this chapter illustrates the concept iteration direction.

4.1 Brainstorm



Introduction: Two rounds of brainstorming have been done to generalize ideas for interventions. (Figure 4-1) The solution-oriented brainstorming was conducted within the social media group, 'have a good meal'. The brainstorm session aimed to collect people's current solutions and suggestions to concerns and challenges in getting rid of restrained eating. The vision-oriented brainstorming was done with fellow students majoring in design. The results of the session were interaction visions representing what a safe experience is in the context of eating.

Figure 4-1: Moving from design goal to ideation method

Solution-oriented brainstorm

Purpose

An online brainstorming session was held to collect current solutions and suggestions from people who have started changing their restrained eating behavior or have succeeded in getting rid of restrained eating. In the literature and user research, I have found the key concerns and challenges of people who decide to give up dieting are the fear of eating, gaining weight, and losing control. Therefore, the results of the session should answer the following three questions:

- How to overcome the fear of eating?
- How to deal with the new body image?
- How to provide themselves with a new sense of control?

Set-up

The session was conducted in the Chinese social media group, 'have a good meal'. 34 people in total participated in the session. The session started with an introduction to the background and aim of this project. Prepared questions were asked in the group chat and members were free to express their answers and opinions to such questions. I collected their answers and wrote down insights during the session. The result was organized with post-its on the Miro board as input for further concept ideation.



Figure 4-2: Data analysis of the solution-oriented brainstorm session (Check Appendix 3.1 for details)

Result

The answers of the participants were categorized into groups and summarized as following.

A. How to overcome the fear of eating?

A.a

Stop counting calories and enjoy the food

It is hard for people to stop counting calories when they used to be obsessed with it. But, group members mentioned that to jump out of the diet mindset, it is a necessary step to kicking the idea of calories and nutrition out of mind, as it can be seen as the foundation for the diet mindset. They suggested that more attention could be paid to the food itself and the consumption process, which is also called **mindful eating**. As they chewed the food, they tried identifying the various ingredients and seasonings. By bringing the joy of eating back to the whole experience, they are able to turn the priority of eating from calories to the food itself.

A.b

Build the mindset that the body needs food as energy

Chronic dieters used to believe that eating more food means weight gaining, which will lead to being less charming and welcome. Group members suggested that a new mindset would need to be built that their body needs food as energy. Food can **make up the deficit of the body** that has been created due to the long-term diet. This mindset also helped them listen more to the signal of their body. They are more aware of how their body feels and learn to love their body more. They finally establish a more harmonious relationship with their own body based on trust.

A.c

***Encourage each
other as a group***

Several group members mentioned that they benefited a lot from being in a social media group with people having similar experiences and problems. The encouragement from fellow people strengthened their beliefs that they were doing something good for their long-term health and well-being. When they saw the pictures of food posted by other members, they were more motivated to eat the food they used to fear. The stories from members who have succeeded in getting rid of restrained eating helped them believe they would be fine in the end and vision a healthy relationship with food.

B. How to deal with the new body image?

B.a

Remember the WHY

It is normal to doubt whether it is worth sacrificing the 'perfect' body image for health in the recovery journey. Group members mentioned that especially at the beginning stage of changing, even though they expected to gain weight, they still experienced frequent depression and issues of poor body image. At this moment, it was important to remind themselves why they started this journey. The WHY armed them to conquer the negative emotion.

B.b

Praise the effort

Getting rid of restrained eating may seem to be easy for normal eaters, as all chronic dieters have to do is eating without rules. However, there are many strugglings happen in the mind of chronic dieters. One of the group members mentioned that when her boyfriend praised her effort, she felt braver to eat. The new body image became the outcome of her effort. She built a positive attitude towards her new body image.

B.c

***Be more critical
to the voice from
others***

Although it is hard to ignore the body-shaming from other people or the preference of thinness in our society, members were more critical to such voices. They were more aware of what was actually important for their body. They could accept more diverse types of beauty. The awareness of being critical helped them accept their new body image. However, they also mentioned that such awareness needed reassurance from different people over and over again. Therefore, it often takes time and patience.

B.d

***Ask for support
from people that
matter***

Support from people that matter is always valuable for people who are changing their current behavior. However, in this case, it can be hard for normal eaters to understand the concerns and challenges chronic dieters are experiencing. Therefore, explaining the story to them and asking for their support becomes more meaningful than ever. Chronic dieters themselves can reconfirm that they are doing rational things. Group members with support from family members and close friends took a shorter time to succeed in getting rid of restrained eating.

C. How to provide themselves with a new sense of control?

C.a
Reprioritize the life

Either set new goals related to eating (e.g. build muscles, feel energetic) or have nothing to do with eating (e.g. focus more on the study) can be helpful in building a new sense of control. The new goal can also make people feel busy with other stuff and don't have time to think about the frustration of weight gain.

C.b
Make a more flexible plan

An entirely different idea to build a new sense of control is to make not controlling part of their plan. For example, one group member mentioned that she used to plan to eat until she felt fully satiated. Another group member planned to eat the first food that popped up in her mind for each meal.

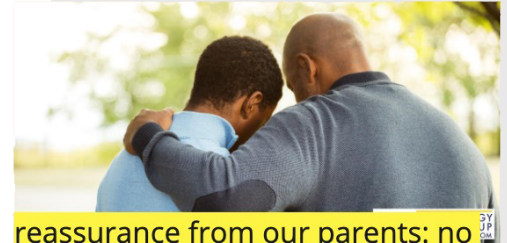
Vision-oriented brainstorm

Purpose

The online vision-oriented brainstorming session aimed to look for Interaction Visions (IV) representing what a safe experience is in the context of eating. (Figure 4-3) The IV is a creative design technique to address the intended character of the interactions with a future design concept. The IV will provide a sense of how interacting with the concept should be experienced by its user. And this will inspire the designer with the means that could be applied to evoke or support this particular experience or feeling.

Set-up

The session was conducted with five Industrial Design Engineering Master students from TU Delft. The session started with an introduction about the health problems of chronic dieters, main insights gathered from literature and contextual research, and the aim of the project. The participants then collected different visions that they thought could represent a safe experience and gave their reasons. After the open discussions, two visions were finally selected that best fit the context of eating.



reassurance from our parents: no matter how horrible your life was going, you would eventually not just be ok, but thrive.

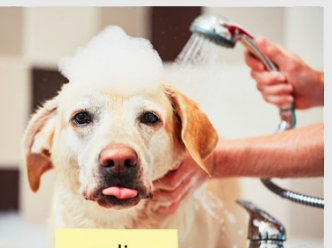


feel in control



nourishing yourself

take care of yourself



realize what you have

Feeling wanted leads to feeling safe.



a hug



hourd food



supportive

Figure 4-3: Data analysis of the vision-oriented brainstorm session (Check Appendix 3.2 for details)

Result

Two selected visions and their interaction qualities are shown as following.



Feeling safe to eat means that the user is supported to learn to eat in a new way. The interaction with the concept should provide a protected learning experience. It should be a tool for temporary use. The key idea is to promote positive emotions during behavior change.

The interaction qualities include:

- **supportive**
- **fulfilling**
- **accompanied**
- **anticipated**



Feeling safe to eat means that the user is training the muscles to fight against body shaming. The interaction with the concept should empower the user to be critical to the voice from others. The key idea is to fight against negative emotions during behavior change.

The interaction qualities include:

- **energetic**
- **powerful**
- **protected**
- **rebellious**

4.2 Initial concepts

Introduction: Two IVs have been developed to illustrate what a safe eating experience is, which leads to two different concept directions. Ideation was done for each direction to explore possibilities, create richness and bring diversity into design spaces. The insights of the solution-oriented brainstorming were also involved in the conceptualization. (Check Appendix 1.3 for sketches of initial ideation)

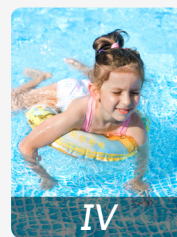
In this section, five initial concepts of two directions were explained.

Concept 1.1: Reassure

Concept Reassure is a mirror that helps the user remember her WHY.

When the user puts her hand on the mirror, quotes of encouragement she used to talk to herself will appear. The mirror will ask the user about her feelings, her current beliefs, and the words she wants to say to herself. The mirror will recognize the positive sentences and show them in the mirror.

With this mirror, the user is able to reflect on her behavior and remind herself of her goal to pursue a healthier lifestyle.



Inspired by:

B.a
Remember the
WHY

B.b
Praise the effort

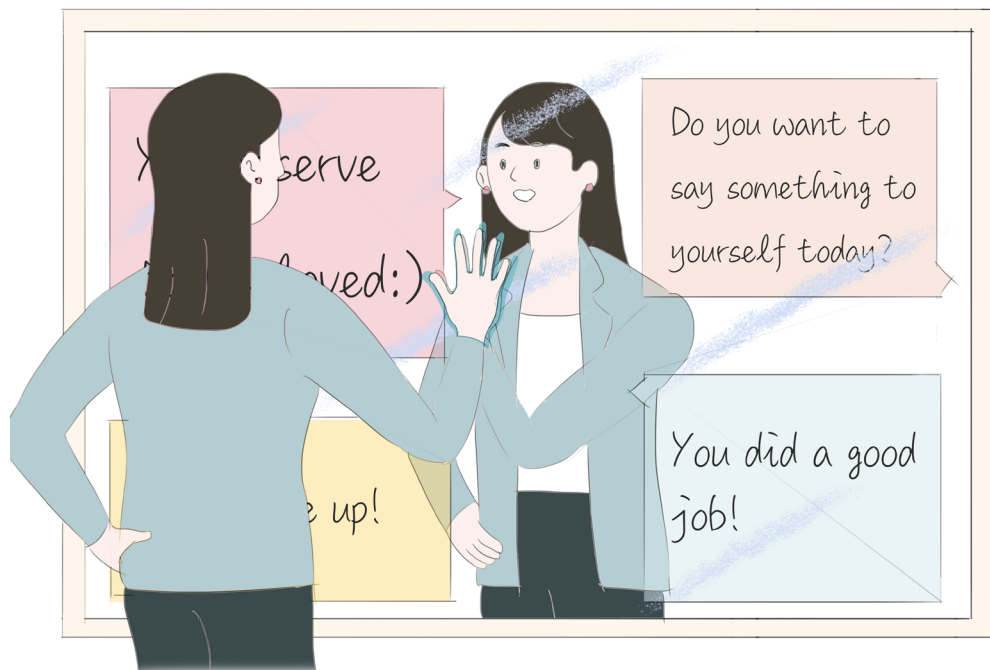


Figure 4-4: Concept 1.1 Reassure

Concept 1.2: Whisper

Concept Whisper is a jacket that encourages the user to eat.

The user can wear the jacket when she eats food. The jacket will provide the warm feeling like that someone is hugging her from behind. The speakers in the hood play the recording of encouragement and guidance of mindful eating.

With this jacket, the user will experience someone whispering beside her and encouraging her to eat.



Figure 4-5: Concept 1.2 Whisper

Concept 1.3: Accompany

Concept Accompany is a plate-app product that keeps the user company when eating.

When the user consumes the food on the plate, the rain is falling and a sapling is growing on the app. This is a metaphor to visualize the process of food nourishing her body. When the user finishes the meal, the rain will stop and she will gain a mature tree. She can check the forest map to see the trees she gained in the past.

With this product, the user will feel accompanied when eating. She can also see the positive outcome of eating, and experience the feeling that she is taking care of herself.

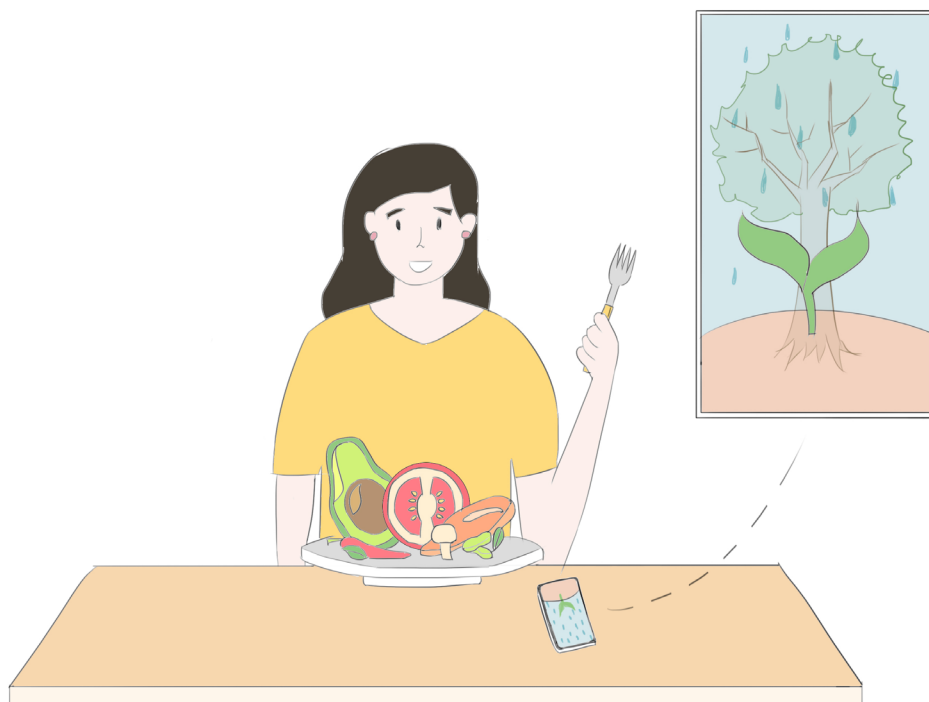
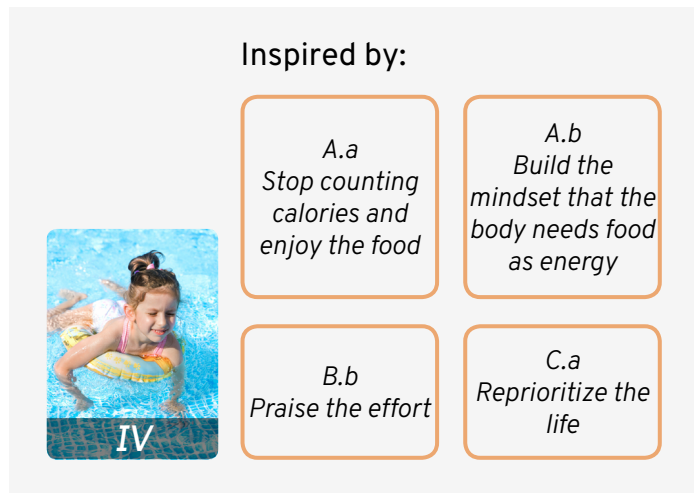


Figure 4-6: Concept 1.3 Accompany

Concept 2.1: Tear

Concept Tear is a series of stickers that help the user break the taboo.

There are words of body shaming and a line that means deleting on the stickers. The user can put the stickers on the cabinet for storing food or the food package. Every time she opens the cabinet or the package, she is breaking the taboo of body shaming. The action, tearing, itself already means breaking.

Similarly, a pair of scissors with the word SHAMED on it is designed for opening a food package. When the user uses the scissors to cut the food or package, she will feel that she is fighting against body shaming.

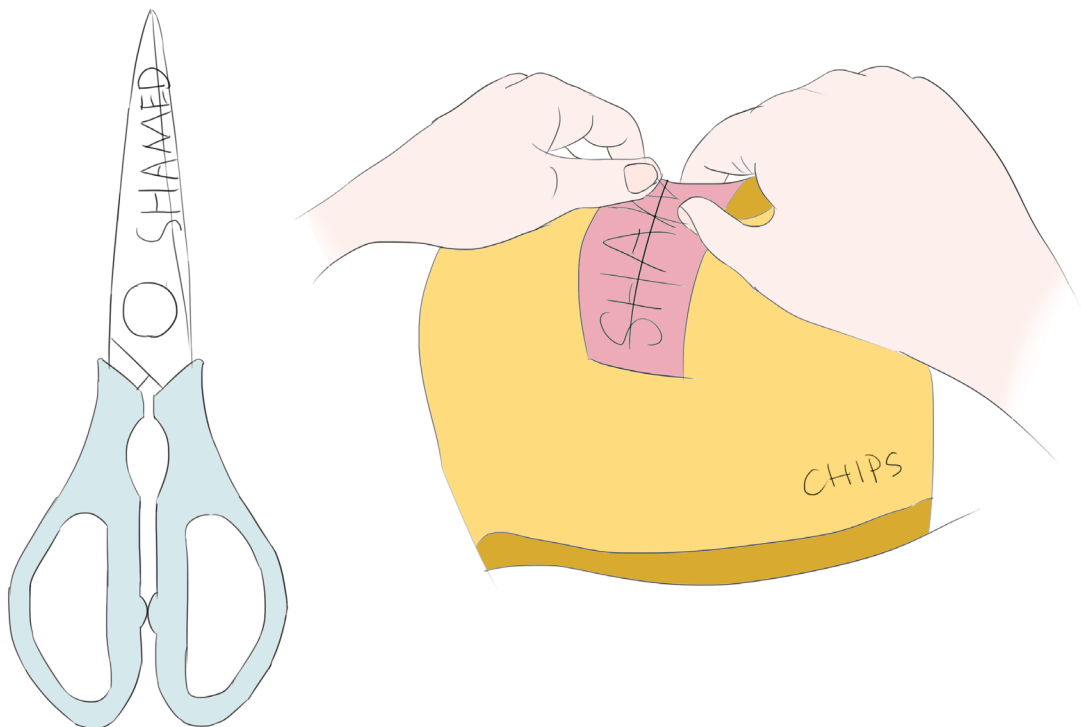
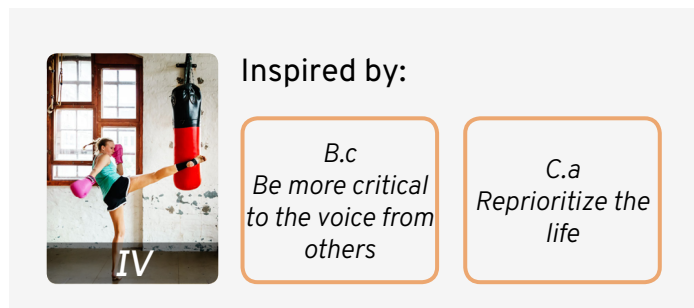


Figure 4-7: Concept 2.1 Tear

Concept 2.2: Fight

Concept Fight is a chopsticks-app product that provides a digital punching experience.

Concept Fight combines concepts 1.3 Nourish and 2.1 Tear. As my target group is Chinese college female students, chopsticks are involved in the concept. It is a pair of chopsticks linked to an app. I also designed a little bag for it. I want to use the material hook and loop so that when the user opens the bag, she gets the feeling of fighting. There are sensors on the head of the chopsticks. When the user picks the food, on the app she is punching something that can represent body shaming. Here in the example it is an egg. Every time she succeeds in breaking an egg, she will receive a medal. The metaphor for this fighting experience can have

other directions. For example, someone hits the nail with the hammer, or weeds grow through the cracks.

With this product, personalized metaphors of fighting against body shaming can empower the user to be critical to those voices. Medals are rewards for their effort.

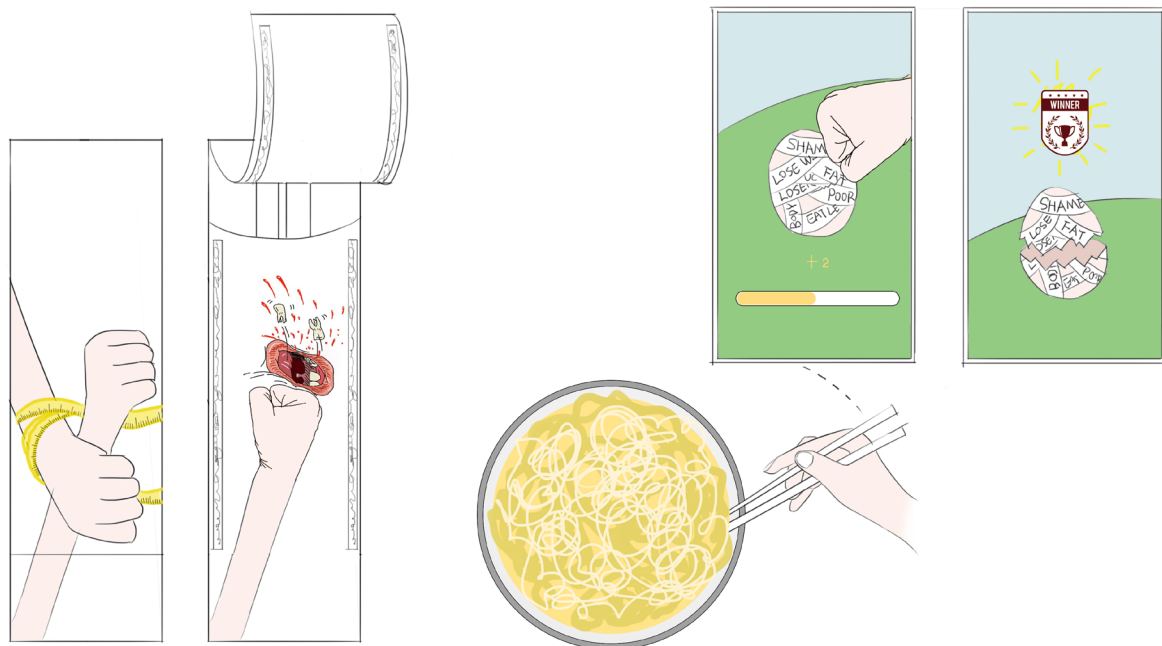


Figure 4-8: Concept 1.5 Fight

4.3 Concept comparison

Method

To compare the initial concepts, I consulted experts in the field of food and eating as well as the field of design for behavior change. I also turned to several people in my target group. Opinions and suggestions from them were collected. **The vALUe Method** was used to evaluate the ideas in a quick and systematic way. (Figure 4-9) By explicitly writing down the ideas in terms of advantages, limitations, and unique elements, the ideas have a common vocabulary which makes further selection easier. [29] After applying this method, I was able to decide what to do next: **further develop concept 1.3 Accompany, and incorporate the advantages of other concepts into the new concept.**

Result

Choice between directions

Direction 1 with the IV of swimming with a swimming ring was my final choice.

Chronic dieters paid too much attention to the voice from others or our society. They ignored their internal feelings when they tried their best to lose weight. Therefore, at this beginning stage of eating behavior change, most people have not built the mindset that they could fight against the shaming. Instead of forcing them to face the negative voices, supporting them to pay more attention to their internal feelings works better for my target group.

For the direction 2 with the IV of working out on a boxing bag in the gym, I believe the design will be valuable for general audiences as it provides a critical reflection

“

The interaction of this concept (Tear) is a bit weird. When I put the stickers on the package, I felt that I was banned from eating. (Participant)

”

“

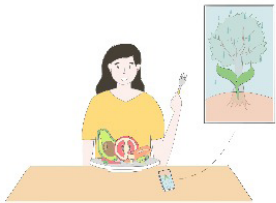
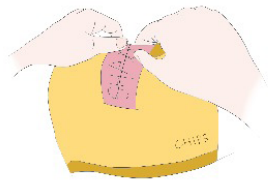
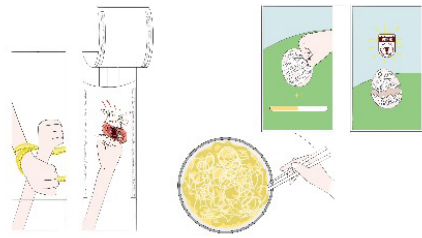
This concept (Fight) looks too aggressive for me. The words remind me of some bad memories. I totally know I should fight against those voices but it just hurts at this moment. (Participant)

”

on mainstream opinions. The design can be an artwork or installation. But this will be another project. My project focuses on individuals. A gentle and calm intervention will be my choice. Although I decided not to go further in this direction, the quality of reflection in concept 2.1 & 2.2 could still be applied in the final design.

