Design for worrying

To explore embodied interactions to help people reduce worries and improve their well-being.

Master thesis

Jizhou Long. August 2020

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SUMMARY

Many people experience worry once in a while. Chronic worry can have a severe impact on people's daily life. Many things, like health conditions, social relationships, sleep quality, and work performance, are all influenced by worrying [Joseph 2017]. So, this is something we would like to address. This assignment aims to explore embodied interactions to help people reduce worries and improve their well-being.

To understand what people are worried about, how they start worrying, and what people do when worrying, I designed a culture probe, with wristband, stickers, and reports. The culture probe aims to capture the moment when the users are worrying. There were 16 participants in this research, providing 90 worry reports[Appendix-2]. From the analysis of culture probe, I narrowed the scope into the design goals: Monitor people's worry level, relieve people's negative feelings, remind people who are stuck in the negative feelings and distract people when they perceive low controllability.

After that, I did competitive research about mental health Apps and therapeutic robots on the market. This research is to analyze the interactions they provide, why they work/do not work. Combining with literature reviews, I came up with the interaction vision describing how the interaction should be. The most essential visions are Inviting, subtle& natural, socially autonomous, and meaningful.

Then, in the ideation phase, I did two brainstorming sessions to explore interactions to relieve people's negative feelings, how to detect their worrying feelings and how to make the interaction intuitively relate to the worries. There were also two evaluation sessions in the ideation phase, which helped me develop the ideas into three concepts.

In the conceptualization phase, I developed three concepts further and arranged a peer evaluation session to determine the final concept, the zen stone concept. Then I did a low-fi prototype test to find out it the idea fits the design goal & interaction vision. The result was very promising; the interaction helped the user to relieve their negative feelings. So I decided to develop the concept further with an App providing guidance. Then I arranged the final usability test and iterated the concept with some details.

The final design's name is Zen stone. It can recognize the user's emotions with emotion recognition by speech software and remind the user when they are worrying, though shining and vibrating. The zen stone will mimic the user's heart rate through a sensor, helping the user be aware of their mental state. It will also provide meditation guidance to help to user calm down and focus on the moment.

TABLE OF CONTENTS

Section 1 | **Introduction**

This chapter includes

This chapter will introduce the background of the problem of "worry" and where are the design opportunities.

Apart from that, I will define the scope for design and the research questions, providing an overview of the whole process.

1.1 PROJECT INTRODUCTION

1.1.1 - Aim of the project

This graduation project is to explore rich interactions to help people reduce their worries and improve their mental health.

1.1.2 - The current situation of "Worry"

Many people experience worry once in a while.
Chronic worry can have a severe impact on people's daily life. Many things, like health conditions, social relationships, sleep quality, and work performance, are all influenced by worrying [Joseph2017].
It is reported that 86 %of adults consider themselves to be a worrier, with every day from work to family weighing massively on their mind [Claire,2015].

Apart from that, the average adult surveyed spent 110 minutes a day worrying[Fig 1]. With 34% of the participants being open to sharing their concerns, 25% of them keep their worries themselves, which will lead to more stress and anxiety [Claire,2015].

86%

Of adults consider themselves to be a worrier, with everyday from work to family weighing massively on their mind

1h,50m

Average adult surveyed spent one hour and 50 mins a day worrying

67%

67% of them keep their worries themselves and do not want to shar their concerns

- **Fig.1 -The current situation of Worry**

1.1.3 - Opportunities:

Worries do the people no good and affect their daily life, so this is something we would really like to address. Currently, there are many options, such as robots. For example, Fribo, a robot to encourages lonely young people to text and call another by sharing information on their daily activities. There are also chat-bots, for example, ELIZA, to talk to people. According to Shah, "while ELIZA was capable of engaging in discourse, ELIZA could not converse with true understanding. However, many users became convinced that ELIZA understood them" [Shah,2016].

While humanoid/animaloid robots and behaviorshavetheirbenefits,theyalsolead the user to expect those systems to have human/animal comparable capacities, which can lead to disappointment and constrained interactions.[L.D, 2018]. For example, the most common interaction between the user and robots is touch-screen. The interaction is unnatural, and many people find it hard to use the touch-screen provided[fig 2].

There are rich interactions rather than mimicking human/ animal shape and behaviour. It can be interactions inspired by nature things. For example, it is reported that ions created by winds can change people's emotional states [Walter,1981]. The strength and temperature of the wind make people interact differently. The houseplants are also proved that they can be a benefit for the elderly. Taking care of plants can improve cognitive performance and help avoid memory problems such as Alzheimer's [figure 3][Bailey, 2017]. Treating the elderly with Alzheimer's disease with color, sounds, or smell is already a part f the treatment. [Nd ,2020}]. The same principles can be applied to other natural things like rain and sunlight. It would be valuable to explore if and how such non-humanoid/animaloid inspirations can be embodied in interactions to help reduce worries.

- **Fig.2 -Robot using touch screen, PAL Robotics, http://pal-robotics.com/ social/ , 21 May 2020**

- **Fig.3 -Elderly taking care of plant,Health and Care, 11 July 2019**

1.2 The assignment

1.2.1 - Research questions

The research questions for the current stage are what the people worries are about? What do they do when they are worrying? Why do they worry? Moreover, how can we, as the designers, help them with novel interactions?

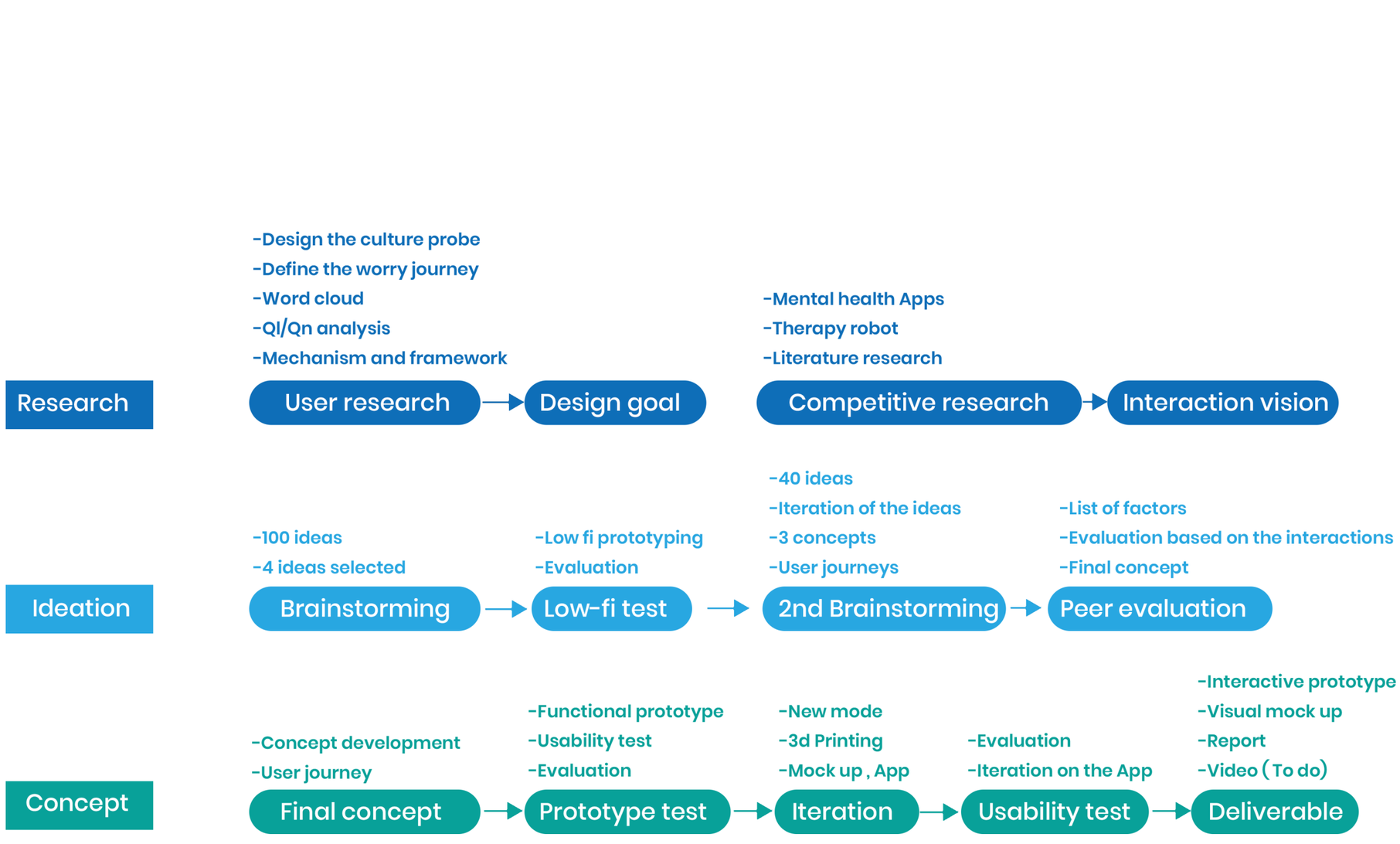
1.2.2 - The scope

The research area about reducing the people's worry will be zoomed in during the process and design. The process of this project will be researching through design, as diverging first and converging later. At the divergence stage, explore as many inspiring research areas & ideas as possible.
After creating a rich overview of the context and earlier attempts, the evaluation is crucial to minimize everything, and the project will come to the convergence part. The research questions and design will be developed and iterates through the whole process, focusing on help people with their worries and improve their well-being[Fig 4].

1.2.3 - The Assignment

The assignment has been formulated as:

"To explore embodied interactions to help people reduce worries and improve their well-being."



▸ **Fig.4 -Overview of the whole process**

Section 2 | **Discover**

This chapter includes

This chapter describes the research approach and dives into the context of the worries.

After receiving a rich set of data from the users through the culture probe, I analyzed the data both qualitatively and quantitatively, to know what people are worried about? Why are they worrying? How do people deal with their worries, and what are the results? Most importantly, what are the reasons behind?

Then, I found what the opportunities for design are, and define the goal for design.

2.1 APPROACH

2.1.1 - Overview

1-Culture probe
- Research questions
- Design of the culture probe

2-Qualitative analysis of the culture probe
- Categorization of the reports
- Word cloud
- Identify patterns/ themes

3-Quantitative analysis of the worry journey
- Analyze of the worry journey
- The transition of the worry journey
- Insights

4-Quantitative analysis of the mechanism and framework
- Mechanism
- Framework

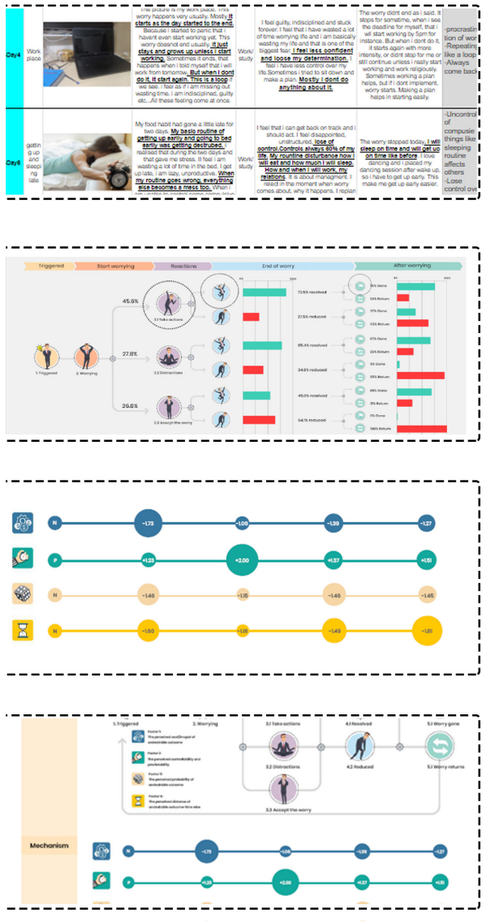
5-Synthesize the research outcome
- Findings
-Insights

6-Design goal
- Main goal
- Bonus goal

The design of the culture probe is to get rich data from the users, after that, the qualitative analysis aims to know the context of people's worries and how do they feel, what are the consequences.

Then, The quantitative analyses aim to define what influences people's feelings and reactions when they are worrying? What role do the factors play in the worry process?

Lastly, using the research outcomes, I found the design opportunities and defined the design goal.



▸ **Fig.5 - Overview of the approach**

2.2 Culture Probe

2.2.1 - Overview

1-Define the research questions

2-Design of the culture probe

3-The final culture probe

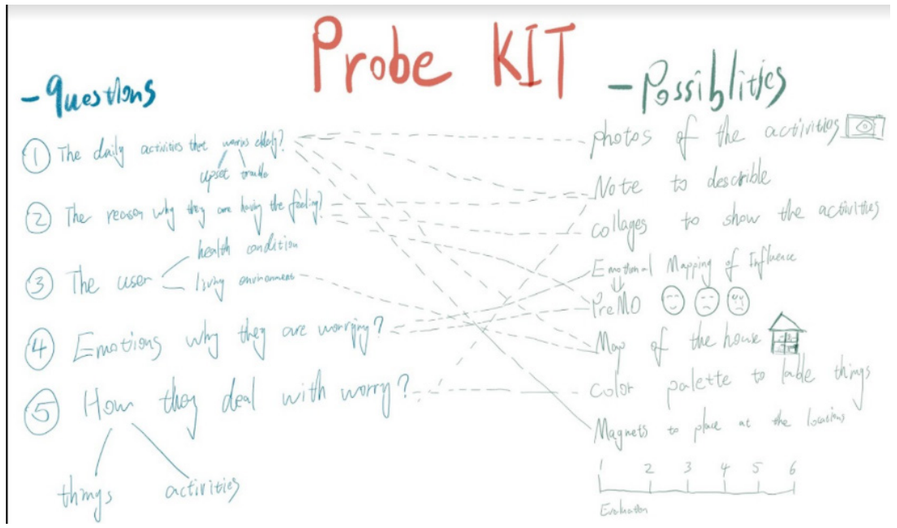
2.2.2 - Define the research questions

Things I would like to know from the research at this stage are:

Start of worry: Worrying always starts with a trigger. Triggers can be various things like when people are under a lot of stress from work? Trouble sleeping? Identify the triggers helps people to manage their worries. The important part of this stage is what triggers people worrying? And how do people feel?

During worry: Worry is the act of continually thinking or being extremely concerned about a particular situation or issue. For example, people are worried about the exam tomorrow? Or the current COVID-19 situation? The critical part of this stage is how do people react to this worry? Moreover, how do people feel when they are worrying?

End of worry: How does the worry end? Sometimes people just let their worries be, until they leave on their own. Sometimes people take measures to deal with the worry, for example, take a walk or talk to friends. The important part of this stage is to know people's experience this stage and what actions do people take.



▸ **Fig.6 - Define research question and possibilities**

▸ **Fig.7 - Process of worry**

2.2.3 - Design of the "Probe"

The probes [Fig 7,8] are small packages that include booklets, wristbands, stickers, cameras along with tasks asking people to track and report their worries. The culture probes were distributed to the participants to help them capture the moment when they are worrying, their feelings, and their thoughts.

The aim is to understand people's worries, thoughts, reactions, and get inspirational ideas.

Process for participants:

1: Introduction to the project

2: Ask them to put the worry stickers on the wristband as a reminder. They are going to wear it for 7 days and provide a report each day.

3: Capture the moment when they are worrying with a picture, and fill in the worry report in terms of

-Start worry(trigger)
-Picture
-Describe how the worry started

-During worry
-Fill in GAD-7 anxiety scale
-Describe how do they feel when worrying

-After worry
-picture
-Describe how the worry ended

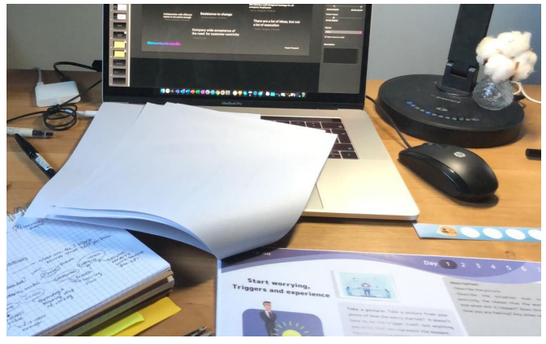
2.2.4 - Final design of the probe

See Appendix-1-Culture probe

2.2.5 - Outcomes

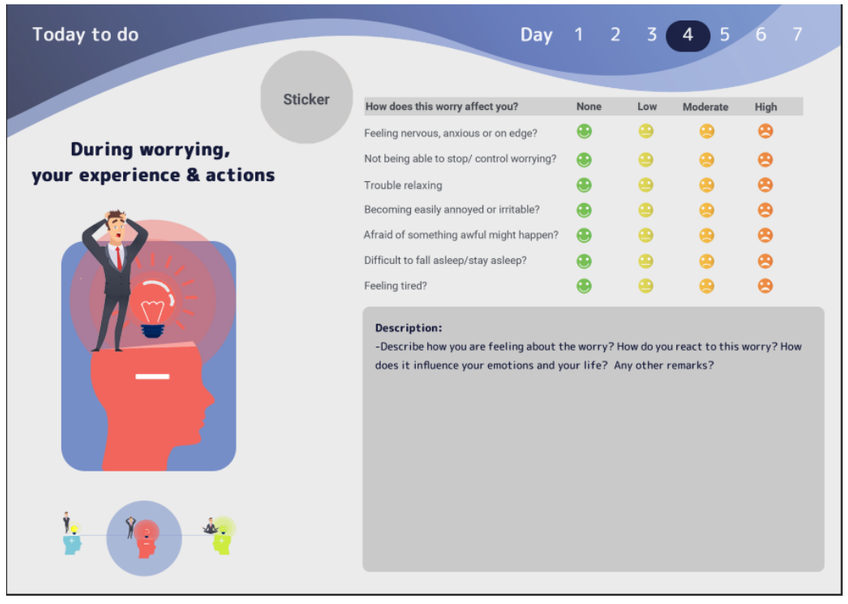
The culture probe research is completed by 16 participants and providing 90 worry reports of how the worry started, how they feel when they are worrying, and how the worry ended.

Participants:
Age: 22-51
Nationalities: Dutch-7, China-5, India-1, German-1, United Kingdom-1, Spanish -1



▸ **Fig.8 - The worry booklet**

▸ **Fig.9 - Worry Wristband**



▸ **Fig.10 - During worrying page of the probe**

2.3 Qualitative analysis

Introduction

The overall goal of the qualitative analysis of culture probe was to identify what triggered people to worry? How did they feel? How did they handle the worry? How did the worry end?

Method

1. Categorization of all the 90 reports based on their types of worry[Appendix - 2]
2. Coding in terms of types of worry, how did the worry start, how did the worry end, how did they handle the worry, how the worry ends.
3. Identify themes and pattern
4.Identify what influence people in the

Overview of the outcomes

- 2.3,1: Triggers, what make people start to worry
- 2.3.2: What are people worrying about?
- 2.3.3: Word could - How do people feel?
- 2.3.4: Worry journey
- 2.3.5: What factors influence people when they are worrying?

- **Fig.11-Transcription of the reports**

2.3.1 Triggers of worry

What are the triggers

Triggers is the stressful situations, events, emotions and objects that cause the worries[Holland,2009].
Triggers of worry can be very different for different people, but there are many triggers are shared by people under same condition, for example, students who is preparing for exam. They share the same stress and triggered by things which are exam related.

Method

Categorize and analyse the pictures that participants took at the start of worry. Then based on their types of worry, identify the patterns and relationship.

Findings : Characteristics

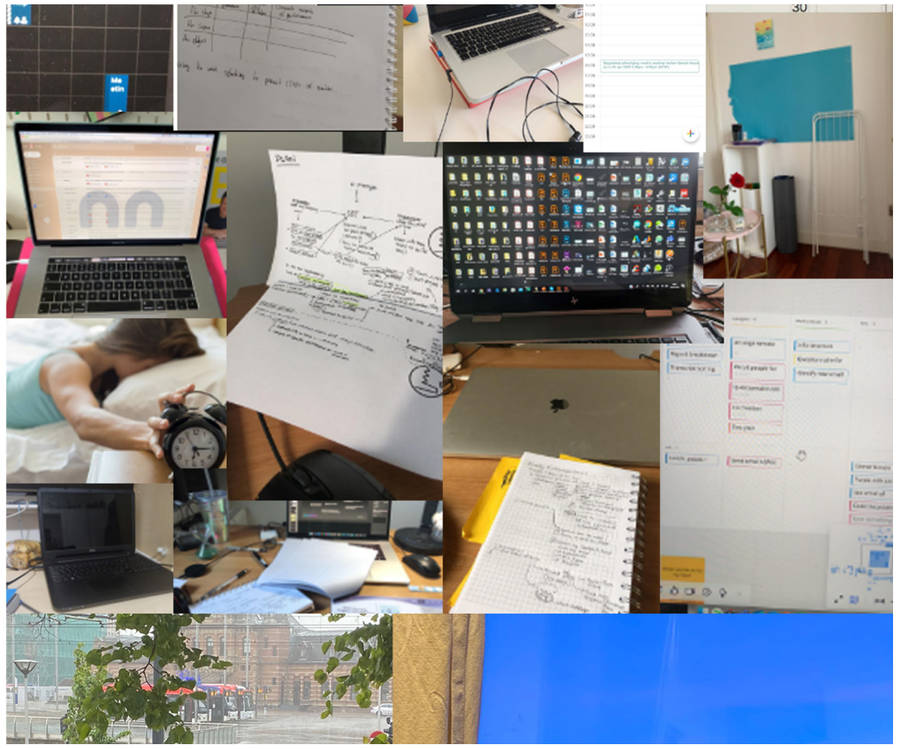
Predictable

There are some triggers that is not predictable like arguing with someone on the street or just come out of no where. For example, a chinese student used the corona virus [Fig 11].

However, most triggers in the worry reports are daily objects for people who share the same types of worries, such as laptops, planning, meetings, mirrors, bad weather...
Take work/study related worries as the example. 42 reports are work/study relate worries. And almost all of the pictures taken when they were worrying are the laptops, planning, calendars etc [Fig 12]...

For worries who always return, the trigger are always the same stressful situations. The triggers are predictable and always the same.

▸ **Fig.12 - Picture of corona from P11**



▸ **Fig.13 - Pictures of triggers from work/study relate worries**

Findings : Characteristics

Unavoidable

Most of the triggers are not avoidable. For example, people triggered by their laptops when they are struggling with working/studying, or triggered by the mirror/food when they see them. For example, one participant is worrying about her appearance. Everytime she starts eating, she will be triggered to be worry[Fig13].

The triggers are common things and are part of people's life. As long as the worry is solved, the trigger might always come back.

▸ **Fig.14 - Triggered by food**

Insights

Since the triggers are unavoidable, people have to face to the triggers in their life.
However because the triggers are predictable, if people can know about them before hand, they can plan for the coming worries and cope preemptively with the worries.
Apart from that, if the trigger is predictable, choosing a specific scenario to design for where always people are triggered to worry might help to reduce their negative feelings.

2.3.2 What are they worrying about?

Characteristics of worry

It is reported by Howard that the characteristics of worry are"
(1) the repetitive thoughts concern an uncertain future outcome;
(2) the uncertain outcome about which the person is thinking is considered undesirable
(3) the subjective experience of having such thoughts is unpleasant."
[Howard,2010]

If something is uncertain; however, the uncertain outcome is not undesirable, people would not be worrying. If something has an inevitable undesirable outcome, people would be sad/angry rather than worrying. Worry needs both of the characteristics to be true.

Method

-Coding
Label the worries in terms of the triggers, the reactions people take, and the consequences.

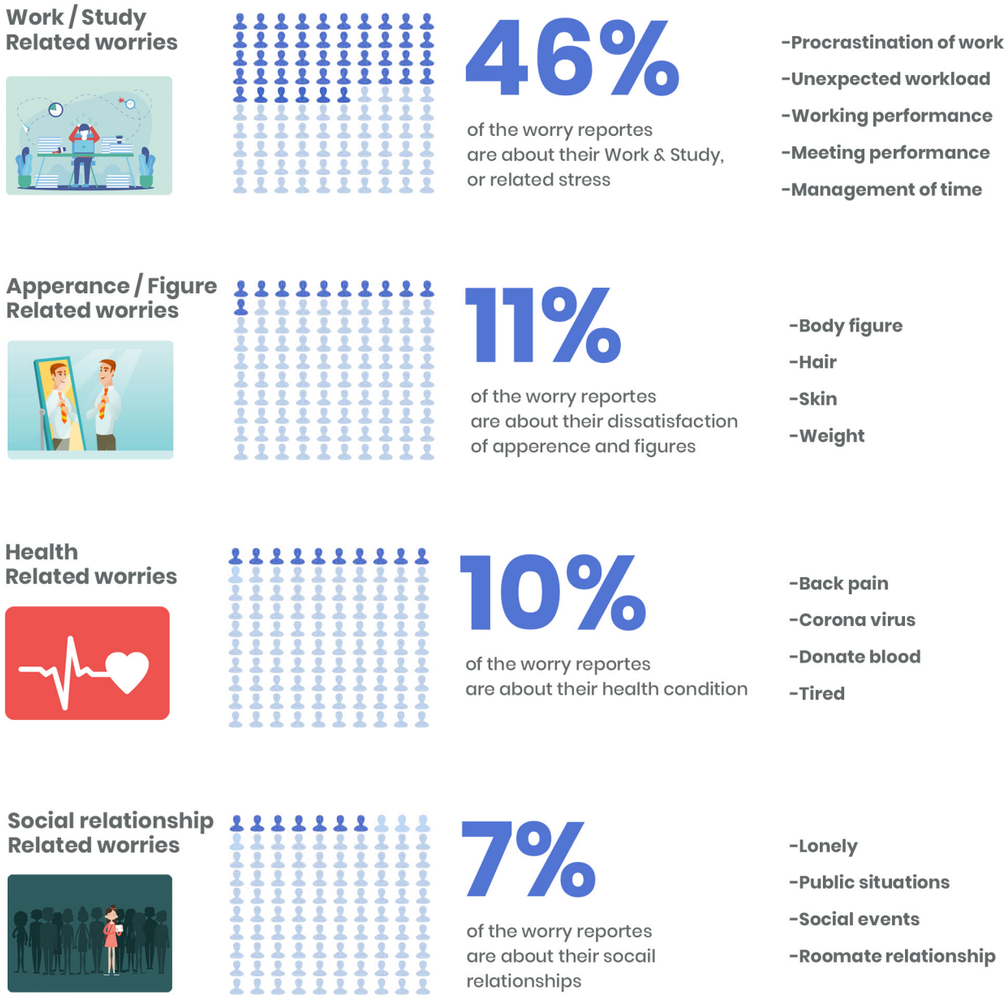
-Categorization

Outcomes

Work / Study related worries are the most common worries. There are 46% of worries are work / study related.
The rest common worries are appearance, health, social relationship etc..

Insights

The participants are aging from 22 to 50. All of them are either studying or working now. It explains why the work / study related worries are the most often worries.



▸ **Fig.15 - What are people worrying about?**

2.3.3 How do people feel?

▸ **Fig.16 - Word cloud of how do people feeling when worrying**

Method

1-Filter the word representing how do people feel from 90 worry reports
2-Using wordcloud generator software to generate the words.
The bigger the word is, the more frequently it is being used by the participants.

Insights

Uncontrol (lack of control) is the word they referred to most. People feel they are not able to control their worries or control their work / Study. For some people, they feel they can not control their life. There might be an interesting opportunity for design to help people take control back to themselves and focus on the moment.

Other frequently used words describing their feels are anxiety, tired, guilty, frustrated, stressed, etc...Constant worrying and negative thinking, have a negative influence on their emotional health. It can decrease people's emotional strength, make them feel negative, and make them difficult to concentrate on their work and life.

2.3.4 Worry journey

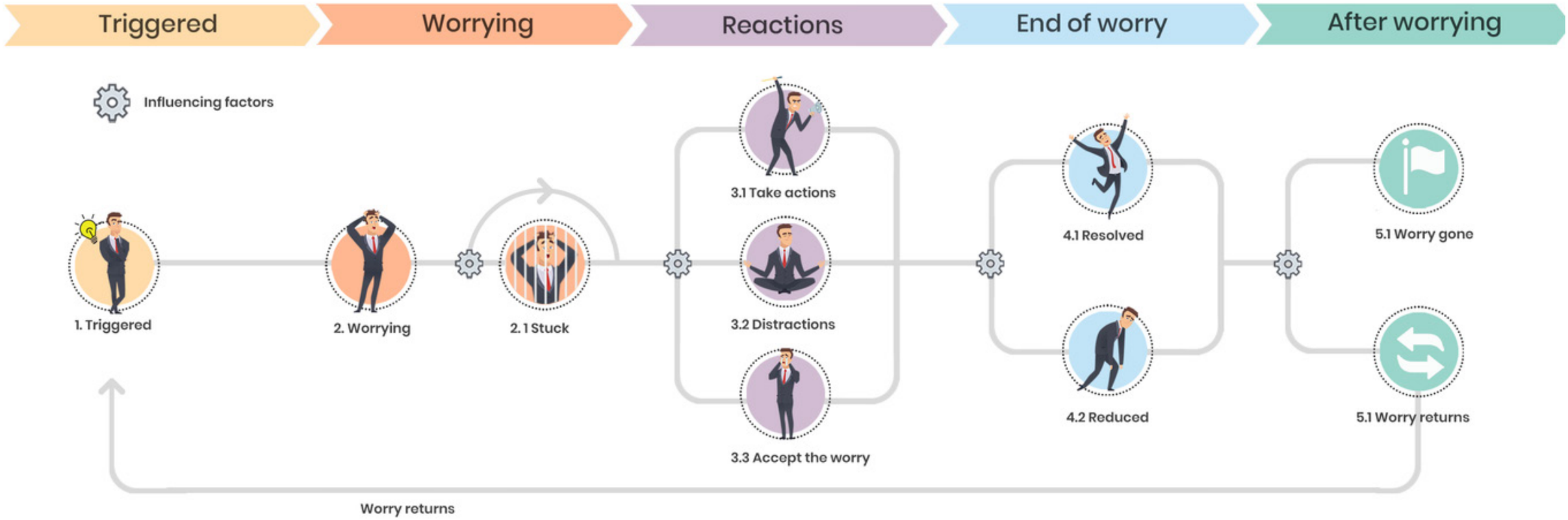
Method

Based on the analysis of the patterns and the relationships from the worry report, the worry journey describes what happened to the users when they worry.

Worry journey

The journey below combines all the decisions that people made and the consequences of their decisions. The influencing factors are the factors that influence people's decisions on the worries, and they also influence the consequences.

Worry journey



▸ **Fig.17 - The worry journey**

Triggered phase

Worries are mostly started with a trigger. The trigger made them start to worry.

Worry phase

People had various negative feelings when they are worrying, and many people stuck in worrying for a long time without moving to the reaction phase.

Reaction phase

People chose different ways to handle their worries, some people choose to take actions to the worry, some people use distractions like listening to music, and some people do nothing and accept the worry

End of worry phase

At the end of worry, people perceived the worry feelings are reduced at different levels. For example, the lowest level is when people still feel the worry bother them a lot at the end.

The highest level is when the worry is resolved and does not influence them anymore.

After worrying phase

Some worries will be gone after the worry ends, because what triggered them to be worried is gone. For example, after they passed the exam they worried, they won't worry about it anymore.

But some worries will always come back to people very frequently, like worrying about work/appearance.

2.3.5 Influencing factors of the worry journey

Introduction

To discover what influenced people making decisions in the worry journey, I tried to specify the factors that influence people in "trigger, worry, stuck, reduction, end, after" phases.

What are the Influencing factors?

The influencing factors (IF) are concluded from the qualitative analysis of the 90 reports and literature researches. I will elaborate on them later in terms of the IFs and how they influence the whole process.

Overview of the analyze

IF 1 : The perceived cost / impact of undesirable outcome
-Definition
-Example
-Analyse
-Insights

IF 3 :The perceived probability of undesirable outcome-Defination
-Definition
-Example
-Analyse
-Insights

IF 2 : The perceived controllability and predictability
-Definition
-Example
-Analyse
-Insights

IF 4 : The perceived distance of the undesirable outcome-time wise
-Definition
-Example
-Analyse
-Insights

Influencing factor 1 : The perceived cost / impact of undesirable outcome

Definition

The perceived cost/impact of undesirable outcome is defined as the degree of impact or cost that the participant perceived of the potential undesirable outcome if it comes true.

According to Howard[2010], the magnitude of the perceived threat depends are influenced by the perceived impact, or cost, of the outcome.

For example, "even if an outcome is perceived as being likely, it will not lead to a large perceived threat if the outcome is considered relatively unimportant. Conversely, even if an outcome is considered unlikely, it may still be perceived as a significant threat if the cost of the outcome is perceived as being quite significant" [Howard,2010].

Example 1.1

Participant 10 Day 2
This morning, i received a email about being suspected of plagiarism of a report i did before. I feel confused and innocent. It was inappropriate citation at most. This thing makes me feel a lot of stress and pressure. I am afraid of how it would go. I dont want to do another elective to make up this 3 ects. I am also afraid of things will get worse.I feel scared, bervous and tons of pressure all day. I even think about if the school will stop my graduation project which i already spent a lot of time and effort in and waste me one year. I hate this situation. I wrote an email to explain myself to the school.

Participant 10 Day 4
It was quite a happy day until something about plagiarism pop up in the browser. It makes me really nervous because i am being suspected of plagiarism. From what i saw online, the consequences could be pretty serious. I feel i have a lot of pressure. It happened before my sleep.

Analyze 1.1

There is an example from participant 10. This participant is being suspected of plagiarism of a report. He feel confused and innocent, however he is afraid of the things could happen for example it might influences his graduation project, or waste a year.
The perceived cost of the undesirable outcome is quite significant to him. Even the worry is reduced by writing email and doing exercises, this worry keeps coming back to him in Day 2, Day 3 and Day4.