	Reassure	Whisper	
Advantages	<div>Train the user to love herself</div> <div>Provide encouragement and support</div>	<div>The user can focus on food consumption</div> <div>Provide encouragement and support</div>	<div>p</div> <div>fe</div> <div>dy</div>
Limitations	<div>Lack of relationship with food</div> <div>Bad day?</div> <div>Mirror can also represent body checking</div> <div>a long interval of time</div>	<div>weird</div> <div>hard to ensure the jacket always fit, which might lead to negative emotions</div> <div>hard to make sure the encouragement will work because it is from a stranger. No emotional relationship.</div>	<div>Th</div> <div>ad</div> <div>foo</div> <div>Th</div> <div>c</div> <div>the</div> <div>out</div> <div>be</div> <div>m</div> <div>spe</div>
Unique elements	<div>A conversation with herself, the cues are always valid</div> <div>Like a journal</div> <div>Reflection moment</div>	<div>Involve mindful eating</div>	<div>Pro</div> <div>ser</div> <div>co</div>

Figure 4-9: Raw data of the vALUe analysis

 <p>Accompany</p>	 <p>Tear</p>	 <p>Fight</p>
<div>Have positive feedback</div> <div>implicit</div> <div>involve eating process</div> <div>dynamic</div> <div>take care of others</div>	<div>Touch the root problem</div> <div>Might be helpful for dealing with voice from others (critical)</div>	<div>Touch the root problem</div> <div>provide pleasant challenge</div> <div>gamification</div> <div>involve eating process</div> <div>dynamic</div>
<div>the plate might challenge to preparation. the process is more complicated.</div> <div>should build the emotional connection (pets)</div> <div>after finish the meal, the user can reflect on the positive advantages (energetic?)</div> <div>rule between eating and come needs to defined (how mindful she is? ed? amount?)</div>	<div>The words might cause negative emotion</div> <div>words: not intuitive</div> <div>wrong message: when put the stickers on the package, the action can mean 'keep it close'</div> <div>too much attention to voices from others</div>	<div>too aggressive</div> <div>The words might cause negative emotion</div>
<div>provide a sense of control</div> <div>Provide a sense of achievement</div>	<div>Powerful interaction</div> <div>feeling of critical and rational</div> <div>raise awareness</div> <div>better for general audience</div>	<div>feeling of critical and rational</div> <div>raise awareness</div>

Choice between concepts

I finally picked the concept 1.3 Accompany as the foundation for further design iteration. This concept tackled the eating process directly and gave immediate feedback during eating. It had the potential to achieve the four qualities defined in the chapter Design goal. To improve this concept, I decided to incorporate the advantages of other concepts into the new concept.

Concept Accompany can evoke positive feelings: The user will experience the feeling of company provided by the growth of the tree. Meanwhile, the collection of different types of trees is a reward for the effort of the user. However, it only evoked positive emotions during and after eating, there was still room for improvement before eating. The final design could involve positive quotes in concept 1.1 Reassure before eating to remind the user of the purpose of eating. Therefore, she would believe eating is a rational and logical thing to do.

Concept Accompany can arouse the awareness: In this concept, there is a strong connection between the growth of the tree and the food consumption process. The feedback of the app can promote the user to eat more food so that the tree can grow stronger. In further concept iteration, the quality of mindful eating in concept 1.2 Whisper can be involved in designing the app feedback during eating so that the user can feel more enjoyable during the meal. After the user finishes the meal, the app can also let her reflect on her feelings.

Concept Accompany can provide a sense of control: The collection of trees can provide a new goal for the user to pursue. This goal with the gamification quality will not add extra pressure on the user. The

“

I like this concept (Accompany) because I feel like I am playing a game. I can imagine a sense of achievement when using it. (Participant)

”

“

Cues given just before the behavior happens are more effective. (Expert in the field of design for behavior change)

”

“

It's important to build emotional connection with the plant. Only when the user cares what happens on it, this concept (Accompany) will provide the sense of achievement and control. (Expert in the field of design for behavior change)

”

growth of the tree on the app also makes the user feel that she is controlling the eating process. The attention is shifted from the calories and nutrition of food to the consumption process.

Concept Accompany can provide guidance: During eating, different types of feedback on the app can guide the user to be more mindful. For example, there can be voice feedback telling the user to focus on the taste, smell, and texture of food. The rule between the sensor and app animation can also nudge the user to eat more food. In addition, when the user reflects their internal feelings after eating, they can receive praises if they feel satiated and satisfied, or they can receive encouragement and suggestions if they feel not so well.

“

When we want to help people change their behavior by giving advices, it's always better to directly tell what they should do instead of stop them from what should not to do. (Expert in the field of design for behavior change)

”

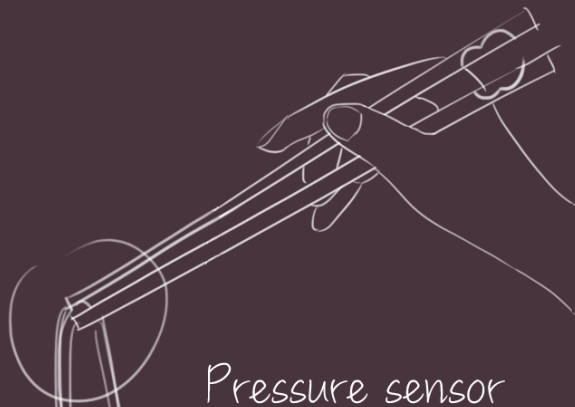
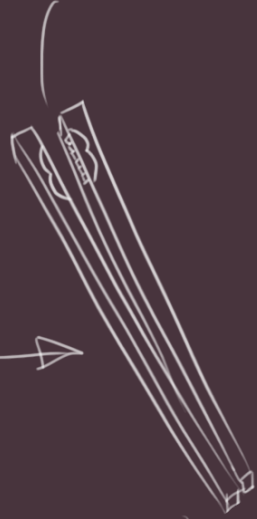
4.4 Conclusion

All five concepts aimed to make chronic dieters feel safe when eating. The concepts that urge people to fight against body shaming may dredge up bad memories and evoke even more negative emotions. Instead, the concepts that encourage people to eat are more appropriate choices for the target user. These concepts prevent the user from being hurt.

Concept 1.3 Accompany was picked as the final direction for further iteration as it tackles the eating process directly and provides positive feedback. To develop the final concept, I still needed to improve the limitations of concept Accompany and incorporate the advantages of other concepts in the final design. Several ideas were addressed to develop the concept Accompany:

- Chopsticks can replace the plate as a sensor. It fits better with the Chinese eating culture.
- Before eating, the design should focus on reminding people of why they should eat. For example, show quotes of encouragement on the loading page.
- During eating, a rule of the relationship between eating and the animation on the app should be defined to encourage positive emotions.
- After eating, I should focus on how to promote the user to keep eating with the intervention again next time. Possible solutions include asking the user to reflect on their feelings, provide attractive rewards, and visualize their achievements.
- Trees and forests might not be the final form. The user should build an emotional connection with what is shown on the app.

On/Off sensor



Rule: Maximum 15 drops of water every time picking the food
 $v = 1 \text{ drop/second}$

using chopsticks

Foodpal

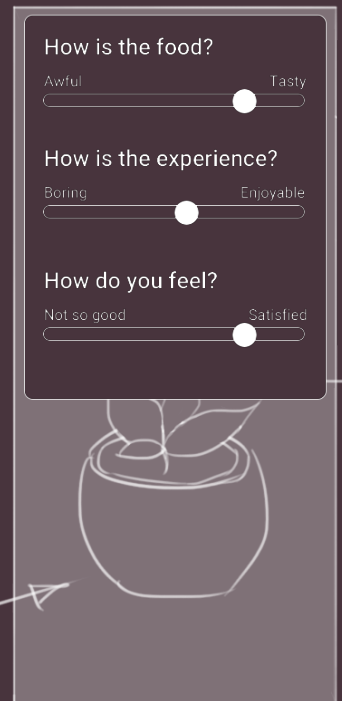
reserve to eat.

.)

g page



Dynamic growing page



Reflection page

Witheread

24h passed,
I have withered :(
Plant a new one...



24

5. CONCEPT FINALIZATION

Concept finalization aims to bring forward the design that achieves the desired interaction. This chapter explains how concepts were further developed and detailed. Material, size, color and type of sensor of the physical part, as well as the form, visual style and workflow of the digital part, were both taken into consideration. The final design is presented with the user journey in this chapter. In the end, the conclusions sum up the key ideas in the final design and reflect on the parts that need to be improved.

5.1 Concept iteration

Introduction: The final concept was named Foodpal. It was developed based on the concept Accompany. The product would like to provide a sense of companionship to the user. They are going to experience that a friend they matter is having meals with them. They can see the outcome of eating with their friend. In this way, they feel safe to eat.

In this section, I explained the concept iteration process. The iteration could be separated into two parts, which were a pair of chopsticks as the physical part, and an App as the digital part. In terms of the physical part, the material, size, color, and type of sensor were taken into account. When I designed the App, the metaphor, visual style, and flow-chart of the App were reconsidered.

The rule of feedback during eating was also redesigned, which will be presented in the section 5.2 Final design.

Physical part

Chopsticks are chosen to be the physical part of the product as it fits the context of Chinese eating culture. Meanwhile, the target users of this project, Chinese female college students, usually have their meals in the school canteen or order takeaway. They hardly prepare food by themselves. Therefore, compared to any container, the chopsticks are more suitable as the physical part.

The chopsticks should fit people's habit of normal use. **The product refers to the shape of traditional chopsticks.** (Figure 5-1) Each stick is 22cm long. Its overall shape is wedge-shaped. The top section is a square with a side length of 6mm. The bottom section is a circle with a radius of 2mm.

In order to reduce weight, only the parts with sensors at both ends are made of metal. The middle part is made of bamboo, which is a commonly used material for traditional Chinese chopsticks. This also ensures that the sensors are protected so that the chopsticks can be washed directly under the water flow.



Figure 5-1: Traditional chopsticks

The chopsticks retain the original color of the material, which makes them look so normal that they can be used in any situation. (Figure 5-2)

The chopsticks are equipped with two internal sensors. When the user separates the two sticks apart, the on/off sensor on top of the sticks will be triggered. The light will switch on to show that the chopsticks start to work. The App will also automatically turn on. When the user picks the food,

the pressure sensor on the bottom of the sticks will sense it. The light will turn yellow as a signal that the chopsticks know the user is about to eat. After the user puts the food into her mouth and starts chewing, the pressure will be back to zero. The light will turn green to show that the chopsticks realize that the user is eating now. The light be increasingly brighter until the maximum brightness or next picking of the chopsticks.

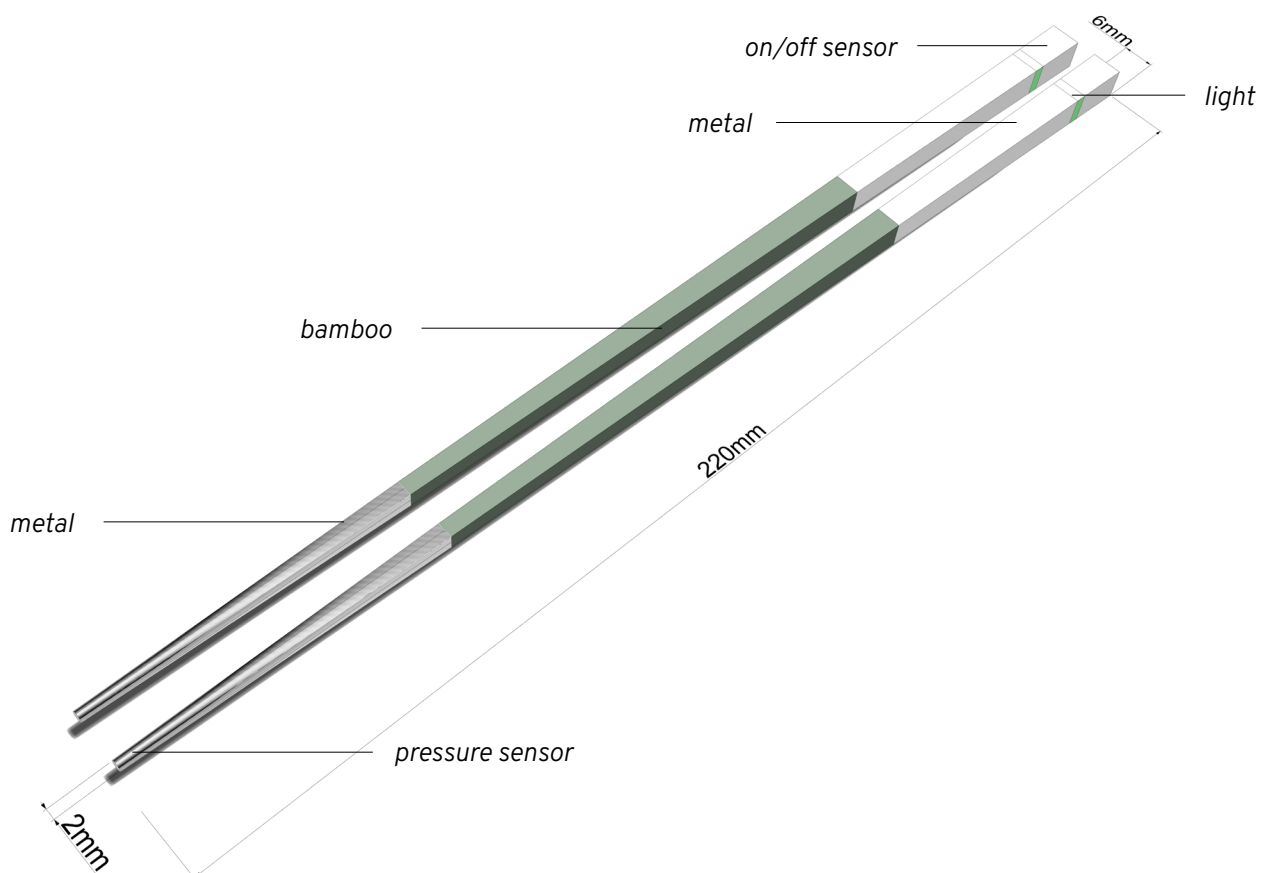


Figure 5-2: Renderings of the chopsticks

Digital part

Metaphor on the App

A metaphor representing Foodpal was selected to trigger the user's emotional connection. They should care what happens on the App. They will receive rewards because of their progress in being braver to eat. Meanwhile, they will also receive negative feedback if they start to diet again.

Different types of metaphors were listed and compared considering possible positive and negative feedback they could provide. (Figure 5-3) The growth of both

animals and plants can provide a sense of companionship as positive feedback to users. However, the death or illness of the animals as negative feedback would be too cruel. Growth and withering of plants turned out to be the proper metaphor on App.

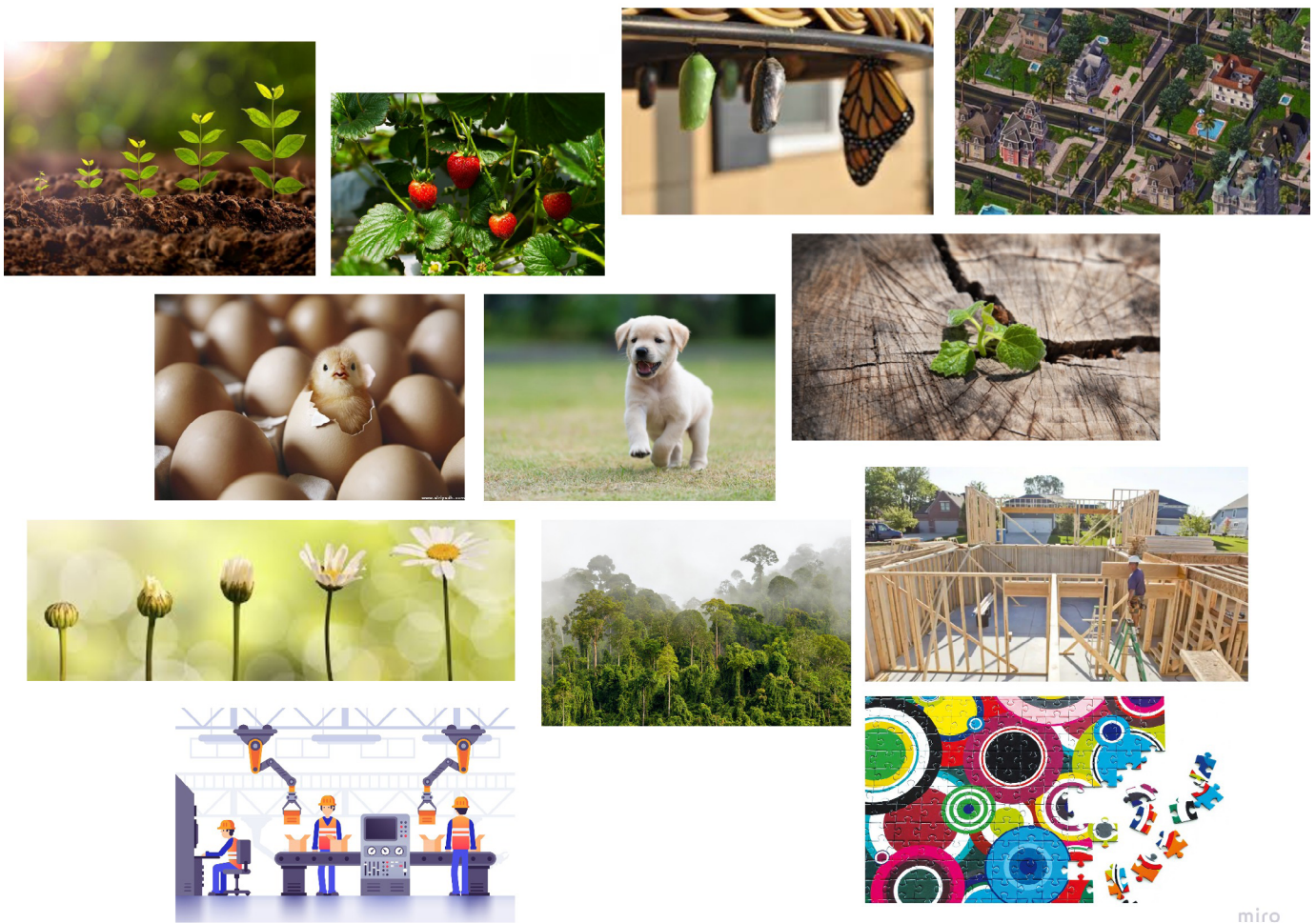


Figure 5-3: Collage of metaphors

Visual style of the App

A mood board was created to explore the visual style of the App. (Figure 5-4) A mood board is a collection of visual materials that evoke a certain style or concept. Designers create mood boards to communicate the “feel” of an idea. They can be a powerful starting point in a creative project—a visual reference for the team and a springboard for new ideas.

The key idea of concept Accompany is the growth of the plant. It is a metaphor for the recovery of the user’s physical and mental state. Therefore, the user will experience a sense of companionship during the whole

eating process. They can also learn to take care of themselves like taking care of someone they matter to. Terms like ‘Care’ and ‘Nurse’ are keywords for creating the mood board. Several colors were extracted from the mood board, which can be a great way to express a particular feel in the App design.

Besides, the radius background of the interface will attract the user’s attention to the plant. The plant will be colorful. And the visual style of other elements except for the plant will be simplified. For example, the icons are composed of white lines. (Figure 5-5)



Figure 5-4: Mood board



Figure 5-5: Home

App flowchart

There are two modes in the App. **Consumption mode** will only be triggered if the chopsticks are activated. It directly tackles the whole eating process. The App is in **normality mode** when people do not use chopsticks. In this mode, people open the App for checking the current condition of their Foodpal, the browsing eating history, and adjusting the settings. The flowchart of both modes is presented in the Figure 5-6.

For details of interfaces, please read the section 5.2 Final design.

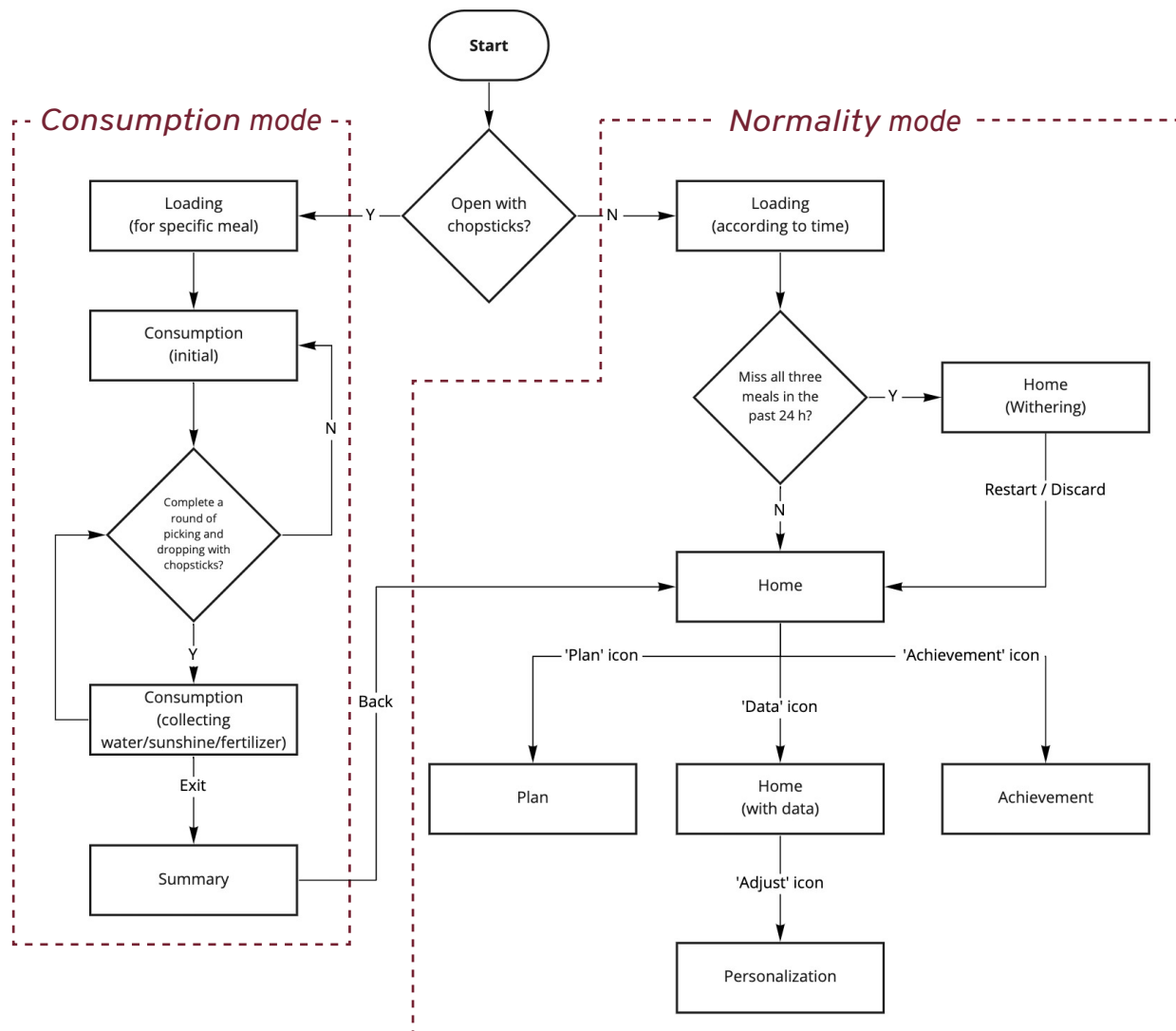


Figure 5-6: Flowchart

5.2 Final design

The final design turns out to be a product, **Foodpal**, with a pair of chopsticks linked to a plant-growing app. (Figure 5-7) Foodpal accompanies the user throughout the eating journey. The pressure sensor on the head of the chopsticks can monitor the user's eating speed, thereby affecting the growth of plants on the app. The interaction with the app encourages the user to eat more food and at the same time be more mindful of the eating process. The growth of the plant on the app on one hand is a metaphor for the positive outcome of eating. On the other hand, it is the reward for the user's courage to fight against their fear of eating and weight gain, so that they can be motivated to keep eating in a new mindful way.