Example 1.2

Participant 7 Day 1
I am worried about Dutch learning. About the pronouncation of g and r, i alway pronounce them incorrectly, and i am not good to memorize words too. I married a Dutch man and I want to talk with his families in Dutch as well.

I want to do my best at learning Dutch, but it is not like biggest worry in the world. I am a bit afraid of left behind. This worry doesnt influence my life very much.

When the study ends, i stoped worry about it. But I always want to be the best and be able to talk to people in Dutch. So this worry will continue until my Dutch improves.

Analyze 1.2

There is another example of long term worrying from participant 7, Day 1.
She is worrying of her Dutch learning progress with the pronunciation and memorizing. She wants to be able to talk to people in Dutch, especially her husband and their families.
However, the perceived cost of undesirable outcome is not that significant in this case. According to her,"It's not like the biggest worry in the world."
Compare to the participant 10 who is being suspected of plagiarism, her worry ended at the moment of the Dutch class ended. The worry will continue however it wouldnt influence her life very much.

Insights

To summarize, the perceived cost of undesirable outcome influences how people feel and react to the worry. The greater the cost is, the greater the person is being threatened by the worry and being influenced more.

Influencing factor 2 : The perceived controllability and predictability

Definition

The amount and variety of undesirable outcomes that could happen to individuals are infinite. As a consequence, humans are constantly surrounded by potentially threatening stimuli. Apart from this, most of the time, most people are not conscious of most of the threats to their safety and well-being [Howard,2010].

Whether a person can perceive the threat depends on whether he is aware of its presence. The perceived controllability and predictability (or lack of) influence how negative people feel by working as signals of safe and danger. [Lohr,2007].

According to Barlow(1988), “a sense of uncontrollability seems to be at the core of negative affect and derivative states of anxiety and depression”

Example 2.1

Participant 10 Day 2
This morning, i received a email about being suspected of plagiarism of a report i did before. I feel confused and innocent. It was inappropriate citation at most. This thing makes me feel a lot of stress and pressure. I am afraid of how it would go. I dont want to do another elective to make up this 3 ects. I am also afraid of things will get worse.I feel scared, bervous and tons of pressure all day. I even think about if the school will stop my graduation project which i already spent a lot of time and effort in and waste me one year. I hate this situation. I wrote an email to explain myself to the school.

Participant 10 Day 4
It was quite a happy day until something about plagiarism pop up in the browser. It makes me really nervous because i am being suspected of plagiarism. From what i saw online, the consequences could be pretty serious. I feel i have a lot of pressure. It happened before my sleep.

Analyse 2.1

Using the same example from Participant 10 who is being suspected of plagiarism. An interview of him was taken after the culture probe, to find the missing information.

In terms of controllability, he has no control over how the thing would go because the decision will be made by the faculty. He does have the change to argue and explain himselves, but the final decision will be in other’s hand. The controllability in this case is quite low.

In terms of predictability, he thinks that the consequence would not be severe because it was an intentional mistake. However, he still feels that even 1% chance still makes him worrying and can not stop the tendency.

Example 2.2

Participant 1 Day 6
My food habit had gone a little late for two days. My basic routine of getting up earily and going to bed earily was getting destrubed. I realised that during the two days and that gave me stress. I feel i am wasting a lot of time in the bed. I get up late, i am lazy, unproductive. When my routine goes wrong, everything else becomes a mess too. When i am unable to control some compulsive haibit, then it affects other habits.

I feel that i can get back on track and i should act. I feel disappointed, unstructured, lose of control.Controls always 60% of my life. My rountine disturbance how i will eat and how much i will sleep. How and when i will work, my relations. It is about managment. I relect in the moment when worry comes about, why it happens. I replan and stay disturbanced.

The worry stopped today. I will sleep on time and will get up on time like before. I love dancing and i placed my dancing session after wake up, so i have to get up early. This make me get up early easier.

Analyse 2.2

Another example is from participant 1 - Day 6.

She was triggered by getting up late and worried about her work undone because her routine is not on the right track. However, this worry ended when she went to sleep on time and got up on time. In terms of controllability, she successfully made herself sleep on time and get up on time. It is only controlling her basic routine. Her controllability compares to participant 10 is quite high.

In terms of predictability, she believes that as long as her basic routine is back to normal, things will be back to normal. So the predictability of the threat is also high. High controllability and predictability made her worry ended easily...

Insights

To summarize, the perceived controllability and predictability have a significant influence on what actions people will take to reduce the worry and how the worry threatens people. The higher the perceived controllability and predictability are, the influence of the worry will be less, and the worry will be easily stopped.

Influencing factor 3 : The perceived probability of undesirable outcome

Definition

"If one is confident that an undesirable future event will occur, one can anticipate it and grieve about it, but one cannot worry about it "[Howard,2010] .

For example, people would not worry about death because it will happen 100% under the current technology level. People may worry about the unpredictable outcomes related to death, such as when the time will be, how they will leave, or what would happen to someone they love if they die. The outcomes are uncertain, but people are different in how likely or unlikely they believe the outcomes are [Howard,2010].

The greater the perceived probability of an undesirable outcome, the greater will be the perceived threat. According to the Howard(2010), the two most important factors that contribute to perceived probabilities are:"
(a) perceptions of others and the world.
(b) perceived competence (perceptions of himself)"

Example 3.1

Participant 13 Day 5

I was running with my friends on the street. There were two Turkish people shouting behind me "fucking covid guys". I fly into rage and tried to chase them and aruge with them. It is the 4th times this kind of shit happen.

I was chasing them and shouting at them, they started to run away. I feel angry more and more. After that, I am scared of the consequence if i lost control and do something illegal. So next time i saw them, i was trying to stay calm and just let it go. These stupid guys do not worth my attention.

It keeps bothering me and i can not forget about it that day.

Analyse 1.1

There are two examples from participant 13-Day 5 and participant 11-Day 4 about (1) perception of others and the world.

These two participants are from China, and because of the Covid-19, they had some unfriendly experience recently. Participant 13 reacted with rage and tried to chase the people who said bad words to him. He failed to catch them. The worry did not end but keeps bother him. He referred to these people as "Stupid guys."

Participant 11 also shared a similar worry. However, the worry ended at the end of the day. He referred to this happened because of "rumours on the internet and the cultural difference in do people react when they see someone wearing masks."

According to Howard(2010), ”All else being equal, an individual who thinks that most people are nasty and brutish will think undesirable outcomes are more likely than will an individual who thinks that most people are benevolent“

Example 3.2

Participant 2 Day 2
The picture shows that i am worrying about that. I cannot stick to my planning. I have too much to do everyday but I am too lazy. This happens a lot. I feel guilty, helpless, hopeless.

I canot stop thinking about it.I feel so stressed and scared f making bad choices.

I try to distract myself when worrying about my tasks. But is makes the situation even worse.

Participant 9 Day 6
Because of the epidemic, my husband's work also stopped. I dont know how long this situation will last. I am also worried what to do it this situation lasts for a long time.

I just feel a little worried, but it is ok.

I am trying to convince myself that i should not worry about it. I trust my husband's ability.

Insights

To conclude, the perceived probability of undesirable is influenced by two factors, the (a) perceptions of others and the world. (b) perceived competence
The higher the perceptions of others and the world are, the influence of the worry is less. The higher the perceived competence is, the influence of the worry is less.

Analyse 3.2

In general, people believe that their actions will play at least some role in influencing outcomes. Besides, people generally believe that their level of competence will influence how they can execute those actions successfully. As a result, one's perceived level of competence should influence one's estimate of how likely are undesirable outcomes [Howard,2010].

There are two examples from participant 2 - Day 2 and participant 9 - Day 6. For participant 2, he thinks that he is too lazy, has too much to do every day, and can not stick to the planning. He tried to distract himself, but it did not work, even made the situation worse. The level of perceived competence is quite low as he referred to himself as "too lazy." This influenced him on how he react and feel about the worry.

Another opposite example is from participant 9 - Day 6. She was worried about her husband's work because of the epidemic. However, she only feels a little worried but at the acceptable level. The reason is that she trusts her husband's ability. The level of perceived competence of her on this matter is high. The worry may not end because the epidemic continues. However she is more optimistic than participant 9.

Influencing factor 4 : The perceived distance of undesirable outcome

Definition

The magnitude of the perceived threat depends are also influenced by how soon the undesirable outcomes are. For example, if the worry is about the deadline tomorrow, the worry will pass easily after uploading the assignment. The distance time-wise is quite short. However, if the worry is about the future in 5 years, it may still return again and again before individuals find a way to resolve the worry.

Example 4.1

Participant 11 Day 5
It is the conversation with a guy who might be helpful. Actually it is also about decision making. I have a potenial side project that need the help from other research groups. But according to their feedback, they show limited interest to this collaboration. This trigger happens several times because we are keeping in touch via email. Feel depressed.
I have to admit that the worry triggered from work is significently awful. To overcome this worry, I started to learn more knowledge in their field and try to link up some added values to them. This worry makes me stressful since it is quite important to me. I feel bad and can not relax very well.
The worry ends until they gave me some positive feedback, which means my idea is sort of valuable. To stop this worry, i learned some new knowledge, to calrify the collaboration more clear. Also, i convinced them with some benefits to them.

Example 4.2

Participant 10 Day 5
I was running with my friends on the street. There were two Turkish people shouting behind me "fucking covid guys". I fly into rage and tried to chase them and aruge with them. It is the 4th times this kind of shit happen.
I was chasing them and shouting at them, they started to run away. I feel angry more and more. After that, I am scared of the consequence if i lost control and do something illegal. So next time i saw them, i was trying to stay calm and just let it go. These stupid guys do not worth my attention.
It keeps bothering me and i can not forget about it that day. But today this worry already passed and i dont know when.

Analyse 4.1 & 4.2

For short term worries, there are two ways of the ends of the worries.

The first one is the worry is solved; therefore, the worry is ended. For example, worry report from participant 11 - Day 5 shows that the participant was worried about making other people interested in helping his project. The worry ended by getting positive feedbacks with learning new knowledge. This participant found the solution to solve the worry, and it worked. The worry is ended. Other examples are exercising after a big meal, or find out what went wrong when received a fine mail.

The other way worry will end is a bit more complicated. People may not be capable of solving the worry, or they can only distract themselves from the worry. The worry might only be reduced or stays. However, the worries in Pattern 2 are short-term worries, which means that the undesirable outcome's uncertainty will fade after the worry passed. An example is from participant 10 - Day 5. The worry keeps bothering him that day, and he can not find a way to solve the worry. However, the worry ended on the second day after sleep.

To conclude, the short term worries always vanish in the end because either the worry is solved or nothing can be done. The uncertainty of outcome will become an inevitable fact, and people will stop worrying about it.

2.4 Quantitative analysis of the worry journey

Introduction

The overall goal of the quantitative analysis of the worry journey was to know the consequences of each decision that people take when they are worrying.

So I could identify the patterns and find the opportunities for design interventions.

Method

1. Based on the categorization of all the 90 reports, coding in terms of types of worry, how the worry started, and how the worry ended, how did they handle the worry, and how the worry ended.
2. Quantitative analysis of the whole journey 's process transition

Overview of the outcomes

- 2.4,1: The overall transition of the worry journey
- 2.4.2: Data analysis
  - -Findings
  - -Insights
  - -Conclusion

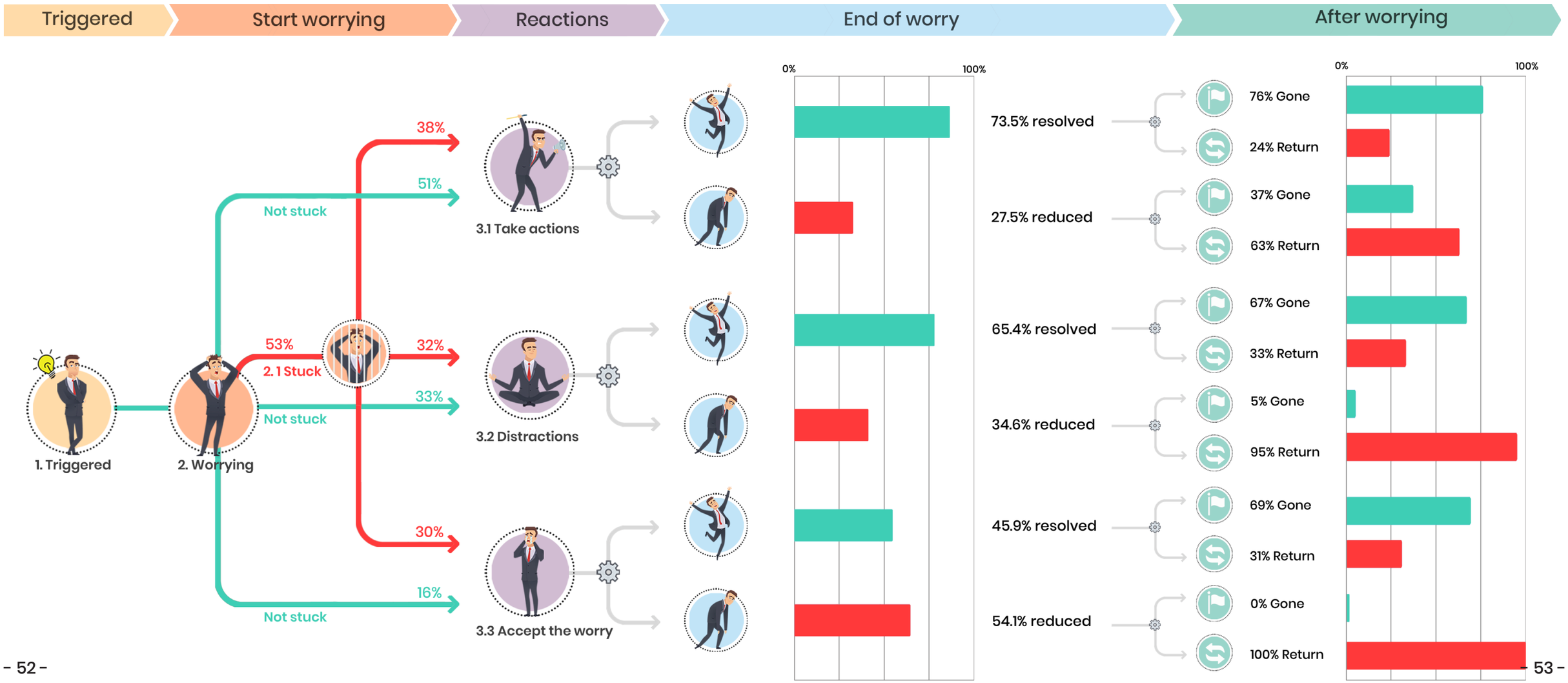
- **Fig.18 - Coding of the reports**

2.4.1 The overall transition of the worry journey

Introduction

The overall transition shows what did people do and what was the consequences

▸ **Fig.19 - Transition of the journey**



Insights

The whole journey contains 24 paths, starts to diverge at the Worrying phase, showing what did people do with their worries and what was the consequences of their decisions. It is found that in the pattern "Trigger, Worrying, Not stuck, Take actions, Resolved of worry, Worry gone," people feel most relieved from the worry.

Pattern 1: Stuck with the negative feelings make people hard to take actions and more likely to accept the worry, and it leads to lower reduction level of worry and higher possibility that the worry will come back.

Pattern 2: Taking actions relieve people from the worry most. Moreover, using distractions relieve from the worry excellently as well. But accept the worry will lead to a much lower reduction level of worry and the highest possibility that the worry will come back.

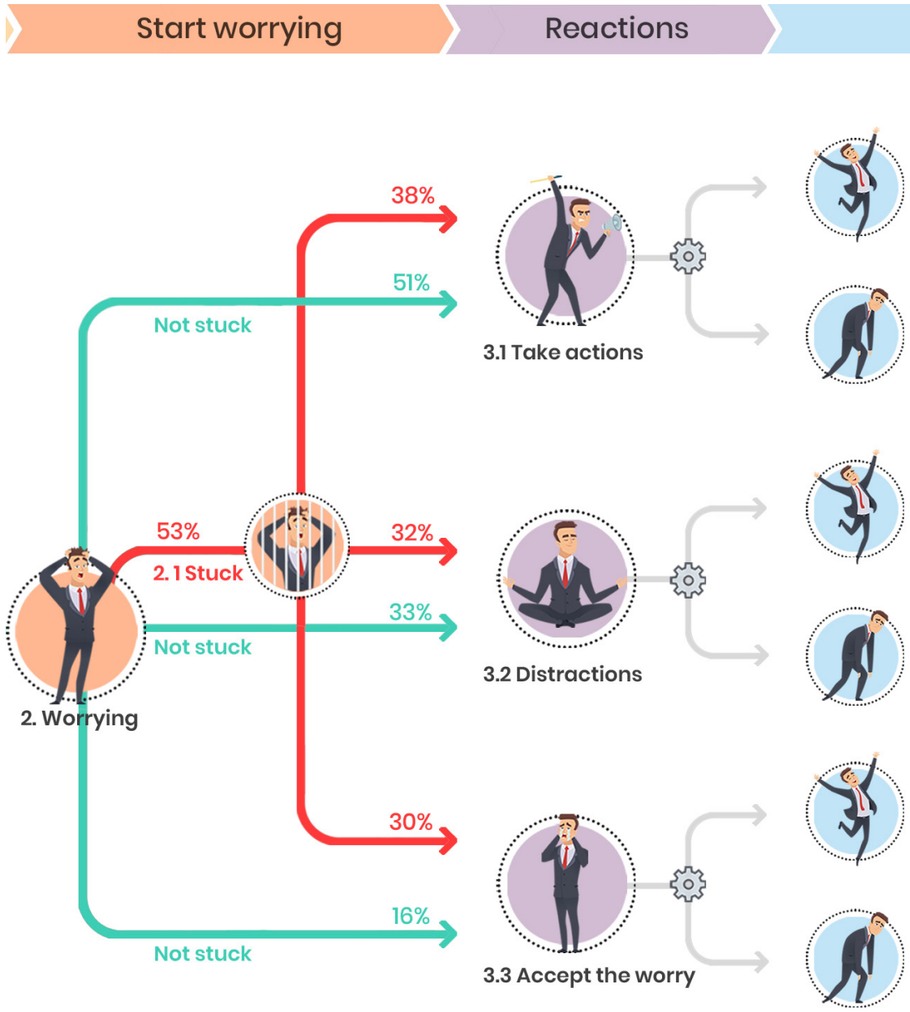
Pattern 3: No matter the worry is resolved or reduced, it still has the possibility that it will return and repeating. Rank: Taking actions >Distractions>Accept the worry

2.4.2 Data analysis of the transition

Introduction

The data analysis is trying to find out how each step in the worry journey influences the process?

Phase-Start worrying



▸ **Fig.20 - Transition in reactions phase**

Findings

People experience negative feelings like uncontrol, anxiety when they are worrying. Data shows that 53% of the worries made people stuck in negative feelings without moving to the next step-"reaction to the worry."

When people are stuck in negative feelings, there is a low possibility for them to take action to deal with the worry and higher possibility of accepting the worry.

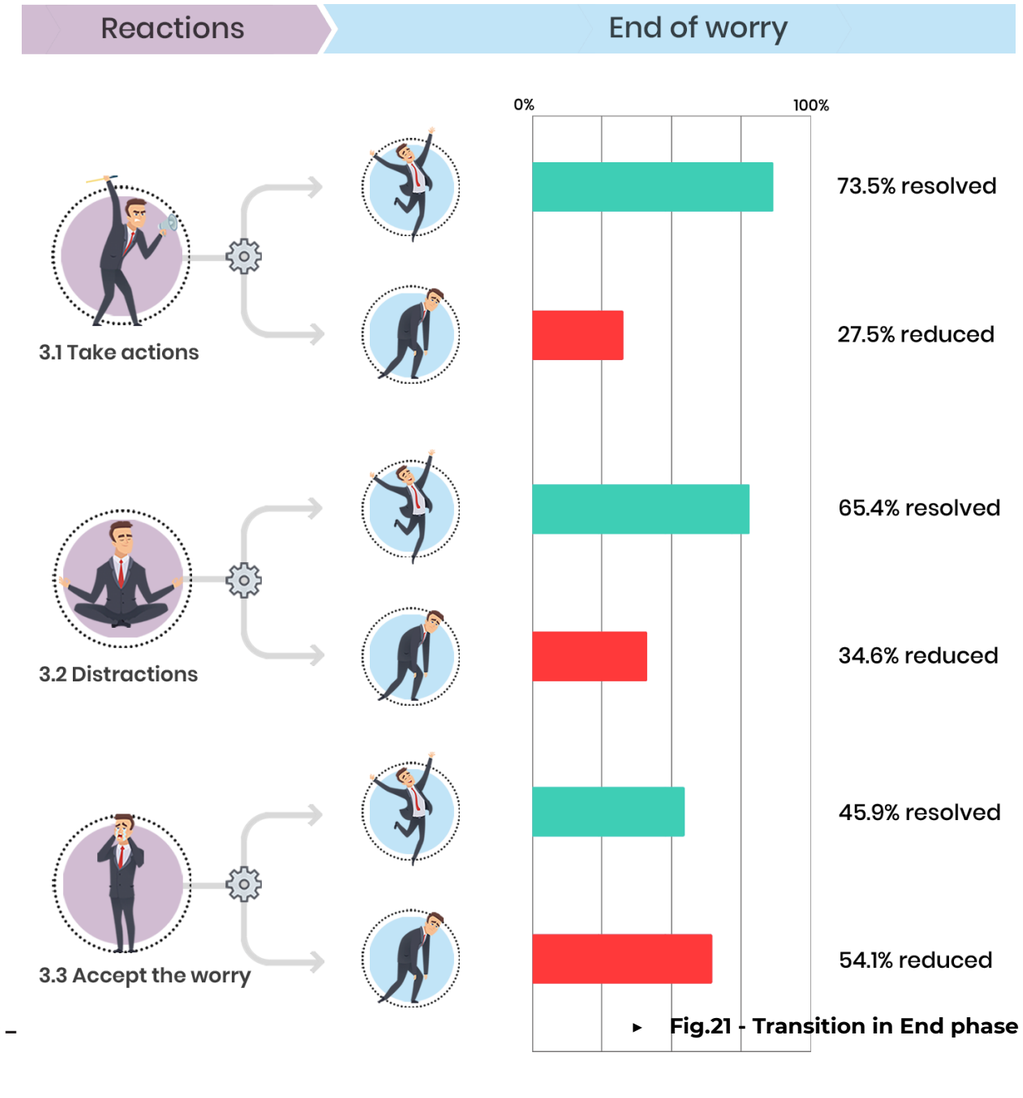
Insights

When people are stuck in negative feelings, it will decrease their emotional strength and make them difficult to concentrate on what they are doing. There might be an opportunity to help people handle their worries better by preventing them from being stuck in negative feelings.

Phase-Reactions

The reaction phase's analysis is to determine which reaction can lead to a higher reduction level of feeling worried.

Phase-Reactions



▸ **Fig.21 - Transition in End phase**

Findings

It can be seen that when people take action to handle the worry, the worry has the highest chance to be resolved.

Using distractions also helps the worry to be resolved, but not works as much as taking actions.

When people accept the worry, the worry has the lowest chance to be resolved.

Insights

If we can motivate people to take action, it will most likely help them resolve their worries.

Taking actions is the most ideal way that people can choose to handle their worries.

Phase-End of worry

The analysis of the end of worry phase is to find out which reaction can lead to the worry coming back.

Phase-Reactions

▸ **Fig.22 - Transition in After phase**

Findings

1: When the worry is resolved, it has a much lower chance to return compared to when the worry is reduced. The difference is quite significant.

2: When the worry is resolved Taking actions to deal with the worry has the highest chance to make the worry gone, but using distractions and accept the worry also have a high chance to make the worry gone. The difference is not significant.

3: When the worry is only reduced and not resolved Accepting the worry has a 100% chance that the worry will return, and distractions have a 95% chance that the worry will return. Compare taking actions to distractions & accept the worry, there is a much lower chance that the worry will return. The difference is quite significant.

Insights

We need to help the worry be resolved, so the worry has a much lower chance of returning. Moreover, taking actions helps to avoid the worry return no matter the worry is resolved or reduced.

Where should the design interventions help in the process?

From the analysis of the worry journey's transition, I find five opportunities for design intervention to help people dealing with worries.

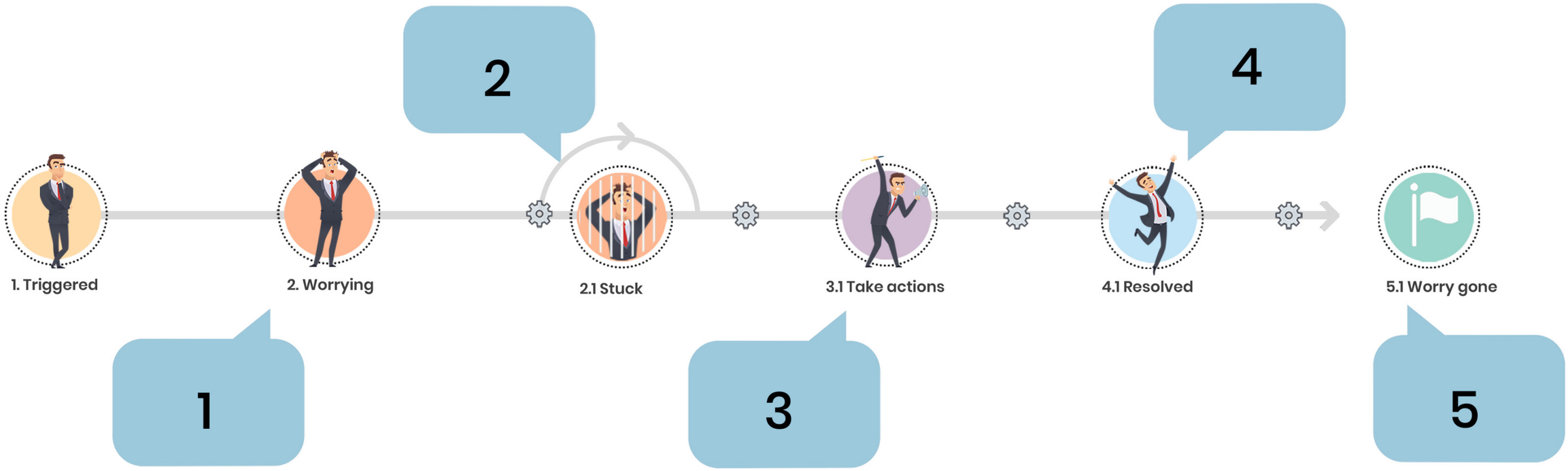
1: Relieve people's negative feelings when they are worrying, helping them to take control back.

2: Remind and encourage people to move on when they are stuck in negative feelings.

3:Encourage to take actions when they are worrying

4:Help them to resolve their worries or reduce their worries as much as possible

5: Help people to avoid the return of worry



▸ **Fig.23 - Possible place for design interventions**

2.5 Quantitative analysis of the mechanism and framework

Introduction

The quantitative analysis is trying to determine how the influencing factors influence each step and provide insight for which opportunities are most suitable for design intervention?

The dataset used in this analysis is the 90 written reports from the culture probe.

Method

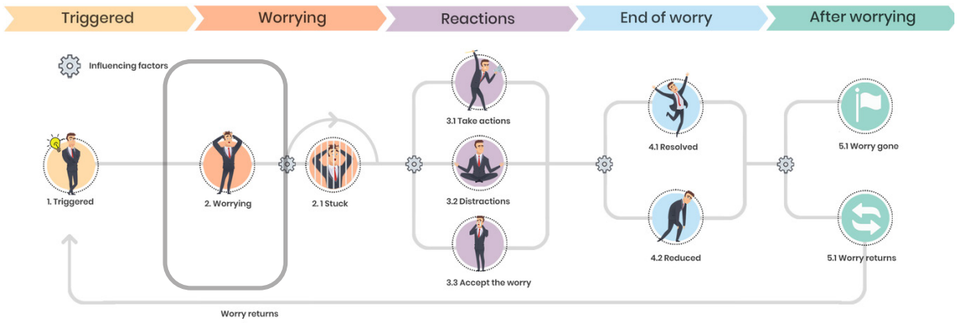
1. Coding
2:Data analysis

Overview of the outcomes

2.5.1 Worry phase - Feelings

Introduction

This analysis is to identify how do the factors influence how people feel when they are worrying?



▸ **Fig.24 - Feelings in worry phase**

Method

The method used in the culture probe is the Generalized anxiety Disorder -7 (GAD-7)scale to measure how severe people experience negative feelings?

GAD scale was used in the culture probe and the participants describe their feelings using the scale [Spitzer, 2006].
Servere point = Sum(factors)/7
Mild level: 1-1.75
Moderate level: 1.75-2.5
Severe level: 2.5-3.25
Panic level: 3.25-4.00

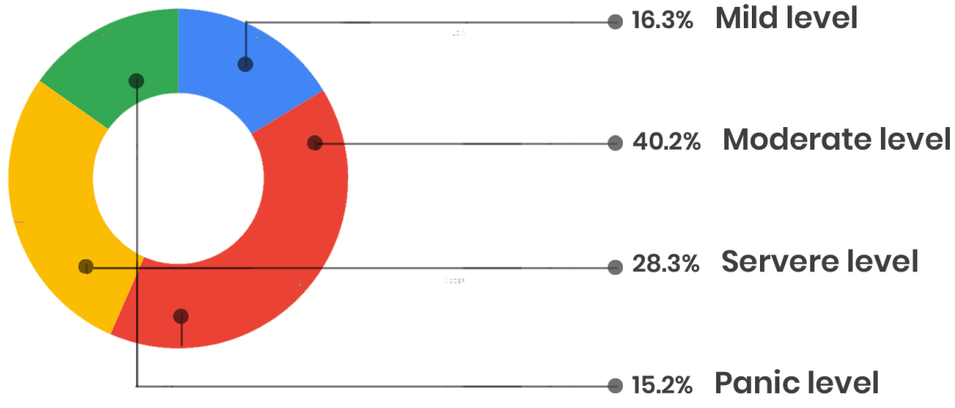
How does this worry affect you?	None	Low	Moderate	High
Feeling nervous, anxious or on edge?				
Not being able to stop/ control worrying?				
Trouble relaxing				
Becoming easily annoyed or irritable?				
Afraid of something awful might happen?				
Difficult to fall asleep/stay asleep?				
Feeling tired?				

▸ **Fig.25 - GAD-7 scale used in culture probe**

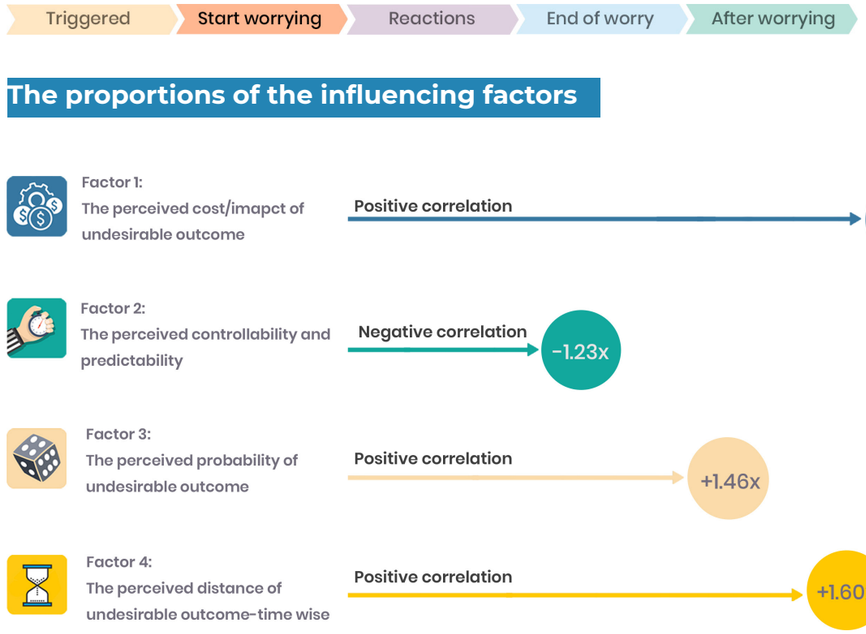
Result

It is found from the data that 16.3% of worries made people feel at a mild level, 402.% at a moderate level, 28.3% at a severe level, and 15.2% at a panic level.

When people are worrying, they experience negative feelings differently depends both on the worries and themselves. Over 43.5% of people experience anxiety more than a moderate level. It will affect their mental health and daily performance.



▸ **Fig.26 - GAD-7 scale result**



▸ **Fig.28 - Proportions of IFs in feelings phase**

Findings

How people feel when worrying depends on all four factors. The degree of feeling severe when worrying is significantly negatively correlated with factor 2 and is significantly positively correlated with factor 1, factor 3, and factor 4.

Full analysis see [Appendix 3]

Insights

Factor 1, the perceived cost/impact of an undesirable outcome, has the greatest significant influence on how severe people feel when they are worrying. According to Howard [2010], “even if an outcome is considered unlikely, it may still be perceived as a significant threat if the cost of the outcome is perceived as quite significant ”. It explains why the perceived cost has the greatest influence on how people feel.

When it comes to factor 2, the perceived controllability and predictability has the lowest influence on how people feel. Even people can handle the worry with high controllability and predictability; it does not influence that they will feel severely worried if the perceived cost/impact is high.

There might be an opportunity to decrease the perceived cost/ impact to help people relieve the feeling of worried.

2.5.2 Worry phase - Stuck

Introduction

This analysis is to identify why people are stuck in the negative feelings?

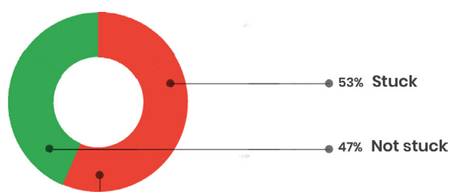
▸ **Fig.29 - Stuck phase**

Method

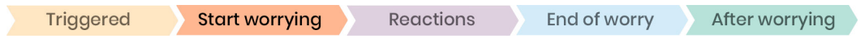
Quantitative analysis

How many people are stuck in the negative feelings?