(Check Appendix 4.2 to have an overview of app interfaces)

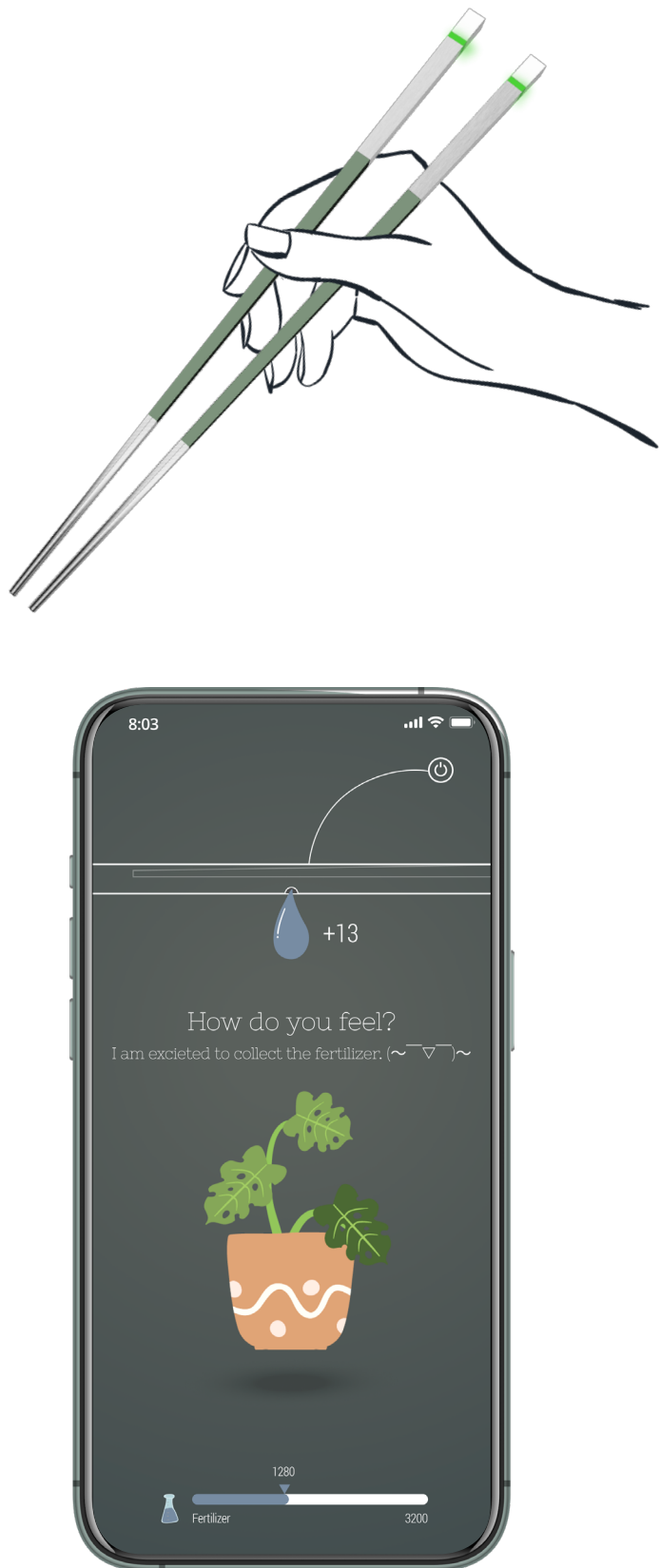


Figure 5-7: Overview of Foodpal

1. Be reminded by the App notification

The app reminds the user to eat meals according to the time set in advance.
(Interface 1)



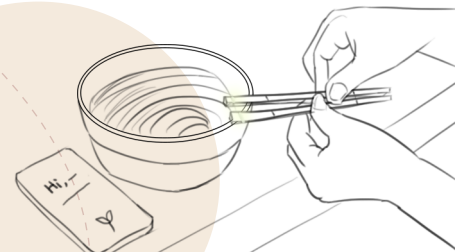
2. Prepare the food

The user can go to the canteen, order take-away, or prepare the food by herself.



3. Separate the chopsticks

The user separates the chopsticks to start eating. The lights of the chopsticks are on. The app opens automatically.
(Interface 2)



4. Be ready to eat

The app enters consumption mode.
(Interface 3)



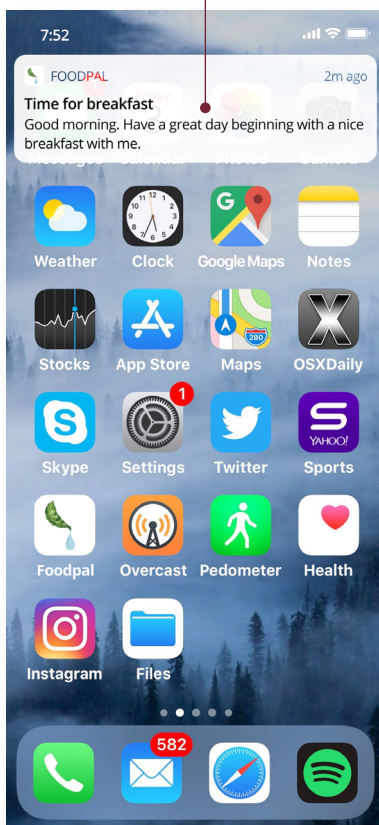
Before eating: Motivate the user to eat

Strategy:

Arouse the emotional connection of the user.

Design:

The wording of App notification invites the user to have meal with Foodpal.



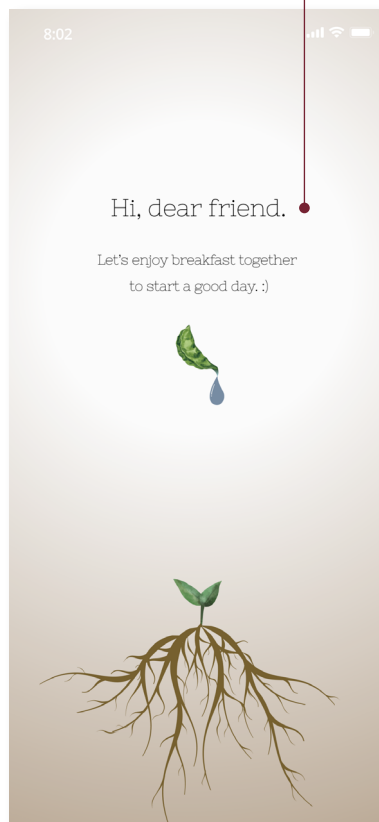
1. App notification

Strategy:

Arouse the emotional connection of the user. Remind the user of their goal of long-term health.

Design:

The quotes on the loading page reminds the user of their WHY. Foodpal keeps the tone light and friendly.



2. Loading
(breakfast)

Strategy:

Arouse the emotional connection of the user.

Design:

The quotes welcome the user. An emoji shows the positive emotion of Foodpal.



3. Consumption
(breakfast / initial)

Design:

The leaves sway gently.

→ Explanation of design details

5. Pick the food with chopsticks

When the user pick the food, the lights turn yellow. After the user drops the food in mouth, the lights turn green and the drop on Foodpal will start to grow.



6. Chew the food

When the user chew the food, the lights will become increasingly brighter the drop on Foodpal will become bigger and bigger. (Interface 4/5)



7. Be encouraged to be mindful

The user should pay attention to the food and her feeling while chewing. (Interface 4/5)



8. Pick another food with chopsticks

When the user picks another food, the drop on the App will fall down as rewards. (Interface 6)



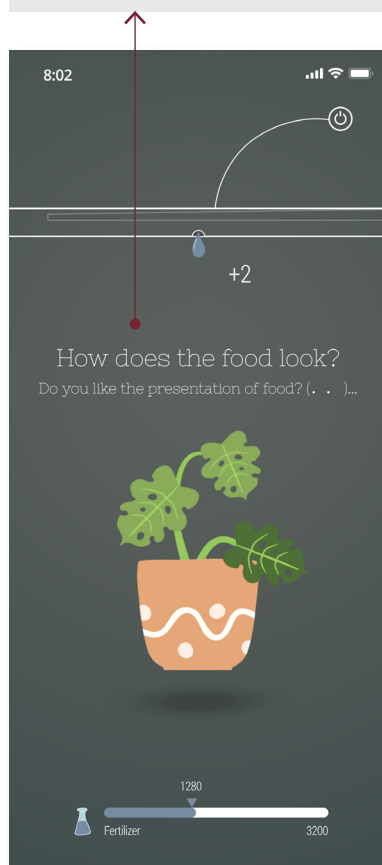
During eating: Make the user enjoy eating

Strategy:

Encourage mindful eating.

Design:

Foodpal asks questions related to mindfulness. Foodpal also has **voice feedback**.



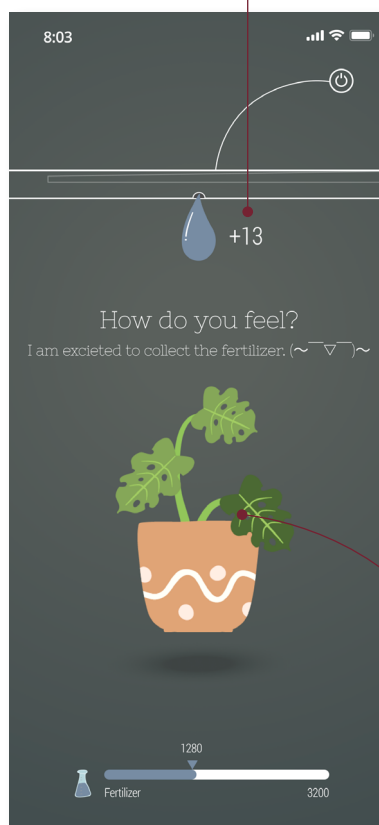
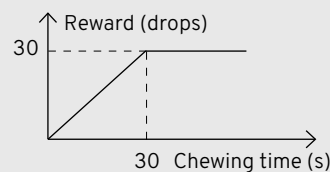
4. Consumption
(breakfast / progressing)

Strategy:

Encourage the user to eat more food.

Design:

There is an assumption that eating more food needs more time for chewing. When the user is chewing, the drop becomes bigger second by second. Each bite, the plant can receive a maximum of 30 drops.



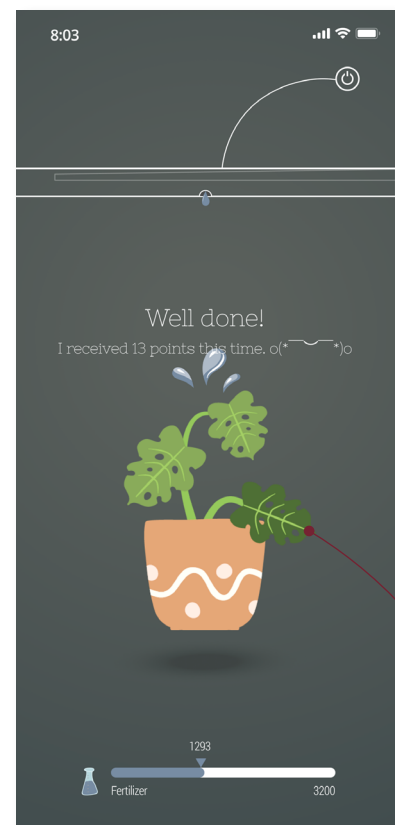
5. Consumption
(breakfast / progressing)

Strategy:

Praise the effort of the user

Design:

The quotes praise the user. An emoji shows the positive emotion of Foodpal.



6. Consumption
(breakfast / result)

Design:

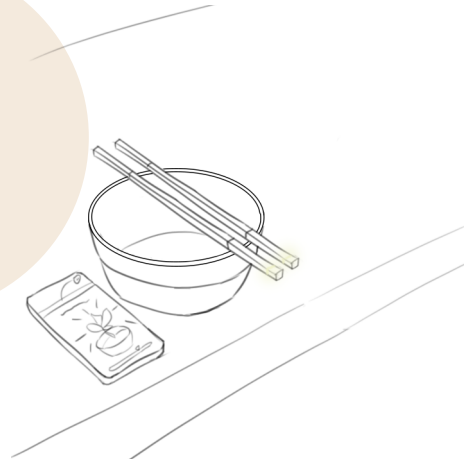
Foodpal blocks the other Apps during eating.

Design:

The leaves sway excitingly.

9. Observe the growth of plant

The plant grows up when certain number of drops has been collected.
(Interface 7)



10. Finish eating and press 'Exit'

The user can click the 'Exit' button to finish the journey.
(Interface 7)



11. Read the report

The user can read the report provided by Foodpal to see the rewards achieved during eating.
(Interface 8)

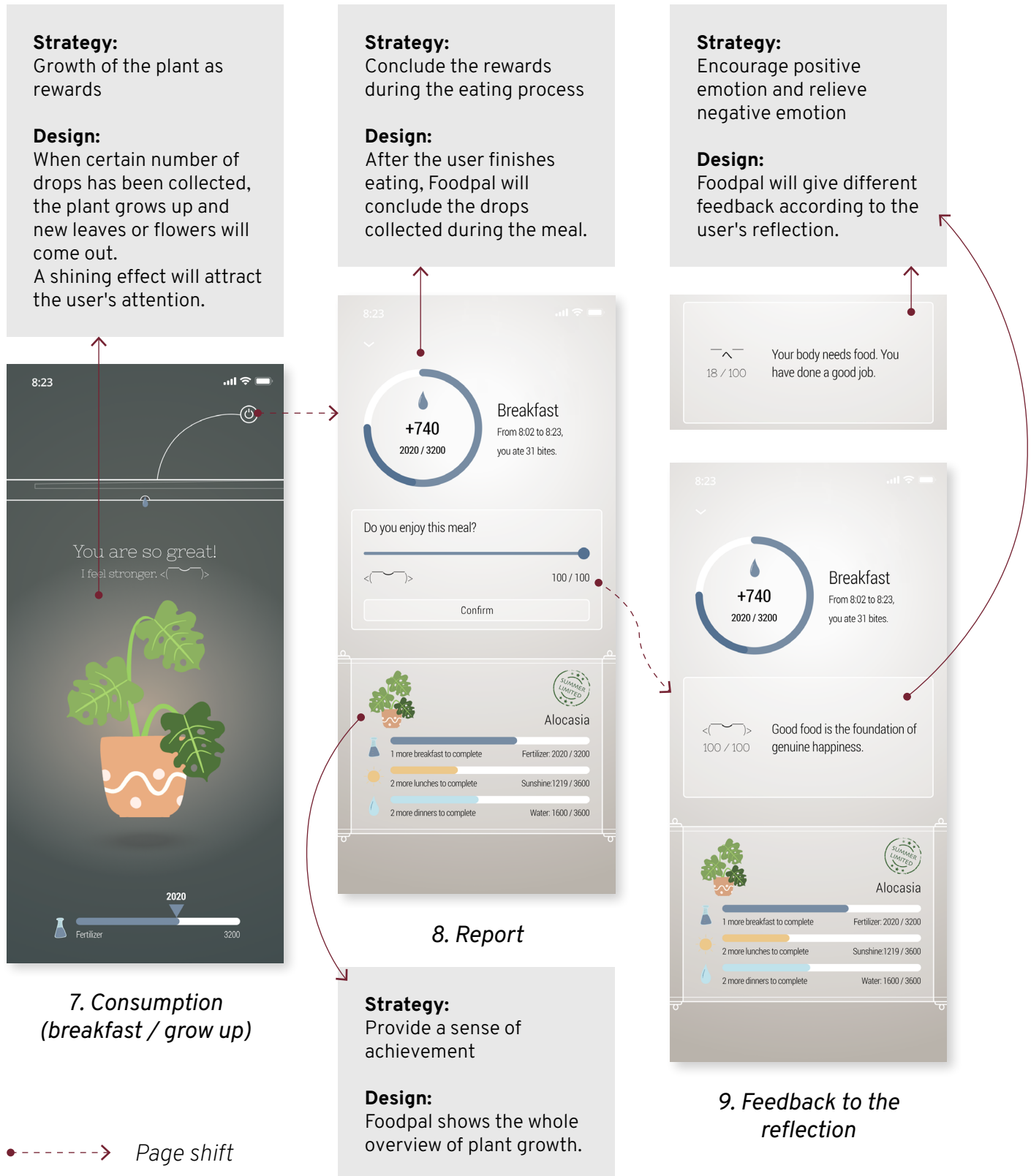


12. Reflect on the internal feelings

The user can report her internal feeling and receive feedback from Foodpal.
(Interface 9)

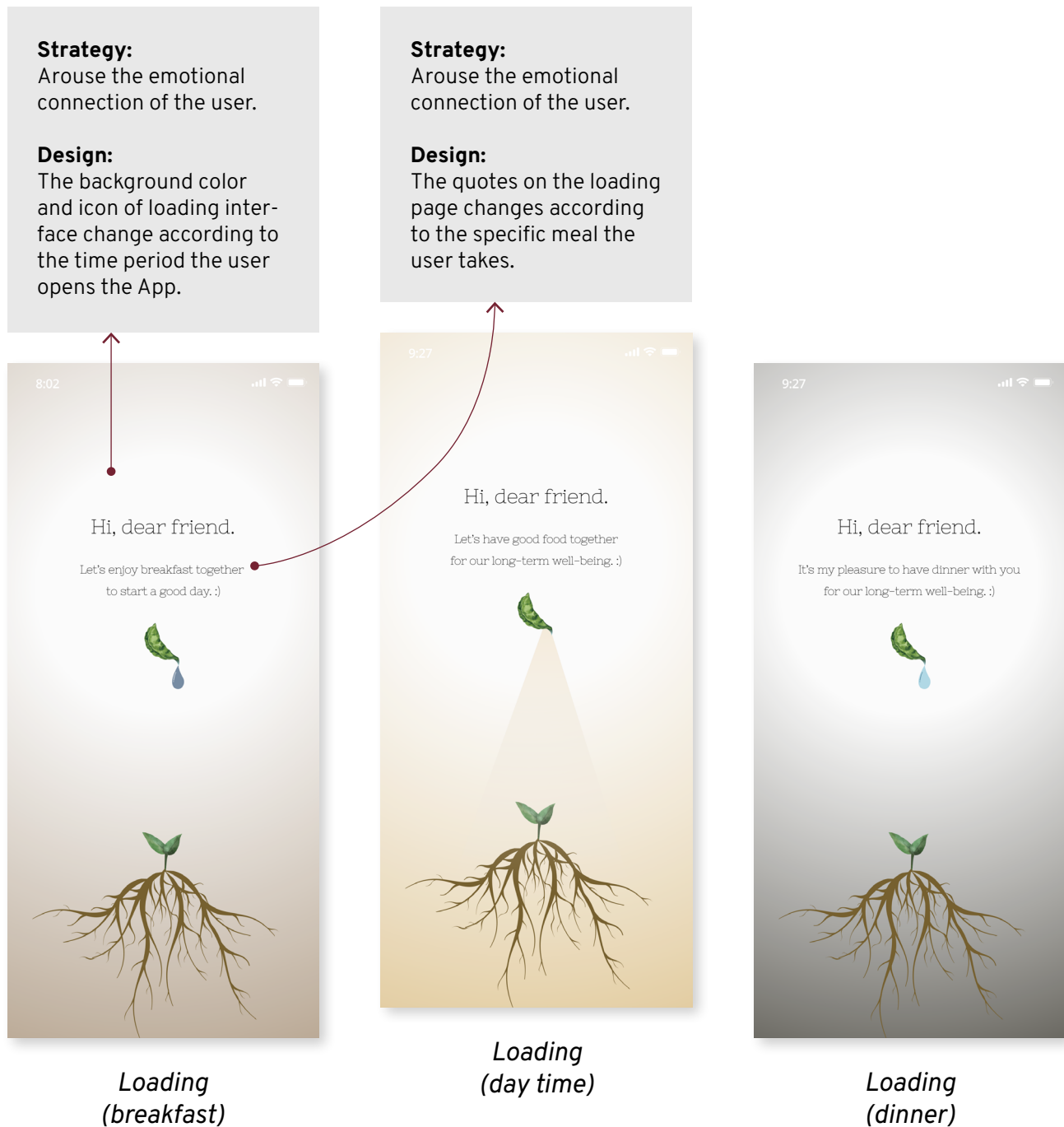


After eating: Enhance the positive memory

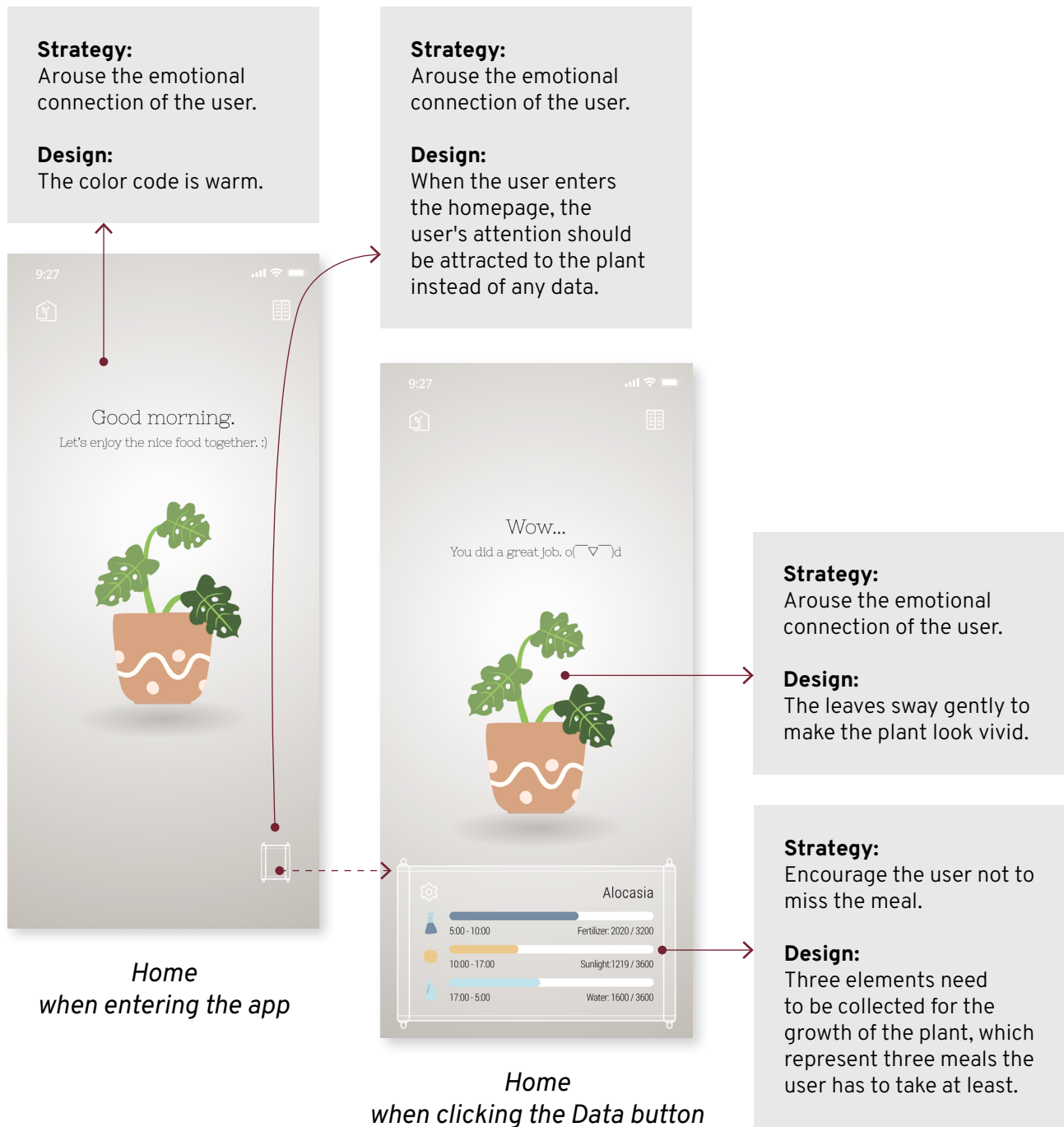


Nomality mode: Promote consistent use

Loading page



Homepage



Consumption mode for three meals

Strategy:

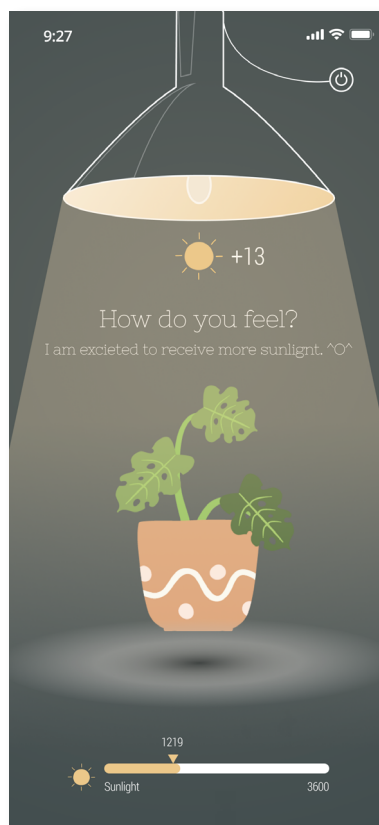
Encourage the user not to miss the meal.
Formulate a food ritual.

Design:

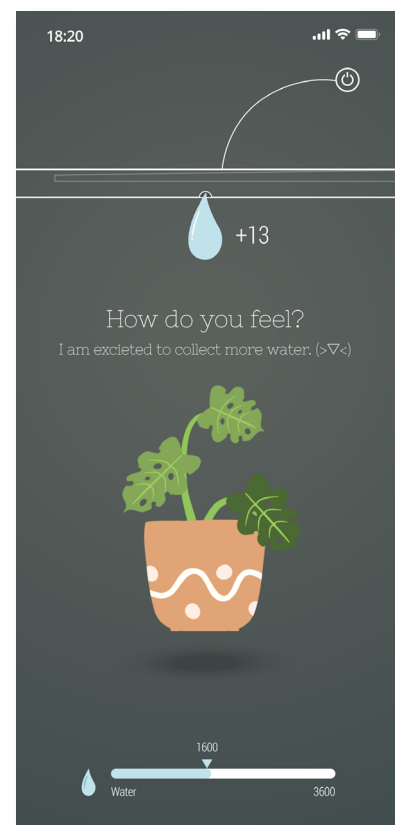
The user collect different elements for the growth of the plant in three meals.



Consumption mode for breakfast

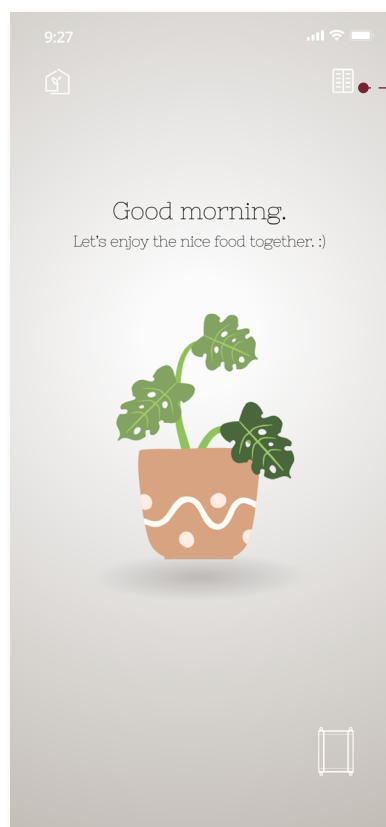


Consumption mode for lunch

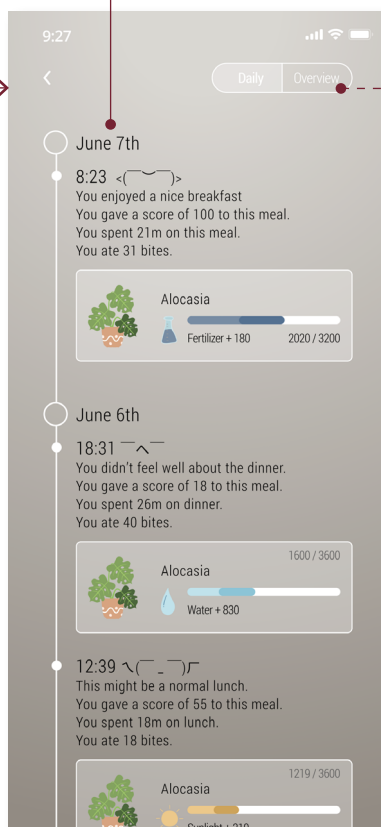


Consumption mode for dinner

Achievement page



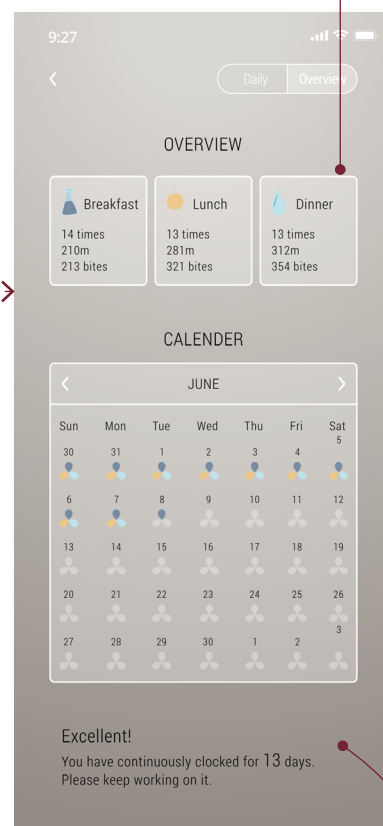
Home



Daily achievements

Strategy:
Praise the effort.

Design:
Foodpal visualizes the overall achievements of each meal the user has received.



Overview of achievements

Strategy:
Reprioritize the life.

Design:
The calendar provided by Foodpal motivate the user to set new goal of keeping eating. Combo is highlighted in purpose.

Plan page

Strategy:

Give autonomy to user.

Design:

The user is able to personalize her plan of growing the plant so that she can have a sense of control.

Strategy:

Arouse expectation.

Design:

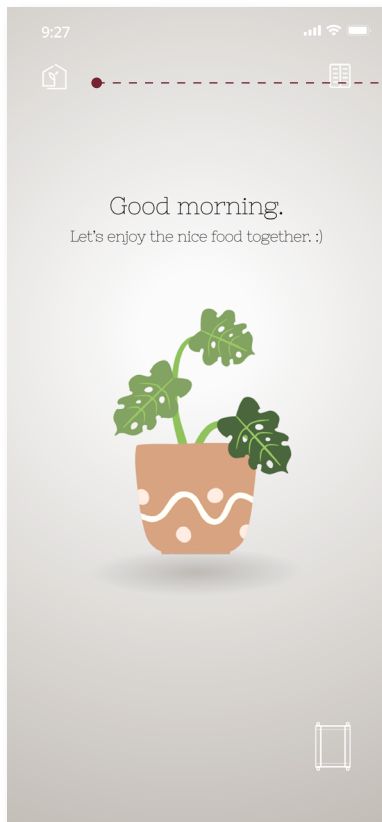
The user can make the collection plan in line with her preference so that she will expect more to eat with Foodpal.

Strategy:

Arouse the emotional connection of the user.

Design:

There are plants that are seasonally limited according to the present month.



Home



Plan



Plan (add new plant in future plan)

Withering

Strategy:

Arouse the emotional connection of the user.
Encourage the user not to miss the meal.

Design:

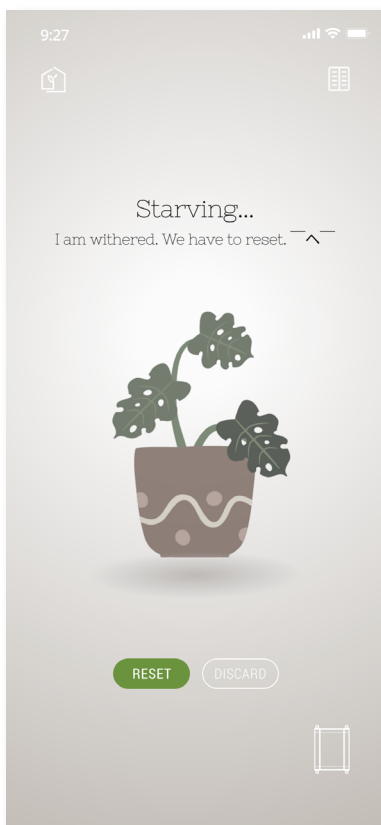
If the user misses three consecutive meals, the plant will be withered.

Strategy:

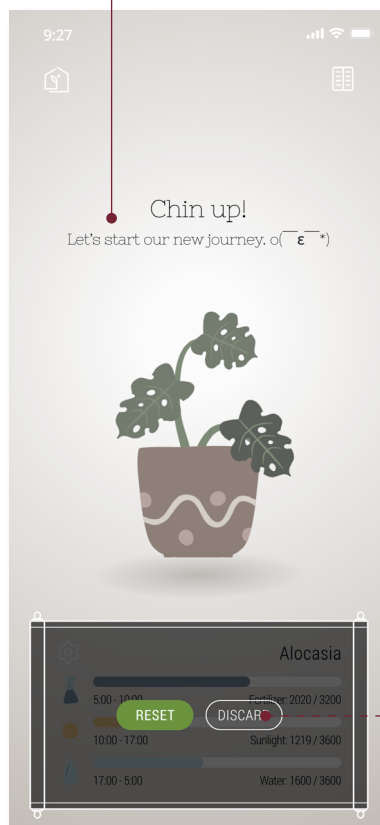
Encourage the user in a bad day.

Design:

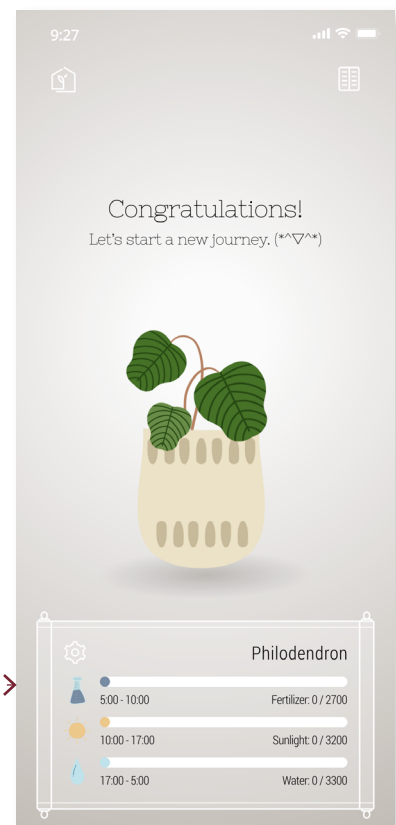
The quote will encourage the user to restart a journey to avoid possible negative emotions.



*Home
(withered)*

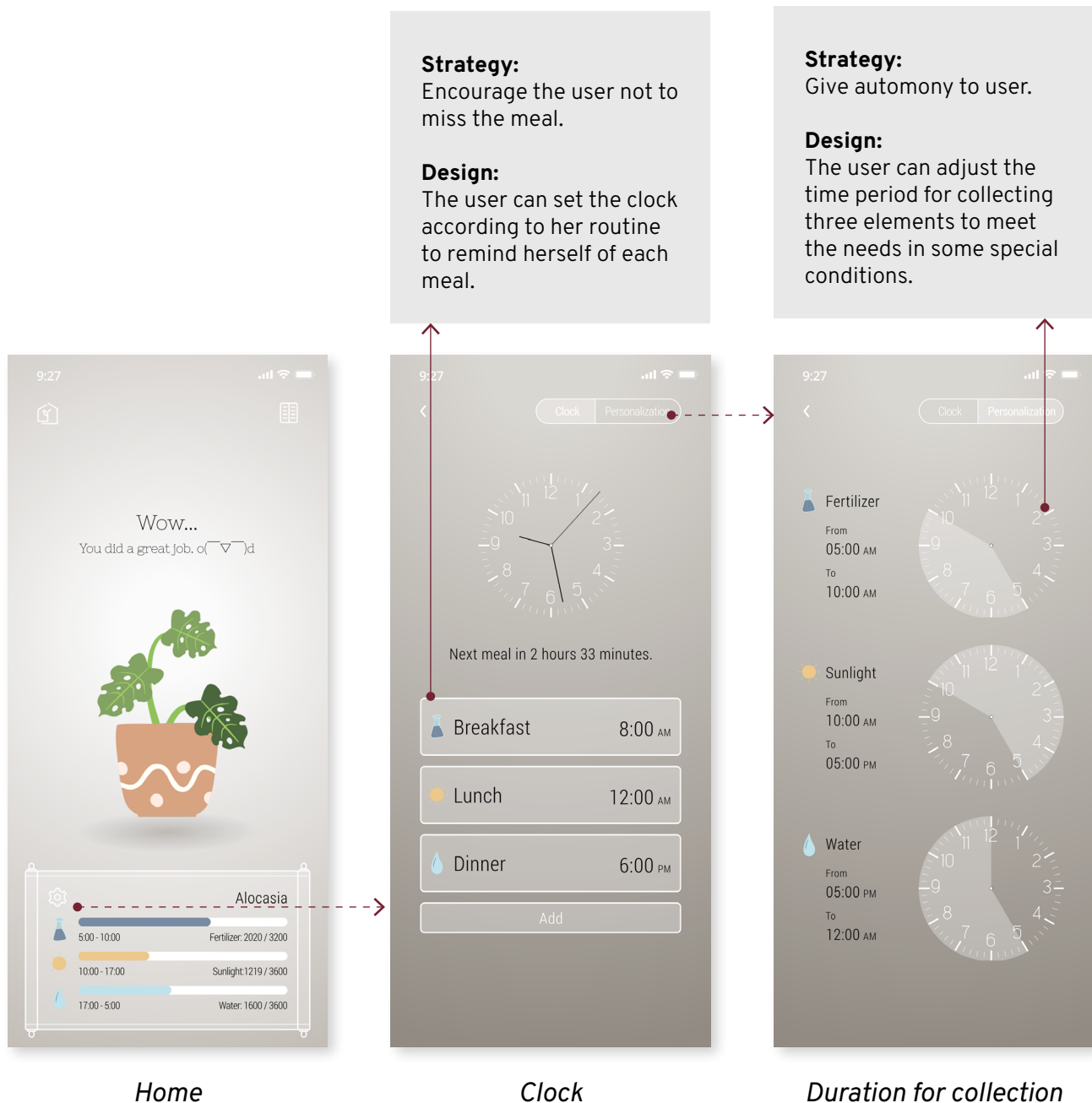


*Home with data
(withered)*



Home
(if discard)

Towards future: Develop an individual food ritual



5.3 Conclusion

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

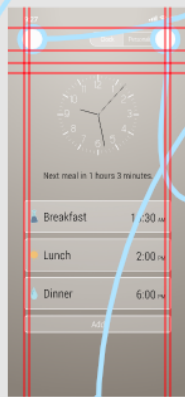
The design emphasizes making chronic dieters feel safe when eating. This is achieved by providing companionship, support, and encouragement to the user during the whole eating process.

The sub-goal changes in different phases of product usage. Before eating, Foodpal motivates the user to eat. The loading page reminds the user of why they choose to get rid of restrained eating. During eating, Foodpal makes the user enjoy the eating process by encouraging mindful eating. After the meal, Foodpal enhances the positive memory of eating. The report page concludes all the achievements and gives different feedback according to the user's reflection. Therefore, the design is able to evoke positive emotions throughout the process of food consumption.

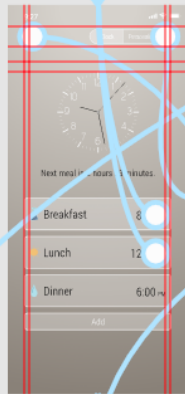
When the user opens the App in non-eating moments, Foodpal aims to promote consistent usage. The user can check the past achievements or make the future plan according to her preference.

Although Foodpal is able to provide a safe eating experience for chronic dieters, some design details have space to be improved. The rule between the chopsticks and the animation on App needs more data to be perfected. The selection of plants can involve some meanings. More experts need to be involved to further iterate the design.

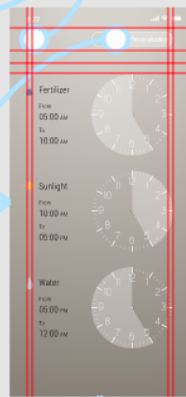
Clock-2



Clock



Personaliz...



Personaliz...



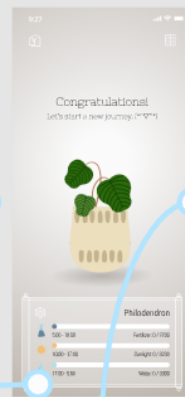
Home-2-r...



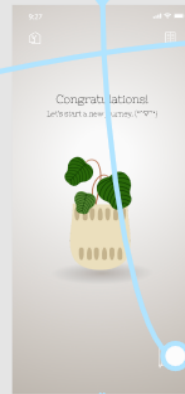
Home-res...



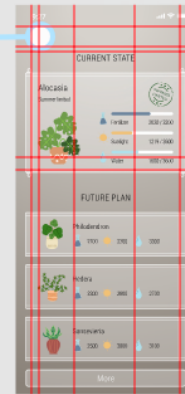
Home-2-di...



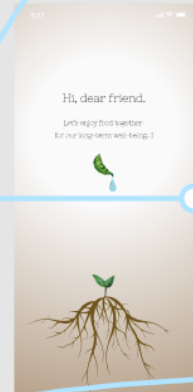
Home-disc...



Vision-2



Loading p...



Home



Home-2



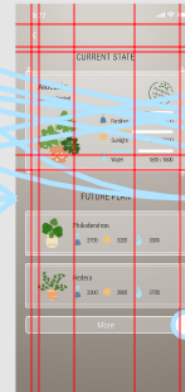
Home-wit...



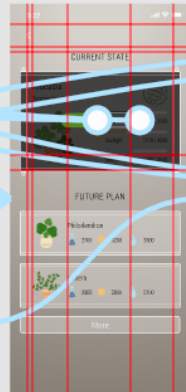
Home-wit...



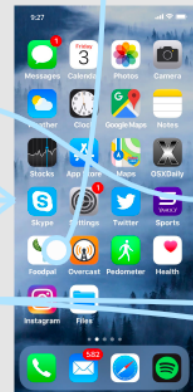
Vision



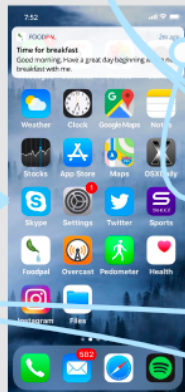
Vision-wit...



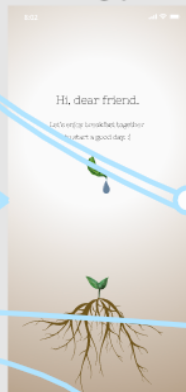
Notificatio...



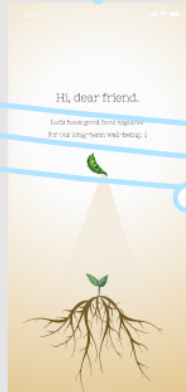
Notification



Loading p...



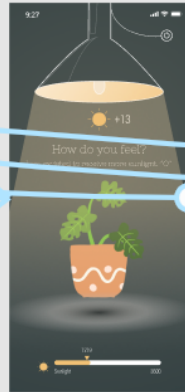
Loading p...



Water-initial



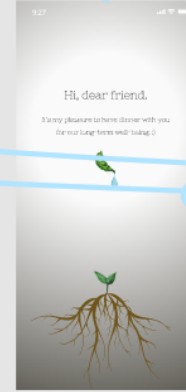
Lighter



Water-dro...



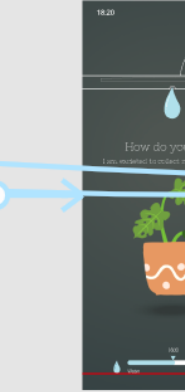
Loading p...



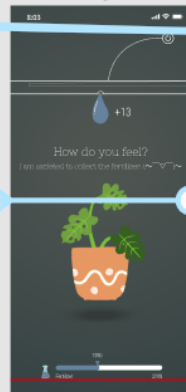
Water-dro...



Fertilizer



Water-pro...



6. EVALUATION

The evaluation aims to test whether the final design achieves the goal and desired interaction. This chapter starts with the research questions for the evaluation. Then the method, process, and outcomes of the evaluation are explained, following by the conclusions that answer the research questions. The result of the evaluation also leads to further recommendations. The reflections of the evaluation and project are also involved at end of this chapter.

6.1 Purpose

The final design was tested, with the design goal in mind, to check whether the targeted interaction and experience are reached. I want to focus on the emotion triggered during product usage. I will test both the consumption mode and the normality mode.