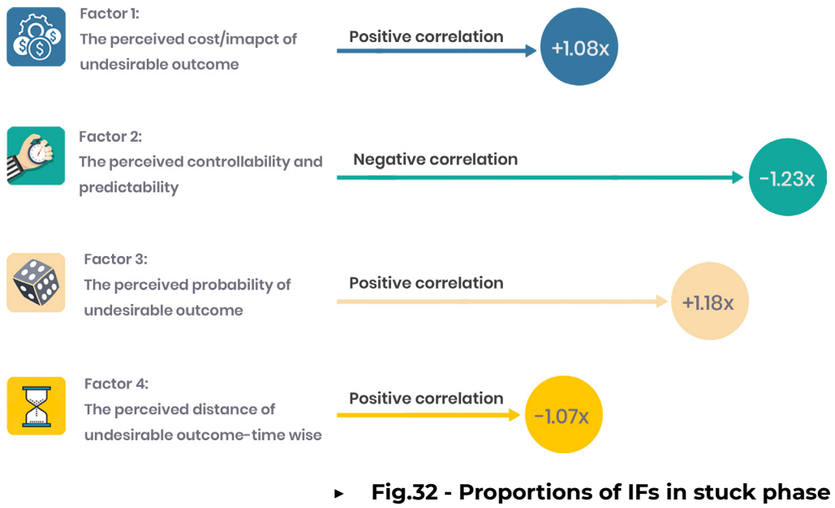
More than half of the worries made people stuck in negative feelings without moving to next step.



▸ **Fig.30 - Percentage of people who are stuck**



The proportions of the influencing factors



▸ **Fig.32 - Proportions of IFs in stuck phase**

Findings

If the user will be stuck in the negative feelings depend on all the 4 factors.

Full analysis see[Appendix -4]

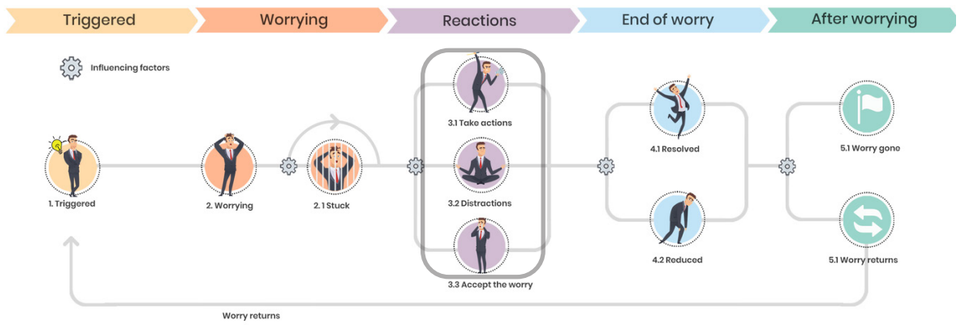
Insights

Factor 2: The perceived controllability and predictability has the most significant correlation with if people will be stuck. When they perceive low controllability and predictability on the matter, they are more likely to be stuck in negative feelings.

2.5.3 Reaction phase

Introduction

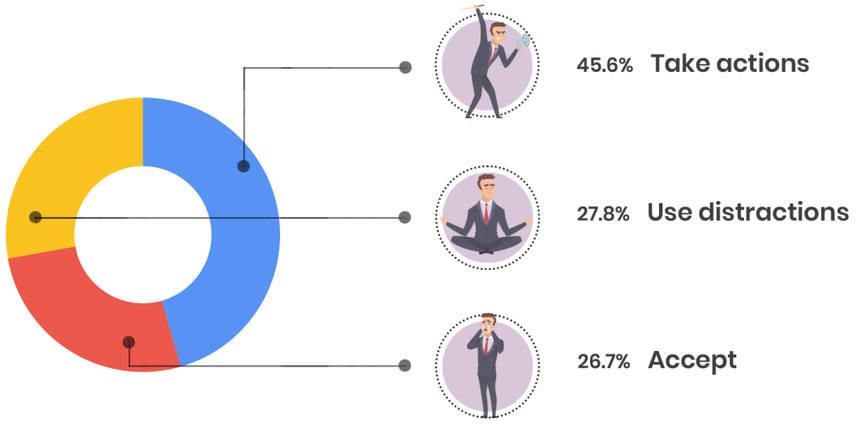
This analysis is to identify what influences people to take different reactions to deal with their worries ?



▸ **Fig.33 - The Reaction phase**

Method

Quantitative analysis



45.6% **Take actions**

People take diret actions to deal with the worry, try to solve the problem. For example if they are worried about deadline of the assignment, they will work on the assignment to solve the worry.

27.8% **Use distractions**

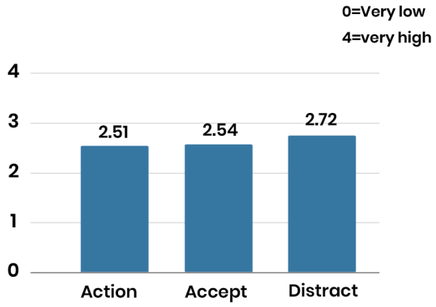
People try to distract themselves by listening to music, try to take a walk or talk to friends etc...

26.7% **Accept**

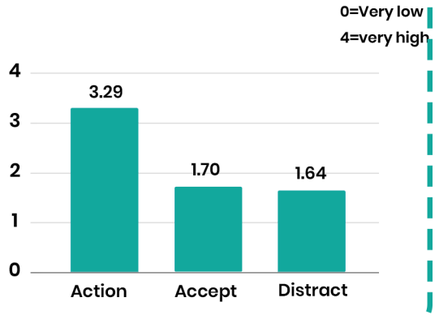
People accept the existance of the worry, and mostly it is because there's not much they can do in the situation or they do not know what they can do in the situation.

▸ **Fig.34 - Percentages of different reactions**

Factor 1:
The perceived cost/imapct of undesirable outcome



Factor 2:
The perceived controllability and predictability



Findings

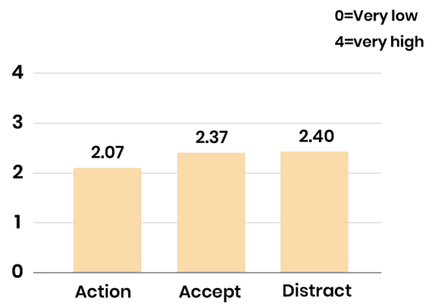
The tables above show how these factors influenced how people handle the worry. For factors 1, 3, and 4, the difference in these factors is not significant. However, when it comes to factor 2, the perceived controllability and predictability has a significant impact on how people handle the worry.

When the perceived controllability and predictability are high, individuals have higher chance to take actions to deal with the worry. When the perceived controllability and predictability is low, individuals have similar chances to either accept the worry or choose to distract themselves.

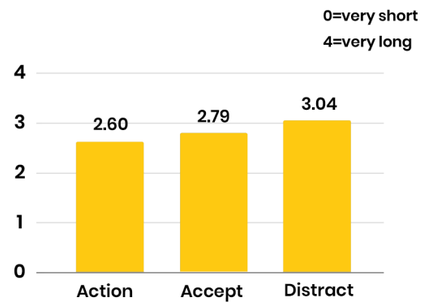
Triggered | Start worrying | Reactions | End of worry | After worrying

▸ **Fig.35- How IFs influence which reaction will people take**

Factor 3:
The perceived probability of undesirable outcome



Factor 4:
The perceived distance of undesirable outcome-time wise



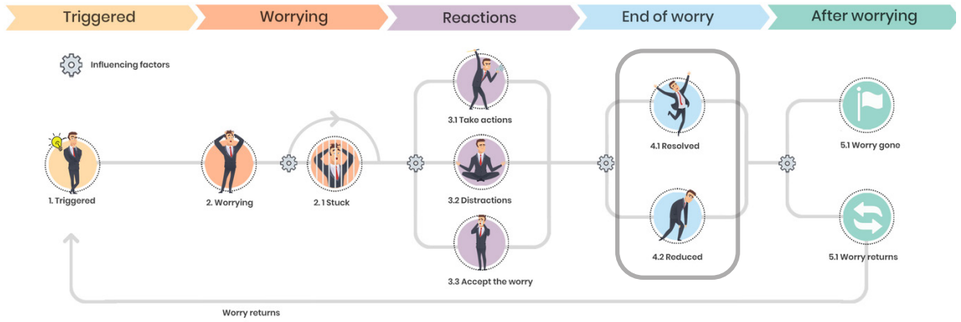
Insights

How people handle the worry is mostly depends on if they have enough controllability and predictability of the undesirable outcome. Individuals with low control of the worry and can not predict what is going to happen. They tend to accept the worry or distract themselves from worrying.

2.5.4 End of worry phase

Introduction

This analysis is to identify what influence if the reduction level of worry (resolved or reduced)



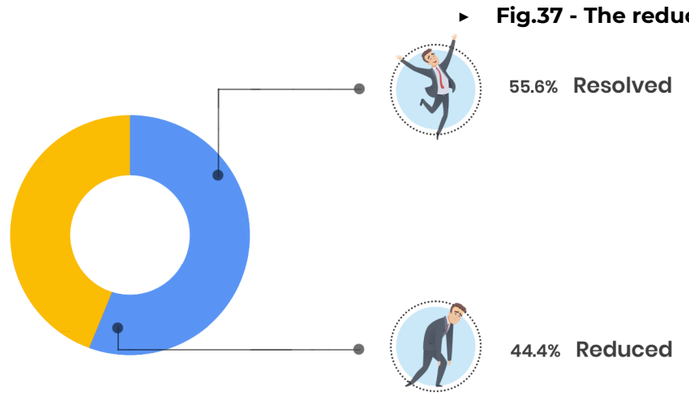
▸ **Fig.36 - End of worry phase**

Method

Quantitative analysis

How does the worry end?

▸ **Fig.37 - The reduction level**



55.6% **Resolved**

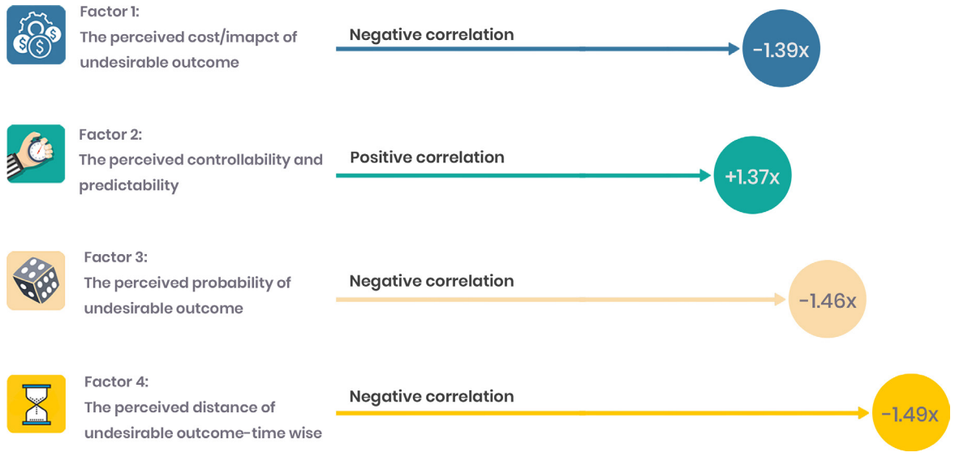
People perceived that they forget about the worry at the moment or perceived the worry ended at the moment.
Worry resolved does not mean the worry is solved fundamentally, it is more like they do not feel the worry influences them at the moment.

44.4% **Reduced**

The worry was perceived not ended, but reduced. In this case, they did not feel the worry influences them as much as when it started.

Triggered | Start worrying | Reactions | End of worry | After worrying

The proportions of the influencing factors



▸ **Fig.39 - Proportions of IFs in End of worry phase**

Findings

The degree of reduction of feeling worried depends on all the four factors. The reduction degree of feeling worried can be seen as a liner outcome. The worry ends means the highest degree of reduction. The degree of reduction of feeling worried is significantly positive correlated with factor 2, and is significantly negative correlated with factor 1, factor3, and factor 4. So there might be an opportunity to help end their worries with enhancing factor 2, and reduce the impact of factor 1, factor 3, and factor 4.

Full analysis see[Appendix-5]

Insights

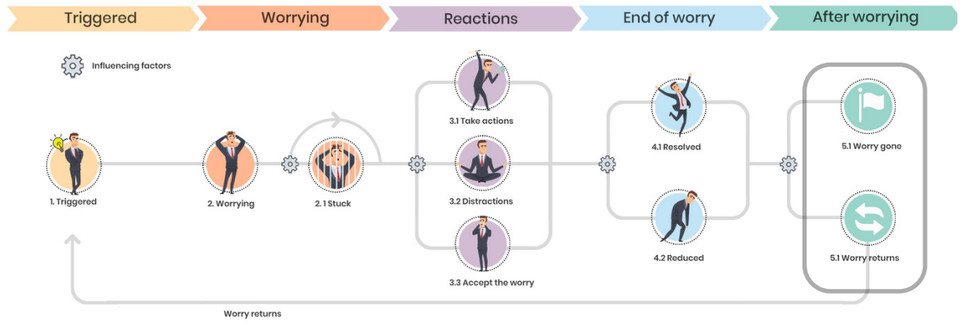
Factor 2 is the only factor that has a positive correlation with the reduction level of worry. The rest 3 factors have a negative correlation. However, factor 2 has the least influence on the reduction level of worry. In the reaction of the worry phase, factor 2 is the only factor that has a significant impact on how people handle the worry. Compare phase 3 reaction and phase 4 end of worry, it shows worrying is more like a burden mentally than something that needs to be solved in reality.

Factor 4 has the highest significant influence on the reduction level of worry. It complies with the first characteristic of worry: “the repetitive thoughts concern an uncertain future outcome”[Howard,2010]. The uncertainty of the undesirable outcome of worry is the critical element determining how much the concern is relieved.

2.5.5 After worrying

Introduction

This analysis is to identify why the worry will return?

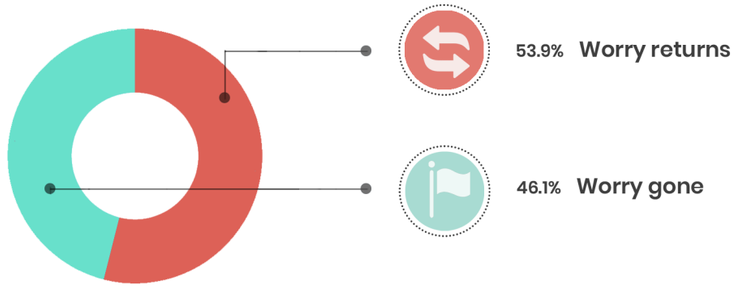


▸ **Fig.40 -After worry phase**

Method

Quantitative analysis

If the worry will return or gone?



▸ **Fig.41 - The percentage of different outcomes**

53.9% **Worry returns**

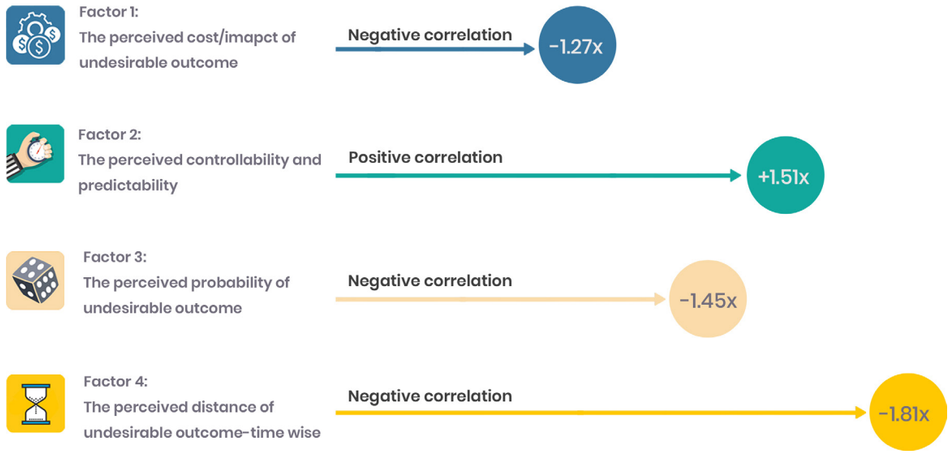
Sometime the worry will return no matter if the worry is reduced or resolved. Until the uncertainty of undesirable outcome vanishs (worry pass), the worry always has the possibility to come back if people is triggered.

46.1% **Worry gone**

Worry gone means that either people find the fundamentally solution to solve the problem, or the worry pass (short term worries).

Triggered | Start worrying | Reactions | End of worry | After worrying

The proportions of the influencing factors



▸ **Fig.43 - Proportions of IFs in after worrying phase**

Findings

If the worry will return or be gone depends on all the 4 factors. The return or be gone of the worry is significantly positively correlated with factor 2, and is significantly negative correlated with factor 1, factor 3, and factor 4. Similar to the insight of phase 3 reaction, there might be an opportunity to avoid worry return by enhancing factor 2, and reduce the impact of factor 1, factor 3, and factor 4.

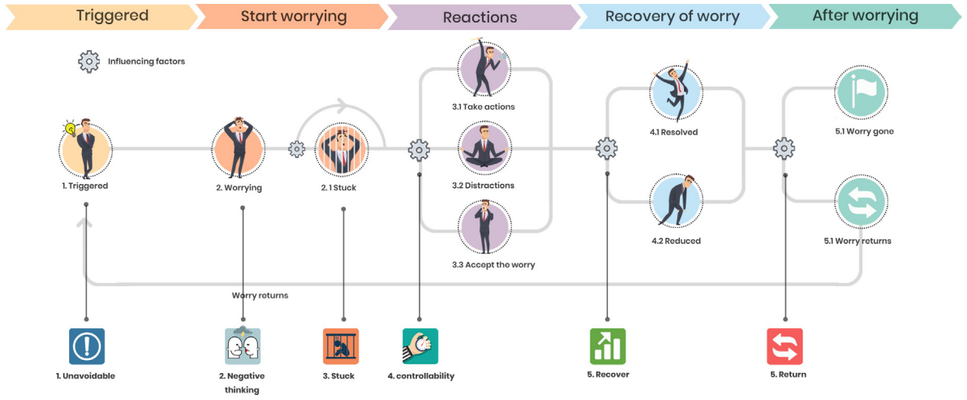
Full analysis see[Appendi-6]

Insights

Factor 4 still has the highest significant influence on if the worry will be gone or return. According to Howard, If one is certain that an undesirable future event will occur, one can anticipate it and grieve about it, but one cannot worry about it [Howard, 2010]. The uncertainty of undesirable outcome still exists until the worry is solved fundamentally, which means long-term worries have very high possibilities to return.

Factor 2 is the only factor which has a positive correlation with the return of worry, and the second most significant factor. If the uncertainty of the undesirable outcome is more controllable and predictable, the influence of the worry would be less and vanish after it is resolved.

2.6 Synthesize the research outcome



▸ **Fig.44 - Insights in the worry journey**

Insights

1. Unavoidable: Most of the triggers are not avoidable because these triggers are part of their daily lives like working stress, looking in the mirror etc..[Section 2.3.1]

2. Negative thinking: 44% of people feeling negative at severe level and panic level. Decrease their emotional strength and make them difficult to concentrate on what they are doing[Section 2.3.3] [Section2.5.1].

3: Stuck: Many people get stuck in negative feelings and can not stop thinking about their worries for a long time without moving to the next step because they perceive low controllability. They can not control things they say or do, hurting themselves and those around them[Section2.4.2][Section2.5.2].

4: Controllability: How people react to the worry depends on the perceived Controllability & predictability. When Controllability is low, people prefer not to take action to deal with worry[Section 2.5.3].

5: Recover: The recover level depends on many factors; many worries is only reduced and not resolved. It keeps affects people's emotions and daily lives[Section2.5.4].

6: Return: More than half of the worries will return, repeating, because the undesirable outcome is far away time-wise, and can't be solved fundamentally until it arrives[Section2.5.5].

Opportunities

1. Although the triggers are not avoidable, many of them are predictable. if people can see them beforehand, they can plan for the coming worries and cope preemptively[Section2.3.1].

2. Relieve people's negative feelings at the start of worry, especially when they are influenced by the worry at severe & panic levels[Section2.5.1].

3: People stuck in negative feelings without moving to the reaction phase because the perceived controllability and predictability is low. I want to remind people that they are stuck and encourage people to get out of the negative feelings and start to react to the worry[Section2.5.2].

4: Perceived controllability depends more on the worry itself and can not be changed. I want to encourage people to take action when controllability is high. Apart from that, if controllability is low, I want to provide distractions for the users and comfort them[Section2.4.2] [Section2.5.3].

5: I want to motivate people to recover from the worry even the worry is not resolved. Reward people when they are making progress. To overcome the long term worries step by step[Section2.5.4].

6: When the same worry returns, I want them to know that they are suffering from the same thing, accept the uncertainty and bring their attention back to the present moment[Section2.5.5].

2.7 Design goal

Main design goal

To help people handle their worries better by
-Monitoring people's worry level
-Relieving people's negative feelings
-Reminding & Encouraging people to move on when they are stuck in the negative feelings
-Distracting people when they perceive low controllability on the worry.

Bonus goal

In addition, if it is possible & fits the design, things I also want to achieve are
-Predict the worry coming before hand and cope with the worries preemptively
-Reward people when they are taking actions to deal with the worry
-Recovering people's mental state at the end of worry
-Prevent the same worry repeating

Reason for Main goals

1-Distract: People's negative feelings are highly correlated to the perceived risk/ cost/impact of the undesirable outcome. Rather than depending on the worry itself, it depends more on the user himself. Therefore relieve negative feelings are more suitable for design to intervene.

2-Remind&Encouurag: If people is stuck in the negative feelings depends on the perceived controllability. Although, as the designer, I can not change the worry itself, what I can do is minimize the time people spent stuck in the negative feelings and help them move on.

3-Relieve: People suffer from negative feelings when they are worrying. It is essential to relieve negative feelings and improve their mental health.

4-Monitor: To use design to intervene in the process of worry, I must know if the user is worrying at the moment, or at least be able to make a reasonable assumption. Therefore monitoring is important to achieve all the goals mentioned above.

Reason for Bonus goals

1-Reward: Whether people will take reaction to deal with the worry depends on their perceived controllability on the worry. It depends more on the worry itself. Therefore the main direction is focused on distract people when controllability is low rather than encourage them to take action.

2-Prevent: Same reason can be applied to prevent the same worry repeating. Whether the worry will be gone or come back depends on the time distance of the undesirable outcome. It also depends on the type of worry.

3-Recover: The perceived controllability is still the most significant factor influencing if the worry can be solved at the end. It also depends on if the worry is solvable.

4:Predict: Triggers can be everything around the user. Therefore it is not possible to predict all the potential triggers. However, some of the triggers are always the same, like stress from working. Thus, rather than predict all the triggers, it might be more appliable to design for a scenario where the users are more liked to be triggered like their working environment.

▸ **Fig.45 - Man stuck in worry , The sun , https://www.thesun.co.uk/dear-deidre/9488310/want-to-leave-wife-for-other-woman/11 Jul 2019 ,**

Section 3 | **Competitive research**

This chapter includes

Currently, there is no design on the market which are specific for worries. However, some solutions are focusing on mental health & anxiety.

The most popular solutions are Mental health Apps & Therapeutic robots. I want to analyze the interactions they provide, how and why they work / they do not work combining with literature research. So I could see how the interaction should be and what needs to be avoided.

3.1 Mental health Apps

Introduction

Many applications on the market go towards helping people to manage their stress and anxiety. Some of them go towards assisting them in making meaningful changes like getting more sleep, working out, and decreasing time on screen. Some provide meditation guidance and therapy help.

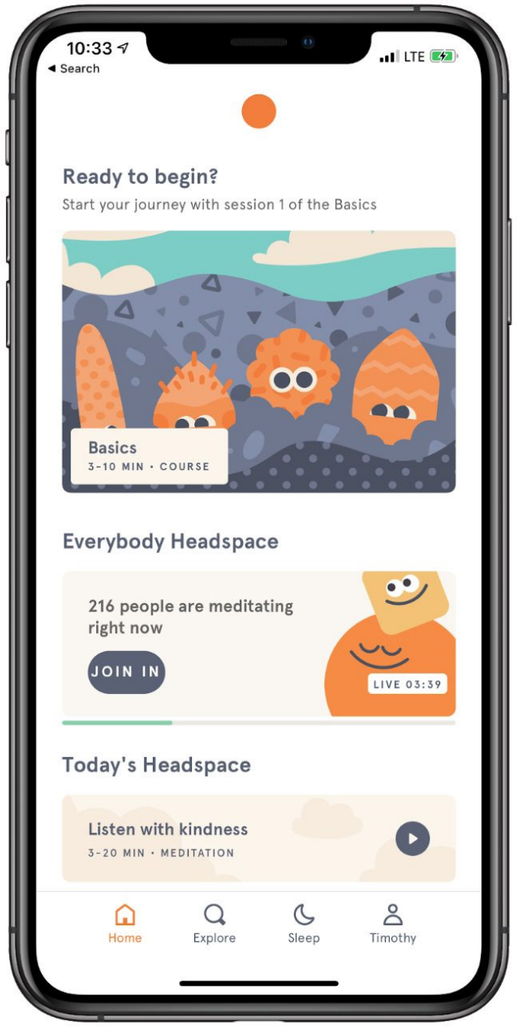
The mental health Apps I used to analyze are the top 10 most popular MH Apps 2019 in the market. Through the analysis, I would like to know how they can help the users, what interactions they provide, and the advantages and disadvantages of the interactions?

Method

-Fogg behaviour change model
-Hook behaviour change model

Overview of the outcomes

- 3.1,1: Directions of Apps
- 3.1.2: Pros of MH Apps
- 3.1.3: Disadvantages



- **Fig.46 - Headspace-Meditation App**

3.1.1 Directions of MH Apps

Meditation
Example Apps: Pacifica, Headspace

Meditation is a practice / process through skills like deep breathing, mindfulness , to help the user focus on the moment. The aim of meditation is "to train attention and awareness, and achieve a mentally clear and emotionally calm and stable state" [Roger, 2006].

Approach: Music and guiding video

Self Report thoughts, emotions & Reflection

Example Apps: Worry watch
According to Aubri [2018], the principle of this kind of App is "Track your mental state over time by asking you first to write down the cause of your stress, and later asks you to reflect on the worry. The app will generate charts and statistics to help you analyze your thought patterns."

Approach: Typing using smart phone

Therapy Apps

Example Apps: Talk space

This kind of App will match users with licensed therapists in their area almost instantly [Aubri,2018]. The user can start with a questionnaire, after that, the App will match you with a therapist and the user can select his treatment plan.

Approach: Chat with Licensed therapists

3.1.2 Pros of MH Apps

High receptiveness

According to Pew Research center, "as of June 2019, the share of people that own smartphones is 81%. Breaking this figure down further, 96% of adults ages 18-29, 92% of adults ages 30-49, 79% of adults ages 50-64, and 53% of adults 65-plus own a smartphone."

The most significant advantage of using MH Apps is that it has high receptiveness. People can just download the App from the App store and immediately start using it.

High accessibility

"Smartphones are not constrained by geography and are usually used privately by one individual. This means that smartphone apps can be extremely flexible and attractive to users, empowered by the confidentiality of their engagement" [Wilson,2014][David,2016,P2].

Price

Many mental health apps in the market are free. Some of them require subscription, but still they are cheaper than therapy.

3.1.1 Disadvantages of MH Apps

Hook model

▸ **Fig.47 - Hook model, Hari, 30 Dec 2018**

Hook-Model
It is said by Eyal [2014] that half of the things people do during the day are done without conscious thought. The reason for people to do these things are out of habit. So why not use the practice of habit design to design better products that are sticky? He introduced a model to promote habits that he calls “a hook.”[Eyal,2014][Anders, 2019]
The hook model describes how product or service can change user's behaviour through forming the habit. I will elaborate on this model in the following analyses.

1-External trigger, leads to disengagement with the App

Mental health Apps are using push notifications to prompt users throughout their day to engage in the interventions. External triggers like push notifications can help people to start using the app. However, too many push notification will make the user feel annoyed and interrupted, which will lead to disengagement of using the App. [Niranjan,2018].

Compared to external triggers of engagement, internal triggers are more suitable for forming long term habits like dealing with worries. Although external triggers are still a good start for the user to initiate the interaction [Eyal, 2014].

Apart from that, According to Michael[2020] and Lupton [2013],"People have varied attitudes towards the use of apps and wearables. Many people reject self-monitoring, finding it annoying, depressing, a burden, or prefer to forget they are having problems ".

2-Delayed feedback & Predictable reward, lead to less engagement

"Research explains how it is not so much obtaining the reward in itself that makes us do a behaviour, but rather the anticipation of a future reward." [Anders, 2019].
The reward user can get from the Mental Health Apps are improved mental health. However, improving mental health requires long term of intervention so the user cannot get instant feedback after using them. Delayed feedback decreases the motivation to continue using the Apps.

Apart from that, according to the research on mindfulness meditation Apps, it is found that it leads to increases in positive effects and decreases in depression, but had no effects for measures of negative affects, or satisfaction with life [n.d.2015].. Mental health Apps fails to provide variable reward for the users.

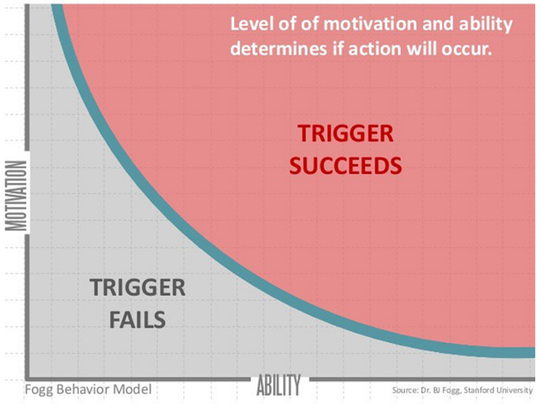
▸ **Fig.47 - Hook model, Hari, 30 Dec 2018**

3-Unnatural and overdue interactions

Based on Fogg behaviour-changing model, the user must have the ability to accomplish the behaviour and make behaviour changing. There are many factors that influence the ability to make the target behaviour. The interactions using Mental Health Apps need to based on the smartphone itself, such as self-report by typing, listening audio or video. instructions.

It is found by some studies that the average time people spent on their phones are over 4 hours per day. There are many negative effects of spending time on the phone. The most obvious negative impact is it will waste a lot of time. Apart from that, using smartphone also influence social interaction in real-life. It will also affect the chemistry in the brain, making people have symptoms like anxiety, stress. [Corey, 2018].

Interactions based on the phone may have problems with attention[David, 2016], and decrease the ability to relax from the worry. Time spent on the smartphone decreases the opportunities for interventions such as mindfulness[David,2016]]. Apart from that, the smartphone might have problems such as low-battery and leads to lower ability. Moreover, many apps provide guided meditation but do not guide users toward meditation when anxious. Apps can not monitor people's mental state and offer help when needed.



▸ **Fig.48 - Fogg model , Anka, 16 Aug 2018,**

3.2 Therapeutic robot

Introduction

There are many therapeutic robots on the market, focusing on the mental health field. Most of them are mimicking the animal's behaviour and appearance to help the user. In this section, I will use Paro as an example, which is the most popular therapeutic robot on the market.

PARO is a therapeutic robot baby harp seal, "PARO has five kinds of sensors: tactile, light, audition, temperature, and posture sensors, with which it can perceive people and its environment" [Parobots,2020].

It is reported that, Paro can recognize if he is being held by other people, recognize the direction of voice and words like its name. It can also praise with the aurdio sensor. [Parobots,2020].

Method

-Fogg behaviour change model
-Hook behaviour change model

Overview of the outcomes

- 3.1.1: Advantages
- 3.1.2: Disadvantages

Aiming effect

The shape of a baby harp seal makes Paro look adorable. By using animal therapy, it aims to help people to relieve their stress and provide companionship.

- **Fig.49 - Paro robot, xobotzorg, 14 Apri 2016,https://www.robotzorg.nl/product/paro-snoezelrobot-voor-demente-bejaarden/**

Interaction with sound

Respond with baby seal voice

Interaction with touch

Respond with behavior like moving legs and making sound

Provide companionship

Stimulate interactions

3.2.1 Advantages of Paro

Animal therapy

It is reported that "Robot pets may powerfully arouse a welcome nostalgia, prompting poignant recollections of valuable experiences with, say, animals in childhood or in adult life "[Simon, Waycott, 2013].

Animal therapy helps to relieve people's stress, provide companionship, and make people less lonely. It can also distract people's attention from pain. Paro is covered with soft fur material, which is very inviting and natural. It invites people to interact with it through its appearance[Parobots,2020].

Advantage of Non-living companions

Compare to real animals who are vulnerable and need to be looking after carefully. Companion robot relieves people from moral stress. For example, when a real pet dog is sick because the person did not provide good care, the person will regret it.

Novelty-Facilitate social interactions

It is reported that the best thing companion robots like Paro do is "to facilitate social interactions-For example, if middle school kids hear their grandmother has a new robot pet, they may ask Mom to take them to visit her in the nursing home"[Delia, 2019].

3.2.2 Disadvantages of Paro

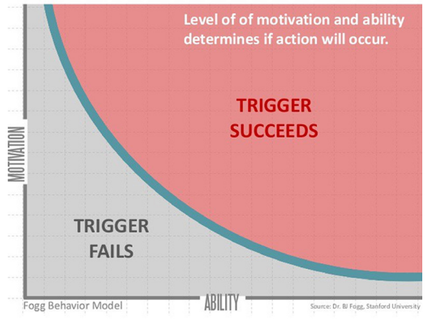
1-Fail of expectation set by their appearance and behaviours

Previous research has shown that users can experience a sense of failure when technology does not work as expected, or when the experience with the products are not as easy or pleasant as expected [Vines J, 2016] [Waycott J, 2011]. Such unanticipated negative factors of using new technologies could potentially be amplified when the technology in question is meant to create an emotional bond and provide companionship.