To have an overall analysis of the user experience of the final design and acquire some useful insights for the future iteration, I listed the two overall research questions and their sub-questions:

RQ1 Consumption mode

To what extent do the users feel safe when eating with Foodpal?

- To what extent do the users feel motivated to eat before eating?
- To what extent do the users enjoy the eating process?
- To what extent do the users have positive memories after eating?

RQ2 Normality mode

To what extent are the users anticipated to eat with Foodpal in normal situations?

- To what extent do the users have an emotional connection with Foodpal?
- To what extent are the users motivated to have at least three meals a day?
- To what extent do the users have a sense of achievement and control when using Foodpal?
- To what extent are the users able to develop their own food ritual using Foodpal?

6.2 Method

Introduction: As most of the participants for the final evaluation live in different cities from mine, I decided to make the user test totally online. The test was taken with the zoom. The participants were asked to share their screens. When they operated the Figma online prototype, I could observe their operation and ask questions when necessary.

In this section, I will discuss all the preparations for the online user test.

Set-up

The test was conducted in one-to-one meetings. I sent a zoom meeting link to the participant one day beforehand. The participant could enter the zoom during the test. I hosted the meeting and asked questions during the test. Meanwhile, I also observed the test and took notes. The participant could operate the online Figma prototype. She was asked to share during the test. I was responsible for recording the screen, which included the operations of the participant, her facial expressions, and our dialogue.

Material & process

Prototype

An online Figma prototype was created to test the final design. The prototype only consisted of the App interfaces. But the context and feedback of the chopsticks were presented in the participant manual (Figure 6-1).

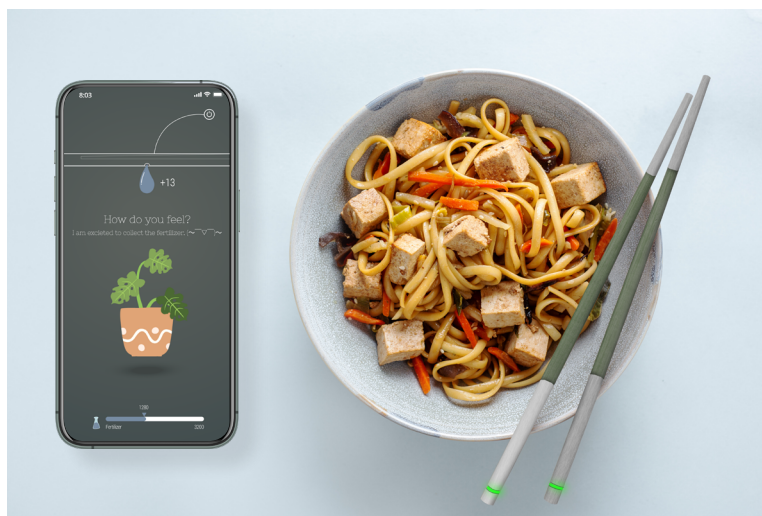
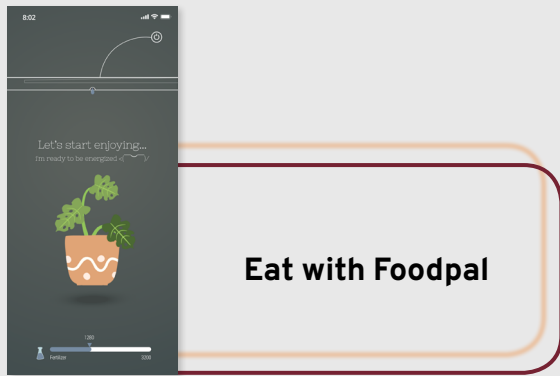


Figure 6-1: Image in the participant manual

For participant



Description: It's 7:58 in the morning. Foodpal sends a notification to remind you of eating breakfast with her. You also feel hungry now. Therefore, you go to the school canteen and order some noodles. You are about to start having breakfast with Foodpal.

Goal: Have breakfast with Foodpal

Questions:

- To what extent do you feel motivated to eat before eating? (demotivating/motivating)
- To what extent are you aware of your new belief? (unaware/aware)
- To what extent do you feel supportive during eating? (obstructive/supportive)
- To what extent do you feel accompanied during eating? (unaccompanied/accompained)
- To what extent do you feel guided during eating? (unguided/guided)
- To what extent do you feel enjoyable during eating? (annoying/enjoyable)

For interviewer

Tasks

- Seperate the chopsticks
- Observe the loading page
- Observe the initial state of Foodpal
- Pick the food
- Drop the food in mouth
- Chew the food and observe the animation on App
- Pick another food and repeat the eating process

RQ

- Do users feel motivated to eat before eating?
- Do users enjoy the eating process?

Participant manual

The participant manual was created as an instruction for the test. It consisted of four following parts.

- Background questionnaire: Participants should fill in the background questionnaire at the beginning of the test. It included the name, age, career, year of dieting, the time of giving up dieting. The data was for further analysis.
- Zoom setting: I prepared a tutorial for the participant to set their zoom.
- Product introduction: I briefly introduced the product with a picture (Figure 6-1) of it.
- Scenarios & questions: 6 scenarios were created to describe the stories and context behind the usage of Foodpal. Among them, 2 scenarios aimed to test consumption mode and 4 scenarios aimed to test normality mode. Several questions (Figure 6-2), related to research questions and interaction visions, were asked after scenarios of each mode. (check Appendix 5.1 for detailed information)

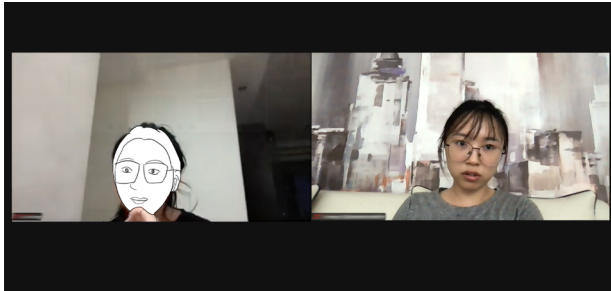
Interviewer sheet

An interviewer sheet was prepared before the session. The tasks the user might finish in each scenario were listed so that I was able to take notes when she met problems. Besides, the research questions were also included to remind me of the purpose of the evaluation session. (Figure 6-2)

Figure 6-2: Example of user scenarios

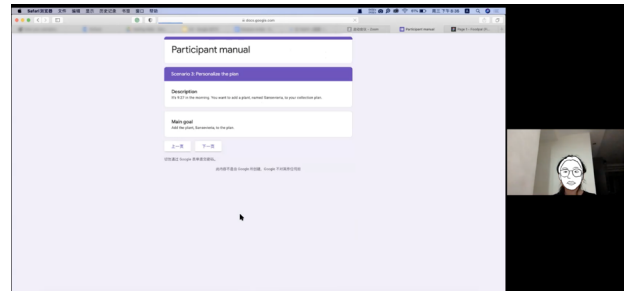
Session procedure

The test session is explained in Figure 6-3.



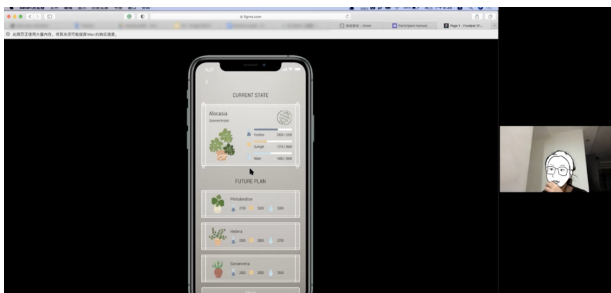
Welcome

- 1) The participant entered the zoom room.
- 2) I welcomed the participant and introduced the project and the test.
- 3) The participant received a link for the manual and started sharing her screen.



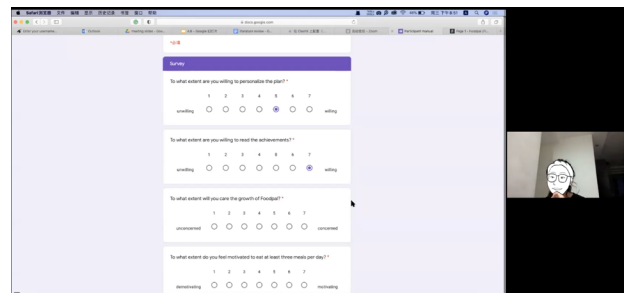
Read the scenario

- 4) During the test, the participant read the scenarios and got the main goal for the scenarios.



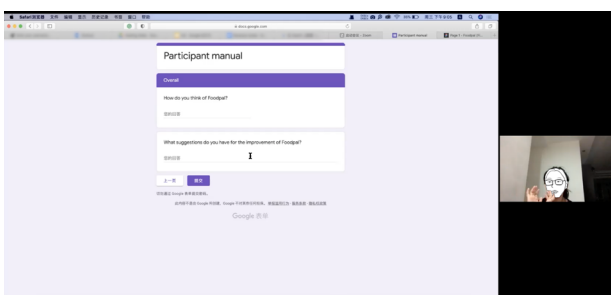
Operate the prototype

- 5) The participant operated the interface prototype. Meanwhile, the participant **spoke out loud**. I dictated the feedback that was not involved in the prototype, including the animation and voice feedback of the app and the feedback of the chopsticks. (**Wizard of Oz**)
- 6) I **asked questions** based on the operations and reactions of the participant.



Answer the questions & explain

- 7) When the participant had finished the scenarios of one mode, she would answer some questions in the manual and give reasons for giving certain scores.



Give an overall comment

- 8) In the end, the participant gave an overall comment to Foodpal and suggestions for improvement.

Figure 6-3: Session procedure

Participants

A total of five participants were recruited. While three of the participants (P1, P2, P3) were familiar with the project due to being part of contextual research or concept test, two participants (P4, P5) were introduced to project first time. All of them are Chinese females in their 20s. The entire information can be found in Figure 6-4.

Just decide to or begin to give up dieting	P1	26 student diet for about 1.5 years
	P2	24 student diet for more than 2 years
	P3	23 student diet for more than 2 years
Have given up dieting	P4	25 student diet for more than 2 years
	P5	24 architect diet for more than 2 years

Data collection

Both quantitative and qualitative data were collected during the session. The participants were asked to give scores to certain parts of the experience as quantitative data. Meanwhile, the sessions were recorded so that their thoughts, opinions, suggestions to the intervention, as well as their reasons for giving certain scores, were collected as qualitative data. In addition, notes were taken throughout the session to mark the interesting operations or emotions of the participants.

Analysis

Although I collected both the quantitative and qualitative data, the analysis only emphasized the qualitative data. The limited number of five participants was not enough for giving convincing scores to judge the product. However, I still paid attention to the reasons why the participants gave low scores.

Figure 6-4: Overview of demographic information of participants

The three-phase structure was applied for generative qualitative data analysis.[28] The session transcripts were read to highlight the important quotes. Impressions and insights were written down as well. Besides, the session notes were also reviewed. The data were clustered according to the research questions so that I was able to verify whether the design goal was achieved. *(Check Appendix 5.2 for Data analysis of evaluation)*

6.3 Result

Consumption mode

Motivation to eat

Although all the participants felt motivated before they started the meal, their reasons were different, which included their own hunger cue, the gamification quality of Foodpal, the rewards from Foodpal, and the quotes of encouragement (on the App notification & loading page) provided by Foodpal. P1 appraised that Foodpal made her more aware of the meaning of eating. P2 and P3 mentioned they expected the notification to provide more information other than quotes of encouragement. For example, the growing progress bar of the plant would motivate the users to eat for collecting the plant.

“

I got a chance to reflect on the meaning of eating. (P1)

”

“

Only one quote on the notification is not motivated enough. I can imagine myself losing motivation if seeing the same quotes on the loading page all the time. Maybe the progress of the collection can be shown on the notification. (P2)

”

Mindfulness of eating

All five participants felt more mindful during eating. P4 mentioned that the animation and voice feedback of Foodpal created a space for her to be more engaged while eating. P1 and P5 thought focusing on the chewing process distracted their attention from calories and nutrition of food. P2 realized that she was able to notice her satiation cue when eating more mindfully.

“

I feel engaged while eating. Foodpal blocks other apps and provides visual and voice feedback which make me more engaged. All I have to do is focus on eating. (P4)

”

“

As I was asked to pay more attention to my internal feeling, I am able to notice my satiation cue. (P2)

”

Enjoyment of eating

Foodpal reminded the participants that they got rid of restrained eating for long-term health, which made the participants feel relieved from the guiltiness of eating. (P1, P2, P5) Meanwhile, the gamification quality of Foodpal added a feeling of enjoyment to the participants. (P1, P4)

“

The growth of the plant makes me believe eating will benefit the recovery of my body.(P2)

”

“

When I see the drop become bigger and bigger, I look forward to what would happen if it falls down. This motivates me to eat more. (P1)

”

Positive memories for eating

Four participants expressed their willingness to read the report after eating. (P1, P2, P3, P5) P1 and P3 mentioned they would receive a sense of achievement because of the report. P5 felt more motivated to eat with Foodpal after reading the report. P4 felt relieved due to the comfort quotes from Foodpal when she gave a low score to a meal.

“

The feedback changes in terms of my reflection. This is quite helpful, especially when I have a bad moment. (P4)

”

Normality mode

Emotional connection

The withering of the plant aroused the emotional connection of the participant. P2 would prevent the plant from withering as this would be recorded on the page of daily achievement. However, she also mentioned that the interface of withering was not shocking enough. There were still spaces for the visual design to improve.

“

It is poor to see my plant withered in the journal (page of daily achievement)... I will feel worse about it if the interface of withering is more shocking.(P2)

”

“

It will remind me of three meals because I set a clock. This helps me avoid unconsciously missing meals. Eating three meals a day will make me feel I am living a healthy life.(P5)

”

“

I can plan when and how many meals I eat per day. Also being more mindful is a part of my ritual.(P1)

”

“

I will notice that I eat too little food in a certain meal when I see the progress bar of that meal is too short. This helps me adjust my meal plan.(P3)

”

Sense of achievements

All five participants believed that the recorded data provided them a sense of achievement. P5 mentioned that especially the daily recordings and the eating calendar could monitor her eating behavior and helped her avoid relapse. P2 would like to see the recorded data as a journal for remembering the positive memories.

“

The daily food journal and calendar can monitor if I was eating more mindfully. I got a sense of achievements, which will motivate me to keep eating like this.(P5)

”

“

The daily recording is like my personal food journal. This will help me remember the wonderful meal and the stories related to eating.(P2)

”

Sense of control

The intervention helped the participants switch the goal of eating. P3 mentioned that she didn't eat for body shape anymore, but eat for collecting new plants and her long-term health. P1 believed that developing her personal food ritual also gave her a sense of control.

“

The collection plan is like the goal for myself.(P3)

”

“

I can monitor my recovery process through the interface of achievements. I can also plan when and how many meals I eat per day.(P1)

”

6.4 Conclusion

RQ1 Consumption mode

The intervention was succeeded in helping the user build a new mindful eating behavior and making them feel safe during eating.

The intervention was found effective in avoiding the anxiety of eating by shifting the users' attention from calories to the food itself and their feelings of consumption. It was agreed by the participants that the more mindfully they ate, the greater pleasure they derived from the food. Instead of seeing food as something that made them fat, they could take food as their friends or partners. They were able to respect their satiety signal. The positive experience increased their courage to stick to mindful eating next time and finally led to the persistence of the new eating habits.

Meanwhile, the intervention kept triggering the users' positive emotions during meals. The words and voice feedback of the App reconfirmed the users' belief in getting rid of restrained eating for long-term health. The growth of the plant provided them with the chance to reflect on the basic meaning of eating, which was gaining energy to live on. The report provided a sense of achievement for the users so that they felt anticipated to eat.

RQ2 Normality mode

In normal situations, the intervention was succeeded in motivating the user to keep eating with Foodpal.

The intervention encouraged the users' anticipation of collecting new plants. They enjoyed the process of personalizing their collection plan as they could choose the plant they were interested in. They were intoxicated with the achievements they already won, which promoted their willingness to collect new plants.

Besides, the collection game could be seen as a new goal for the users to pursue. It made them feel more rational. Although they got rid of restrained eating, they were still making an eating plan for themselves. The plan included the number of meals they should take every day, the time for each meal, and the goal of each meal, which was eating mindfully until they feel full. The plan met their appeals to improve the health condition of their body. They experienced a sense of control and a feeling of living a healthy life.

A potential advantage of eating with Foodpal was the intervention could decrease the possibility of relapse at the beginning of eating behavior change as it played a role of a supervisor of the users. Although such an advantage could not be proved by the short-term evaluation session, the participants felt guided and supported by the intervention to learn mindful eating in the session. They expressed their intention to practice the new eating habits over and over again because they got the goal of collecting the plants on Foodpal by eating. In this way, I assumed that they would build a new mindset that eating should be a mindful experience.

6.5 Recommendation

Introduction: There are certain aspects of the intervention which need further consideration based on user feedback and my observations during final testing.

In this section, recommendations for further improvement will be proposed.

The words of encouragement should be more explicit.

During eating, clear hints from the intervention can strengthen the users' acceptance of their actions, which will promote the users to make up their minds to stick to unrestrained eating. Therefore, the words of encouragement in consumption mode should be more explicit and understandable. For example, the goal of eating according to the satiety signal for long-term health should be mentioned during usage. When the user quit consumption mode after only eating a small amount of food, there should be a pop-up asking the user whether she feels full and encouraging her to eat more food.

Besides, the intervention can involve some advice from professionals. Such information will make the users trust the product more. They will also see their decision more rational, which is helpful to keep the new eating habit.

The users should be able to personalize the settings of consumption mode.

The users may feel boring and annoyed by the voice feedback after a period of usage as the voice feedback is repetitive and similar all the time. As long as they have been familiar with mindful eating, voice guidance is not necessary anymore. Therefore, the app should allow the users to personalize the settings of consumption mode so that they can shut off the voice feedback.

The users should be able to input the data of eating even when they eat without the chopsticks.

Although chopsticks fit most of the Chinese eating scenarios, there are still lots of food that cannot be eaten with chopsticks. This will limit the users' food choices, which is contrary to the goal of encouraging unrestrained eating. In addition, when the users

forget to bring the chopsticks with them, they lose the chance to collect the plant by eating. They may abandon the product because of the frustrating experience. Therefore, a function should be added to allow the users to input the data of eating when they eat without the chopsticks. By entering the eating time and eating speed, the app needs to estimate the value collected by the plant. This algorithm can be built based on the analysis of the data when the users eat with chopsticks.

The app misses an important interface for showing all the plants the users have collected. By adding this interface, the users can receive a stronger sense of achievement.

The visual design of the app should be improved.

The different stages of plant growth are not obvious enough. An idea is that each element can affect one feature of the plant. For example, the value of fertilizer affects the height of the plant, the value of sunlight influences the color of the plant, and the value of the water decides the number of leaves and flowers.

Besides, the interfaces for breakfast and dinner are too similar. To improve, the interface for collecting water in dinner can use the form of a spray pump.

The interface of the withered plant is not shocking enough. To arouse a stronger emotional connection with the users, some pity words, or images of ghosts or flies can be added to make the withered plant look more pitiful.

For the interface of the collection plan, instead of the final figure, only showing the outline or silhouette of the plant before the user collects it will arouse the user's curiosity and make the user more anticipated to collect the plant.

6.6 Limitation

Introduction: A reflection of the evaluation will be done in this section. There are some limitations of the test result because of the design of the evaluation set-up. Further research needs to be done to gain more complete and convincing results.

The small number of participant

Only a limited number of five participants have tested the final design. For gaining insights to improve the product, test 5 users let me find almost as many problems as I could find using many more test participants.[30] However, for quantitative studies (aiming at statistics, not insights), I need to test at least 20 or even more users to get statistically significant numbers.[30]

Test consumption mode with Wizard of Oz

The functions was tested using the clickable model, and the experience of using it would be different from using the real product. Especially when it came to the consumption mode, due to the fidelity of the prototype, parts of the feedback of the intervention were provided by my verbal description. The participants needed to imagine the real situation. It was hard to judge whether they understood the design details and were engaged in the scenario. Meanwhile, I could not observe their real first reaction. To obtain more accurate evaluation data, further development of the prototype is required.

Not test the long-term result

The test result was based on the short-term experience of the participants. The test set-up was not enough for driving the long-term result. Therefore, some behaviors I would like to achieve with the intervention were hard to be evaluated, such as whether the product is attractive enough for long-term usage, and whether the product prevents the user from relapse. Although the participants gave their opinions on whether such effects would be realized based on their imagination in the final test, their actual long-term experience needs further research.

6.7 General reflection

Reflection on the outcome

Based on the final evaluation, the intervention is helpful in evoking positive emotions in my target users. In this way, they enjoy the eating process more and feel motivated to eat in a new mindful way.

However, I am aware that design for eating behavior change is not only about food and eating itself, but also about people's beliefs in body shape and body image. In this project, my research covered the relevant topics. In the design phase, although I tried to explore the intervention space in body shaming, I finally decided to focus on the eating behavior based on the feedback of my participants. But for further research, such a topic is still interesting to look into. How to build a healthy attitude towards our body shape? How to avoid pursuing an extremely perfect body shape at the expense of health? Or on the society level, how to arouse the awareness of people that leanness isn't equal to health? There is still a lot of work to do.

Besides, as a designer, I mostly focus on promoting the intended experience for chronic dieters who want to eat freely, getting rid of the influence of diet mindset. But I haven't thought about how to launch the intervention in the market. More consideration should be put into tackling the target users and convincing them of the effectiveness of the intervention. One step further, the intervention can help people, who are still suffering from the side effects of diet and restriction, make up their minds to get rid of it.

The long-term vision of the intervention is that people will figure out the amount of food their body actually needs and find the balance in eating healthy food and joy food, which will lead to a balance in body

shape and eating. But it cannot be achieved only by one simple intervention. Deeper research needs to be done and more interventions need to be proposed.

Personal reflection

Throughout the five-month-long journey, I learned a lot in organizing, planning, and executing a project. Being responsible for a project urged me to be more initiative, organized, willing to learn new knowledge, and attentive to details, which shaped my character as a designer. I am grateful for this chance to practice the skills, make up for my deficiencies, conclude my graduate study, and prepare myself for being a professional designer.

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APPENDIX

- Appendix 1 Design brief
- Appendix 2 User research
- Appendix 3 Concept ideation
- Appendix 4 Concept finalization
- Appendix 5 Evaluation

IDE Master Graduation

Project team, Procedural checks and personal Project brief

This document contains the agreements made between student and supervisory team about the student's IDE Master Graduation Project. This document can also include the involvement of an external organisation, however, it does not cover any legal employment relationship that the student and the client (might) agree upon. Next to that, this document facilitates the required procedural checks. In this document:

- The student defines the team, what he/she is going to do/deliver and how that will come about.
- SSC E&SA (Shared Service Center, Education & Student Affairs) reports on the student's registration and study progress.
- IDE's Board of Examiners confirms if the student is allowed to start the Graduation Project.

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Download again and reopen in case you tried other software, such as Preview (Mac) or a webbrowser.