It is reported by Gail [2016] that "In comparison to the living animal, children viewed the robotic pet as a much more restricted interactive partner." The interaction with the companion robot is more like entertainment toy than create a relationship with it.

2-Lack of Trigger-When novelty wear off, leads to less social interactions

It is reported by Delia [2019] that the best thing companion robots like Paro do is to facilitate social interactions-For example, if 10 years old kids hear their grandmother has a companion robot like Paro, they will be interested and visit her grandmother. However, after a while, the novelty of playing with the companion robot will fade out. The interactions are simple and repetitive, and there will be less social interactions.



▸ **Fig.50 - Fogg model , Anka, 16 Aug 2018,**

3-Interactions are not ”Meaningful”

The intention of the therapeutic robot is to improve user’s mental health using animal therapy. There’s less reward user can get from interacting with companion robot compared to real companion animals, such as: Nourishing part from taking care of real animal, emotional respond of the interaction. The interaction provides more entertainment than therapeutic effect.

It is reported that, Interaction with robot pets, as opposed to companion animals, is just not ‘meaningful.’ Especially when the user expects that companion robot can work 100% like the real animals. User may only want to use it for entertainment rather than companionship. [Lazar,2016] [Simon,2018]

▸ **Fig.51 - Hook model, Hari, 30 Dec 2018**

4-Interactions lack of reciprocity in caring

According to Lazar [2016], "The functional support of robotic pets is appealing, but older adults value reciprocity inherent in caring for a pet and the relationship that it creates". It is said by one of the participants that the "need for maintenance" is the function he wants to have most.

People want to look after the companion robot as a way to build a mutual relationship with it.

3.3 Insights

Meaningful than entertainment

The therapeutic robot aims to provide animal therapy to provide companionship and improve user's mental health. However, the therapeutic robot in the market acts more like a toy than a therapeutic robot, providing more entertainment than therapeutic effect.

For my design, the interaction should be meaningful. It can entertain the user. However, the most crucial part is that the interaction is meaningful and helps people relieve their negative feelings.

Social autonomous

The mental health Apps provide meditation guidance but do not guide the users toward meditation when anxious. It is because the Apps can not monitor people's mental state and offer help when needed.

The interaction should be socially autonomous so that it can initiate interaction instead of waiting for the user to start the interaction.

Nature interactions

Interactions with the Apps are not natural because it requires the smartphone. Interactions with the phone decrease the opportunities for interventions such as mindfulness [David, 2016].

Nature interactions are essential to help the user who is worrying without causing any negative effects.

Inviting & Playful

When the novelty fade wears off, people are less interested in interacting with Paro.

Inviting plays a vital role in a long term behaviour change like stop worrying. It helps to keep the user engaging in using the product.

Playful is an approach to make the product inviting. It might help to relieve people's negative feelings as well.

Symbiotic

Example from Paro shows that mutual benefits with the product might help the user to keep motivated in using the product.

3.4 Interaction vision

Interaction vision

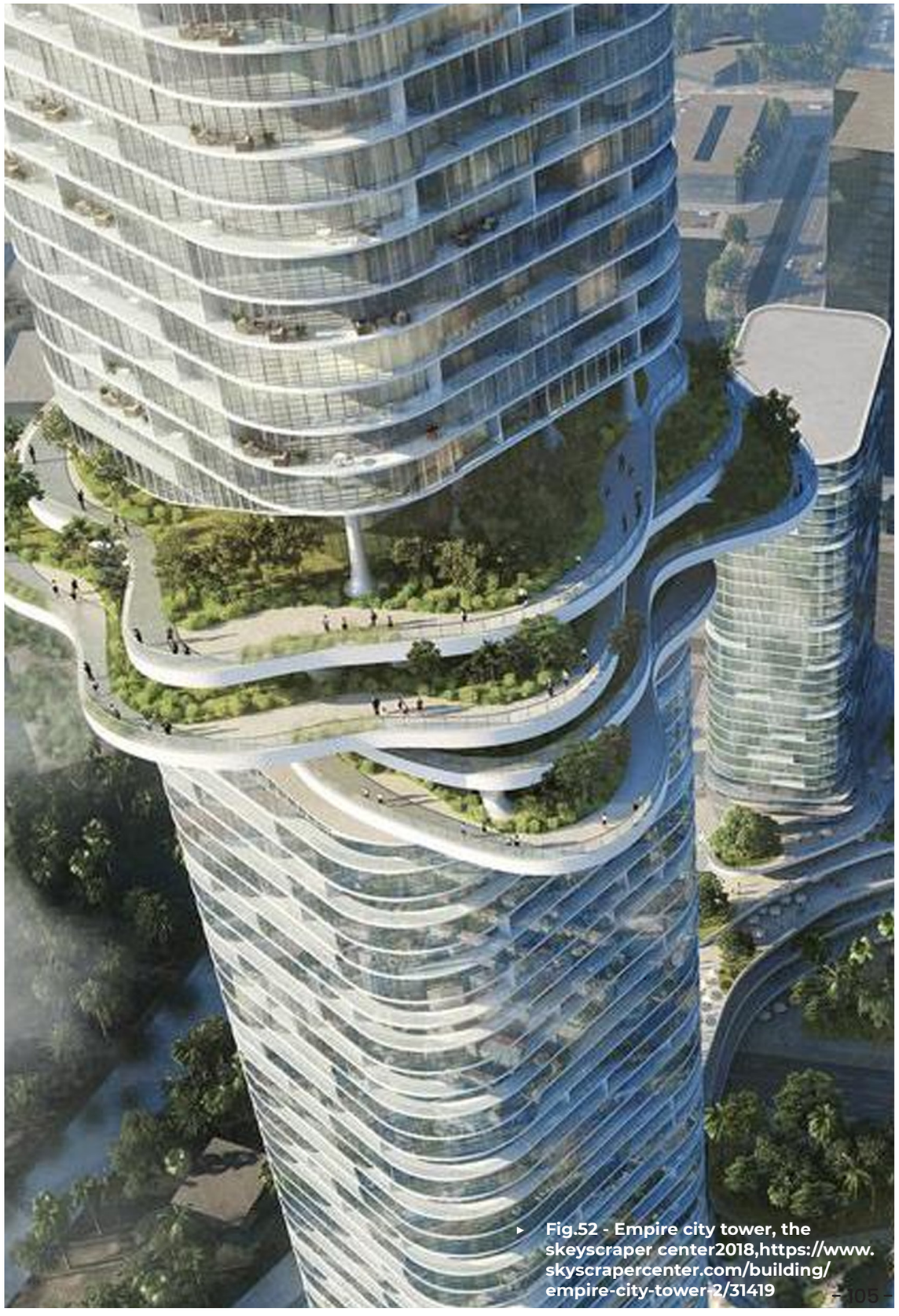
I want to create a **symbiotic** relationship between the intelligent product and the user, which should be approached by the **embodied** interactions between the product and the user. The intelligent product should be **inviting** and **playful.** The embodied interactions should be **social-autonomous**, **subtle**, and **natural**, giving **adaptive**, **meaningful**, and **unpredictable** feedbacks.

Main vision

1: Inviting:
Promoting the engagement of using the product.
2: Subtle &. Nature:
Do not draw a lot of attention, unless something is serious and action is required
3: Social autonomous:
Be able to initiate actions insofar
4: Meaningful:
Be able to help people rather than pure entertainment

Bonus vision

5: Symbiotic:
Build a reciprocity relationship between the user and the object instead of one-way interaction.
6: Playful:
Increase the engagement of using the product
7: Adaptive:
Act in response to their physical and social environment



▸ **Fig.52 - Empire city tower, the skeyscraper center2018,https://www.skyscrapercenter.com/building/empire-city-tower-2/31419**

Section 4 | **Ideation**

This chapter includes

In this section, I started to connect the research outcomes (Design goal & Interaction vision) to the ideas.

There was 2 ideation session; the first one is to explore how to relieve people's negative feelings. After that, the prototype test helps to find out what is missing in the ideas, and I decided to do a second ideation, to brainstorm how to detect worries and how to make the interaction intuitive so that people can connect the interventions to their worry feelings.

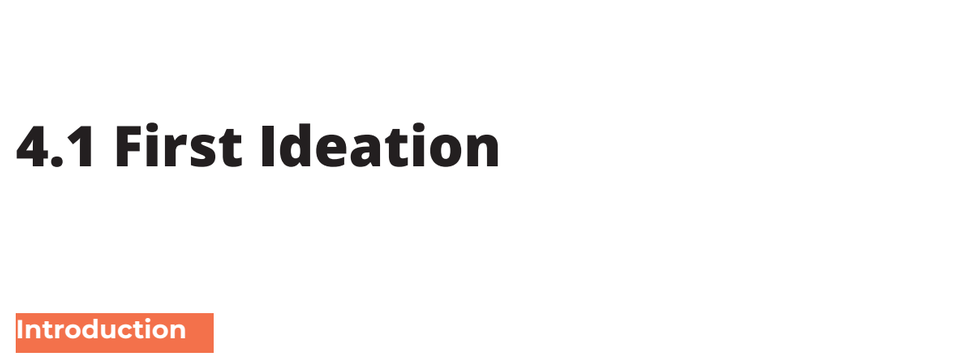
4.1 First Ideation

Introduction

After analyzing the culture probe outcomes and research on the current solutions on the market, I decided to generate ideas that suit the design goal and interaction vision. The first ideation aims to explore how to help people relieve their worries and possible interactions/ solutions.

Overview of the process

- 4.1,1: Brainstorm session with peers
- 4.1.2: Brainstorm 100 possible ideas



- **Fig.53 - Sketch of some ideas**

4.1.1 Brainstorm session

Introduction

I did a brainstorming session with peer IO students (4 people, including me), to explore what are the possible solutions to help people to relieve their worries.

Process

The brainstorm session is organized based on the design goals.

The brainstorm questions are:

Main goals:

1 : How to monitor peoples' worry levels?
2: How to encourage people when they are stuck in negative feelings?
3: How to distract people when they perceive low controllability?

Sub goals:

4: How to motivate people to take action?
5: How to help people recover their mental state?
6: How to predict the worry coming?

Outcomes

I.How to monitor people's worry levels?

1.Facial emotion recognition
Machine learning-based approach for facial emotion, which already achieved over 99 percent of accuracy [Lee, 2019] [N.d,2019]
2.Emotion detection
Use facial skin temperature and heart rate variability(No touching). [Kahil,2018]
3: Speech emotion recognition
4.Self-report

2.How to encourage people when they are stuck in the negative feelings?

1.External stimulus
Chatting with peers. peer support ,Support from literature, music, etc.,Mutual help group, Punishment (Negative feedbacks), Find sth, sb that can empower you, Machine learning?, Catch people's attention

2.Internal stimulus
Self reflect on how badly the worry influence people, Self reflect on why do people not react to the worry feelings and do nothing, Positive Imagination, Digest the mood

Outcomes

3.How to distract people when they perceive low controllability?

-Break the worry cycle -get-ups. get moving-meditate-yoga, deep breathing -muscle relaxation -writing and journaling -Cuddle with pets -TV-Games -cleaning- Map - create a safe space Create a worry period

4.Sub-goal: How to motivate people to take action?

Distinguish between solvable and unsolvable worries,

Solvable

- Motivate to take actions -Set goals, provide instant feedback on the progress (0% - 100%) -Virtual reward or physical reward

5. How to help people recover their mental state?

-It shows them that they are making progress (0% -100%) in handling their worries and mental health.
-Focus on what they are doing right in front of them
-Relieve their negative feelings by pouring out how they feel (Create a tree hole)
-Rewards

6.Sub-goal: How to predict the worry coming?

- Record each worry, find patterns. Gps, time, worry level, results
-Create a worry period by choosing a set time and place to worry. Try to worry about everything possible before they happen, and the rest of the day is worry-free.

4.1.2 Brainstorm 100 ideas

Introduction

In this step, I tried to brainstorm as many ideas as possible so that I could develop creative and novel ideas.

There were about 100 ideas generated at the end of this brainstorming.

▸ **Fig.54 - Producing 100 ideas**

4.2 Ideas & Prototype test

Introduction

After brainstorming, I choose 4 of the ideas out of the 100ideas and make low-fi prototypes of them.
The test was completed with 4 people. After the test, they evaluated the ideas with the evaluation form

Overview of the outcomes

4.2.1 Ideas & Set up

Idea 1

Interaction: Smart ball invites the user to play and go outside

Description: The idea is to distract people by hitting them. The smartball will hit the user when the user is worrying or move around the user, and then through interactions such as jumping, moving, vibrations and the emotions on its face to invite people to go out and play with it.

- **Fig.55 - Ball robot idea**

Set up

Prototype:

The prototype is made of football, and use simple drawing as the interface.

Process:

1: The ball detects that the participant is worrying and move around participants' legs to draw his attention, with an interface showing a sad face, then telling the participant to play with it.

2.If the participant interacts with the ball through kicking, and it will always go back to the participant.

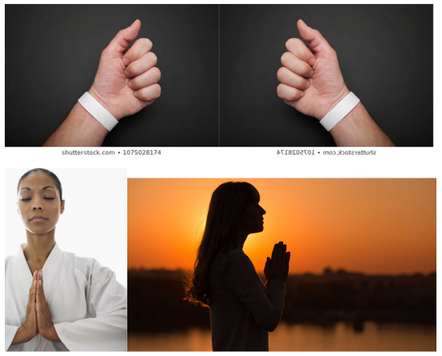
3. The negative feeling is relieved, and the ball shows a happy face and tells the user" good job".

- **Fig.56 - Ball robot prototype & test**

Idea 2

Interaction: Close user's hand and help them to do meditation.

Description: In the fast paced world, many people are worrying because their want to keep up with the pace in their busy day. The idea is to slow people down when they are stuck in negative feelings. There are two wristbands, one on the right hand and one on the left. When the bands detect that people is worrying, they start to vibrate and try to stop people from their things. The user need to close their hands and put their hands together to stop the vibration until the person is relieved from being stuck in the negative feelings. Meanwhile, the bands may possibly provide meditation indications with led lights or something. With their hands stuck, they can reflect on themselves and things they are worried about.



▸ **Fig.57 - wristband idea**

Set up

Prototype:
The prototype is wristband with fishing line attached.

Process:
There are simple icons on the wristband, such as the heart rate icon and arrow icon.

1. It will show the heart rate icon and vibrate at the start.

2. After a while, it will guide the user the close their hands with the arrow icon and the fishing line.

3. The wristband will release the hands after the negative feeling is relieved.

4. The heart icon disappears.

▸ **Fig.58 - wristband idea prototype & test**

Idea 3

Interaction: Catch people's attention and breathe with the plant.

Description: Many people take care of their plants every day, making sure there's enough sunlight, water, and temperature. Plants may be an excellent way to draw people's attention. Peers designers also like the virtual plant idea when I show it to them. They say if the plant is withered or dying, they want to do something to help it. I want to use the plant to symbolize how worry is influencing people and how people are making progress in dealing with worries.

▸ **Fig.59 - Virtual plant idea**

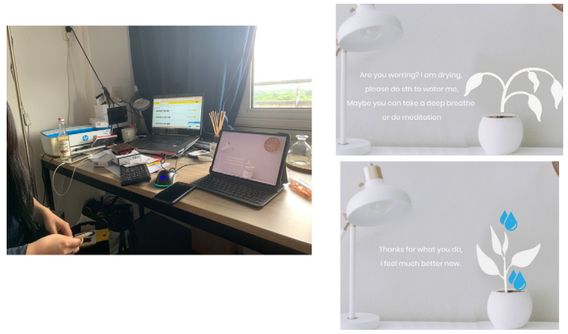
Set up

Prototype:
The prototype is shown with the iPad on the table.

Process:
1. It shows information that it is drying and asking people for help (deep breath, meditation, etc..).

2. If the participant reacts, there will be water drops on the flower.

3. The flower is water and growing well. It provides the user with a virtual reward(fruit).

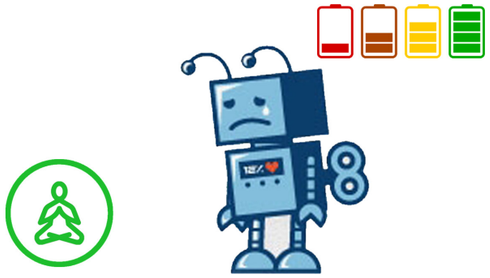


▸ **Fig.60 - Virtual plant idea prototype & test**

Idea 4

Interaction: Distract people by asking for help from them.

Description: The character of the robot is that he is always worrying about his life (battery level). Sometimes he could be very excited, and sometimes he can be very depressed. The user can help him with feeding him the energy coins. The energy can be gain from the user doing exercises, meditation, etc... When he detected that the user is worrying as well, he will be more depressed and ask for help from the user.



▸ **Fig.61 - Sad robot asking for attention**

Set up

Prototype:
The prototype used a piggy bank with a coin box.

Set up:
1: The coin box detects that the participant is worrying and move to the participant with a sad face, then saying," Please feed me an energy coin from the coin box".

2. The coin box will tell the participant to do meditation and then give him an energy coin.

3. The participant feeds the energy coin to the robot, and the robot shows a happy face.

▸ **Fig.62 - Sad robot prototype & test**

4.2.2 Evaluation

Evaluation form

Some criteria were defined to evaluate the 4 different ideas based on the design goals and interaction vision. The participants are asked to fill in the form after the test and elaborate on their choices.

1. What do you think the product is trying to do?

2. This product is supposed to xxxx, Pls rate your experience with this product, while rating, can you explain why you rate each category like this?

It's not clear at all	1	2	3	4	5	It's very clear
It can not relieve my negative feelings	1	2	3	4	5	It relieve my negative feelings 100%
I hate this product	1	2	3	4	5	I love this product

3. Can you please rate how you experienced the interactions with the product? When rating, can you explain why you rate each category like this?

Repulsive	1	2	3	4	5	Inviting
Forced	1	2	3	4	5	Subtle & Natural
Un-aotonomous	1	2	3	4	5	Aotonomous
Meaningless	1	2	3	4	5	Meaningful
Uncooperative	1	2	3	4	5	Symbiotic
Dull	1	2	3	4	5	Playful
Inflexible	1	2	3	4	5	Adaptive
Repeating	1	2	3	4	5	Unpredictable

4. Anymore comments?

▸ **Fig.63 - Evaluation form**

Idea 1 Evaluation result

The smart ball idea has the second-highest score.

When the ball asks the participants to play with it, P2, P3, and P4 are very interested and decided to play with the ball. They kicked the ball and wanted to play with it. It is said by P2 that "Although the prototype is quite rough, i can imagine that it is adorable, so I want to play with it, and the interaction of kicking is very natural." So it can be seen that the inviting score is quite high, as well as subtle and playful.

However, P1 shows less interest in this idea. She said that when she is worrying of something, she would not have the interest to play with the ball. When she kicked the ball away, and the ball came back to her, she did not want to play with the ball and just kicked it away again. She said," I don't like sports or going outside, I might play with it indoor but not outdoor. And it could be annoying if the ball continues to come back to me again and again." Also, in the discussion session, some participants said that the ball could have more interactions than kicking. Other possible communications like petting or holding could also be nice.

To conclude, idea 1 is clear for the participants and relieve their negative feelings to some extent. It is very inviting, nature, and playful. However, the interactions need to be carefully designed to not cause any negative feelings like annoyed.

▸ **Fig.64 - Ball robot idea**

	p1	p2	p3	p4		average
Clear through interaction?	3	4	4	5		4
Does it relieve your nagative feeling	2	4	4	4		3.5
Do you like this product	2	4	4	4		3.5
inviting	4	4	4	4		4
Subtle & Nature	4	4	5	5		4.5
Autonomous	4	4	3	4		3.75
Meaningful	2	2	4	4		3
Symbiotic	2	3	3	4		3
Playful	4	5	5	4		4.5
Adaptive	3	3	3	3		3
Unpredictable	2	3	4	3		3

▸ **Fig.65 - Evaluation result for Idea 1**

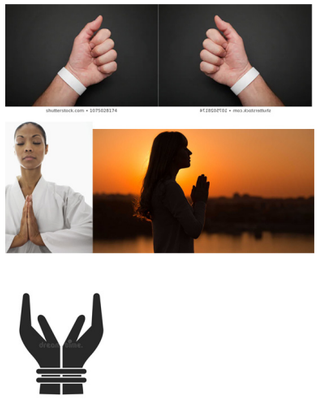
Idea 2 Evaluation result

Idea 2, the wristband has the lowest score.

It is said that “the praying gesture worked. However, I feel like I am wearing handcuffs.” Therefore the subtle and nature score is quite low. They feel they are more forced to make the gesture. The interaction is very clear for P3 and P4. However, P1 and P2 can not relate the praying gesture to their mental state even with the heart rate icon.

The inviting score is quite high because they think that the arrow icon is very clear. However, they still feel that it would be silly to wear two wristbands on both hands. But if the wristbands are very beautiful and modern, they might consider using them.

To conclude, the interaction of making people close their hands might work. However, it might cause negative feelings that they are forced to do so. Apart from that, some people can not relate this gesture to meditation or mindfulness. It might be because of their background difference or cultural differences.



▸ **Fig.66 - wristband idea**

	p1	p2	p3	p4		average
Clear through interaction?	2	3	5	4		3.5
Does it relieve your nagative feeling	3	2	3	3		2.75
Do you like this product	3	2	3	3		2.75
inviting	4	4	4	2		3.5
Subtle & Nature	1	2	4	3		2.5
Autonomous	4	2	2	3		2.75
Meaningful	2	2	3	3		2.5
Symbiotic	2	1	2	2		1.75
Playful	2	2	2	3		2.25
Adaptive	3	2	3	2		2.5
Unpredictable	1	2	1	1		1.25

▸ **Fig.67 - Evaluation result for Idea 2**

Idea 3 Evaluation result

Idea 3, the virtual plant has the highest score.

The intention of this idea is most clear because there is also text in the projection light. And this idea relieves the negative feelings most significantly.

In terms of subtle & Nature, according to P1, she was annoyed by the smart ball robot idea because she did not want disturbance when she is worrying, and she thinks the interaction with plant ideas is the most subtle.

And they like the idea of a virtual fruit reward idea. They think that if they can compare the reward (number of fruit) with others, they will have more motivation to do so. And they feel that it would be nice to have another state of the plant rather than drying, maybe having weeds around, etc..

To conclude, the interaction with this idea fits the interaction most. However, there are still things that need to be improved further.

▸ **Fig.68 - Virtual plant idea**

	p1	p2	p3	p4		average
Clear through interaction?	5	4	5	5		4.75
Does it relieve your nagative feeling	4	3	4	4		3.75
Do you like this product	5	4	4	4		4.25
inviting	5	5	3	4		4.25
Subtle & Nature	5	4	3	4		4
Autonomous	5	4	5	4		4.5
Meaningful	5	4	4	4		4.25
Symbiotic	5	4	4	4		4.25
Playful	5	2	5	3		3.75
Adaptive	4	3	2	3		3
Unpredictable	4	2	2	4		3

▸ **Fig.69 - Evaluation result for Idea 3**

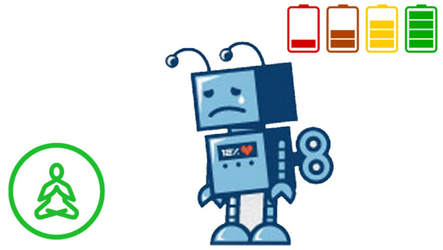
Idea 4 Evaluation result

Idea 4, the sad robot idea has the medium score overall.

According to the participants, the interaction with this idea is very similar to the light plant idea. But this idea has a lower score than the light plant idea. The first reason may be the prototype is too rough and did not provide enough instruction. That's why the inviting score is lower. The energy coin is also not very clear for them about how it works. There are too many steps to help the sad robot.

To conclude, this interaction with this idea need to be adjusted to be more clear and straightforward.

Idea 4 -Sad robot that need you to feed him



▸ **Fig.70 - Ball robot idea**

	p1	p2	p3	p4		average
Clear through interaction?	4	4	2	3		3.25
Does it relieve your nagative feeling	3	2	4	2		2.75
Do you like this product	4	2	3	3		3
inviting	4	3	5	3		3.75
Subtle & Nature	4	5	4	3		4
Autonomous	3	2	5	3		3.25
Meaningful	4	3	3	4		3.5
Symbiotic	4	3	5	3		3.75
Playful	4	2	3	2		2.75
Adaptive	3	3	2	2		2.5
Unpredictable	3	3	2	3		2.75

▸ **Fig.71 - Evaluation result for Idea 4**

4.2.3 Insights

Conclusion

For the main interaction vision, the interaction should be inviting, subtle& nature, autonomous and meaningful.
Therefore idea 1 the smart ball and idea 3 virtual plant work best. And these two are also the most favourite ideas.

Idea 3- the virtual plant has the highest score, the second highest idea is idea 1 the ball.
It also shows in the ranking that idea 3- virtual plant and idea 1-the ball are the most liked ideas.

Idea 1 -Smart ball Invits him to paly and go outside

Idea 2 -Wristband to help people slow down

Idea 3 -Virtual light plant

Idea 4 -Sad robot that need you to feed him

Insights

1- The interaction should be appropriate & subtle

Three participants chose to respond to the ball and wanted to play with it. However, l participant said that " the ball will make me annoyed if it keeps coming to me again and again "She kicked the ball away. Therefore the interaction needs to be appropriate not to cause any negative feelings when interacting with it.

2- The interaction should not be forced

For idea 2, the wristbands attract each other and try to make people close their hand and do meditation. This idea has the lowest subtle &. Natural score. It made the participants feel forced and do not want to use it.

3- The interaction should be intuitive

For idea 2, one participant can not relate the posture-closing hand to their worry feelings. She didn't know what the wristbands were trying to do. Therefore the interaction needs to be intuitive and make sure the user can relate the interventions to their worries.

4- The interaction should simple

For idea 4 the sad robot idea, the principle of it is the same as idea 3 -the light plant idea. However, it has a much lower score compare to idea 3. From the interview, it is said that the interaction with the robot is too complex and not easy to understand. For the virtual plant idea, communication is very simple and clear.

▸ **Fig.72- Evaluation results for all ideas**

4.3 Second ideation

Introduction

From the test results, it can be seen that there's a lack of clarity for some ideas. The participants are hard to relate the interventions to their worry feeling. Therefore I did second ideation to solve this.

The second ideation is focused on how to detect people's worries and how to connect people's worries to the product.

Overview of the second ideation

The second brainstorming consists of two parts.
1: How to detect worries
2: How to make people be able to connect the product to their negative feelings

- 4.3,1 : Detect worry
- 4.3.2: Connect worry

4.3.1 Detect worry

How to detect worries

1: Use a camera & Facial emotion recognition technique

"There are 7 basic emotional expressions: anger, sadness, happiness, fear, surprise, disgust and neutral " [Smith,2018].

Research shows that people who are worrying / anxiety are recognized fear faces significantly[Paola,2004].

Worry is very similar to fear. Worrying is caused by the perceived risk of an uncertain undesirable outcome. Therefore fear can be used as a sign of worry.

2: Emotion detection using wearable

Using facial skin temperature and heart rate variability (no touching) [Kahil,2018].

Wearable such as olive use the same technology to manage stress.

- **Fig.73 - Olive stress management wristband, Urban, 3 Dec 2014,https://urbanwearables.technology/olive-bracelet-stress-management/**

3: Sentiment analysis/ audio analysis

Extract their worries from their talks or their chat with others, then use it to determine the interactions.

The working principle of sentiment analysis is very similar to using facial emotion recognition techniques. Using fear as a signal can be applied in sentiment analysis as well.

- **Fig.74 - Vokaturi, emotion recognition by speech, 28 Apr 2020, https://vokaturi.com/**

4.3.2 Connect worry

How to connect the interaction to worry?

40 ideas were generated, and 2 of them were selected to be further developed.

Idea Goosebump / Piloerection

People often say they feel their “hair standing on end” when they are frightened. When people are cold or experiencing stressful situations (fear, stress), goosebump might appear. It was intended to make humans look larger to scare off predators. Goose bump/ piloerection occurs in many animals when they are threatened.

Worrying is because of the person is threatened by an undesirable outcome. So the idea is to use goosebump (hair stand up) as a metaphor. The hair/surface of the product will stand up or become rigid to show that people are worrying and get people’s attention to pet the hair and make it smooth. The negative emotions can be reduced through the repetitive motions like patting the hair. It works as a way of distraction.

Patting the stand up fur can be applied to the wristband. For example, the wristband's surface will become rough and make people feel uncomfortable, inviting people to pat on it and make it smooth. During the patting, it distracts people from what they are worried about[Fig76].

The same principle can be applied to the ball robot. The "hair" on the ball will stand up to indicate that the user is worrying and invite the user to pat it [Fig76].

▸ **Fig.75 - Goosebump**

▸ **Fig.76 - Goosebump ideas**

Pulse stone

The idea is to a stone shape product that mimics the user’s mental state. The product vibrates strength is related to the user’s heart rate.

When the user is worrying, their heart rate is high, and the stone starts to vibrate intense and shining red.

The user needs to hold it and feel their heartbeat.As the user breathes and relax, the pulse start to clam and giving subtle light.

▸ **Fig.77 - Holding stone shape hand warmer,xiaomi,04 Dec 2017,https://designwanted.com/design/cieplik-hand-warmer/**

4.4 Summary

In the first ideation phase, I did a brainstorming session with peers and individual brainstorming session. The outcomes from the first ideation phase are 4 ideas to catch people's attention and relieve people's negative feelings.

After that, a prototype test was set up with 4 participants. The test was to see if the interactions work to relieve people's worry and if the ideas fit the design goal and interaction vision. From the test results, it is found that, 1: The initiate of the interaction need to be realizable (detect worry and initiate interaction). 2: The interaction needs to be intuitively related to worry.

So in the second ideation phase, I tried to solve the problems mentioned above and brainstormed about how to detect people's worries, and how to make the interaction intuitive so that the user is able to connect the interaction to the worry. I selected 2 ideas from the brainstorming to be further developed.

After the second brainstorming, I decided to move to the conceptualization phase and create concepts using ideas from the first brainstorming and second brainstorming.

Section 5 | **Conceptualization**

This chapter includes

In this section, I created three concepts based on the outcomes from the ideation phase and evaluated the idea to choose the final concept.

After that, I prototyped a functional model and test it with the participants to see if the design fits the design goal and interaction vision. There were 2 test sessions, following 2 iterations of the design.

5.1 Concepts

Introduction

After ideation phase, 3 concepts were created. The concepts focused on how to detect people are worrying, how to catch people's attention and how to interact with people to help them relieve their negative feelings.

Overview

- 5.1.1 : Concept - 1 Ball robot
- 5.1.2 : Concept - 2 Goosebump band
- 5.1.3 : Concept - 3 Ripple stone

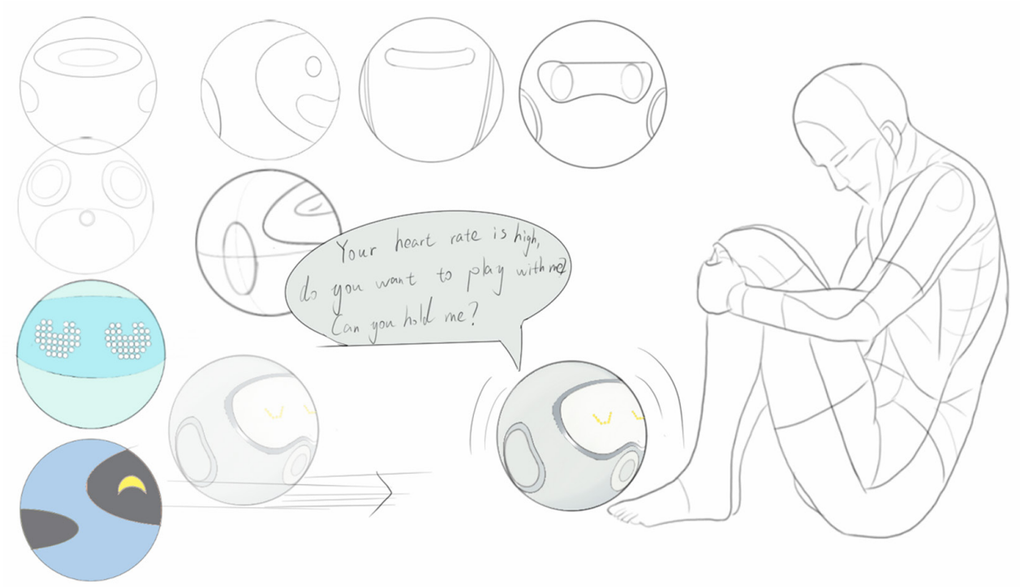
5.1.1 Concept - 1 Ball robot

Introduction

The first idea is a companion ball robot. Combining the ideas of ball robot and pulse stone. It aims to detect people's emotions with speech emotion recognition. When the user is worrying, it will come to the user and catch the user's attention. It will interact with the user through patting or kicking, inviting the user to go outside to play with it. It also comes with a supporting accessory - a smart pad, which mimic the user's mental state through heart rate data. The user can hold the pad and deep breathe with the led guidance to calm down.

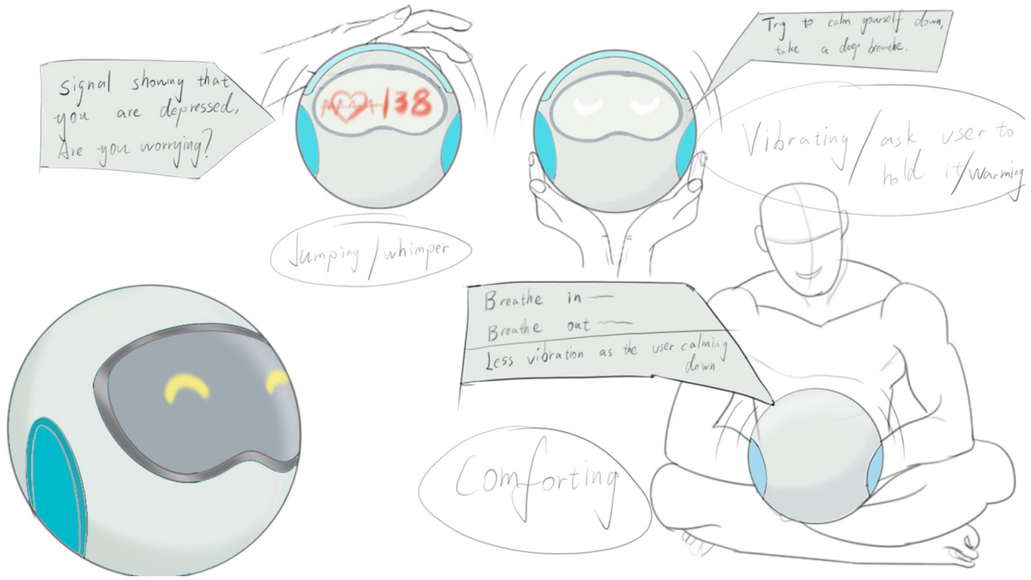
Step 1

The ball comes to the user when it detects the user is worrying/anxious.



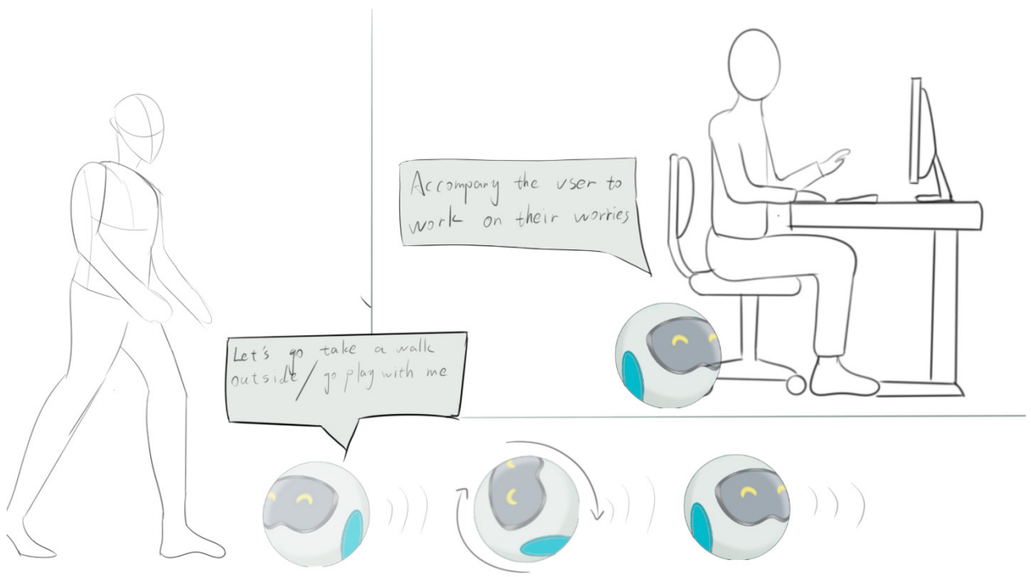
Step 2

The ball invites the user to play with it and interact with the user.



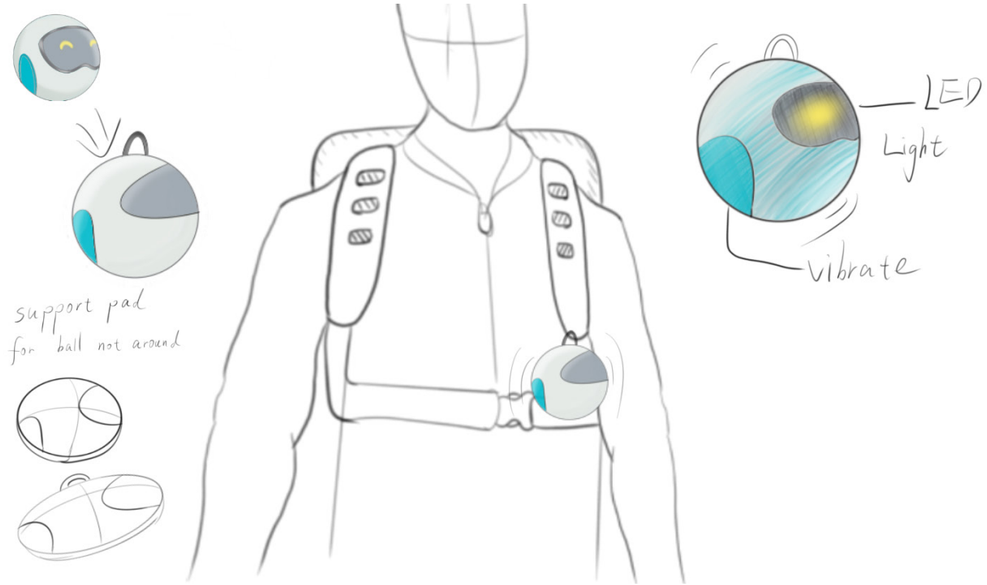
Step 3

The ball guides the user to go outside and play with it / provide companionship when the user is working.



Step 4

Support pad that allows the user to carry it around.



Step 5

The pad mimics the user's heart rate, pulse and vibrate as the heart beats.

It will help the user to deep breathe and do meditation.

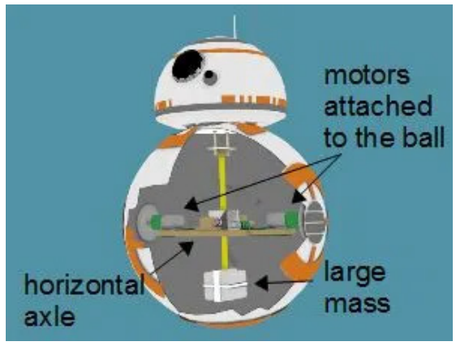
User journey - Concept 1

The user journey is created to show how the ball robot provides companionship and help the user throughout the day.

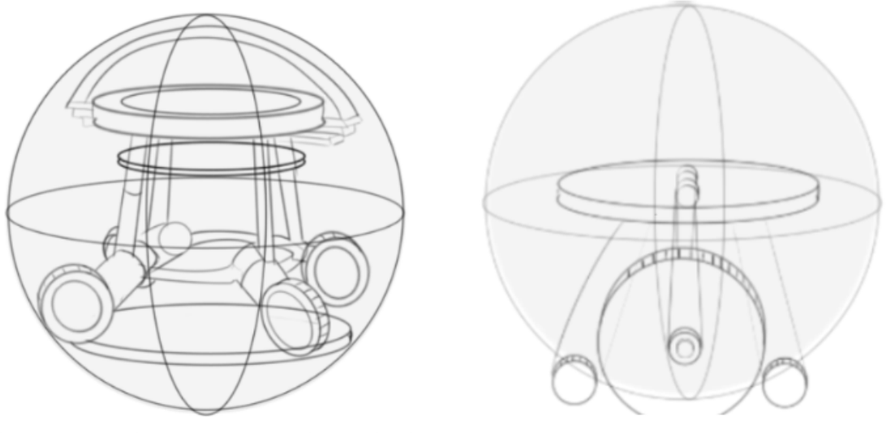
Technology - How to build a sphere robot

I researched how to make a real sphere robot that allows rolling, and I found that similar technology already exists in the market. The most famous example is BB-8 from Star war.

It is reported that "The ball robot can be achieved by using gyroscopic sensors and accelerometers to sense microscopic shifts and counteract them using 3 or more omnidirectional motors "[Bell,2015].



- **Fig.78 - BB-8 ball robot from star war, Hackaday, https://hackaday.com/2016/06/24/driving-bb-8-more-than-one-way-to-move-this-bot/**

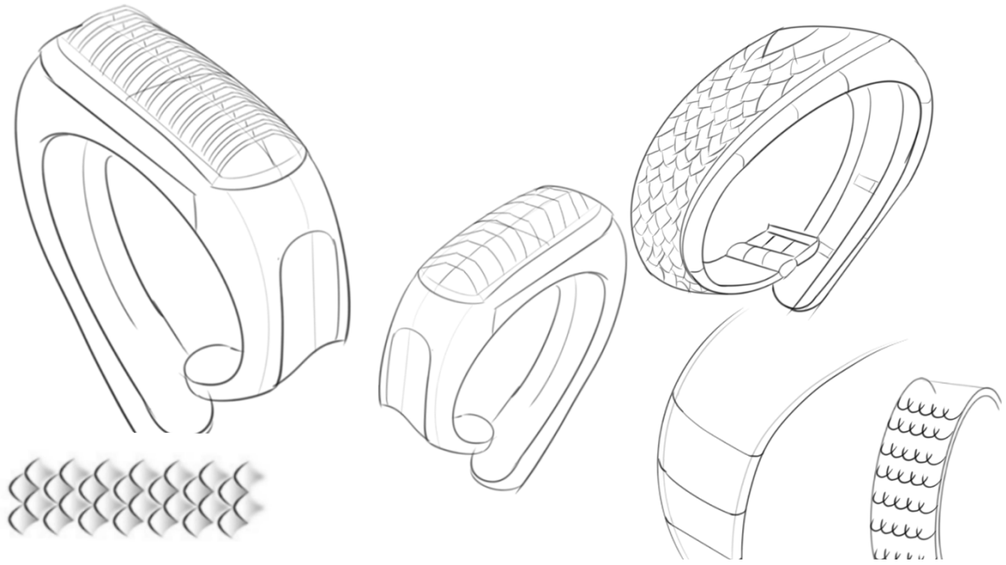


- **Fig.79 - Drawing of the working principle for ball robot-By me**

5.1.2 Concept - 2 Goosebump

Introduction

The second idea is inspired by goosebump. The wristband works as the extension of the body.
Patting the goosebump is a repetitive action, which works as a relaxation response. It will help the user to relieve negative feelings.



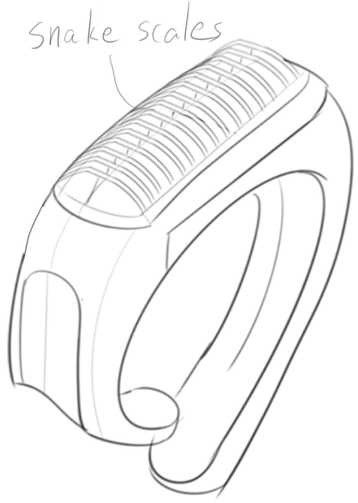
Step 1

The hair/surface of the wristband will stand up when it detects the user's heart rate is high. It will tighten up / giving a small electric shot to remind the user.

The hair is inspired from scales of snake. It will rise up & down to show different states.

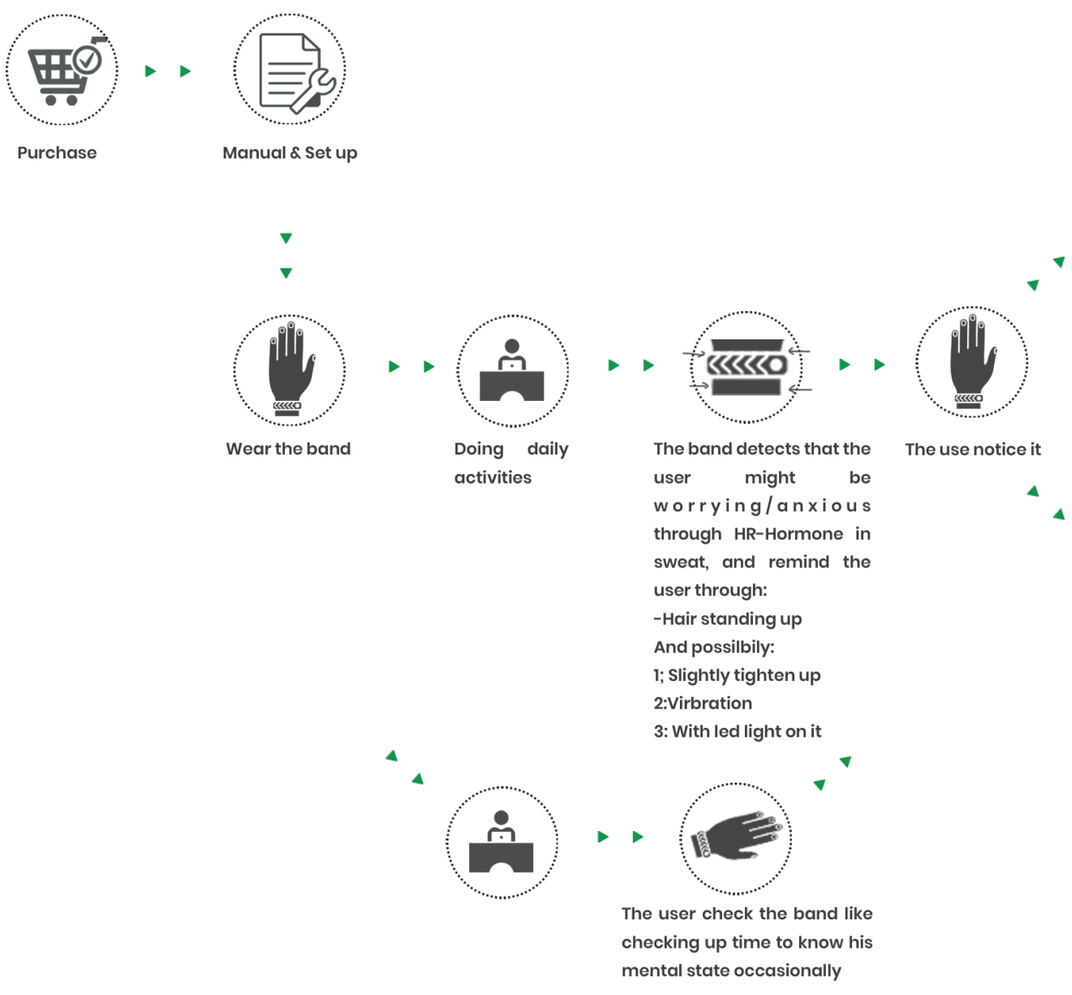
Step 2

The user pat on the wristband to make it smooth and relax.



User journey - Concept 2

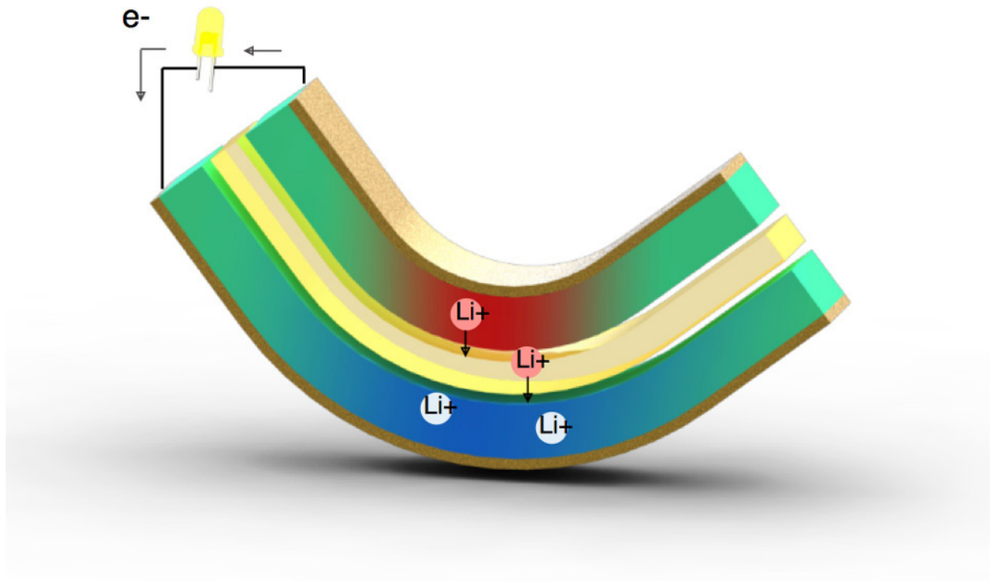
The user journey is created to show how the goosebump wristband works as the extension of the body.



Technology - How to make the hair stand up

To make the hair standing up, the idea is to use metallic material to connect the hair at the bottom. Metals like copper can be bend with changing temperature.

Using an electric current is a possible solution to provide heat and bend the metal, then the hair attached to the metal will be bend as well.



- **Fig.80 - Metal is bended by electric current, MIT news, http://news.mit.edu/2016/harnessing-energy-bending-motions-0106**

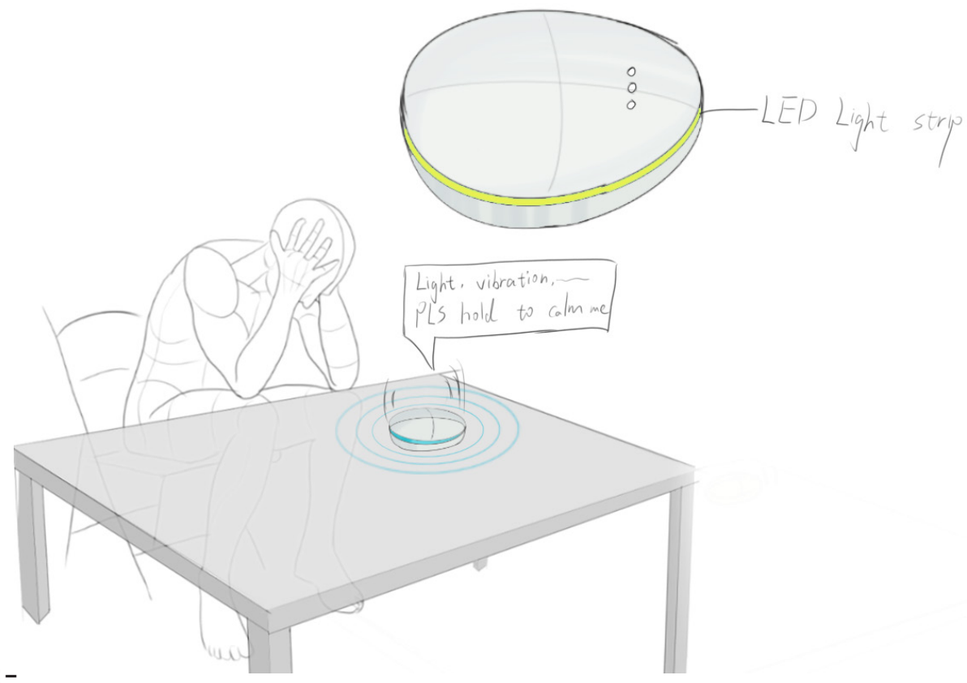
5.1.3 Concept - 3 Ripple stone

Introduction

The third idea is inspired by pulse stone & ripples.
The stone will create ripple effect around it to remind the user when he is worrying. The pulse of the stone mimics the user's heart rate. The light and vibration of the stone will pulse as the heartbeats. Holding the stone and meditate with it will relieve the user's negative feelings.

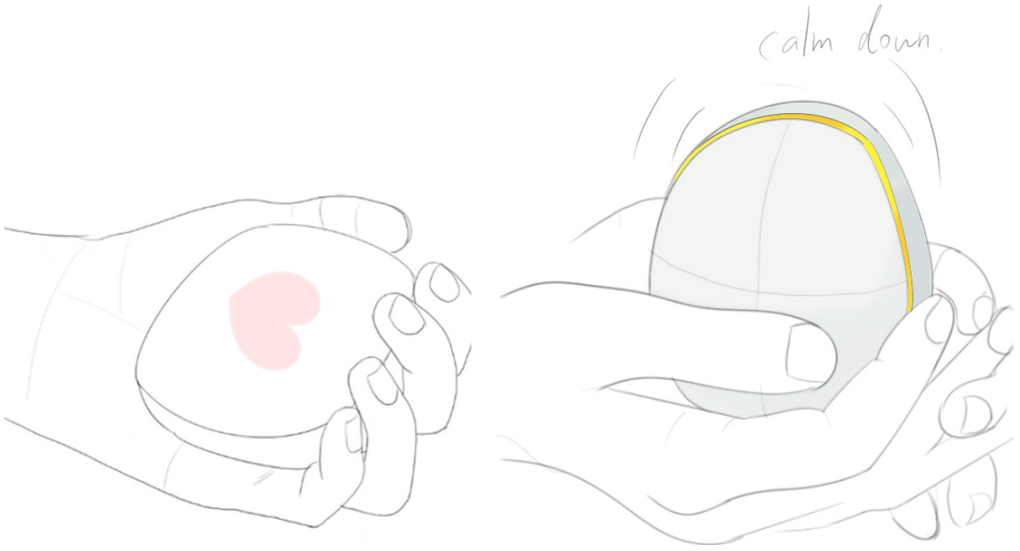
Step 1

The stone detects that the user is worrying. It lights up, vibrates, and create a ripple effect around it to remind the user.



Step 2

The user holds the stone to feel his heartbeat, and meditate with the pulse to calm down and relax.



Technology - How to make the stone work

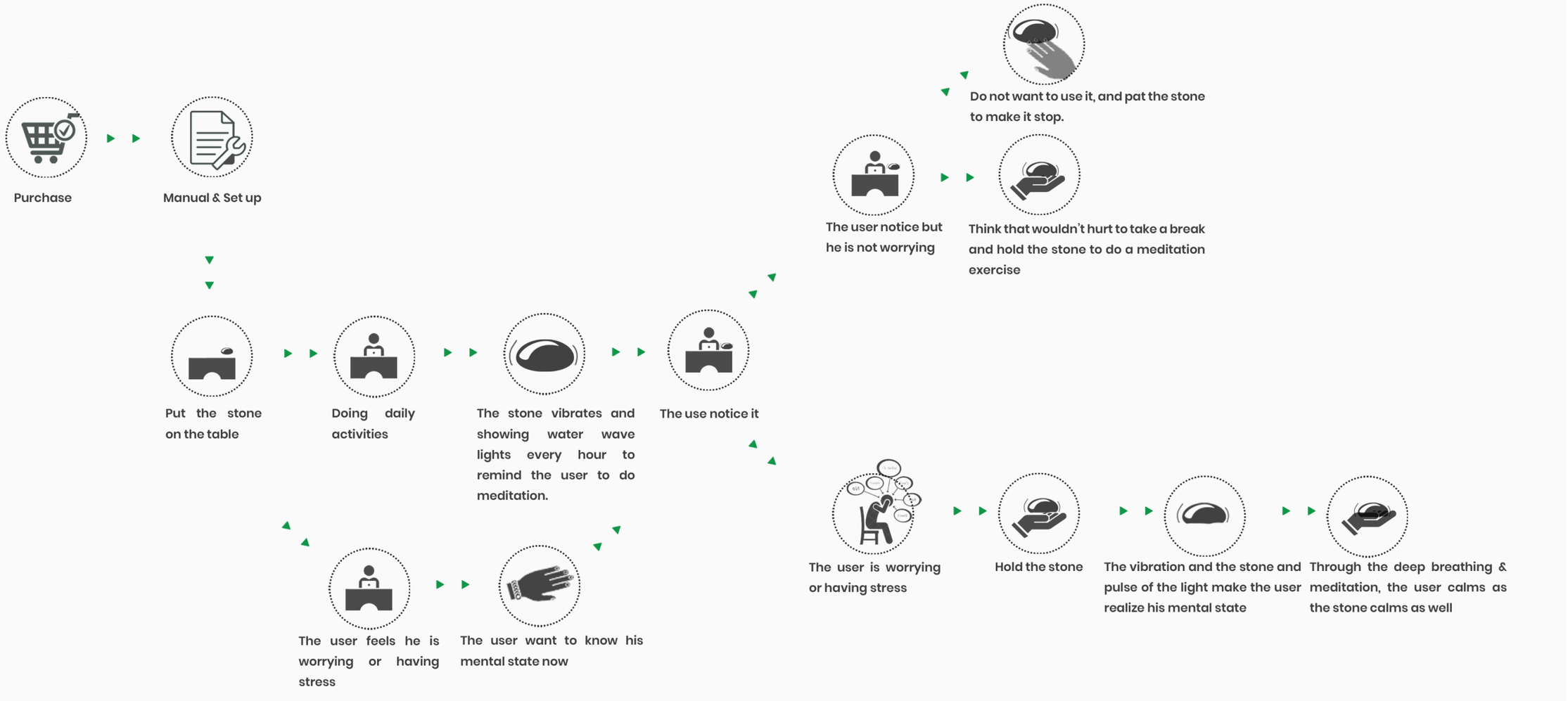
To make the stone works, the first issue is how to detect people's emotions, which was mentioned in Section 4.1.1.

Apart from that, how to detect the user's heart rate is another issue. It can be achieved through a heart rate sensor, using conductive metal to detect electric current change through the skin. A common example in life is the heart rate monitor(The metal bar) on the running machine in the gym.

- **Fig.81 - Heart rate sensor on the running machine, using conductive metal, https://brillianthippie.com/products/olympia-exclusive-electric-folding-walking-running-treadmill**

User journey - Concept 3

The user journey is created to show how the ripple stone works.



5.2 Concept Evaluation

Introduction

After creating 3 concepts, I invited 3design students from IO Tudelft (2 of them are participants from the previous prototype test), to evaluate the concepts.

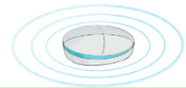
I created a list of factors to evaluate if the interaction works and fits the design goal & interaction vision.

List of factors for evaluation	Weight
1: If the interaction is meaningful? If it can help people relieve their worry feelings?	4
2: If the interaction is intuitive? without the manual	2
3: If the interaction is inviting?	2
4: If the interaction is subtle & Natural	2
5: Personal preference	3
6: Technological feasibility (for me)	3

The ranking uses 1 - 5 scale.
1 is the lowest and 5 is the highest.

Result





Factors	Weight	ball p1	ball p2	ball p3	ball SCORE	band p1	band p2	band p3	band SCORE	Stone p1	Stone p2	Stone p3	Stone SCORE
1-If the interactionis meaningful? can help people relieve their worry feelings?	4	2	3	2	28	3	2	3	32	4	4	4	48
2-If the interaction is intuitive? without the manual?	2	2	2	3	14	3	4	4	22	3	4	4	22
3-If the interaction is inviting?	2	2	4	3	18	1	3	3	14	4	4	5	26
4-If the interaction is subtle & Natural	2	3	2	2	14	4	4	3	22	4	5	5	28
5-Personal preference	3	3	2	3	24	2	2	2	18	4	4	5	39
Total score(3p)					98				108				163
6-Technological feasibility (Designer)	3		1		3		2		6		3		9
Overall score					101				114				172

Analysis for ball robot

Compare to the previous evaluation of ideas, idea smart ball robot had the second-highest score. However, it has the lowest score in this evaluation.

It might because I told the participants to evaluate only the interaction(approaching, moving, play). The participants can not relate the actions of the ball to their worries without the UI.

The intent of the ball is not intuitive. They would rather kick the ball away instead of following the ball to go outside and play with it.

Analysis for goosebump wristband

The goosebump idea has a high intuitive score and a high natural score.

The goosebump can be easily related to their worry feelings.

However, the interaction of petting the stand-up surface is not meaningful as expected. They feel that petting the band will help with their negative feelings a little bit, but not much.

So the meaningful score is not high. And it is said by the p1 that he does not want to wear anything on the arm. For people who wear a watch, it might be strange to wear another wristband.

Analysis for ripple stone

The stone idea has the highest overall score. Especially for factor 1, it has the highest score on helping people relieve their worries.

Breathing with the stone and feeling their heart rate with the vibration and light pulse can calm their anxiety. And the inviting score is also the highest.

The ripple light effect & pulse of the stone can catch their attention intuitively, and the effect is very natural.

Conclusion

From the peer evaluation result, it can be seen that the ripple stone idea has the highest score; most importantly, it can help people to relieve their negative feelings most.

Compare to concept ball robot and goosebump wristband, the technological feasibility of the ripple stone is also the highest.

Therefore concept 3, the ripple stone, is chosen and going to be developed further.

5.3 Concept development

Introduction

In the concept development, I focused on developing interactions with the product.

After that, I updated the user journey and ideate on how to create a ripple effect.

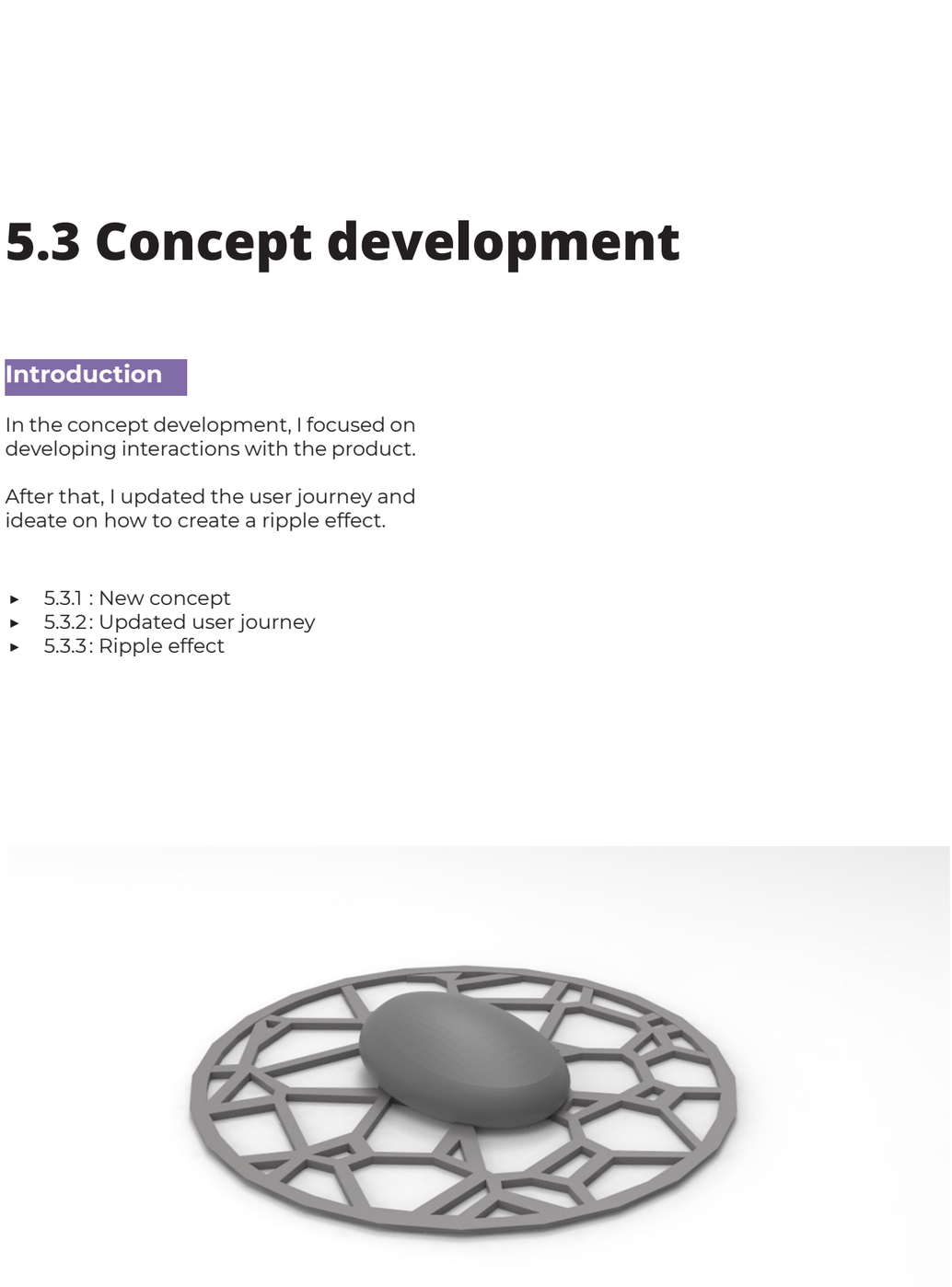


Fig.82 - A 3d model of the stone

5.3.1 New concept

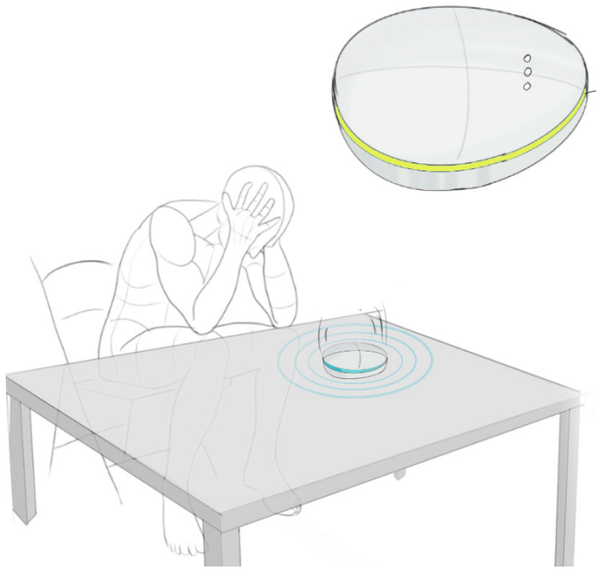
Stage 1: Detect worry

I am using speech emotion recognition technology to detect emotions. Fear can be used as a signal of worrying.

When the "fear" signal is detected, it will ask the user's attention through shining, vibrating, and the ripple effect, to mimic the user's mental state.

The product also responds to environmental sound and vibrations on the table. When these 2 signals are detected, it will shine and vibrate and create a ripple effect. However, it will be less intense comparing when the "fear" signal is detected.