STUDENT DATA & MASTER PROGRAMME

Save this form according the format "IDE Master Graduation Project Brief_familyname_firstname_studentnumber_dd-mm-yyyy". Complete all blue parts of the form and include the approved Project Brief in your Graduation Report as Appendix 1 !



family name Zhang
 initials L.Z. given name Lei
 student number 5062896
 street & no. [redacted]
 zipcode & city [redacted]
 country Netherland
 phone [redacted]
 email [redacted]

Your master programme (only select the options that apply to you):

IDE master(s): ☐ IPD ☒ Dfl ☐ SPD

2nd non-IDE master: _____

individual programme: _____ (give date of approval)

honours programme: ☐ Honours Programme Master

specialisation / annotation: ☐ Medisign

☐ Tech. in Sustainable Design

☐ Entrepreneurship

SUPERVISORY TEAM **

Fill in the required data for the supervisory team members. Please check the instructions on the right !

** chair Rick Schifferstein dept. / section: ID/DA
 ** mentor Natalia Rumero Herrera dept. / section: ID/DC
 2nd mentor _____
 organisation: _____
 city: _____ country: _____

comments
(optional)

|||

Chair should request the IDE Board of Examiners for approval of a non-IDE mentor, including a motivation letter and c.v..



Second mentor only applies in case the assignment is hosted by an external organisation.



Ensure a heterogeneous team. In case you wish to include two team members from the same section, please explain why.

APPROVAL PROJECT BRIEF

To be filled in by the chair of the supervisory team.

chair _____ date 10 - 03 - 2021 signature Rick Schiffenstein - IO

Digitally signed
by Rick
Schiffenstein -
IO
Date:
2021.03.10
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CHECK STUDY PROGRESS

To be filled in by the SSC E&SA (Shared Service Center, Education & Student Affairs), after approval of the project brief by the Chair.
The study progress will be checked for a 2nd time just before the green light meeting.

Master electives no. of EC accumulated in total: 27 ECOf which, taking the conditional requirements into account, can be part of the exam programme 27 EC

List of electives obtained before the third semester without approval of the BoE

☒ YES all 1st year master courses passed

☐ NO missing 1st year master courses are:

name C. van der Bunt date 15 - 03 - 2021 signature CB

FORMAL APPROVAL GRADUATION PROJECT

To be filled in by the Board of Examiners of IDE TU Delft. Please check the supervisory team and study the parts of the brief marked **. Next, please assess, (dis)approve and sign this Project Brief, by using the criteria below.

- Does the project fit within the (MSc)-programme of the student (taking into account, if described, the activities done next to the obligatory MSc specific courses)?
- Is the level of the project challenging enough for a MSc IDE graduating student?
- Is the project expected to be doable within 100 working days/20 weeks?
- Does the composition of the supervisory team comply with the regulations and fit the assignment?

Content: ☒ APPROVED ☐ NOT APPROVED

Procedure: ☒ APPROVED ☐ NOT APPROVED

comments

name Monique von Morgen date 29/3/2021 signature MvM

Design for chronic dieters to develop unrestrained eating habits

project title

Please state the title of your graduation project (above) and the start date and end date (below). Keep the title compact and simple. Do not use abbreviations. The remainder of this document allows you to define and clarify your graduation project.

start date 18 - 02 - 202102 - 07 - 2021

end date

INTRODUCTION **

Please describe, the context of your project, and address the main stakeholders (interests) within this context in a concise yet complete manner. Who are involved, what do they value and how do they currently operate within the given context? What are the main opportunities and limitations you are currently aware of (cultural- and social norms, resources (time, money,...), technology, ...).

In today's society, a great emphasis is placed on body weight and body image ideals. The portrayal of an unattainable body image by the media is so pervasive that individuals who are exposed to such images experience a more negative body image and feel pressure to achieve weight-loss goals. An estimated 45 million Americans, including many within a non-overweight BMI range, go on a diet and spend \$33 billion on weight-loss products each year. [1]

The chronic dieter is defined as an individual who consistently restricts energy intake to maintain an average or below-average body weight.[2] Chronic dieting syndrome describes individuals who have a persistent overconcern with body shape and weight, restrict their food choices for 2 or more years, and continually diet to achieve weight loss without success or with success but with weight regain.[2]

For chronic dieters, typical physical harm includes poor energy and nutrition intake, lower resting metabolic, and lower total daily energy expenditure.[3] Psychologically, they experience anxieties toward food and eating, as well as decreased pleasure and well-being.[4] They become preoccupied with food in thoughts and conversation and become entirely concerned with finding food.[5] Therefore, for sake of health, they have to get rid of chronic dieting and change their restrained eating behavior.

Dietitians and psychologists have developed strategies and interventions to overcome restrained eating. For example, intuitive eating, which focuses on internal hunger and satiety cues to initiate food consumption and eating cessation, can help individuals decrease emotional eating and dietary restraint. Such intervention used in the psychology field only relies on a person's cognitive abilities. In fact, the dieter has been used to restrained eating habits for so long time that they usually experienced helplessness and uncertainty at the beginning of behavior change.

My design will guide chronic dieters to walk through the uncertain beginning stage and gradually develop an unrestrained healthy eating habit.

The project will be done with the help of the Food and Eating Design Lab. Their abundant experience in topics like food nutrition, food culture, and eating behaviors will support my exploration in this project.

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introduction (continued): space for images

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image / figure 2: _____

PROBLEM DEFINITION **

Limit and define the scope and solution space of your project to one that is manageable within one Master Graduation Project of 30 EC (= 20 full time weeks or 100 working days) and clearly indicate what issue(s) should be addressed in this project.

My project will focus on chronic dieters who have been aware of the harm of a long-term restrained diet and are willing to change their current eating habits. In the transtheoretical model of behavior change [6], they are in the contemplation or preparation stage. Therefore, they need information and guidance in the process of formulating as unrestrained eating habits.

In this project, several challenges need to be tackled:

1. The diet mindset will influence their determination of getting rid of restrained eating. The mindset includes preoccupation with shape and weight, perceived deprivation, and dysfunctional beliefs about food and exercise.[4]
2. Chronic dieters have conducted a restrained diet for more than 2 years. They count calories or label food as healthy or unhealthy unconsciously. Changing the unconscious of human behavior will add a challenge to the upcoming design.
3. It has been speculated that people who are trying to avoid certain foods tend to be tempted to those foods more and more. Therefore, people may experience overeating at the beginning of getting rid of restrained eating. The guilty feeling might cause a relapse.

[6] Prochaska, J. O., Johnson, S., & Lee, P. (2009). The transtheoretical model of behavior change.

ASSIGNMENT **

State in 2 or 3 sentences what you are going to research, design, create and / or generate, that will solve (part of) the issue(s) pointed out in "problem definition". Then illustrate this assignment by indicating what kind of solution you expect and / or aim to deliver, for instance: a product, a product-service combination, a strategy illustrated through product or product-service combination ideas, In case of a Specialisation and/or Annotation, make sure the assignment reflects this/these.

Developing a product guiding chronic dieters to make decisions in what and how to eat without the influence of the diet mindset so that they can get rid of restrained eating and formulate a healthy eating habit.

When people want to lose weight, they use applications like MyFitnessPal to count calories or plan their meals. When chronic dieters want to get rid of restrained eating, the outcome product of this project will help them make decisions in what and how to eat without the influence of the diet mindset. In this way, they can finally formulate a healthier eating habit.

To achieve this goal, sub-tasks include:

1. I will research the contextual and personal factors that formulate their belief in weight loss.
2. I will interview them about their personal eating behavior, which will include how they choose food, how much time they spend on making food decisions, what their attitude towards food and eating is.
3. I will turn to dieticians to how to come up with a personalized healthy diet. I will also ask psychologists for therapy for eating-related mental problems.
4. I will design the product combining all the insights from the societal, contextual, personal, psychological, and nutritious perspective.

PLANNING AND APPROACH **

Include a Gantt Chart (replace the example below - more examples can be found in Manual 2) that shows the different phases of your project, deliverables you have in mind, meetings, and how you plan to spend your time. Please note that all activities should fit within the given net time of 30 EC = 20 full time weeks or 100 working days, and your planning should include a kick-off meeting, mid-term meeting, green light meeting and graduation ceremony. Illustrate your Gantt Chart by, for instance, explaining your approach, and please indicate periods of part-time activities and/or periods of not spending time on your graduation project, if any, for instance because of holidays or parallel activities.

start date 18 - 2 - 2021

2 - 7 - 2021 end date

Calendar Week	3.2	3.3	3.4	3.5	3.6	3.7	3.8	3.9	3.10	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9	4.10	4.11	4.12
Project Week	W1	W2	W3	W4	W5	W6	W7	W8	W9	W10	W11	W12	W13	W14	W15	W16	W17	W18	W19	W20	W21
From	18-Feb	22-Feb	1-Mar	8-Mar	15-Mar	22-Mar	29-Mar	5-Apr	12-Apr	19-Apr	26-Apr	3-May	10-May	17-May	24-May	31-May	7-Jun	14-Jun	21-Jun	28-Jun	5-Jul
To	19-Feb	26-Feb	5-Mar	12-Mar	19-Mar	26-Mar	2-Apr	9-Apr	16-Apr	23-Apr	30-Apr	7-May	14-May	21-May	28-May	4-Jun	11-Jun	18-Jun	25-Jun	2-Jul	7-Jul
Discover	Literature research																				
Define	Target group research																				
Develop	Problem definition																				
Evaluate	Design vision																				
Deliver	Ideation																				
	Intervention development																				
	Concept test																				
	Concept selection																				
	Concept detailing																				
	Concept evaluation & analysis																				
	Finishing the report																				
	Final presentation																				

Phase 1: Discover and Define (W1 - W6)

This phase is for understanding the problem and looking for design opportunities. The literature research will first be conducted to understand the theoretical background. A user research plan will be written done. Sensitizing booklets will be delivered to the participants to prepare them for the session. Online interviews and sessions will be done to collect contextual and personal factors. After the data analysis, the persona and current scenario/storyboard will be defined. The design goal and vision will be formulated.

Phase 2: Develop (W6 - W12)

The second phase is for finding the direction for the final design concept. Activities in this phase will include brainstorm and online creative sessions with participants. Up till the midterm (W9), different concepts should have been produced and a test plan should be finished. After the concept test and data analysis, I want to come up with several intervention ideas at the end of this phase.

Phase 3: Evaluate (W12 - W17)

In this phase, I will first finalize the final concept and make an evaluation plan. Then I will test the final design within my target group. Data will be collected and analyzed to evaluate whether the intervention achieves the design goal and vision.

Phase 4: Deliver (W18 - W21)

The final phase is for doing the refinements and concluding the deliverables of the project. I plan to conduct the final presentation on 7 July to finish my project.

MOTIVATION AND PERSONAL AMBITIONS

Explain why you set up this project, what competences you want to prove and learn. For example: acquired competences from your MSc programme, the elective semester, extra-curricular activities (etc.) and point out the competences you have yet developed. Optionally, describe which personal learning ambitions you explicitly want to address in this project, on top of the learning objectives of the Graduation Project, such as: in depth knowledge a on specific subject, broadening your competences or experimenting with a specific tool and/or methodology, Stick to no more than five ambitions.

In the course Context and Conceptualization, I learned to deal with scientific knowledge about the context, obtain situated knowledge about the context from the 'experts of experience', i.e., users, stakeholders, and domain experts, and devise visions and concept designs. However, C&C gives experience and theory, but not in-depth training. To build experience, I would like to apply methods like contextmapping and ViP in graduation projects.

In the course Exploring Interaction, I learned to analyze the context and current interaction so that I can formulate a design goal and an interaction vision for conceptualization. I also practiced generating various concepts and iterate the ideas based on the test. During the ideation phase, I stuck to one idea and improved it. Although the final concept was concrete, I would like to try different approaches for ideation in the graduation project.

I took Health Psychology: Tools and Methods elective where I learned the theoretical determinants of health and health behavior and methods that can be used to inspire and evaluate psychological and behavioral design interventions. In my graduation project, topics like behavior change, stress coping, and social support would be covered. Through applying the theories and models to the design challenge, I hope to achieve deeper thought about the course content.

I also took Food and Eating Design elective where I dived deeper into the essence of food through topics like production, acquisition, preparation, consumption, and disposal of food. As long as I am so familiar with food, I am able to take it as a friend. I hope through the graduation project, I can communicate such an attitude to the people who cannot enjoy food because of chronic dieting and help them get a more harmonious relationship with food.

FINAL COMMENTS

In case your project brief needs final comments, please add any information you think is relevant.

Appendix 2: User research

2.1 Sensitizing booklet

HELLO!

The booklet aims to help you start thinking about your current eating behavior and your relationship with food.

This will be your food journal for two days. You can pick one weekday and one weekend that suit you. On those two days, please finish the following activities:

- take photos of the food you eat;
- collect your emotions and thoughts before, during, and after you eat;
- fill in the roadmap;
- answer a few questions at the end of each day.

Remember: there is no wrong or right answer. It is what you do and what you think.

After you finish the booklet, please send it back to me. I am willing to have an interview session to go deeper into what is mentioned in this booklet. :)

WHO ARE YOU?

Name

Age

.....

Occupation

.....

MY DIET HABIT

How often do you diet?

Relapse means you eat out of your control. Therefore, a planned cheat meal is not relapse.

- ☐ I consistently diet and almost never relapse.
- ☐ I consistently diet but often relapse.
- ☐ I diet regularly. (e.g. seasonally, once every 3 months)
- ☐ I diet only for certain purpose. (e.g wedding, holiday)
- ☐ There is no certain regularity but I feel like I am always dieting.
- ☐ Others.....

How did you diet?

You can select several options if you want.

- ☐ I restrained the calories intake.
- ☐ I restrained the macronutrient intake.
- ☐ I restrained the type of food to eat.
- ☐ I restrained the way to prepare food.
- ☐ I did not eat a certain meal.
- ☐ Others.....

MY CURRENT SITUATION

How is your current situation?

- ☐ I am dieting.
- ☐ I am not dieting but I will do it in the recent future.
- ☐ I am not dieting but I will do it when I need.
- ☐ I am trying to give up dieting.
- ☐ I have already given up dieting.
- ☐ Others.....







MY WEEKDAY FOOD JOURNAL

TODAY is

Mon / Tue / Wed / Thurs / Fri

ROADMAP

Mon / Tue / Wed / Thurs / Fri

Time	8:00	10:00	12:00	18:00
Meal	Breakfast	Snack	Lunch	Dinner
Photo				
Emotions & Thoughts	Before			
	I feel anticipated, because ...			
	During			
After	I feel boring, because ...			
	I feel guilty, because ...			

TODAY, I FEEL ...

Mon / Tue / Wed / Thurs / Fri

Pick the most positive and negative food related moments today and write down your reasons for the choice.

I feel most positive when I

.....

.....

because

.....

.....

I feel most negative when I

.....

.....

because

.....


.....

TODAY, I FEEL ...

Mon / Tue / Wed / Thurs / Fri

Give a score(1-10) to your eating behavior today and explain why. Tell me what kind of eating behavior you expect to have in the future.

I give a (1-10)
to my eating behavior today.
because.....
.....



I expect my eating behavior to be
.....
.....
because.....
.....





MY WEEKEND FOOD JOURNAL

TODAY is

Sat / Sun
.....

ROADMAP

Sat / Sun

		Time			
		8:00	10:00	12:00	18:00
Emotions & Thoughts	Meal	<div style="display: flex; justify-content: space-around;"> Breakfast Snack Lunch Dinner </div>			
	Photo	<div style="display: flex; justify-content: space-around;">     </div>			
	Before	I feel anticipated, because ...			
	During	I feel boring, because ...			
	After	I feel guilty, because ...			

TODAY, I FEEL ...

Sat / Sun

Pick the most positive and negative food related moments today and write down your reasons for the choice.

I feel most positive when I

.....
.....

because

.....
.....

I feel most negative when I

.....
.....

because

.....
.....

TODAY, I FEEL ...

Sat / Sun

Give a score(1-10) to your eating behavior today and explain why. Tell me what kind of eating behavior you expect to have in the future.

I give a

to my eating behavior today.

because.....

.....



I expect my eating behavior to be

.....

.....

because.....

.....

Thank you for participating!

Please contact me if you have finished the booklet. I am willing to have an interview session with you. :)

Lei

2.2 Interview questions

Welcome & Introduction

The aim of this interview is to have a better understanding of the eating behavior of chronic dieters. This interview will help my MSc graduation project in Design for Interaction 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 get rid of restrained eating and formulate a healthier eating habit. Moreover, I would like to focus on the contemplation or preparation stage, since the patients are already aware of the problems of restrained eating and have a predisposition to getting better.

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 more about yourself. From the sensitizing booklet, I know you are a ...

- *Where do you work/study now?*
- *Do you live alone or with other people?*

Interview with those who are still dieting

1. Booklet (current eating behavior)

Thank you for journaling your daily food ritual for me. It is quite inspiring.

(Ask questions about their current eating behavior according to their booklet. Keep asking why.)

- *How much time do you spend on making food decisions every day? You don't have to be very precise. For example, for each meal, how much time do you spend on choosing food.*
- *Do you think about food when you are not hungry? / How do you deal with your hunger cues?*
- *Do you have some rules in choosing food? (calory / macronutrient / type) Does it happen consciously or unconsciously?*
- *Why do you choose this way (e.g. counting calories) to restrain your food intake?*
- *How does this make you feel?*
- *So generally speaking, are you satisfied with your current eating behavior? Why?*

2. Purpose of diet

Now I can say I am quite familiar with your current eating behavior, I am wondering...

- *Why do you eat like this? / Do you have a purpose for your current diet?*
- *Do you change your purpose and way of diet throughout the whole process? Why? / Can you explain how did you gradually develop your current eating behavior? (situations, family, friends, school...)*
- *Can you explain what food means to you in your life?*

3. Diet mindset

(If body image is mentioned, ask the following questions.)

- *To what extent do you think food will influence your body shape? Give a score from 1-10 and explain why.*
- *To what extent do you think your body image will influence self-esteem/wellbeing? Give a score from 1-10 and explain why.*
- *Are you satisfied with your current body image? If not, what would you like to change?*
- *What is your ideal body shape? Why do you choose this?*
- *What do you do, in order to change your shape? Do you use any tools/products?*
- *Are your attempts successful in changing your body shape thus far? Why (not)?*
- *How strong your willingness is to achieve this body image?*
- *Does this influence your eating behavior?*

4. Disinhibitors

- *Do you overeat occasionally?*
- *When / how does it occur?*
- *How does it make you feel?*
- *How can you manage to stop?*

5. Behavior change

- *Why do you want to give up restrained eating?*
- *Have you taken any strategies? Were they successful?*
- *How do you maintain a healthy relationship with food?*
- *What is the biggest challenge regarding eating behavior change?*

Interview with those who have given up dieting

1. Differences between current and past eating behavior

- *How did you eat when you were dieting? (calory / macronutrient / type)*
- *Why did you choose this way (e.g. counting calories) to restrain your food intake?*
- *How did this make you feel?*
- *What are the differences between current and past eating behavior?*
- *So generally speaking, are you satisfied with your current eating behavior? Why?*

2. Purpose of eating

- *Can you explain how did you gradually develop your current eating behavior? (situations, family, friends, school...)*
- *What food means to you in your life?*

3. Diet mindset

- *To what extent do you think food will influence your body shape now? Give a score from 1-10 and explain why.*
- *To what extent do you think your body image will influence self-esteem/wellbeing? Give a score from 1-10 and explain why.*
- *Are you satisfied with your current body image? If not, what would you like to change?*

-
- *What is your ideal body shape?*
 - *what did you do, in order to change your shape? Did you use any tools/products?*
 - *Were your attempts successful in changing your body shape thus far? Why (not)?*
 - *If satisfied, how did you achieve this mindset? / If not satisfied, how did you overcome this?*

4. Disinhibitors

When you first tried to get rid of restrained eating,

- *Did you overeat occasionally?*
- *When / how did it occur?*
- *How did you feel?*
- *How could you manage to stop? / What strategies did you take to avoid this?*

5. Behavior change

During the process of eating behavior change,

- *What was the biggest challenge regarding eating behavior change?*
- *What strategies did you take? Were they successful?*
- *How do you maintain a healthy relationship with food?*
- *What positive experiences do you take from this? What would you advise other people suffering from restrained eating?*

Ending

- *I've asked everything I wanted to. Have we missed anything?*

Thank you for your time. If you are interested in my topic and would like to see the outcome of this project, I can keep informing you.

Appendix 3: Concept ideation

3.1 Date analysis of solution-oriented brainstorming



by
food
lful)

Explore
new food
(curious)

Share food
thoughts
with others

rage
ther
roup

'What you eat
doesn't
determine
who you are.'

'Trust
your
body'

er
m or
about
body

Remember
you are doing
this for
personal
health!

Get rid of the
mindset that
appearance is
important / find
other advantages

Stop
body
checking

Make yourself feel
best (loose cloth /
explore dress
style for new body
shape)

Journaling, pay
more attention
to your
internal feeling

Appraise
each
other's
courage

Accept
the bad
day

Vision
the
future

You are doing
something
logical and
rational

't get it,
to give
quickly,
ifficult,
r they
n that.

al to
nions
hat
media
s

Remember
your WHY!

Encourage
yourself to
step out. Most
people are
nice.

Llive my life in
my way,
instead of
what other
people tell me.

not to
ontrol
rything
ur life.

3.2 Date analysis of vision-oriented brainstorming

To make chronic dieters feel safe when eating;

To help them find a balance between body shape and eating;

To encourage the positive attitudes towards the weight gain process

To provide a sense of control when they stop restraint eating

Evoke positive feelings

Arouse awareness

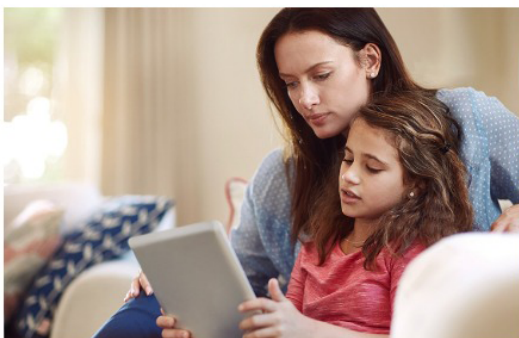
Provide sense of control



reassurance from our parents: no matter how horrible your life was going, you would eventually not just be ok, but thrive.

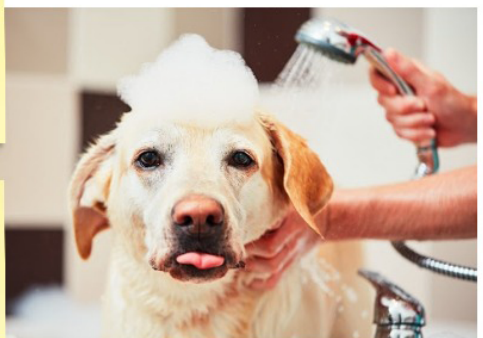


feel in control



nourishing yourself

take care of yourself



realizing what you have

e a
of
ol

Provide
guidance

Be for
personal
use

Feeling wanted
leads to feeling
safe.



a hug



ot worried about
eing criticized by
ose surrounding
ou.



Learning



hourd
food

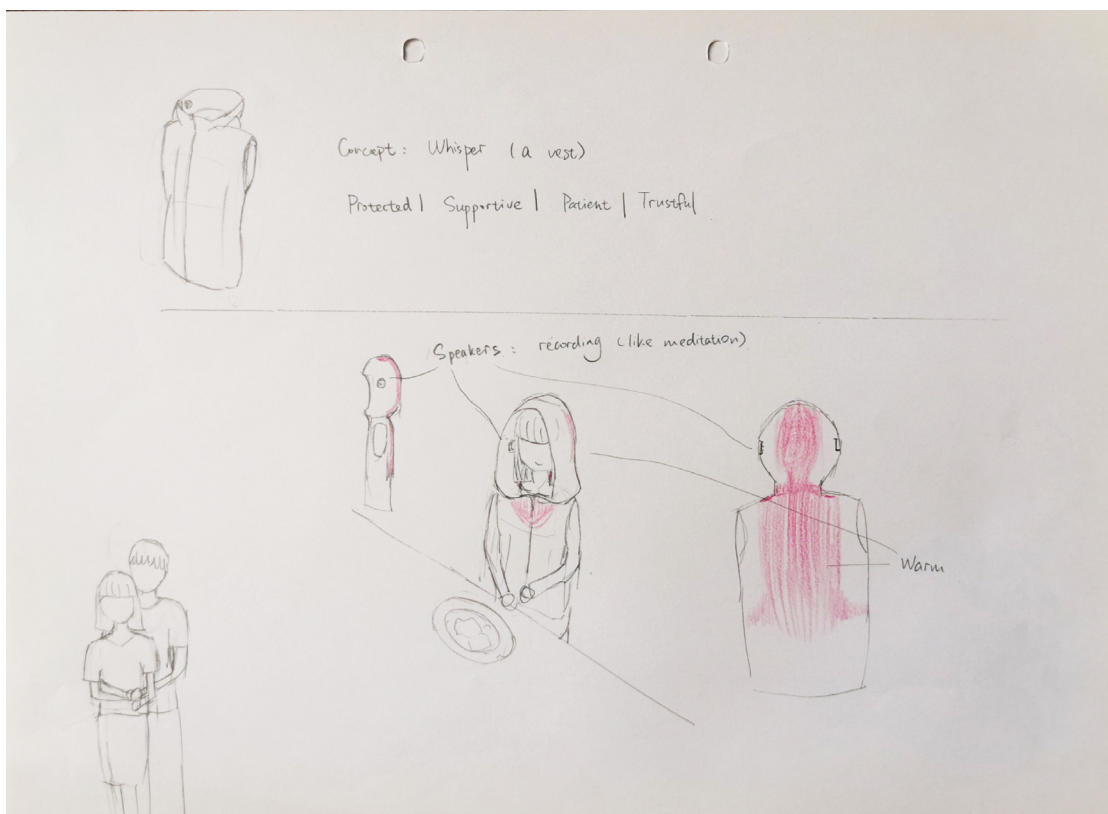
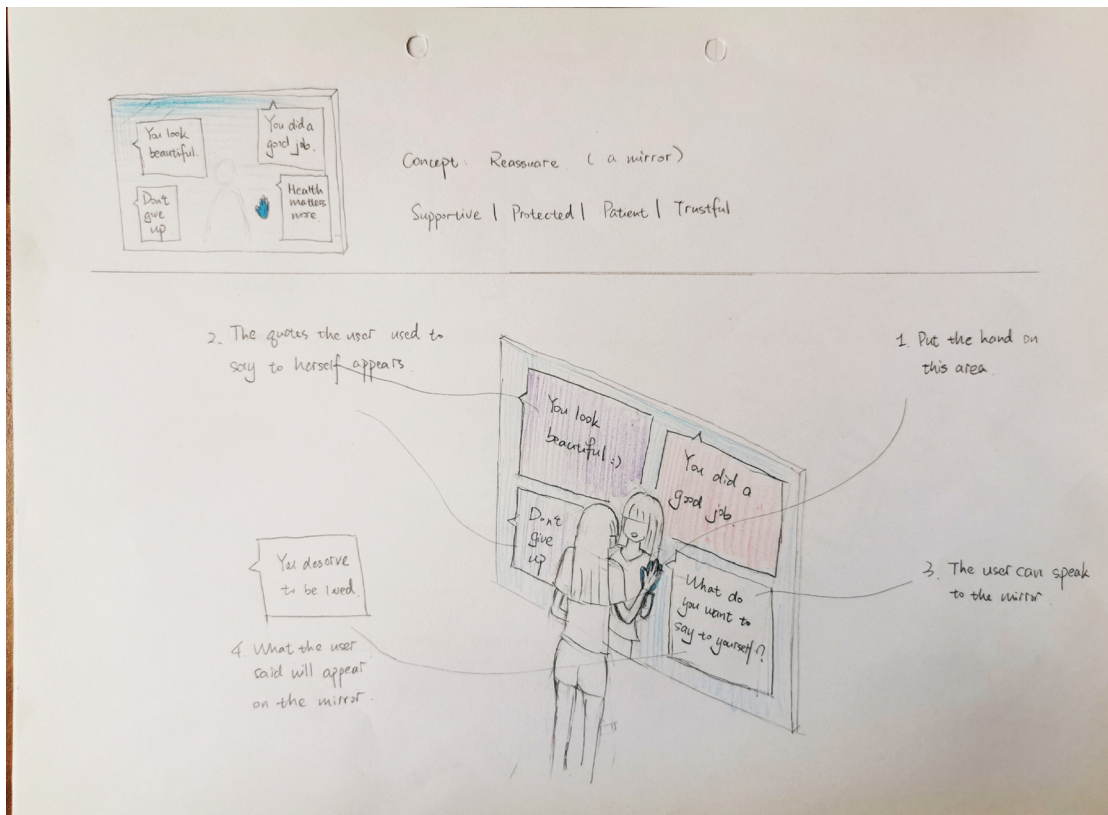
ze
you
e

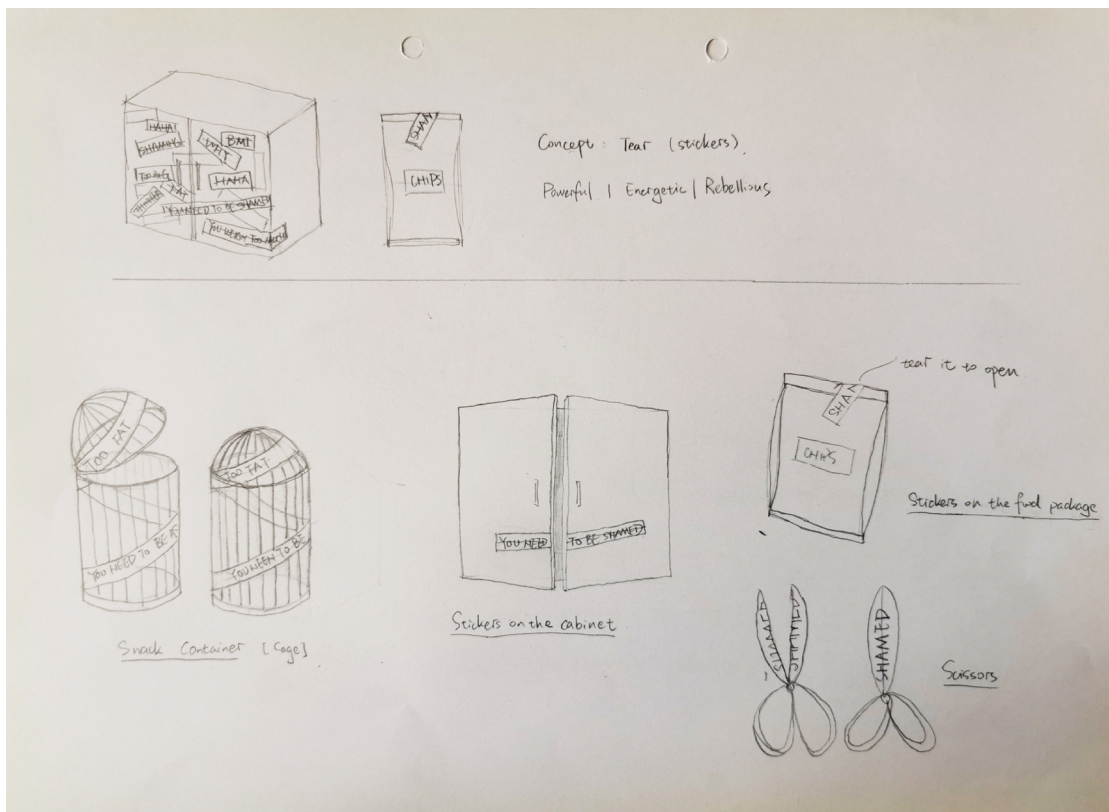
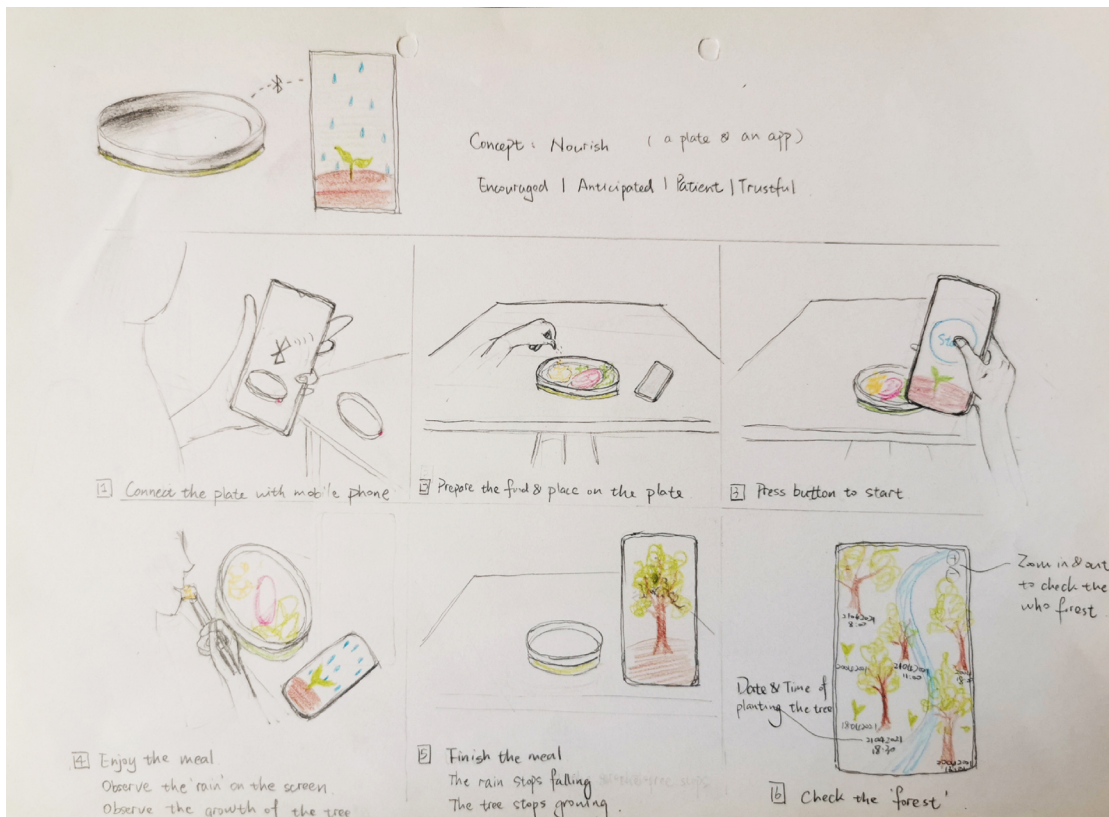


fight



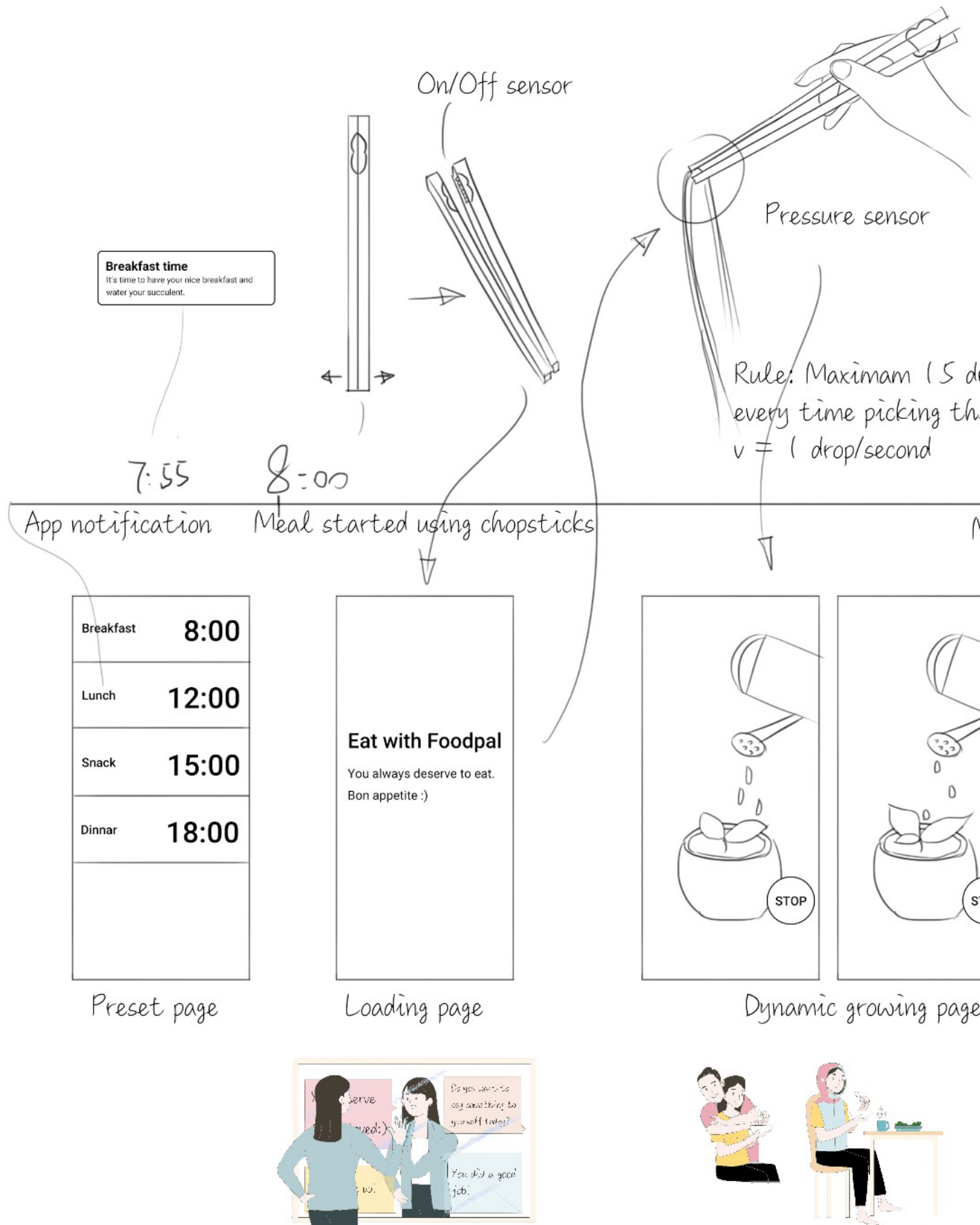
3.3 Sketches of initial concept ideation

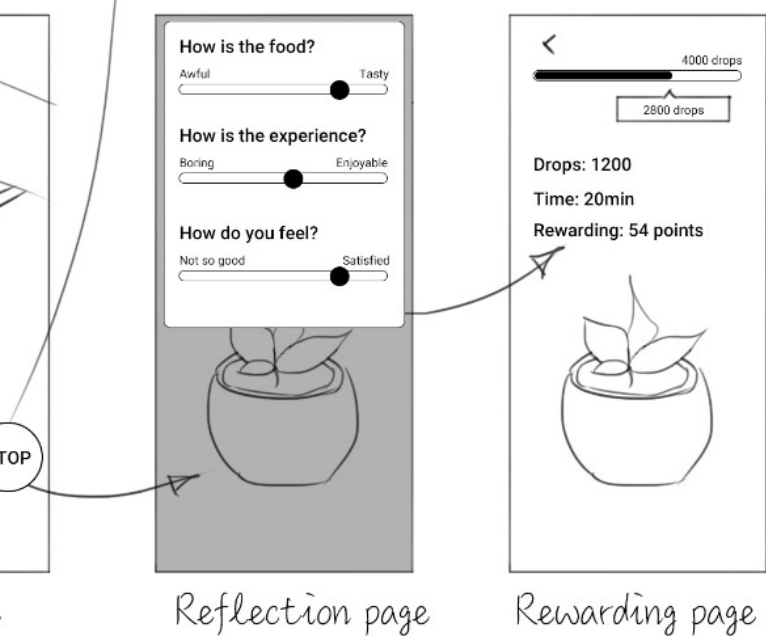
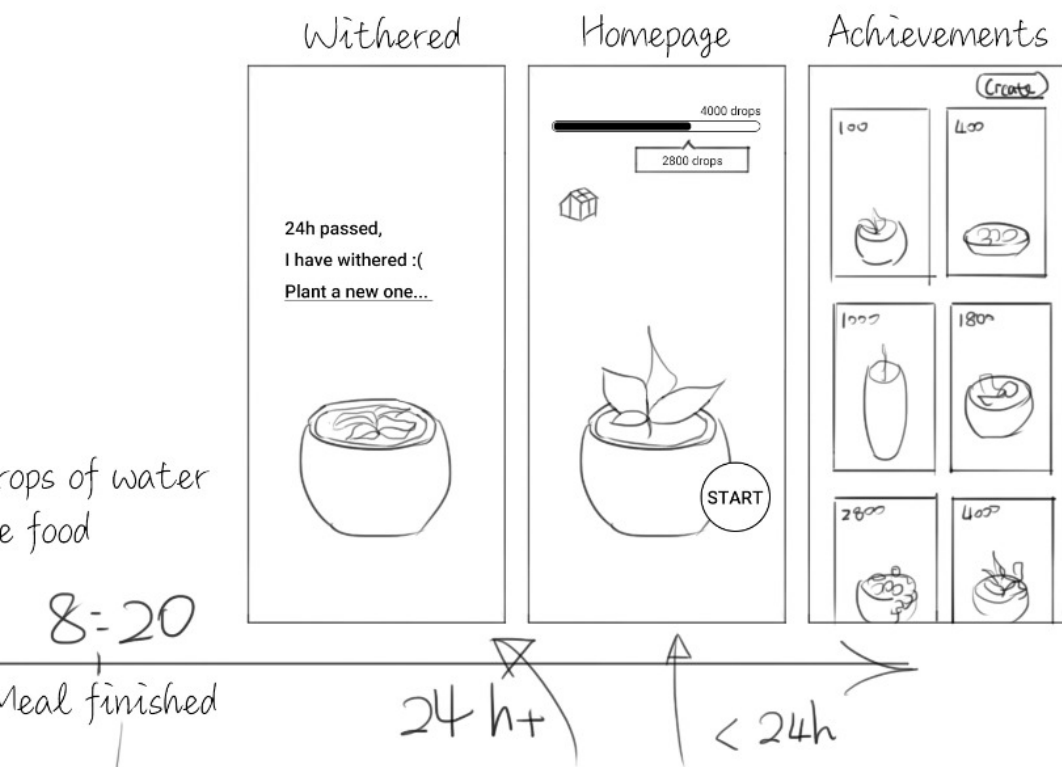




Appendix 4: Concept finalization

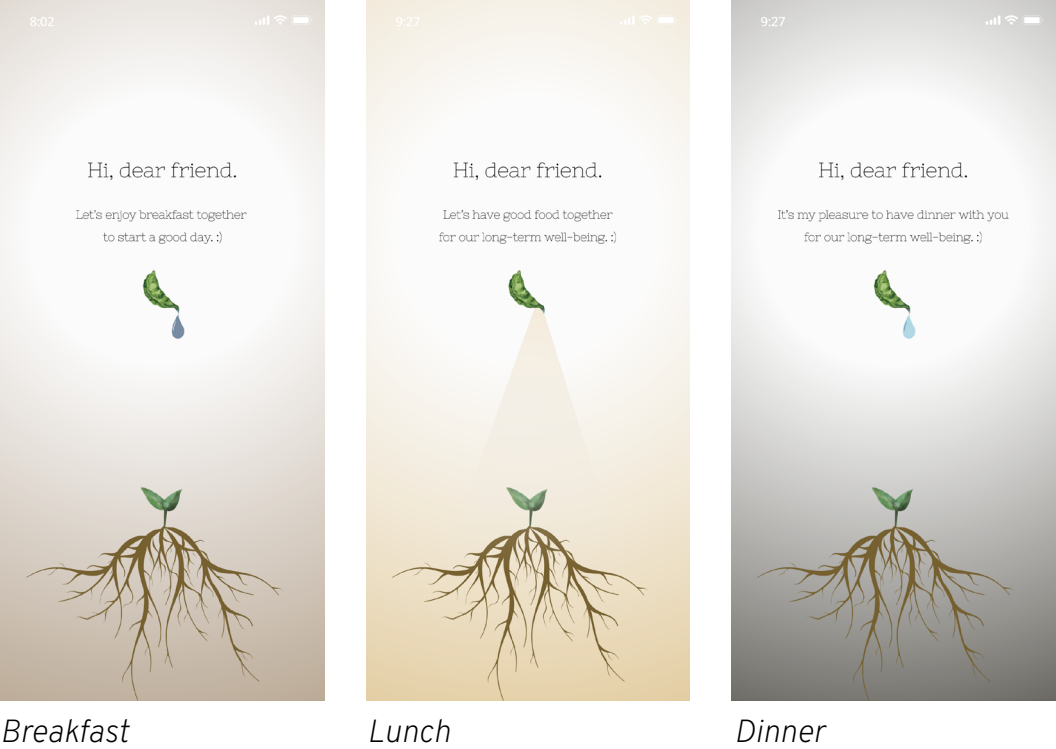
4.1 Initial user journey of eating with Foodpal