▸ **Fig.84 -Speech emotion recognition**



Arduino microphone
Detect environment sound changing

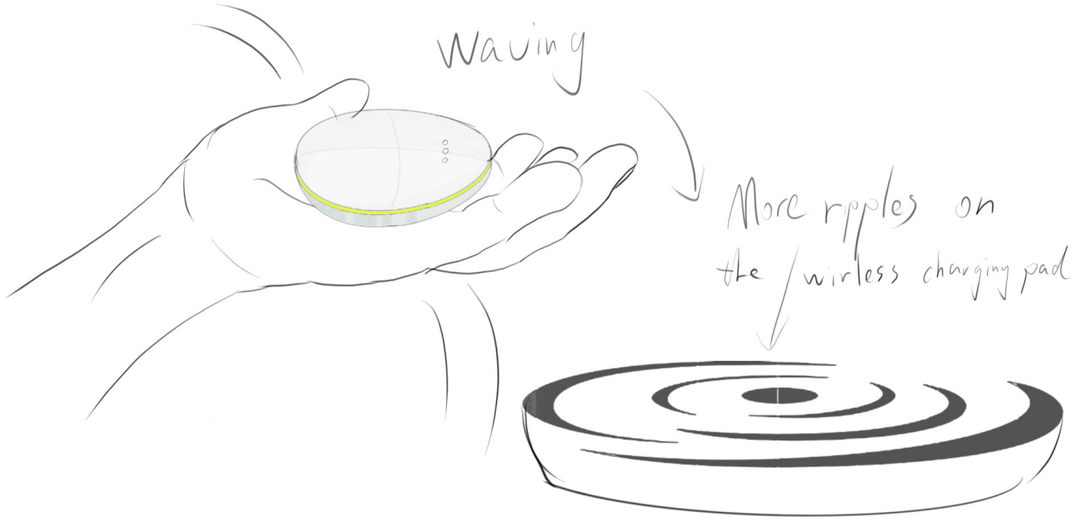
Arduino vibration sensor
Detect vibration change on the table

VOKATURI

Openvokaturi sdk
Emotion recognition by speech
Open source, python

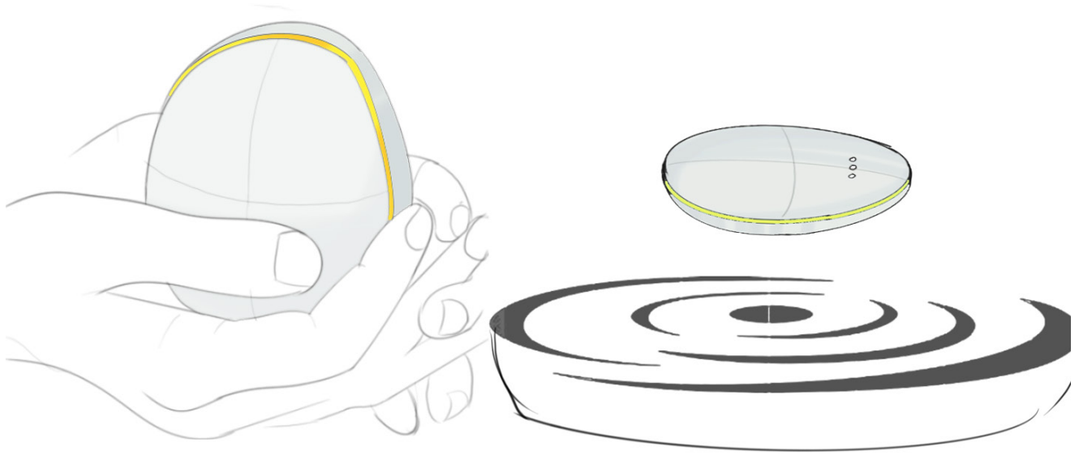
Stage 2: Interact with the ripples

There is a base for wireless charging for the stone and creating a ripple effect. When the user interacts with the stone, like waving it, it will create more ripples on the wireless charging base.

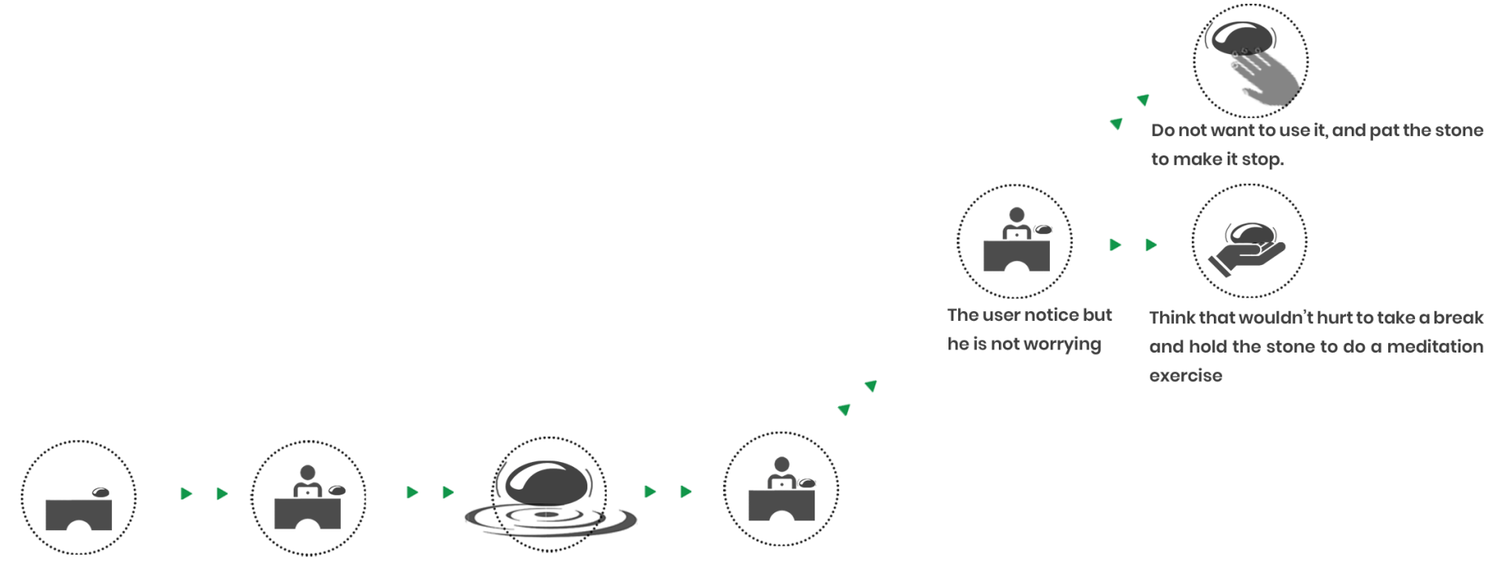


Stage 3: Meditation

When the user is holding the stone, it will mimic the user's heart rate and pulse as the heartbeat. It aims to guide the user to calm down and do meditation.



5.3.2 Updated user journey



Alternative path

The signal can not always be correct. Therefore I created alternative paths when the message is wrong. The user can just pat the stone to make it stop.

5.3.3 Ripple effect

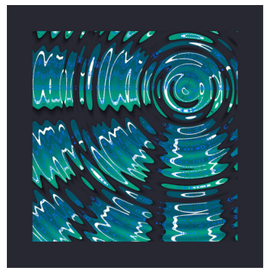
Method 1 LED ring

Use led ring set to create the ripple effect controlled by arduino and use diffuse plate to diffuse the light on the top.

- **Fig.85 - Led ring set**

Method 2 Screen

Use screen to show the ripple effect, and use processing to generate and change the ripples.



- **Fig.86 - Ripple effect**

Method 3 Water

Use arduino controlled vibrator to vibrate water in the bottom container, and the ripple effect will show on the water

- **Fig.87 - Ripple tank**

Summary

After discussed with supervisors, I decided to use real water for the prototyping. Because it matches most with the ritual design, and it is the most subtle & natural choice.

5.4 Prototype test

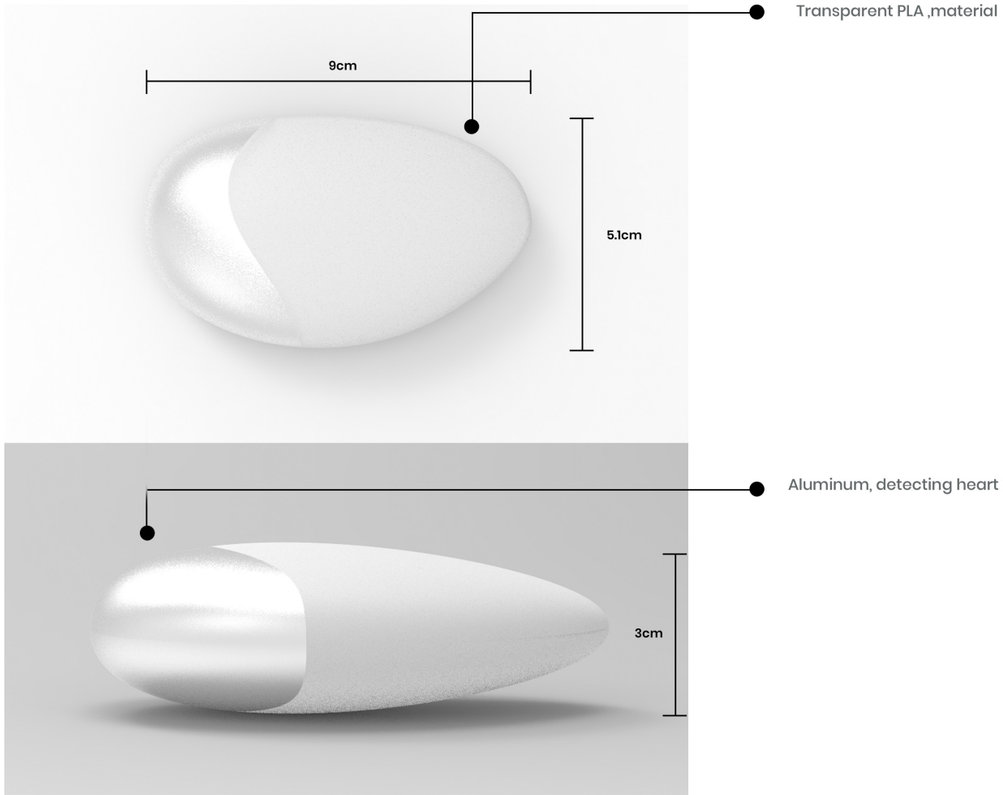
Overview

- 5.4.1 : Prototype
- 5.4.2: Prototype test
- 5.4.3: Result & Conclusion

Overview

The prototype test aims to see if the ripple stone can help people relieve their negative feelings, and evaluate the interaction based on the design goal and interaction vision.

The 3D model



The size of the 3d model is designed for the user to be able to hold it with one hand.

The left part is made of aluminum, which can read the user's BPM detecting skin electric change.

The right body is made of transparent PLA, allowing the light to shine through.

5.4.1 Prototype

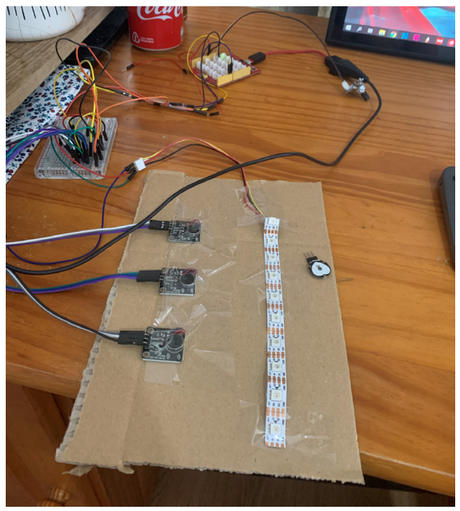
Arduino parts

The parts used for arduino are :
1: Heart rate sensor
2: 3 * Vibration motors
3: Led strip
4: On/Off switch

Working principle

The Heart rate sensor detects the user's heart rate (Input), and the led strip and the vibration sensors read the input. They will pulse as the heart pulse.

Apart from that, the strength of the vibration and the brightness of the light also changes with the heart rate. When the heart rate is high, the vibration strength and brightness are high. When HR is low, strength and brightness are low.



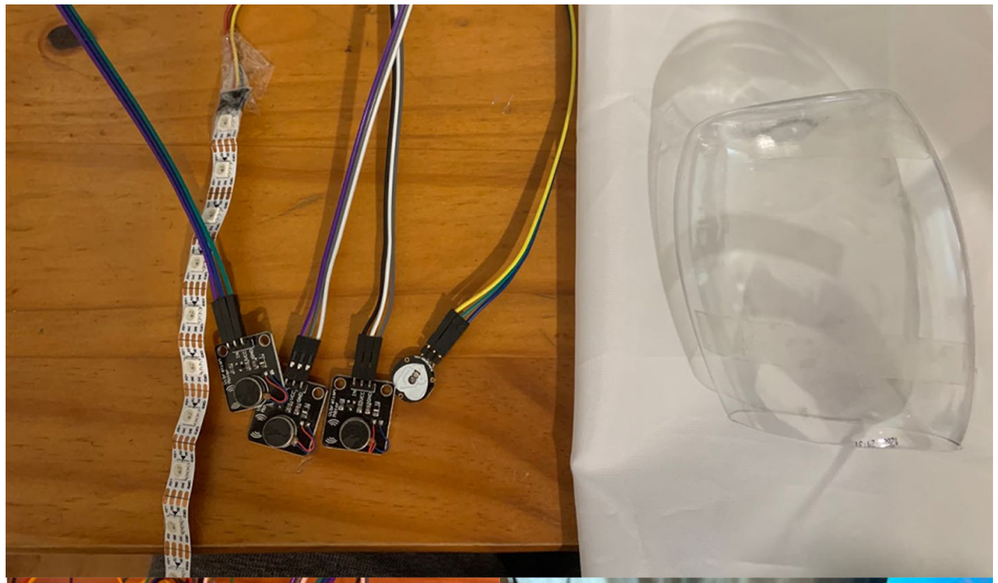
▸ **Fig.88 - Arduino parts**

```
Workingcode-vb-led | Arduino 1.8.13
文件 编辑 项目 工具 帮助
Workingcode-vb-led
//rgbrgbrgbrhb
#include <ChainableLED.h>

#define NUM_LEDS  5

ChainableLED leds(4, 5, NUM_LEDS);

/////////////////////////////////
#include <FastLED.h>
int motorPin = 6;
int motorPin2 = 4; //电机位置
#define LED_PIN     7          //电机位置
#define NUM_LEDS    30
#define ROTARY_ANGLE_SENSOR A0
#define GROVE_VCC 5 //VCC of the grove interface is normally 5v
#define FULL_ANGLE 300 //full value of the rotary angle is 300 degrees
char var;
const int buttonPin =5;    //  color
int run;
const int bluePin = A2;     // to freqency
int buttonState = 0;
int frequency=20;
int brightness=20;
int ledState = LOW;

unsigned long previousMillis = 0;
long interval = 50;

int r = 0;  // Redness starts at zero and goes up to full
int b = 0;  // Blue starts at full and goes down to zero
int g = 0;             // No green needed to go from blue to red


// top
```

▸ **Fig.89 - Arduino codes**

Low-fi model

Material list:
1: A transparent bottle as main body.
2: Diffuse fabric
3: Heart rate sensor
4: Vibration motors
5: Led strip
6: A plate of water



▸ **Fig.90 - Low-fi model**

5.4.2 Prototype test

Process

Number of participants: 4

1: Trigger the participants to worry / recall worry feelings

2: The stone start vibrating/shining in the water, creating ripple in the water.

3: Ask the first reaction from the participants.

4: Let the participants to interact with the stone and breathe with the stone.

5: Questionnaire & Interview

▸ **Fig.91 - Test**

5.4.3 Result & Conclusion

Result

Questions (1 lowest,5 highest)	P1(Liu)	P2(Li)	P3(Hu)	P4 (S)	result
1: How negative you felt before you interact with this product?	4	3	1	3	2.75
2: How negative you felt after you interact with this product?	1	2	1	2	1.5
3: If the interactionis meaningful? can help people relieve their worry feelings?	5	4	3	4	4
4: If the interaction is intuitive? (without manual)	4	4	4	3	3.75
5:If the interaction is inviting?	5	5	4	5	4.75
6:If the interaction is subtle & Natural	5	4	4	5	4.5

Insights

1: The interaction with the stone is meaningful.

Avg score for meaningful is 4, and the interaction reduced the negative feelings of the participants from 2.75 to 1.5.

According to P1, " the moment where the light starts to pulse slow make her calm down and feel secure. "

And for P4, he would like to hold it even he is not worrying at all. He would like to hold it when he is watching TV/Movie, and it could provide companionship.

2: The water effect is not necessary

The water effect is natural and beautiful. However, the stone already provides enough information.

It is said by the participants that the stone already catches his attention quickly. Compare to the pulse and vibration of the stone; the ripple effect works more aesthetic than functionally.

3: It needs to provide more guidance.

-3.1: For P3, he never did meditation before and do not know how to do it. The interaction did not relieve his negative feelings as expected. He would like to have an App/ voice guidance to help him start.

-3.2: The pulse light works fine. However, it provides less guidance to help the user to meditate. Apart from the pulse light, there are 2 participants also want to have a breathing light to guide him in doing deep breathing.

-3.3: Avg score for intuitive is 3.75. For p1, p2, and p3, they did not know the pulse of stone mimic their HR at the beginning. However, they learned it very quickly after they hold it.

But for P4, he did not know how to control the stone after he holds it. He would rather have something like an icon of heart on it, so it would be easier to relate the interaction to heart rate. However, after the first time usage, he thinks there's no problem relating the interaction to HR and breathing.

Insights

4: The stone and the interaction are inviting & natural.

Avg score for inviting is 4.75, which is the highest. The prototype is low fi, only works functionally. The body of the prototype is bigger than it should be. All participants said that they want to hold it with one hand only. After I showed them the 3d model and told them the size it should be, they were all satisfied with the size.

Avg score for natural is 4.5. The shape of the product is inspired by pebble stone. All the participants said that it is very natural and it can work like a decoration to put on the table.

Apart from that, p2 mentioned that it made him feel very comfortable without any buttons on it. It made him feel “zen”, related to meditation quickly.

5: More information would be helpful to be provided

Participants said that it is already enough that they can perceive and feel their heart rate without the numbers.

However, they still are curious about his data and want to see it. Apart from that, the worry level also curious about the worry level from the speech emotion recognition program.

Conclusion

1:Delete the ripple effect

I decide to delete the ripple effect from the concept. It is unnecessary to keep it; the stone already catches enough attention for the user to start the interaction. I want to keep the design simple and elegant.

2: Develop an App

Apart from that, I would like to design an App to support the product. The App will work only as a support to provide guidance and some data. The usage of the stone will be 100% functional without the App.

3: Another mode: Breathing mode

Pulse light works fine. However, it provides less guidance for meditation. Therefore I would like to add another mode-breathing mode to guide the user doing meditation.

5.5 Concept iteration

Introduction

After the prototype test, I decide to finalize the concept. The updates including:

1 : New mode
2: New model
3: New application

New mode

There are two modes in the new Arduino code.

-Pulse mode, the light, and vibration mimic the user’s heart rate

-Breathe mode, the light and vibration will breathe following the meditation frequency.

The user needs to wave the stone to change the mode (or through app).

However it has not been achieved yet. I will use a button to change the mode for the prototype test for the functional model in this stage.

New model

The new model is made by 3D printing.
1: Size:

The size of the new model is comfortable for the user to hold with one hand.

2: HR sensor:

In the concept, the left part should be metal and detect HR through the skin electricity.

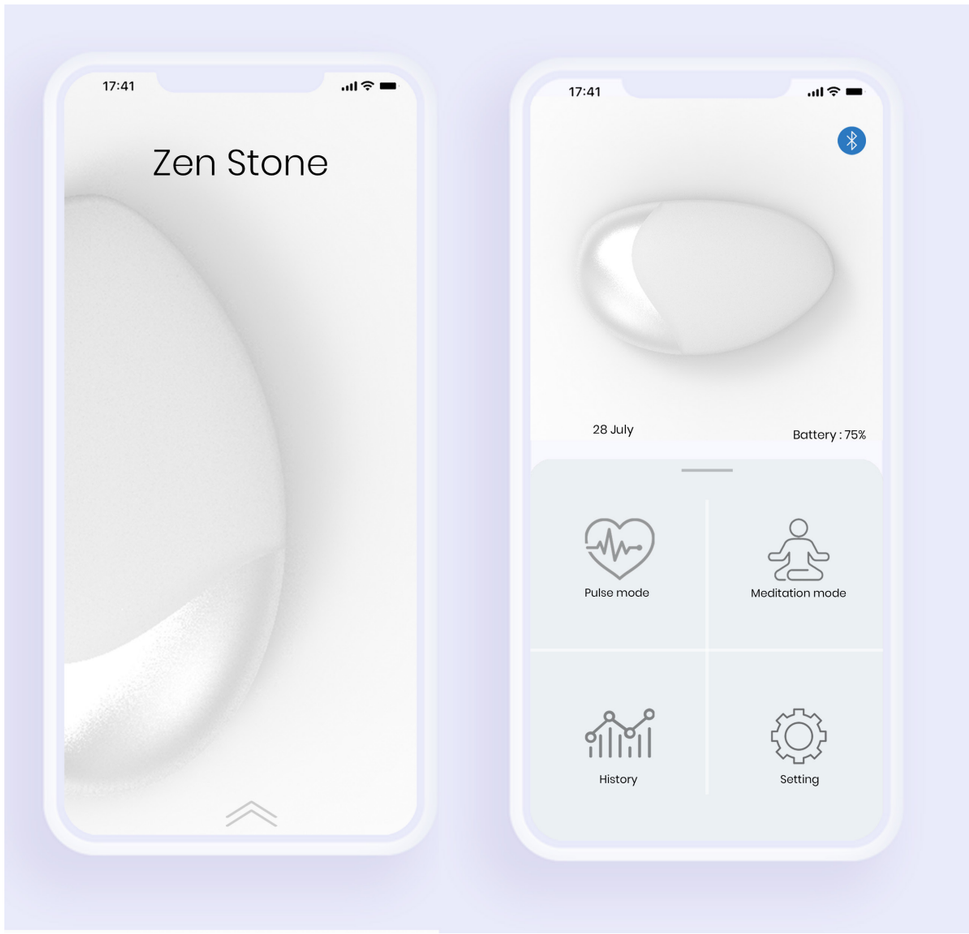
However, now the heart rate sensor from Arduino does not allow that. Therefore the functional model has a hole in it. The user can touch it comfortably.

Fig.92 - New model

New App

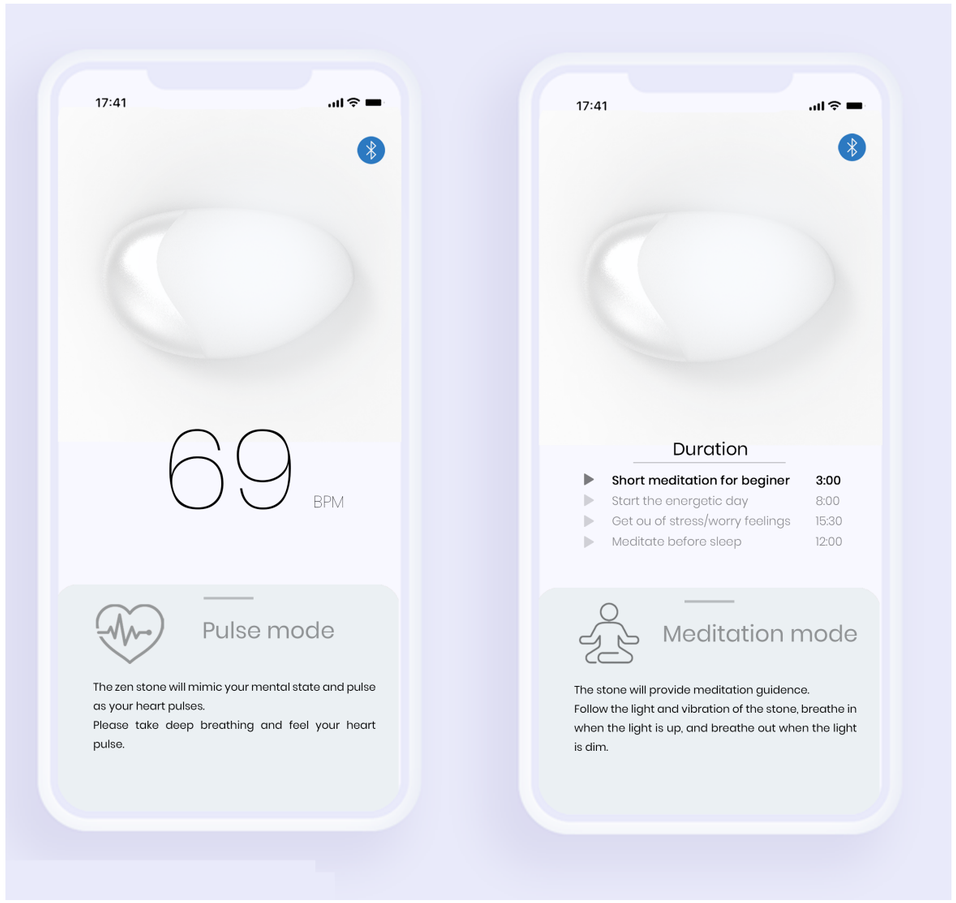
The app only works as a support for the stone. So the user could learn how to use the product for the first time and provide information which the user is interested in.

There are four functions in the App
1- Pulse mode
2- Meditation mode
3- History and progress
4- Setting



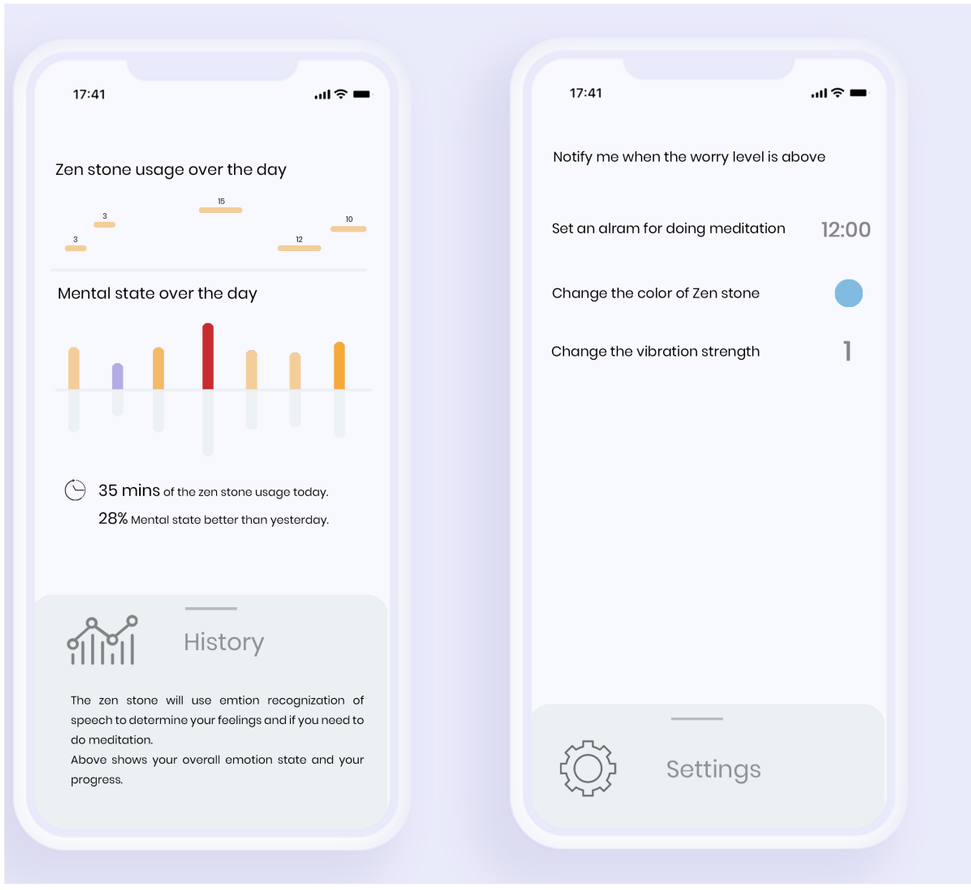
In the pulse mode, the user can see their BPM data and the stone pulse with the heart rate.

The meditation mode will provide meditation guidance for the user to choose how long the meditation will be.



In the history menu, I would like to show the time user used the product & their mental state data over the day.

In the setting menu, I would like to allow the user to set the alarm to control when the stone reminds them, and the color of the light& vibration strength.



5.6 Usability test

Aim

The usability test aims to determine if the App can help improve the user experience of the stone and help people learn how to interact with the product.

Apart from that, the test also aims to see how people will react to the new model and if it will work to relieve their negative feelings.

Process

Number of participants: 4

1: Trigger the participants to worry / recall worry feelings

2: Provide them with the App and place the product on the table.

3: Let the stone shining and ask them to follow the instructions in the App.

4: Let the participants to interact with the stone and breathe with the stone.

5: Questionnaire & Interview

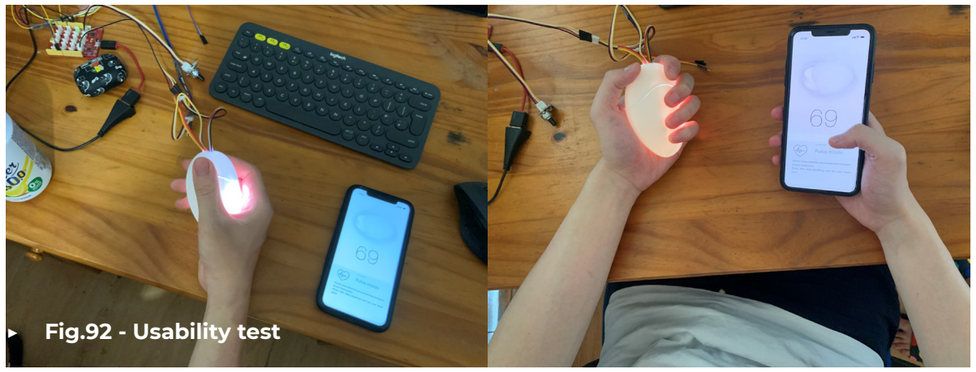


Fig.92 - Usability test

Result

Questions (1 lowest,5 highest)	P1(Y)	P2(Z)	P3(D)	P4 (J)	result
1: How negative you felt before you interact with this product?	4	3	5	3	3.75
2: How negative you felt after you interact with this product?	2	2	2	2	2
3: If the interactionis meaningful? can help you relieve their worry feelings?	5	5	4	3	4.25
4: If the interaction is intuitive? (with the app guidance)	5	5	4	4	4.5
5:If the interaction is inviting?	4	4	5	4	4.25
6:If the interaction is subtle & Natural	5	4	5	3.5	4.375

Insights

1: The product can distract people from their negative feelings effectively

Avg score for meaningful is 4.25 and decreases people's negative feelings from avg 3.75 to 2.
According to P3, although the product can not help him to solve what he is worried about when he was using the product, he was focusing on breathing and forgot his worries at the moment. The product works well to distract people's attention and focus on the moment.

2: The product works to focus the user's attention and improve the experience of meditation

According to P1, who is familiar with meditation and uses meditation App, She tried to use the product both with eyes closed and open. When she closed her eyes, she was focusing on the pulse of vibration from the stone. When she opened her eyes, she was focusing on the pulse of light. She said that it always took some time to focus on breathing when she did meditation before, and now with the stone, she can focus on meditation and breathe in rhythm much quicker.

Meditation is the experience of breathing, and the user needs to direct full, undivided attention to a single object of focus [Rich, 2018]. The zen stone can help people to focus their attention and improve their experience of meditation.

3: For people who are not familiar with meditation, they might need to take more time to learn how to do it.

P1, P2 & P3 are all familiar with meditation and know how to do it. The meaningful scores from them are 5,5,4.

However, for P4, who even do not know what meditation is, the score from him is 3. According to him, although he feels relieved slightly from deep breathing, the product did not work that well for him. He did not know how deep breath and meditation are related to his worries.

If more time is available, I would like to develop the product to provide more guidance for people who are not familiar with meditation.

Insights

4: The interaction with the product is natural and inviting.

Avg score for inviting is 4.25. According to P2, he said that he liked that the stone shines to remind him of his mental state and wanted to use it. The reminder was not intrusive and caught his attention quickly.

Apart from that, the Avg score for natural is 4.375. With the size change of the prototype, all participants are satisfied with the size and appearance. For the App, they think it is natural as well. According to P2, the App is very simple and clear, without redundant interactions.

5: The App works to make the product more intuitive. However, it still needs more improvement.

The previous prototype has an intuitive score of 3.75 (without the manual), and now the intuitive score is 4.5 (with the App guidance). The guidance from the Apps helps to shorten the learning process with the product.

According to P2, he learned how to use it with guidance in the App immediately. And according to P1, she would use the App to get familiar with the product in the first month and do not need the App after. However, the App still needs more improvement.

According to P3, in the pulse mode, he knew that the stone would mimic his heart rate, but he did not know what to do. He would like to have more explicit instructions, for example, telling him to breathe deep to calm the stone. Apart from that, the word beginner make P4 feel anxious a little bit. Because he thought it would take time to learn how to meditate.

6: The history function is popular with the participants

All four participants like the history page. According to P3, the visualization can make him easy to know what his mental state is over the day so that he can adjust his daily activities accordingly. For example, if he always worries before sleep, he would like to avoid working before sleep.

7: The stone extend the user's ability

According to P1, when I was asking if she think the stone is the extension of her body. She said that the stone is an extension of her ability. She occasionally does meditation; however, sometimes, she forgets to do so. The reminder from the stone helps her in terms of her ability to do meditation.

8: Privacy concern

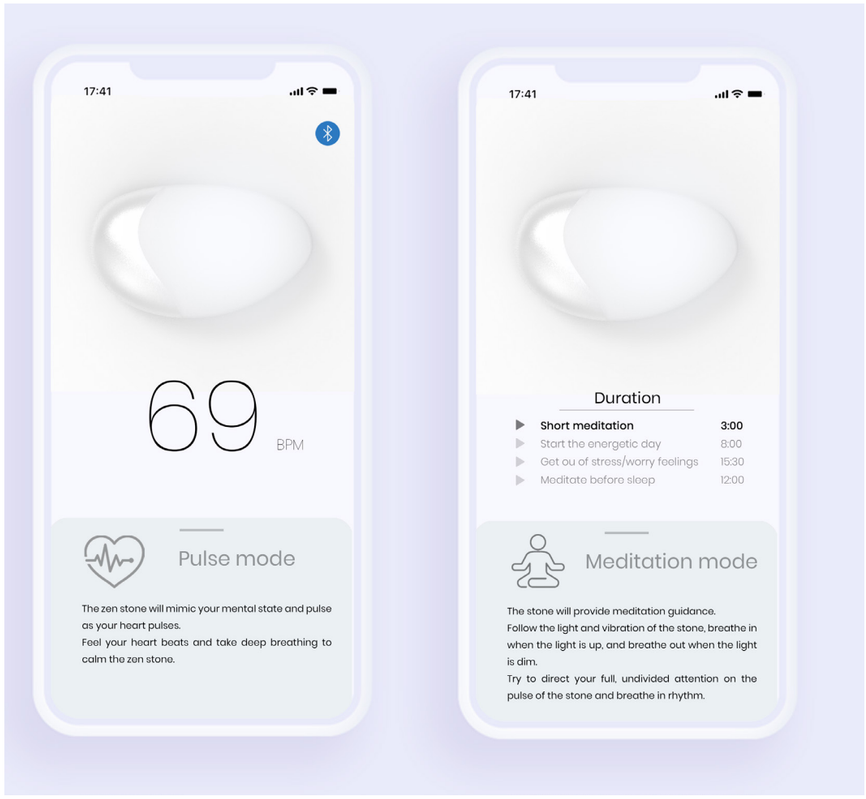
According to P3, although he liked the functions of the product a lot, he might feel uncomfortable with the speech emotion recognition. If the stone will analyze everything from his speech, then he will hesitate to use it.

However, I think this problem can be solved by changing the technology if I have more time. For example, I can use skin temperature and heart rate date (No touch) as the signals of the user's mental state.

5.7 2nd Concept iteration

Introduction

After the usability test, I decide to iterate the concept based on the evaluation results.
There are no changes in the zen stone, the changes are mainly focused on the guidance provided by the App.



The guidance text of the pulse mode and meditation is updated so that it could provide more precise and step by step guidance.

Section 6 | **Reflection**

This chapter includes

This section contains my personal evaluation of the final design to see if it has achieved the design goal and interaction vision.

Apart from that, I concluded serval interaction principles that might be interesting for other designers to refer to in the future.

6.1 Personal evaluation

Introduction

The purpose of this graduation project was to explore embodied interactions to help people reduce worries and improve their well-being. During this project, I created a design goal [Section 2.7] and interaction vision [Section 3.3] to narrow down the scope.

This personal evaluation aims to determine if the final design - Zen stone achieves the design goal and interaction vision.

In this personal evaluation, I will evaluate the design based on

6.1.1-Design goal

6.1.2-Interaction vision

6.1.1 Design goal - Evaluation

Main design goal

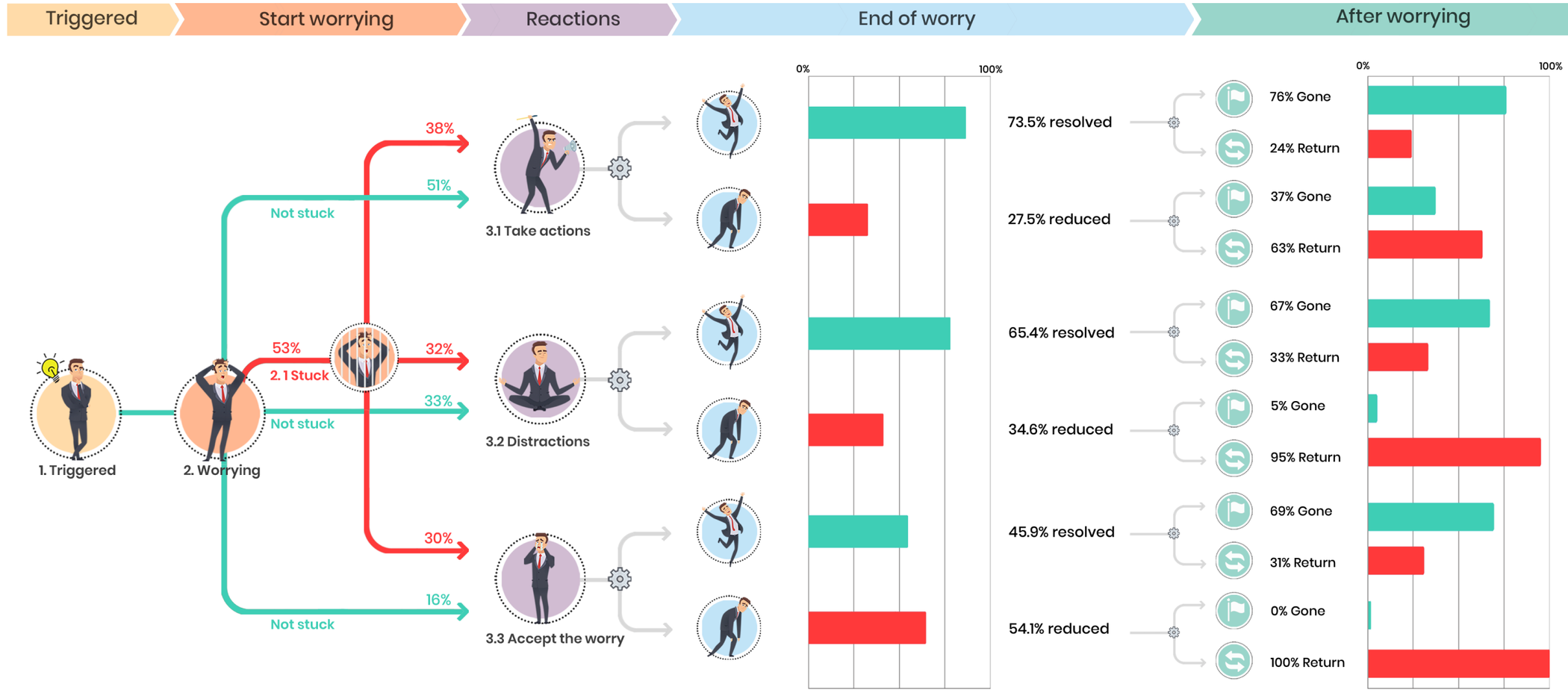
To help people handle their worries better by
-Monitoring people's worry level
-Relieving people's negative feelings
-Reminding & Encouraging people to move on when they are stuck in the negative feelings
-Distracting people when they perceive low controllability on the worry.

Bonus goal

In addition, if it is possible & fits the design, things I also want to achieve are
-Predict the worry coming before hand and cope with the worries preemptively
-Reward people when they are taking actions to deal with the worry
-Recovering people's mental state at the end of worry
-Prevent the same worry repeating

Approach

I will evaluate if the design fits the design goal based on the worry journey [Section 2.4] and the results from the usability test [Section 5.6].



Main goal- Monitor

The goal of "monitoring people's worry level " is achieved through emotion recognition by speech technology. The zen stone can initiate the interaction based on people's emotions [Section 5.3.1], and the App provided allows people to know their mental state over the day[Section 5.5].

Therefore monitoring is achieved. Monitoring plays an essential role in the final design to remind the user when they are worrying.

Main goal- Relieve

In the usability test [Section 5.6], the Avg score for meaningful is 4.25 and decreases people'snegativefeelingsfromavg3.75to2.

The final design works to relieve people's negative feelings when they are worrying in the phase "start worrying."

The zen stone helps the users to take control back to themselves and focus on the moment through meditation.

Main goal- Remind

When the user is detected to be worrying, the zen stone will shine and vibrate to remind the user; the App will also push notifications to the user. When the users hold the stone, they can feel their state through the pulse of light. It is said by a participant that the stone helps her to know that she might not be in good mental state and will take a break if the stone is shining too fast.

In the worry journey, people sometimes servals hours unconsciously stuck in negative feelings. the zen stone works to remind the user when they worry/stuck in negative emotions. It helps users to be aware of their own mental state.

Main goal- Distract

The goal "distract" is achieved through deep breathing and meditation with the stone. When the user follows the guidance provided by the stone, they are distracted from their worries and focus on the moment.

It is said by the participant that when he was deep breathing with the stone, he was entirely focused on the light/vibration pulse of the stone, and forgot his worry at the moment.

The stone works to distract the user when they are worrying.

Bonus goal- Predict & Prevent

According to the participant, the visualization in the history function can make him easily know what his mental state is over the day so that he can adjust his daily activities accordingly.

In the worry journey, predict the worry coming beforehand and cope with the worries preemptively can help people in the phases "Triggered" and " After worry." When the user has access to his mental state data over the day, he can adjust himself and avoid the trigger.

Therefore, the goal "predict" and goal "prevent" are achieved through the App. However, if there is more time available, I would like to dive into predicting the worry coming and preventing the worry coming back, combining the interactions with the stone.

Bonus goal- Reward

The bonus goal "reward" is not achieved. Although I wanted to reward people when they take actions to deal with the worry, if people will take actions depends on their perceived controllability and predictability of the undesirable outcome. This factor depends on the worry itself and can not be changed by the designer.

Therefore my main focus is to distract people instead of encouraging people to take action.

If there is more time available, I would like to explore what kind of interactions can work to reward the user, not only when they take actions, but also when they follow the guidance provided by the stone regularly.

Bonus goal- Recover

I am not sure if the goal "recover" is achieved or not. Because the prototype test was focusing the interaction with the product and if it works to relieve people's negative feelings.

To find out if people are recovered at the end of worry, require the user to report back after they have been using the product for a long time.

If I am going to develop the product further, I will try to build a 100% functional prototype to allow the user to use it through the whole worry process and report back to me.

Reflection

All the four main goals have been achieved, and for bonus goals, predict the coming worry and prevent the same worry repeating have been achieved.

Even the bonus goal "reward" and "recover" are not achieved. However, I think this product as a whole still fits the design goal and helps to relieve people from their negative feelings because it distracts the user from their negative feelings effectively, and the interactions with this product is intuitive.

The 2 bonus goals which were not achieved are interesting to be explored in other projects. However, they are considered not to be suitable in this project during the development of this project because the characteristic of worry, which is the controllability of the worry can not be changed

6.1.2 Interaction vision - Evaluation

Interaction vision

I want to create a **symbiotic** relationship between the intelligent product and the user, which should be approached by the **embodied** interactions between the product and the user. The intelligent product should be **inviting** and **playful.** The embodied interactions should be **social-autonomous**, **subtle**, and **natural**, giving **adaptive**, **meaningful**, and **unpredictable** feedbacks.

Main vision

1: Inviting:
Promoting the engagement of using the product.
2: Subtle &. Nature:
Do not draw a lot of attention, unless something is serious and action is required
3: Social autonomous:
Be able to initiate actions insofar
4: Meaningful:
Be able to help people rather than pure entertainment

Bonus vision

5: Symbiotic:
Build a reciprocity relationship between the user and the object instead of one-way interaction.
6: Playful:
Increase the engagement of using the product
7: Adaptive:
Act in response to their physical and social environment 8: Unpredictable: Making them anticipating the future feedbacks.

Main vision- Invting

In the final usability test, the score for inviting is 4.25 (1-5). It is said by the participant that the stone shining makes him want to hold it if he is free. The appearance of the product is inviting as well. Another participant said that even she is not worrying, she would hold it if she has nothing to do like when she is watching Tv. Overall, I think inviting is achieved through the interaction of the product and its appearance.

Main vision- Subtle & Natural

The score for subtle&natural is 4.375. The shape of the product is inspired by pebble stone. All of the participants said that it is very natural. According to participant 2 from the prototype test, the stone does not have any buttons on it, making him feel "zen." Therefore I think subtle & Natural is achieved become of the simplicity of the interaction.

Main vision- Social autonomous

The zen stone uses emotion recognition by speech to decide when to remind the user.

The stone is able to initiate actions insofar. Therefore I think it achieved this vision.

Main vision - Meaningful

Meaningful is the most important vision in my perspective. The most important aspect of the interaction is meaningful, which means instead of providing entertainment, the stone will truly relieve people's negative feelings. In the usability test, the score for meaningful is 4.25, decreasing people's negative feelings from avg 3.75 to 2.

This vision is achieved by reminding the user of their mental state and distracting them though meditation guidance.

Bonus vision- Symbiotic

Symbiotic means to provide mutual benefit between the user and the product. For the stone idea, I do not think it achieved that.

There were some ideas that focus on symbiotic, but they failed to pass the evaluation.

However, I still think that symbiotic is a very interesting attribute to explore in the future, especially in mental health field. A symbiotic relationship between the user and the product can motivate the user to engage in using the product.

Bonus vision- Playful

Playfulness is not achieved as well. I think playful is more like an approach to inviting, therefore inviting is the main vision, and playful is the bonus vision.

Although inviting is achieved, if there is more time available, I am still interested in making the product more playful. For example, interact with the user through different frequencies/ colors of the light and vibration.

Bonus vision- Adaptive

The stone can initiate interaction if it detects that the user is worrying. When the users do not have time to do so, they can pat the stone to make it stop. All the participants are satisfied with this interaction.

Therefore I think adaptive is achieved.

Reflection

All the four main visions are achieved, and for bonus vision, there is one vision achieved and two not.

I think this project as a whole fits the interaction vision because it can provide a calmful experience for people to relieve their negative feelings. The goals not achieved are symbiotic and playful, which are more like approaches to goal "inviting" .

Since the product is already inviting, I think it is acceptable that these two goals are not achieved.

▸ Fig.92 - Usability test

6.2 Reflection

Introduction

This reflection is divided into two parts.
-Personal reflection
-Design principle

Personal reflection

1: Keep in mind of the boundaries, the goals

There were some ideas that seem very interesting in the ideation phase, and I liked a lot, for example, the smart ball robot idea. I thought that build a functional rolling robot will be very cool and challenging.

However, in the evaluation, although the ball robot sounds nice, the interactions with the ball can not really help the participants with their negative feelings, which did not fit the design goal. So I gave the idea up.

Keep in mind the design goal, and interaction vision helped me connect research to the design. They set up boundaries so I will not get lost in the brainstorming. In the first brainstorming session, I came up with about 100 rough ideas.

Consciously thinking of dg & iv during the process helps me to bring everything together and make the decision.

2: Privacy concern

In the last prototype test, after he knew how the stone works(using speech emotion recognition), he feels a bit uncomfortable and will hesitate to use it if it is a real product in the market, although he like the functions of the stone. Privacy concern is very important for designers.

However, the problem is solvable by changing technology. If there's more time available, I will try to use skin temperature and heart rate data (No touch) as the signals of the user's mental state.

3: Participant choice

I am a design student, and most of my friends here are also design students. In the prototype tests, many participants are design students. Of course, they provide me many useful insights from the design perspective.

However, testing with non-designers is a different experience for me. For participants who are designers, they kind of already know how it should work when they are introduced to the project or at least make a guess. When I test with non-designer participants, they have a different thinking pattern and reveals many problems I did not think of. For example, privacy concerns. Besides that, details that are not clear enough, not providing step by step guidance, etc...

I think in the future, when I recruit participants, I would like to test with more non-designers(designers are also important). So I can think out of my limitations and gain more realistic insights.

In the end, I think doing this graduation project makes me learned a lot. It has allowed me to learn more research methods like culture probe, which helps me a lot during this situation (Covid-19). I did not expect the reports from the culture probe to provide me so many rich insights with pictures and descriptions, capturing the moment when the users are worrying.

As a design student, the projects I have done so far are most with a team. Doing a project alone was quite tricky for me at the beginning. However, it provides me the opportunity to challenge myself and to see what I am capable of.

The supervisor team also helps a lot in this project. Communicating with them solves many of the questions and helps me to make significant decisions.

I think this project is significant for my career after I graduated. I wish to have a chance to keep exploring the rich interactions to help people in the mental health field.

Interaction principle

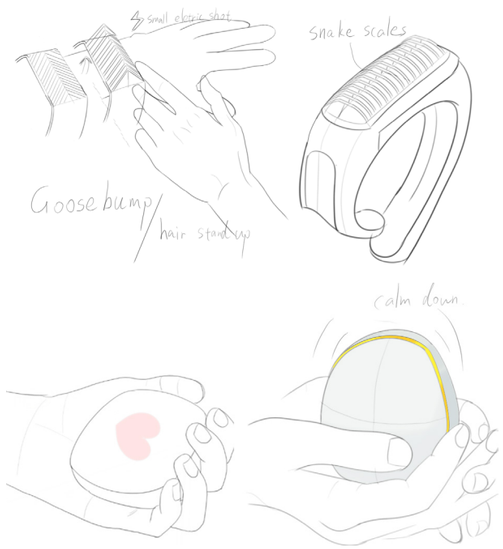
1: Interactions which works as the extension of the body are very intuitive & also extend the user's ability

Both the goosebump wristband idea and pulse stone idea work as the extension of the body, mimicking people's physiological phenomena when they are worrying.

Hair standing up and rapid heartbeat are signs of worry. Although the interaction with the goosebump wristband idea does not work as the relaxation effect as expected, it has the highest intuitive score (pulse stone has the second-highest).

Sometimes people are not aware of their mental state; hair standing up / quick pulse of the stone increases their ability to know themselves. Apart from that, the extension of the body also extends the user's ability.

In the prototype test, one participant mentioned that the stone mimicking her heart rate also extend her ability to do meditation, providing a focusing point for her and make her get into the vibe quicker.



▸ **Fig.93 - Goosebump wristband and zen stone**

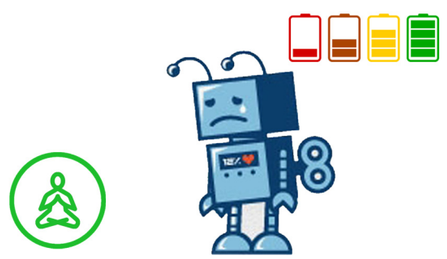
2: Simplicity helps to adapt to various situation

When evaluating the ideas/ concepts with the participants, I learned that the interaction should be simple and will help match different situations.

In the ideation phase, there were two ideas(sad robot and virtual plant) using the same principle, mimicking the user's mental state and catching people's attention. However, the evaluation results show a significant difference. Because the sad robot idea is too complicated and requires many steps to follow. Compare to the virtual plant idea; it is not easy to learn and use. Simple interaction can be easily adapted to more situations.

▸ **Fig.94 - Virtual plant**

Idea 4 -Sad robot that need you to feed him



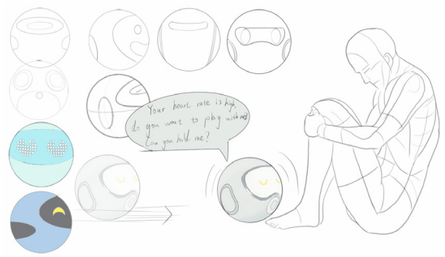
▸ **Fig.95 - Sad robot**

3: Giving the user freedom to interact with the product the way they want

For the ball robot idea, one participant said she would kick the ball away instead of playing with it. Although the concept was not developed further, there might be an opportunity to allow that interaction of kicking.

People punch the sandbag to release their stress; kicking might also work to relieve their negative feelings. How people can interact with the product the way they want and how designers can allow the product for multiple ways of using it are very interesting to look at.

In the prototype test of the worry stone, many participants mentioned that if they want to interact with the stone depends on if they are free. They might want to stop the vibration of the stone sometimes. Allowing them to pat the stone to make it stop gives them more freedom.



▸ **Fig.96 - Ball companion robot**

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Appendix -1 Culture probe

Registration

Day 1 2 3 4 5 6 7

Research project of "Worry"

Name:

Age:

Nationality:

Occupation:

Contact information:

TU Delft

Introduction

Day 1 2 3 4 5 6 7

What is this Toolkit & Research about?

This toolkit is designed for a graduation project in TU-Delft. With this toolkit, we aim to investigate what people worry about and when. In addition, we hope it will help you get more insights into your worries and what you could do to reduce them.

Your answers will be treated confidentially and only be used for researh purposes.

What we ask of you?

Participating in this study will take about 10 minutes a day, for 7 days in a row. The first day may take a bit longer, around 20 minutes, as you set everything up.

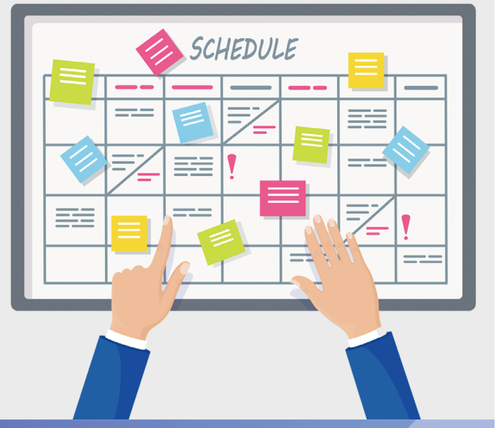
Day 1:
-Read the instructions and create a "worry wristband", that will help you to reflect on your worries. We ask you to wear the worry wristband throughout the week.
-You can also create your own stickers, that will help you indicate what you worry about and what triggers your worries. You can always go back to these pages and edit/add new stickers.
-Lastly, we will ask you to write your first "worry report", to practice with the procedure. And don't worry, we'll provide clear step-by-step instructions.

Day 2-6:
We would like to ask you to fill in at least one worry report daily. The worry wristband can help you remember what you worried about during the day, so that you can fill it in at the end of the day. You can of course also carry this booklet with you and write things down directly.

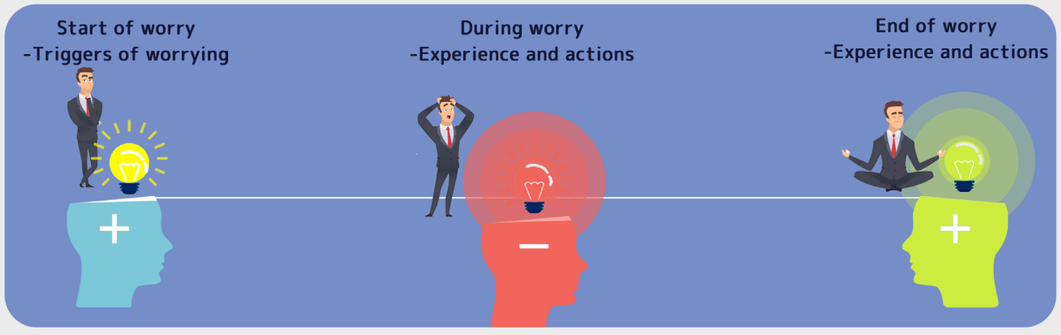
If you want to fill in more worry reports, we have included additional pages at the end of this booklet. This can help you gain more insights into your worries

Day 7
On this last day, we will ask you to reflect on the process and to return this booklet to us. Each individual worry report should also include two pictures, which you can send to us immediately through Whatapp(+31 0620361069) or on this last day, whichever you prefer.

Get started



What's the process of worrying & topics of interest about worrying?



Start of worry: Worrying always starts with a trigger. Triggers can be various things like when you are under a lot of stress from work? Trouble sleeping? Identify the triggers helps you to manage your worries. For yourself and researchers, the the important part of this stage is what triggers you worrying? And how do you feel?

During worry: Worry is the act of constantly thinking or being excessively concerned about a particular problem or situation. For example, you are worried about the exam tomorrow? Or the current COVID-19 situation? For yourself and researchers, the important part of this stage is how do you react to this worry? And how do you feel when you are worrying?

End of worry: How does the worry end? Sometimes people just let their worries be, until they leave on their own. Sometimes people take measures to deal with the worry, for example, take a walk or talk to friends. For yourself and researchers, the important part of this stage is to know how you experience this stage and what actions do you take.

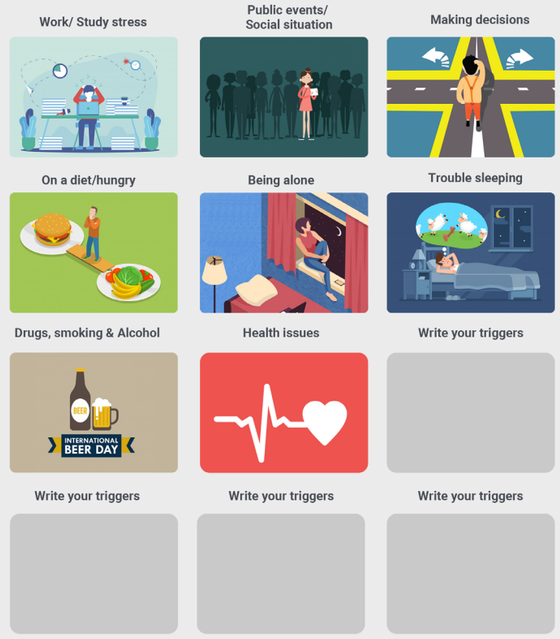
2 - Identify what triggers your worrying?

Worry triggers can be different for each person, but many triggers are common among people with these conditions. Most people find they have multiple triggers. But for some people, anxiety attacks can be triggered for no reason at all.
For that reason, it's important to discover any triggers that you may have. Identifying your triggers is an important step in managing them. Keep learning about these triggers and what you can do to manage your worry. For example:
-Sleep disturbances: Not getting enough sleep has an overall negative effect on health and trigger worry.

Task to do :
Apart from the common triggers people share on the right page, there are also personal triggers, for example seeing an old picture from the past or reading news. Feel free to add them when you identified them. You are going to use the trigger-stickers for later tasks. Cut them out when needed.

Quick Tips!

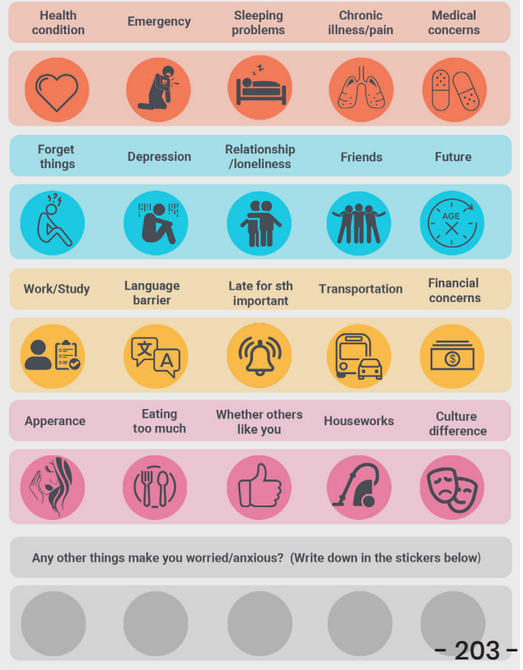
Be honest with yourself. Worrying can cause negative thoughts and poor self-assessments. This can make identifying triggers difficult because of the anxious reactions.



1 - What are your worries?

What are your worries regarding health, daily life? Or anything that worries you? Choose and cut out the stickers which make you worry from the right, and you are going to use the stickers on the next step.

Task to do:
Feel free to add things not on the list and write them on the stickers at the right-bottoms part. When you find yourself worrying about other worries you can always go back to this page and add them.



Step 1
Make your "Worry Wristband" for day 1-6

Use the same worry stickers from preparation and put them on the wristband. Remember, you can always change the stickers on the wristband, and you can always go back go "Preparation" to reselect the worries.

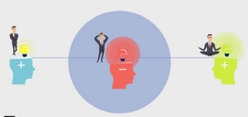
How to use the "Worry Wristband"

Why do you need the band:
The "worry wristband" is designed to be a trigger to help you know yourself' worries. People always won't notice how they are feeling emotionally. The band is to help you open the eye into your daily life. By finding your worries, you can deal with your worries better.

How to use:
Put on the wristband and when something that worries you happened, you can take the sticker down and do the task following the instructions of the worry report.
When you feel the worry, try to find out what triggers you worry at the moment and do the task on the next pages immediately. Otherwise, if you are not able to do the task immediately, put the sticker somewhere obvious for you like your phone case and do the task when you have time.
We ask you to finish at least one task a day, but you are very welcome to finish more tasks if you experience more worries.

Sticker

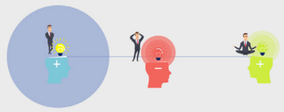
During worrying, your experience & actions



How does this worry affect you?	None	Low	Moderate	High
Feeling nervous, anxious or on edge?				
Not being able to stop/ control worrying?				
Trouble relaxing				
Becoming easily annoyed or irritable?				
Afraid of something awful might happen?				
Difficult to fall asleep/stay asleep?				
Feeling tired?				

Description:
-Describe how you are feeling about the worry? How do you react to this worry? How does it influence your emotions and your life? Any other remarks?

Start worrying, Triggers and experience

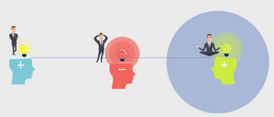


Put the trigger sticker here

Take a picture: Take a picture from your phone of how the worry started? It doesn't have to be the trigger itself, but anything you think that can represent the moment.
You can send the picture right away through WhatsApp, or send all the pictures at the end of this research to the researcher. They will be used for research purposes only.

Description:
-Describe the picture
-Describe the situation that triggers you worrying, the reason that the worrying started and when did it happen? Does this happen a lot? How you are feeling? Any other remarks?

End of worrying, your experience and actions



Description:
-Describe how the worry ends? You can continue with this part when the worry stops.
Do you do nothing about it or take some steps to stop worrying? Does it help you? And elaborate on your choice, please.

Take a picture: Take a picture of how the worry ended? How did the worry stop or reduce? It can be anything you think can represent the moment.

You can send it through Whatsapp right away, or send all the pictures at the end of this research to the researchers.

Quick Tips!

Make time for meditation
Taking some time to find some zen can really help anxiety in your brain

What to do at the end of the research?

1: Organize all the pictures in sequence.
Example: Day1, start, end, Day2, start, end...

2: Send them to the researcher.
Email: J.Long@student.tudelft.nl
Wechat: cs1210262319
Whatsapp: +31 0620361069

Keep in mind that you can also be sending the pictures throughout the process by Wechat or Whatsapp.

3. Return the booklet to the researcher.

Thank you very much for participating in this research. Hope you can deal with your worries better.

Best wishes

Today to do

Day 1 2 3 4 5 6 7

Reflection:
After these days of tasks, are you dealing better with your worries? Describe your reflections in terms of start worrying, during worrying and end of worrying. Apart from that, you are welcome to say anything related to your own experience.