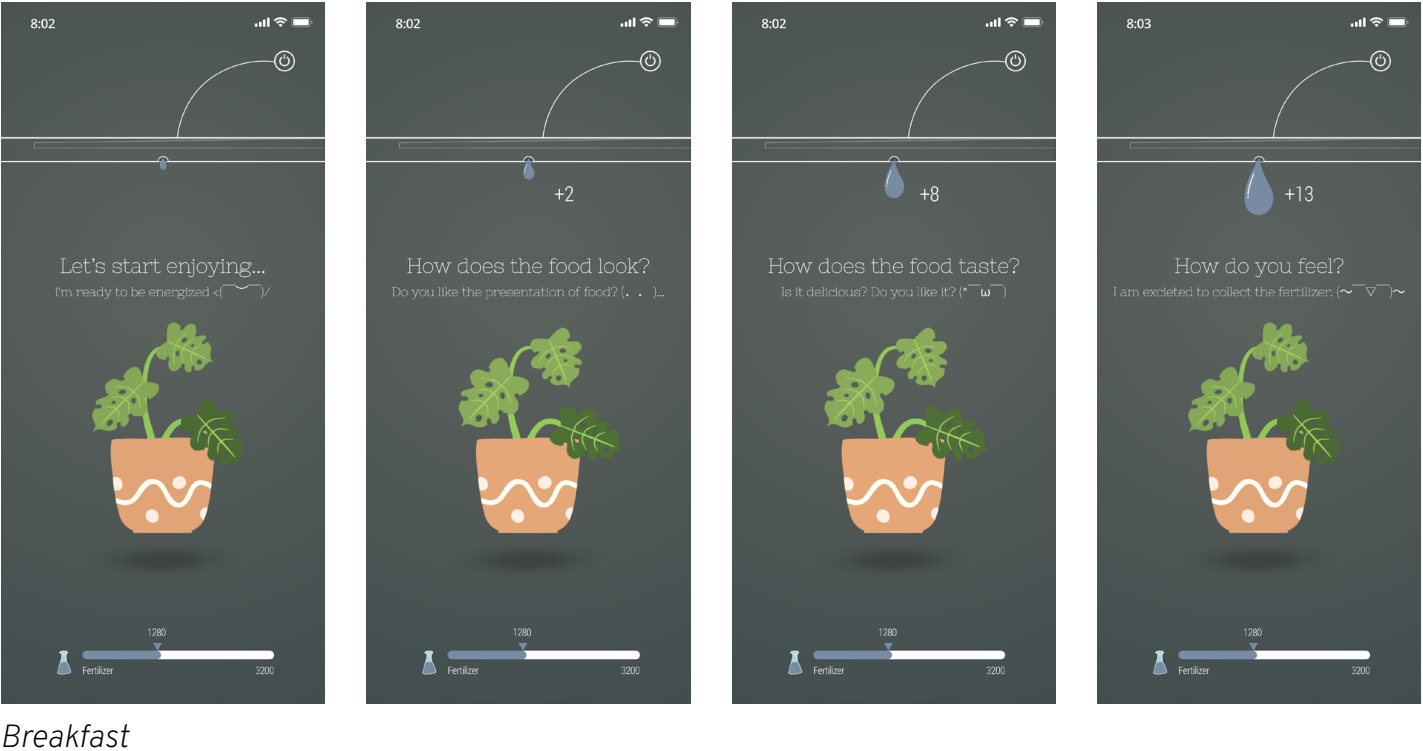


4.2 App interfaces

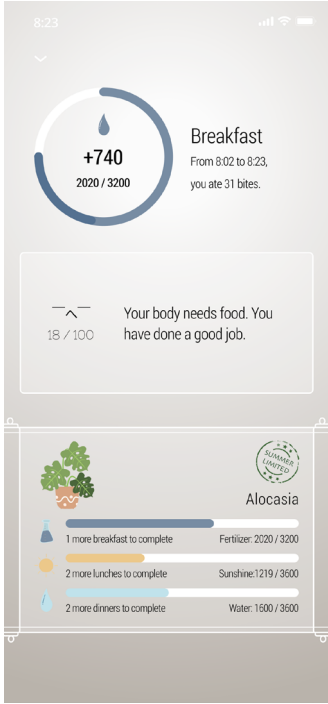
Loading



Consumption mode

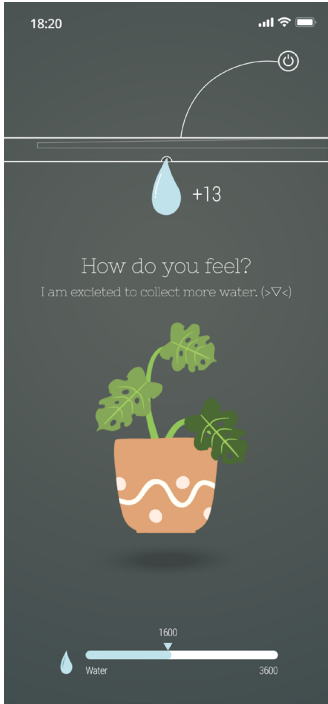
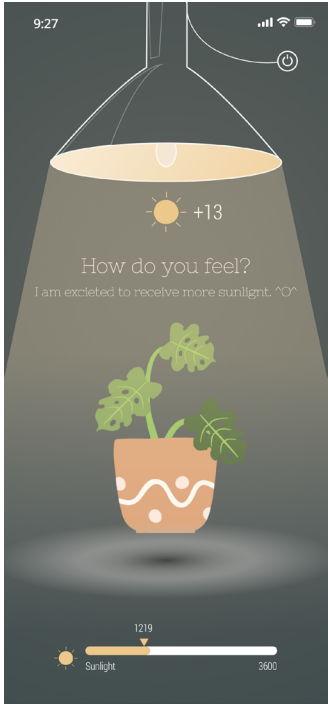
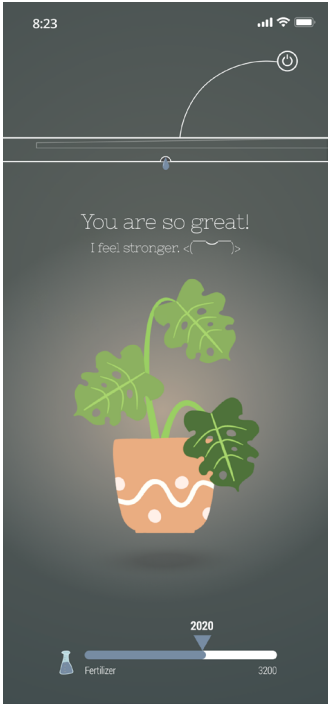


Report



Positive refecton

Negative reflection



Level up

Lunch

Dinner

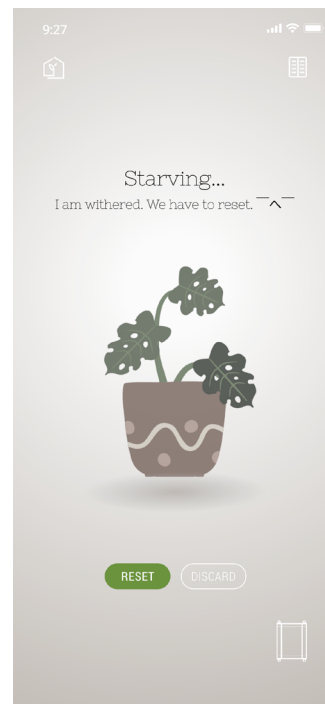
Home



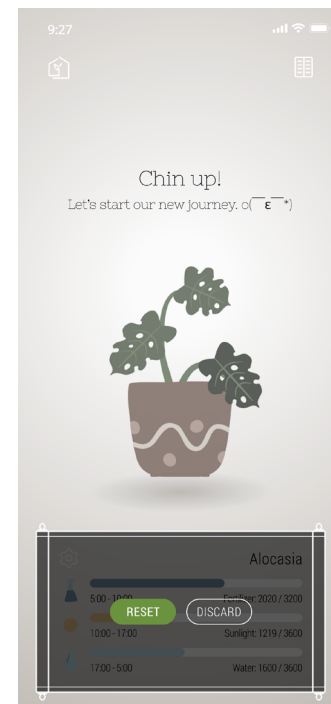
Initial home



Home with data

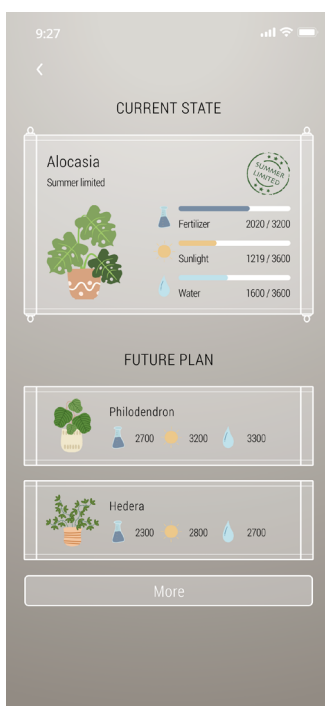


Plant withered



Plant withered with data

Plan

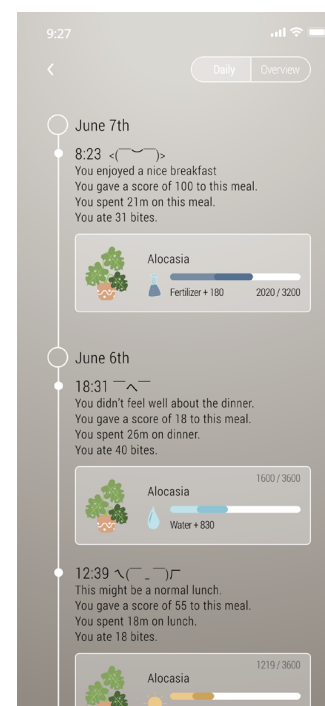


Plan

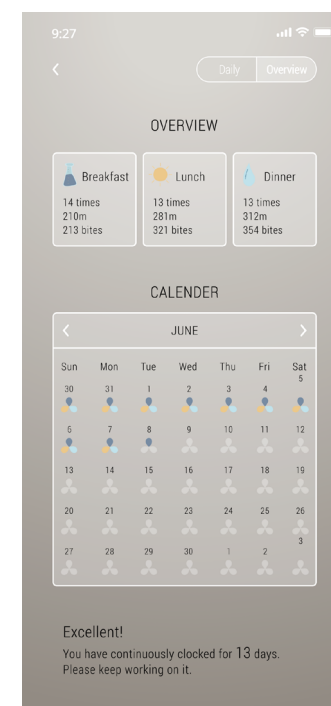


Press 'More'

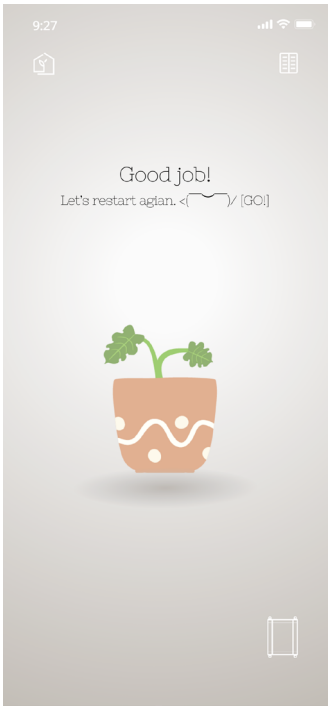
Achievement



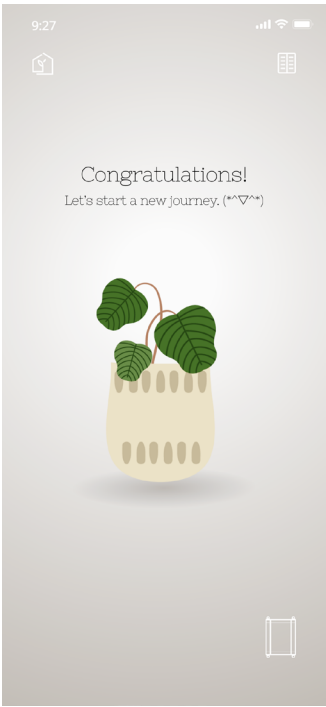
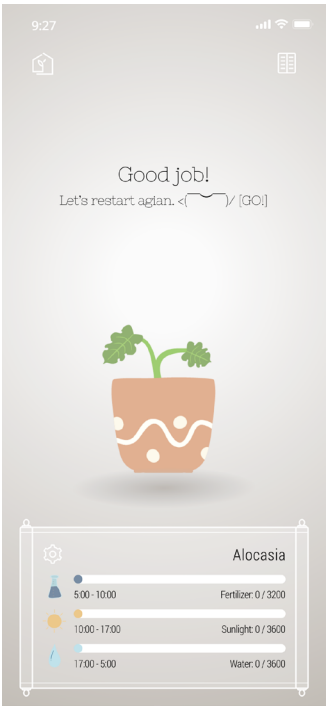
Daily



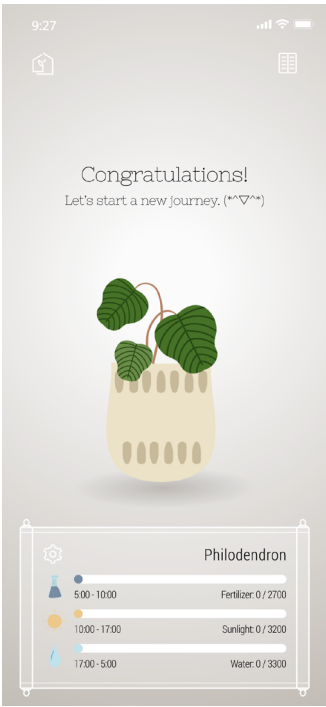
Overview



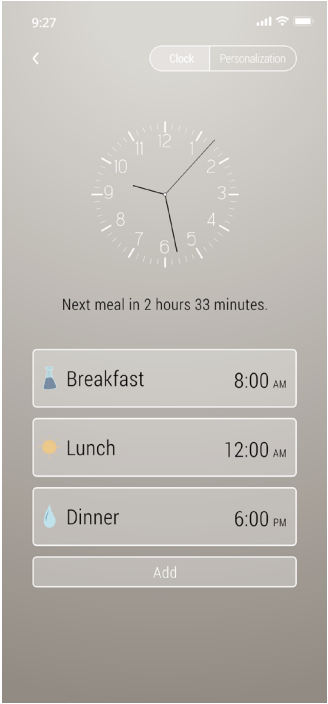
Press 'RESET'



Press 'DISCARD'



Setting



Clock



Duration for
collecting elements

Appendix 5: Evaluation

5.1 Scenarios and questions in participant manual

Scenario 1: Eat with Foodpal

<https://www.figma.com/proto/pjFyUJI6Wm5VtJ10no69Hz/Foodpal-Finalized?page-id=0%3A1&node-id=280%3A2251&scaling=min-zoom>

Description

It's 7:50 in the morning. Foodpal sends a notification to remind you of eating breakfast with her. You also feel hungry now. Therefore, you go to the school canteen and order some noodles. You are about to start having breakfast with Foodpal.

Main goal

Have breakfast with Foodpal.

Scenario 2: Reflect with Foodpal

Description

It's 8:23 now. You have finished the meal and pressed the 'Exit' button. The Foodpal summarizes your achievements throughout the eating process and invites you to reflect on it.

Main goal

Read the report and reflect on it.

Survey

To what extent do you feel motivated to eat before eating? *

	1	2	3	4	5	6	7	
demotivating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	motivating

To what extent are you aware of your new belief? *

	1	2	3	4	5	6	7	
unaware	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	aware

To what extent do you feel supportive during eating? *

	1	2	3	4	5	6	7	
obstructive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	supportive

To what extent do you feel accompanied during eating? *

	1	2	3	4	5	6	7	
unaccompanied	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	accompanied

To what extent do you feel guided during eating? *

	1	2	3	4	5	6	7	
unguided	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	guided

To what extent are you willing to read the report after eating? *

	1	2	3	4	5	6	7	
unwilling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	willing

To what extent do you feel valuable to receive the feedback? *

	1	2	3	4	5	6	7	
inferior	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	valuable

To what extent do you feel enjoyable during eating? *

	1	2	3	4	5	6	7	
annoying	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	enjoyable

Scenario 3: Personalize the plan

Description

It's 9:27 in the morning. You want to add a plant, named Sansevieria, to your collection plan.

Main goal

Add the plant, Sansevieria, to the plan.

Scenario 4: Browse the achievements

Description

You have been using Foodpal for several days. You are curious about your current achievement.

Main goal

Read the interfaces of achievements.

Scenario 5: Restart the journey when the plant withered

Description

You forgot to eat with Foodpal yesterday. When you open the App today, you see the plant withered. Now you want to restart the journey.

Main goal

Reset the plant or discard the plant.

Scenario 6: Personalize the ritual

Description

This is a new semester. You don't have courses in the early morning. But you have lots of assignments to work on. It's quite common for you to work late at night and stay in bed until 10:00 am. Therefore, You decide to have breakfast at 10:30 am and lunch at 2 pm.

Main goal

Change the time for collecting fertilizer and sunlight and reset the clock.

Survey

To what extent are you willing to personalize the plan? *

	1	2	3	4	5	6	7	
unwilling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	willing

To what extent are you willing to read the achievements? *

	1	2	3	4	5	6	7	
unwilling	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	willing

To what extent will you care the growth of Foodpal? *

	1	2	3	4	5	6	7	
unconcerned	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	concerned

To what extent do you feel motivated to eat at least three meals per day? *

	1	2	3	4	5	6	7	
demotivating	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	motivating

To what extent do you have a sense of achievement? *

	1	2	3	4	5	6	7	
unfulfilled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	fulfilled

To what extent do you have a sense of control? *

	1	2	3	4	5	6	7	
uncontrolled	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	controlled

To what extent are you able to develop your own food ritual? *

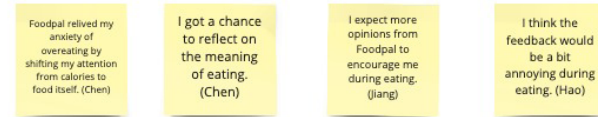
	1	2	3	4	5	6	7	
unable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	able

To what extent do you feel safe to eat? *

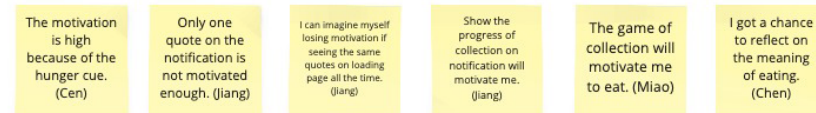
	1	2	3	4	5	6	7	
fear	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input checked="" type="radio"/>	safe

5.2 Data analysis of the design evaluation

Consumption mode: To what extent do the users feel safe when eating with Foodpal?

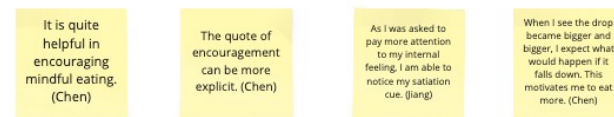


To what extent do the users feel motivated to eat before eating?

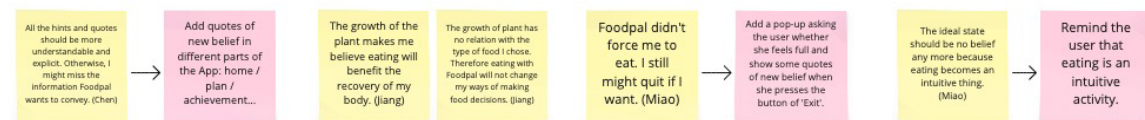


To what extent do the users enjoy the eating process?

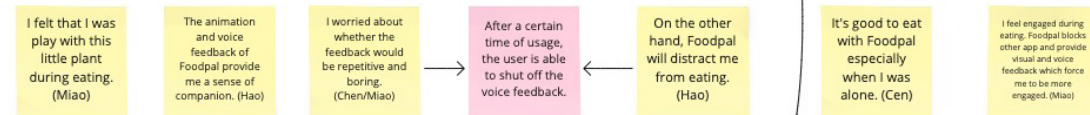
Be mindful and eat more



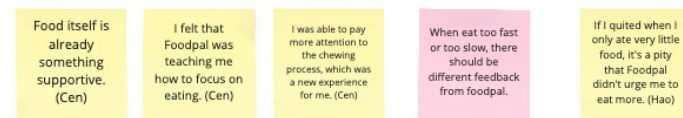
Realize the belief: get rid of restrained eating for long-term health



Feel accompanied

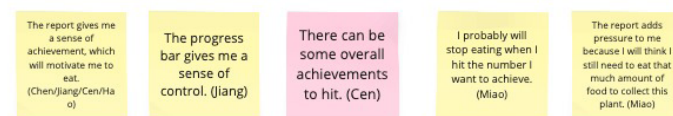


Feel supportive and guided

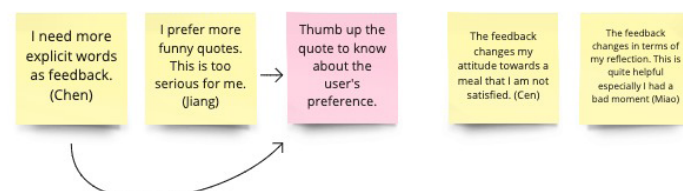


To what extent do the users have positive memories after eating?

Read report



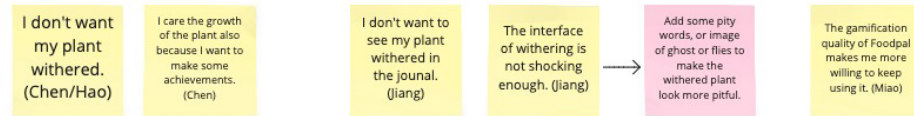
Receive feedback



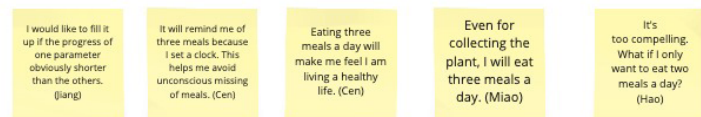
Normality mode: To what extent are the users motivated to eat with Foodpal in normal situations?



To what extent do the users have an emotional connection with Foodpal?

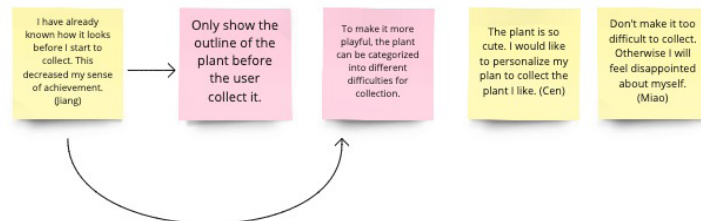


To what extent are the users motivated to have at least three meals a day?

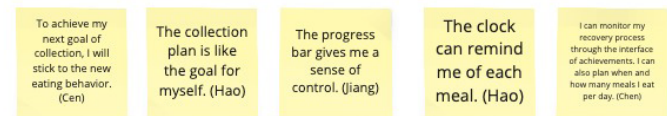


To what extent do the users have a sense of achievement and control when using Foodpal?

Plan



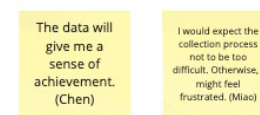
Sense of control



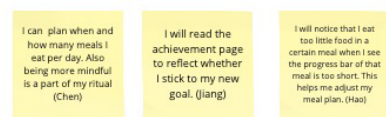
Achievements



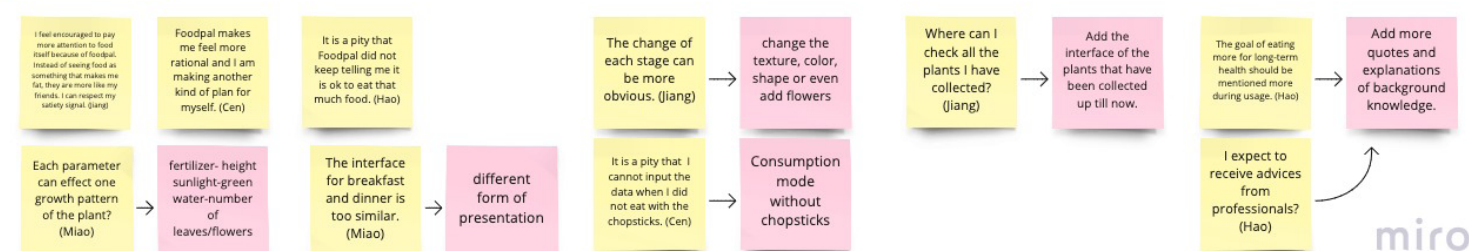
Sense of achievements



To what extent are the users able to develop your own food ritual??



OVERALL



miro