Appendix -2 90 worry reports

	Trigger	Start	Worry	During worry	End of worry	Insight	Pattern		klonk (q3(xx) 1(Yaw)	How did the participant transform? (1) Task actions, (2) accepted it, (3) distanced themselves	What happened with the worry? (1) resolved, (2) resolved	And then? (1) gone, (2) return	Factor 1 – perceived risk/controllability? (1) Very low, (2) low, (3) High, (4) very high	Factor 2: Perceived controllability and predictability (1) Very low, (2) low, (3) High, (4) very high	Factor 3: Perceived controllability and predictability? (1) Very low, (2) High, (3) very high	Factor 4 – How far away to the actionable when (0 is now, 1 is within a few days, up to a month, (2) within a few months, (3) further away than that		Feeling	Feeling before worry (1) very negative, (5) very high	How intense was the worry? (1) very low, (5) very high	Feeling during worry	Become aware of a lack of control? (1) very low, (5) very high	Affect (1) Is it a negative or positive thought?	Feeling after
1	Pt-Day1	Work place	The picture is my work place. This were happens most usually. Around 8 o'clock in the morning. Because I started to panic that I haven't done my work. Then I get more anxious and usually, **I just stress out process via science.Cyber security** is a very complex field. It happens when I start myself that I will work for tomorrow, **But when I start working, I feel that I can't do this** and I'm nervous. Then at 11 am starting I can't do anything. I just stress out and etc... All these feeling come at once.	I feel panic, I was confused and I don't know how to control that during the two days and that gives me stress. If that I am not working, I feel that I am not a good girl, I am lazy, unproductive. **When my science gets wrong, everything is wrong** and I'm unable to control. I am unable to control science complexities I build, then it affects other habits.	The worry didn't end as I said. It stops for sometimes, when I was working. Because I'm concentrating on what I'm working on.Not by myself, but I know that I'm working on it. Then I'm relaxed. But I know **that I will have to do that work tomorrow.** Because I don't know how science works and etc. Sometimes it tries to sit down and work. But I'm not able to do **anything about it.**	Unsorted worry strings like science studies affects a core control over life should affect	Pattern 1 -Long term process -Perceived probability of underskills outcome -High perceived controllability and predictability -Not and tbd reduced		1	4 4 L H	1	2	4	2	3	4 4 L H		Panic, indisciplined, guilty, wasting time, fear, lose control, insense	2	3	3	2	1	2	2	1
2	pain and Anxiety	My food habit had gone a little bits for two days. **My body reacting as if nothing up and my mind going to bed** and I'm not able to sleep. Because I'm not able to sleep, I'm not able to get up late, I am lazy, unproductive. **When my science gets wrong, everything is wrong** and I'm unable to control science complexities I build, then it affects other habits.	I feel that I can get back on track and I should act. I feel disappointed, unproductive, lazy and unorganized.	Carefully always With, all day life. **My science gets wrong, everything is wrong** and I'm unable to control science complexities I build, then it affects other habits. **I'm always thinking about science.**	The worry stopped today. I will stop, as time went and I got so much work to do. **I'm always thinking about science.** I'm not able to get up early. So I have to get up early. This makes me get up early same time.	Unsorted strings like science studies affects a core control over life	Pattern 2 -short term process -Perceived probability of underskills outcome -High perceived controllability and predictability -Ended		1	3	2	1	3	2	1	2		Irritated, lazy, unorganized, disappointed, unproductive, disturbance	3	3	3	3	2	2	2
3	Pt-Day2	Place rug	Start working - my reading with people I need to connects to **Science.** I'm not able to do my work tomorrow. **This happens a lot when I'm overly worked in science** and I'm not able to attend to **present day.**	During working I feel, I'm always panic before presentation in that that I'm not able to do my work. I'm not satisfied this morning. It's still a little bit of work. I'm not able to do it. I tell myself that it's fully, at least it's 80% of work is done. I'm worried about this biggest influences so far.	After worrying my worries about science, I'm not able to get about what I'm doing, neither I don't have any clear understanding of what my prof wants from me. I'm not able to do it anymore. I'm not able to **perform it during its activity** and I'm not able to attend to **my profession** so, at least I'm really know where they wants from me. I'm not satisfied with the project. **By not satisfied with the project, I'm not able to perform it** and I'm not able to **redirect humanity.** My mentor is not satisfied with my work. So my health as I started to make a point to work before my deadline. But now I'm not able to have food to eat. I don't think I have anything else to sleep. I'm not able to sleep properly. Normally I can eat/watch/ do some work what the building is the right thing to build.	Do not solve a solution	Pattern 1 -Long term process -Perceived probability of underskills outcome -Depending -Low perceived controllability and predictability -not and tbd reduced		0	2	2 2 L H	1 1 L H	3	3	2	1 1 L H	3		4	3	3	2	4	4	1
4	Pt-Day1	Laptop	Worries about someone who is working for the other company. I am thinking of they had an ambition and they are working hard for it. I am not able to find it difficult, to make the decision	I'm hard to stop thinking about it. I want a lifetime of vulnerable steps to be successful in my life.	The worry overdosed until 8th moment I felt the heat The worry 70% of tip10 in the end, it was not a problem, it was solved. Now I'm not a more productive.	Pattern 2 -short term process -Perceived probability of underskills outcome -High perceived controllability and predictability -Ended	zoom		1	1	2	1	1	4	1	2			2	4	3	3	1	2	2
5	Pt-Day1	Work place	Start working on it around **Less one** and then **barely affects my science** and **wrong a cheap quality book.** Because I'm not able to do my work within my science. I still have my **science** and I'm not able to do my work about it. How does it influence my science? Because I'm not able to **perform during** my work, and I'm not able to present well enough to my **professor** and I'm not able to **present** my work in front of my professor. Because I'm not able to **present** my work in front of my professor, I'm not able to **perform** my work. Because I'm not able to **perform** my work,

#	ID	Trigger	Start	Worry	During worry	End of worry	Insights	Pattern	stuck 0(No) 1(Yes)	How did the participant handle it? (1) Took action, (2) accepted it, (3) distracted themselves.	What happened with the worry? (1) reduced, (2) resolved	And then? (1) gone, (2) return	Factor 1 -- perceived risk/cost/impact? (1) Very low, (2) low, (3) high, (4) very high	Factor 2-Perceived controllability and predictability (1) Very low, (2) low, (3) high, (4) very high	Factor 3-Perceived probability (1) Very low, (2) low, (3) high, (4) very high	Factor 4 -- How far away is the undesirable effect time-wise? (1) within a day, (2) within a few days, up to a week, (3) this month, or (4) further away than that.		Feeling	Feeling nervous, anxious or on edge	Not being able to stop/control worrying	Trouble relaxing	Becoming easily annoyed or irritable	Afraid of something awful might happen	difficult to fall asleep/stay asleep	feeling tired
49	P2-Day5	Appearance	When I am alone, I recall how people judge my red hair color. They said it was a failure, it does happen a lot. I feel sad that I dont look good.	Appearance	I feel very angry. It just make me feel not trusting people. I regard telling people about it.	I talked with my friends(other friends) about this worry. They comforted me, and I feel better. It helps a little.		long term	0	3	1	2	2	2	3	4	3.285714286		2	4	4	4	3	4	2
50	P11-Day6	On a diet hungry	It is the fried chicken I order today. I have ordered too many take-aways this weeks, which are more than what I eat before. I am not satisfied with my figure, so this happens more or less at meal time.		I feel nervous and no appetite during meal time. I know the worry can be controlled as far as I stop eating too much food. So the worry doesnt make me easily annoyed and tired. But I know if the worry continues, somthing awful would happen because food is indeed one of the sources of happy life.	The worry ends when I start to do exercise. I shared food with friends so that I do not eat much but still taste great food. Also, exercising, in other words, more consumptions, makes me relaxed.		short term, ended	1	1	2 E-1	1	L-2 E-3	L-4 E-2	L-1 E-2	1	1.857142857		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
51	P3-Day1 (Thomas)	Food &Weight	Looking in the mirror and see extra weight gained in the weekend. Does happen a lot, however I was getting dressed to do a workout. So I wasnt feeling negative , so more motivated to put all my effort in it.		I am worrying a bit to stay in shape during the covid crisis, react on this worry by actually working out more. It doesnt have an influence on my emotions, since I see it more as a challenge. The pat that worries me is not knowing if I do it well.	the worry ended when doing the workout and taking a shower. I feel exausted but satisfied and clean. Sometimes I worry about it when I dont have a workout planned. So then I do a short one anyway making small progress. Improving myself heps to get rid of the worry.			1	1	2	2	2	4	1	4	1.428571429		2	1	2	1	2	1	1
52	P14-Day1 (Marten)	Food &Weight	I'm trying to lose weight so on days when I dont see progression or I'm hungry all the time I worry.	Appearance	It's an annoyance,specially hunger if it happens frequently. I want to fel better, bear myself but I'm not worried a lot wore frustrated by the speed.	I just do other things like reading as I can't really do more than stick to my diet Sometimes I do some exercises and then I feel good.		long term	0	3	1	2	3	2	2	4	1.571428571		1	1	1	3	1	1	3
53	P5-Day1 (Laura)	Family	Worrying about only shortly visiting my father because I was busy with studying	Family	I was thinking whether I should visit my father this weekend. I would like to keep a "fair"balance between my father and my mother	I make a plan for when to see my father, I call him to set a date this saturday			1	1	2	1	1	4	1	2	1.428571429		2	3	1	1	1	1	1
54	P9-Day4	Family	My ex-husband thought the corona virus is serious in Eu. He hope my daughter would return back to China now. I dont think it is a good idea. But I really worry about how long the epidemic would continue. I am worrying about whether my daughter can graduate and if she can find a good job.	future	Although I am worried, I believe my daughter can have a great future.	I still trust my daughter to make right decision. I stand by the window and look outside, the good weather makes me feel better.			0	3	2	2	3	1	1	4	2		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
55	P9-Day5	Family	my husband likes to do carpentry work, but he is not used to wear mask to prevent dust. I worry that he will inhale a lot of dust.		I am worried about my husband's health. I believe if I try harder to convince him wear the mask, he would do it.	I keep worrying because he always forgets. As long as he wear a mask, I will stop worrying.			1	1	1	2	2	3	1	3	3.142857143		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
56	P9-Day6	Family	Because of the epidemic, my husband's work also stopped. I dont know how long this situation will last. I am also worried what to do it this situation lasts for a long time.		I just feel a little worried, but it is ok.	I am trying to convince myself that I should not worry about it. I trust my husband's ability.			0	2	1	2	3	4	1	4	2		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
57	P4-Day2	Washing my face before going to sleep	My parents in law invited us to spend the long weekend at their place but, is it responsible to go? Would I go if they were my parent even though they are in the risk group and idk if I have asymptomatic corona?		Sometimes I feel like I might be overeacting some other times I think "well responsibly talking I shouldn't go and that is not rude because what's happening it's real"	worry ends, going to bed, closing my eyes and falling asleep letting the worry go			0	3	2	1	2	2	2	1	1.857142857		2	2	1	1	3	1	3
58	P6-Day1	Family call	I called dad to see how he was doing and he sent a picture of a barbecue. He described that my young sisters (12-15) were complaining and not enjoying. He said he took ways their phones and their laptops every night. They are too much on their technological devices, he said. And they are not liking him for this. I am worried about how they will evolve with this large of use of tech in their childhood. I am often worried about them because I am not there since 6 years ago.		I try to trust my dad's actions to control the situation. He is trying to give them a good education. I am concerned and should call my sisters to see how they are feeling. This doesn't really influence my life and it is a very far away life in central america. I know I am not responsible in the end and I can not do much about it rather than be an example to them. I tried to do other stuff to distract myself	The worry won't stop !		long term, no end	0	3	1	2	3	1	3	4	2.142857143		3	3	1	2	4	1	1
59	P2-Day3	Family	My dad just called me to remind me about my future....... should I go back to China or stay here?	Family	I am worrying about the same problem as yesterday, even more stressed and scared	I still can not find a solution. I always distract myself. But the same worry will come back again for me ..		long term, loop	1	2	1	2	4	1	3	4	4		4	4	4	4	4	4	4
60	P6-Day2	Feeling physical tension/tickling below my chin and on my chest	The picture is the view from my desk where I sit all day and look at. During the day I started feeling tension and physical symptoms. I had a meeting this morning and been dealing with other situations this week(Landlord, ex-boyfriend dilemma), so my anxiety level are high and as I notice I get more worried because it is bad for my health. These symptoms are not really that bad, but it gives me a warning that I have to relax. I feel like in moments of preassure and anxiety.		I worry that I am suffering anxiety and stressed. I am doing yoga for every day since 1 month and I thought I wouldnt be this anxious. (Sad emoji), it makes me feel like I can not control my emotions or reaction to situations. I get irritated and feel like being by myself. Maybe I isolate a little...but not so exaggerated, it is just I am sharing a house with 2 people and having to talk everyday when there's nothing new or ujst because we happen to be in the same place makes me feel trapped. I need space!!!	I tried meditation podcast and breathing exercise. The physical sumptoms are gone. I also tried to deal with some things that I could do something about. Meditation helps to get clarity on what I feel and what I should do, what I think is right and good.			1	1	1	2	2	2	2	1	3.142857143		3	4	3	4	3	2	3
61	P12-Day5	Health	The picture is tram line 1. During this sepcial period, people might get too sensitive to coughing. I went out in a hurry and forgot to take my mask. I was trying to avoid people. I was in teh tram for less than 5 mins. A man in front me was coughing and then a women behind me started coughing. I was so scared and hardly dare to breathe. I started worrying for my health condition.	Health	Feeling: Very anxious, afraid of getting sick. I feel hard to relax, lose desire of eat. It influence my emotions a lot, I may still think of it several days later.	The worry ends a few hours later. I disinfected my jacket and took a shower immediately when I got home. I washes my hands several times and talked to my friends to get some comfort. I also had a delicious eal and watched funny tv series.		short term, end	1	1	2 E-1	1	3	3 E-1	3 E-1	1	3.142857143		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
62	P3-Day2	Health	Worry started by waking up with a back pain again. Worried my bed light be bad for my back.		Worried since it is ifficult to change the bed. It doesnt affect my emotions.	I did online research about how to prevent back pain. Couldnt find any easy solutions for this by keeping the same bed. I will remember I can focus more on the back when going yoga. Will do that.			0	1	1	1	2	4	2	2	1.285714286		1	2	1	1	2	1	1
63	P5-Day5	Health	A month ago, I enrolled myself at Sanquin to donate blood. Today was the day of the first appointment where they will take same blood to check you on diseases. Although I fell healthy, I was still worried that they would find some thing grave	Health	It is a constant worry that is in the back of your head. You know that it is bullshit, but still you cannot stop worrying	The worry ended because they were not able to get blood from my veins, my veins are too narrow So I did not get information on my blood and health. So I also did not hear that I am healthy		short term end	1	1	2	1	2	4	2	1	1.857142857		2	2	2	1	3	2	1
64	P3-Day5	Health(drinking)& Social	Kings day is coming and my roommates planned some activities. We already did a lot together so I rather want to have some my own time. Tomorrow is working day so I dont want to drink too much.		Feeling a bit exhausted and need to refill by being alone for a moment.	I joined for half of the day and then I took a rest. I chilled on my couch and listened to some music. This helped me relax quite easily.		short term, end	0	1	2	1	2	3	2	2	1.571428571		1	1	3	2	1	1	2
65	P14-Day5	Health	I want to do things but I'm too tired. Also my dog is a bit sick and that is worrying.		Apathetic. Don't really want to do anything.	I'm waiting for my dog to come home from the vet. I'm starting to work on somethings to feel like I'm doing atleast something.			1	3	1	1	3	2	2	2	1.571428571		1	1	3	2	1	1	2
66	P5-Day5	Safety	Today my mother and I put my bike on the car because it was bad weather. She picked me up with the car at my boyfriend in rotterdam. During the ride, I was constantly checking if the bike was still in place and did not fall off	Safety	During the ride, I was constantly worrying. When we got off the highway, I was a bit more relaxed because we drove somewhat slower. I was afraid that the bike might fall off and hit another car	It ended at the moment I drove into my street. I knew that I could now take off the bike and everything would be fine		short term, end	0	2	2	1	3	1	2	1	2.285714286		3	3	3	1	4	1	1
67	P3-Day3	Skill worry	Skill worry. Was climbing and made pictures. In some pictures my form was really bad. So I worried I am not improving enough.		Feeling annoyed on myself for not making enough progress.	The worry stopped by thinking about 2 things. 1; It is ok that I sometimes dont improve. It is the fun that matters.2; I havent climbed in a long time. This can happen always gives me opportunity to improve.			0	2	2	1	2	1	2	2	1.285714286		1	1	3	1	1	1	1
68	P4-Day1 (ILE-214)	Good weather	Knowing I have to work to complete my masters when a lot of people have 'free' time (some no work) and seeing them enjoy the weather through my window. I started to get distracted and ended up deciding working very little. So not a productive day. I then worried of not being capable of finishing because of my lack of focus. What if I am not competent? What if what I'm doing does not make sense at all?		At the moment this is a recurrent worrying, I think sometimes I feel incapable career-wise	I kept distracting myself even more with Pinterest,. Trying to make up the worr		long term, distract	0	3	1	2	3	1	4	4	1.857142857		2	2	2	2	2	2	1
69	P4-Day5	Commitment with myself	Not waking up with the alarm to 'enjoy' my alone day. My boyfriend went to visit his family and friends to his hometown and I preferred to stay home, one the one hand because of the corona situation and on the other to spend some time alone and enjoy the studio. I put an alarm to take the best of the day out, to say, squeeze the alone time I had. When I realized I did not wake up as I planned I felt like my willpower is low and that maybe I should be more strict with myself.		When this happens to me (which is often) I feel a little as betraying myself then I kinda make peace with myself too thinking that, in this case, part of enjoying myself was to sleep through the alarm and that maybe I should not be that hard on myself.	exercising			0	2	2	1	1	3	2	1	1.571428571		2	2	2	1	1	1	2
70	P7-Day2	Public event /social situation	Today I had to conduct a generative session for the first time. A virtual one because of covid-19. So I wake up really worried about whether I was ready or not. I was worried cause I was going lead a sesion with strangers and I am very self-concious, so I tend to overthink, specially when I start to think whether my english is good or fulent enough for these situation. So I guess this worry come everytime I need to talk in public.		I feel to self concious while I am talking or on the light spot. I try to calm my self by telling me it is gonna be okay. I also try to prepare before hand so I dont feel so nervous. But while I am talking in public, I am always wondering if I am doing it right. I am also very sensitive during these moments.	Only when the event is over or by the end of it is that I calm down. I takes some breathes to try to relax and I try to stay focus on the important things.			0	2	1	2	3	3	3	1	2.857142857		3	3	3	3	2	3	3
71	P7-Day3	Eating without control during social events	I had a small picnic with friends. Everyone brought food(bread, fruits, veggies, sweets, beers). Once I start to eat junk food and it is very hard for me to stop. It happens at parties or dinners where food is abundant. And I realized at the middle of the event that I am eating too much		I feel very frustrated & disappinted at myself, cause I know it is a very bad behaviour but at the same time I can not stop. So I just feel bad, worried and I guess that fuels the behaviour.	It ends at the next day cause I normally feel guilty the whole till the next day when I start eating healthy			1	1	1	1	2	4	2	2	2.428571429		2	4	2	2	2	2	3
72	P7-Day4	Health related	This morning I had for breakfast/lunch a really spicy meal, along with two pills for different discomforts I am experiencing. Later today I started to feel heartburn which is a symptom of gastritis. I am feeling sick, nauseas and it hurts. I am also worried about how long it will last. I almost never get gastritis. This is the 3rd time in my life I've gotten it.		I am annoyed cause I can not concentrate on my thesis because of the pain. I wish I had a treatment more effective for gastritis so the pain could go away and I could get back to work. I am worry this scalates and become something more serious.	It endsed after a couple of days, thanks o the treatment I took, and also cause I avoided spicy food these days. It did help, I wanted to feel better asap, so this was the only way.			1	1	2	1	3	4	2	2	3.285714286		3	3	4	4	3	3	3
73	P7-Day5	Being alone	Whenever I am watching a series/movie that remins me of my family, friends, love. I can not help to feel a bit lonely cause I am away from home and missing some important event. I also worry about meeting someone special to date, specially cause I would like to stay in the NL. So sometimes I feel hopeless and lonely.		I always try to talk to friends/ families whenever I get worried about not finding a partner. I also try to go out and meet friends, having a beer or something. I guess it brings me down for a while but no thing serious.	As I said I normally talk to my best friends about this. And it usually helps. Sometimes I just wait for it to pass by. I also remind my self of how luck I am to have the friends I have.			0	3	2	2	2	1	3	4	2.428571429		2	2	2	2	3	3	3
74	P7-Day6	Cloudy Day	This is a picture of the view from my room. It's been cloudy the last few days. And that wways being my spirit down & Makes me nostalgic. Today I have a weird feeling in my chest and I am worried about my mental health since I can not go out & see my friends.		I am feeling down, I wish I could just feel energized and motivated again. It affects my story progress, this week I havent worked much on the thesis. Right now I a m just waiting for this feeling to pass and hopefully tomorrow I will feel better.	A day after and I am feeling much better. I pushed myself into exercising & woking from early morning. I think exercise really helps. It helps ease my mid & also feel energetic.			1	J-3 E-2 L-2	J-2 E-1 L-2	J-2 E-2 L-1	3	3 E-2 L-2	J-2 E-4 L-3	J-1 E-2 L-1	2.714285714		3	3	3	3	3	2	2
75	P8-Day1(Marianne)	trying to find free legal advice	We have to pay tax, a raised rent and a broken dishwashe that are not our damage. We scheduled with roomate today to call to ask for tax exemption (money back) This picture is a letter of tax from the government, for february, and we did not see it.		I am worried since some days already and today we decided with the roomate to call to ask for exception of taxes during lunch. Our request was rejected because it is under our landlord's name and she is the owner so cannot apply for exception. But our contact says we have to pay. This made us start worrying because we have a build up of issues with our cruel landlord and have to pay a lot of money. We think we do not have to pay. We then spent 3 hours calling and trying to find free legal advice, finding infor online and writting email for the landlord.I felt very frustrated	The landlord asked for legal advice and she asked for a exception. We donot have to pay the total amount and the deadline is extended too. The steps I took was to call for legal advice and then send her an email communicating our perspective. Then wait to see how she reacts and what can be done. The steps helped me and the worry was solved.		short term ,end	0	1	2	1	2	2	3	3	3		4	4	3	2	4	1	3
76	P2-Day1 (Liu)	Bad sleep	--I slept very bad, stay up till 4:00Am-- Tigger: Canot fall asleep keep thinking about annoying friends, what they said about me. And I am also worrying about my future	Sleep	I feel short of breathe, very serviours, can not fall asleep. Feel very tired due to stress and feel very upset and down	I do nothing to control my worry. I will forget about it the next day because I dont care extra effort to do anything to it.		short term to long term????	1	2	1	2	3	1	3	4	3.857142857		4	4	4	3	4	4	4
77	P8-Day3		The trash bin is full and it is my roomate's turn to change. I always do it, so I asked that we split this task weekly and this week is her turn. I told her yesterday that it was overflowing. This morning it smells there, unchanged. I reminded her again, I worry that I will have to take care of these things myself if they are only important to me. I worry that this is not the only thing getting on my nerve and I have to be here for a long time! ! I do like my roomies, though.		House duty. I feel a bit angry and want to let it go, in the end it is not that big of a deal, but it is build up of things. I feel impotent and like I am holding to myself my thoughts to not make the situation unpeaceful. In the end no one is doing anything to bother others. It is only different standards of cleaning and a different way of co-living. I feel frustrated!	I told my roomate about the trash bin, she did it. When I think something, I do not keep it and say it repeatly. Then I can also understand the other people's perspective.		short term end	0	1	2	1	3	3	2	2	2.428571429		3	3	3	4	2	1	1
78	P8-Day5	Health related	I have pain in my upper back since 8 years ago. I am worried that it is something serious but the time I've been to the doctor "it is stress". I want to go to see the doctr again as I feel worse in my back. So I worry everyday about this pain and it has getting worse and move to different place.		I am used to this worry already. So I just learned to live with it. I think of going to the physical therapist but do not really know how to do that in the NL. I do a lot of yoga to help the pain by stretching and it helps a bit. I feel helped.	It won't end until I go to the doctor and treat it properly.		long term	1	2	1	2	3	1	3	4	2.142857143		3	3	2	1	4	1	1
79	P9-Day1 Min-56-housewife)	Public event/social situation	Today we went to the supermarket for shopping. My husband is very close to a man. There is no distance of 1.5 m, and the man communicated with my husband. I am worried that he is infected with corona virus. I am very nervous		I am feeling both angry and worried for my husband. I had a big fight with him, but there's nothing I can change.	I get a feeling this corona situation is getting better now. I am less worried, but this is also because there's nothing I can do to this worry. Sometimes I take a walk when I am feeling down, to see the nature and breath in fresh air.		long term, nothing can do but reduced	1	3	1	2	3	1	2	4	2.857142857		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
80	P9-Day3	Take care of flower	I have a pot of flowers that I like very much. I take care of them well and they looks growing very well. It should be the time to bloom now, but it isnt now. For the last two years, it always bloom at this time. So I do not know what went wrong.		I am afraid of the flower might dead.	It is a small thing. So I forget about this quickly. The picture is taken from last year of the same flower.			0	2	2	1	1	1	1	3	1.142857143		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
81	P10-Day5	racism	I was running with my friends on the street. There were two Turkish people shouting behind me "fucking covid guys". I fly into rage and tried to chase them and aruge with them. It is the 4th times this kind of shit happen.		I was chasing them and shouting at them, they started to run away. I feel angry more and more. After that, I am scared of the consequence if I lost control and do something illegal. So next time I saw them, I was trying to stay calm and just let it go. These stupid guys do not worth my attention.	It keeps bothering me and I can not forget about it that day. But today this worry already passed and I dont know when.		short term,ended at last	1	1	1	2	4	4	4	4	2.142857143		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
82	P10-Day6	Social pressure	A guy keeps poping up in my social media apps. I dont know why but I do not like seeing him. I tried to block this guy's post and it didnt work.		I feel that I can not control my entertainment even on my smartphone.	I adapted to it and learned to stay calm when I see him Good night.			1	2	2	1	1	1	2	2	1.428571429		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
83	P11-Day2	Weather	The picture is the weather forecast. The situation is that bad weather makes me worry. This worry might relate with works on hand. Also, the weather of last several weeks is always funny. It does not take place a lot but most of this worry happen when I am doing nothing. I only feel depressed at moment like this.		Bad weather makes me feel depressed. I can not feel relaxing during the break (At office). Definitely I can do nothing to change nature. What I can do is moving my attention to other things To be honest, when it is raining outside, I am a bit easily to be annoyed and irritated. In my deep mind, a concern about something awful exists.	The worry ends when the raining stops. I did nothing but tried to occupy my schedule with other things. I think if I stop thinking about weather, the worry can be reduced.			1	2	2	1	2	1	2	1	2.428571429		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
84	P11-Day3	Conversation with friends	This picture is the screenshot with my friend. He explained his work stress and some issues in his relationship with his girl friend. It only happens once and it triggered my worry on relationship and lonliness.		I feel not so negative to this worry because it is an unexpected worry. or this worry, I still do not know how to react to it. It influences little to my emotions but I do feel difficult relaxing myself in the spare time. Some worries about relationship/ loneliness, uncontrollable pops up.	This worry ends before I go sleeping. As I mentioned before, I do nothing to this or in other words, I accept the current situation of my life. Since the trigger disappears, my worry is also reduced.		short term, end	1	2	2	2	3	2	3	4	2.142857143		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
85	P11-Day4	Public event/social situation	Day 5 during : I wrote down my thoughts on a piece of paper and think about how m I going to negotiate with my client. Then I decided to stop n have some small exercise breaks in between, it helps a bit in making my brain focus on a individual task than splitting between work n thesis.		I feel a bit tired about this worry. I tried to ignore this worry because I can not change other's mind. This worry doesn't affect my life a lot. I become a bit careful when I am ouside during this difficult period.If someone stares at me, I would be easy to be annoyed and irritated.	This worry also vanishes before i go sleeping. I try to convince myself that there are too many rumers on the internet and the cultural difference makes local feel uncomfortable when they see me with masks. I can not change their mind in a short time, so just let it go.		long term, end	0	2	2	2	3	1	1	4	1.714285714		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
86	P12-Day2	Weather rain	Bad weather and no sunshine. The sky is very dark and it is raining outside. It makes me feel upset and tired, I feel less motivated and not productive.	Study stress	I am very anxious and can not concentrate on study.	The worry ends when I had some dessert. Dessert helps. I like sweet food and it makes me feel happy and warm.			1	3	2	1	2	2	1	1	2.428571429		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
87	P14-Day2	Sleep	In some days I'm just on my place a long time and don't want to go to sleep because I know I'll be always for a long time. I'll just be think about fling I want or need to do.	Sleep	It's one of the most frustrating on days where I cannot in sleep in but it is very useful to "worry"because if helps me define and find the causes etc. It's most frustrating when it's just feelings.	When I become tired and finally fall asleep otherwise I read on I write something on my phone.			1	3	2	2	1	2	2	1	1.857142857		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
88	P14-Day4	Make decision	This one is elective and I'm wondering whether it's god or bad. I like having lots of options. But I'd love to have something to would look forward again.		This one is quite constant. Sometimes I forget but it is more a theme what do I want. It's not so negative because I like dreaming about it too. What's possible? where I will go? Exciting! But how do I act.	It doesn't permanently. But it does just go away after a while, to come back again later...			0	2	2	1	1	3	1	1	1.857142857		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
89	P14-Day4	Tired	The trigger was already there the whole time; feeling tired . the trigger to reflect was this booklet..	Health	I'm just grumps and annoyed. I'm tired,didn't study well today and just UGH!	Just say to myself .. ch. Tomorrow I'll do it,but today I'm too tired.			1	2	1	2	3	2	4	1	1.857142857		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
90	P15-Day7		The deadline is coming and I only finished 40% of it. I must keep working up		Anxious and nervous, I do not have enogh time	The worry ended after I uploaded the file. It was not a nice work but I think I will pass, at least a 6			0	1	2	1	3	3	2	1	1.857142857		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Reflection

P11-Day7: In terms of dealing with worries, I think this is helpful. Before, I never think about figuring out what are the reason behind my worries, and when and how do they vanish. In my case, the start of worrying, or trigger of my worries, usually are very small and unnoticable issues. For instance, chatting with friends or some work mails. During overrying, in most of the cases, I dont know how to take measures to reduce the worries. Let's say, if I know how to efficiently reduce those worries, then they would never be considered as worries. For the end of worrying, most of worries go away before the end of the day. Maybe it is because those worries are not so serious to affect the quality of sleep. XD. Besides, I think communication with friends, colleagues and family members do help to reduce worry. But to stop the worry, it is still depends on myself. (0)

Reflection

P5-Day7: I am more aware of my worries (during) & where they come from/what triggers them(start).To end the worrying, I try to stop thinking about it if it is an unessary worry, or something I cannot change. I try to think of something else. If there is something I can change, I keep busy with making a plan on how to sole the issue. Only when the plan is finished, I stop worrying & Let go. It would be nice if I can let go easier. (0)

Reflection

P2-Day7: I think I deal with my worries better after these days of tasks.But its more like a treehole where I can share my worries. In terms of during worrying, I realized that the level of me feeling worried is really high. But I still dont know how to stop worrying. (0)

Reflection

P12-Day7: After these tasks, I get a clearer idea of my daily worries. And how I deal with these worries unconsiously. My worries are ainly about study, sleep problem , future and figure. And I feel these worries can all be connected as one can be the trigger of another one. Almost all my worries will end in the same day it starts, but will come back another time the day after. There's not any new worries apart from these worries. So I am more and omre familar with these worries. So sometimes I will do nothing about it. I will focus less on it when I start on something else.

Reflection

P1-Day7: I realised during 7 days reflection that there are a lot of triggers that get me worried. For some trigger, the worry lasts for a long time, such as a few days and for some it only last for a few seconds. <u>It depends on how is that matters connected to my life. And very importanly, how much have i grow in knowledge, wisdom and meditation. These technique help a lot in disconnecting me from the matters and look at it from an outsider perspective.</u> So if it is a small matters like undone dishes (and it is my flatmate's), I will react instantly and act accordingly, like reminding the person politely, as sometimes even ignore. Others such as unexpected workload, as commitment to something. <u>There are more severe worries than undone dishes. Order: 1----Chores2----Commitment for some work3----unexpected workload4-----career related.</u>

Pattern: -Orders of worries 1-Chores 2-Commitment for some work 3-unexpected workload 4-career related. -Important to disconnect from the matter and look it from outsider perspective

Reflection

P7-Day7: I think it helped me being more concious and notice how I was feeling and what was the sources. It's very easy to fall into worries all the time. There are a bunch of things that we need to do, finish, accomplish...So it's very tricky to actually live without worries, to say the least. So I think that knowing how to manage those worries is very important. The ideal scenario will be not to worry at all, but the end best scenario is knowing how to deal once the worry comes, and dont let if affect you. Expressing the worries in pictures was very hard since it is all very abstract. But I hope

Reflection

P8-Day7: I think it this booklet is more about being aware and I journal every moring, so I am quite aware of these things. However, I did notice that I selected some worries for the wristband which I considered to be major worries. At the end of each day, I realised that my main worry of the day sometimes was something that, in the big picture of my life, is merely relevant. The small worries affect more my daily life, as the take up space in my head to understand them and think about what to do. The big worries are just there, stays, and require deeper work to do something about them. On the other hand, I notice it is hard to identify the trigger because sometimes it is not a particular thing that I can point. It was hard to choose pictures for this. The trigger sometimes are fears.

Reflection

P14-Day7: I don't think I'm really the person who would need a tool like this ; I reflect all the time and talk to people about it quite often so I don't really need a reminder or a tool like this I think the sticks could be fan to start with

Reflection

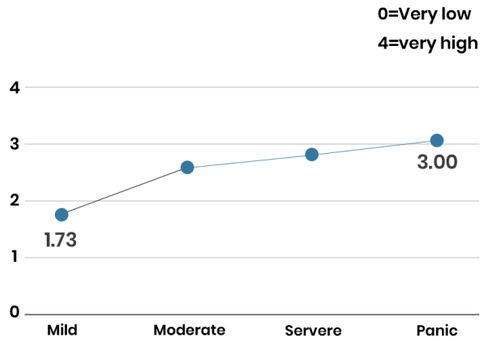
P13-Day7: It was really interesting to reflect on my worries in a more structured way, and to think about the coping mechanisms I've developed for different types of worry. ***Identifying the triggers was particularly helpful as I can imagine that I'll be able to recognise these better in future and maybe reduce the amount of anxiety I feel as a result.*** I noticed that during worrying, I mostly experience moderate to high levels of anxiety, but low levels of anger/irritation. I think this is because a lot of my worries are internal, i.e. related to things about my identity, abilities or immediate situation, so there isn't much to be angry about per se; it's more so a feeling of helplessness. I also found that I tend to be solution-focused when I try to stop worrying, e.g. making lists or schedules. When I can't do this, I tend to distract myself with things that remind me of positive aspects of my life. I wonder now about the influence of some of these 'solutions' on my longer-term mental state. Perhaps by trying to find an answer for my worries,I <u>**am actually raising the mental stakes for myself and setting myself up to be even more distressed next time if the 'solution' fails.**</u>

Appendix -3 Feelings analysis

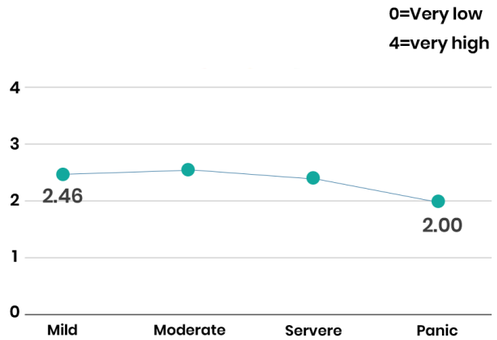
Triggered | Start worrying | Reactions | End of worry | After worrying

▸ **Fig.27 - How IFs influence how servere people perceive**

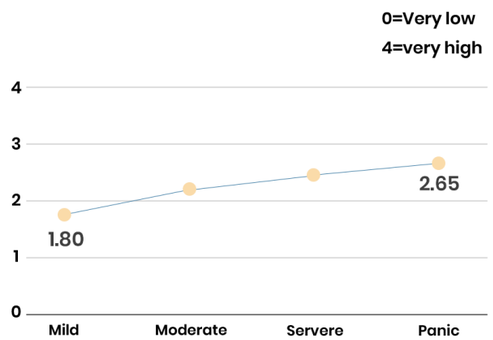
Factor 1:
The perceived cost/imapct of undesirable outcome



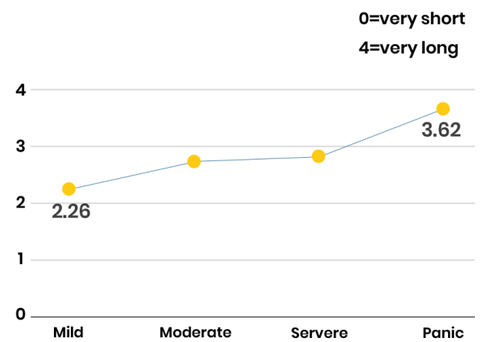
Factor 2:
The perceived controllability and predictability



Factor 3:
The perceived probability of undesirable outcome



Factor 4:
The perceived distance of undesirable outcome-time wise



F1 : Significant positive correlation

The higher the perceived cost/impact of undesirable outcome is, the individual will feel more severe

F2 : Significant negative correlation

The lower the perceived controllability and predictability is, the individual will feel more severe

F3 : Significant positive correlation

The higher the perceived probability of the undesirable outcome is, the individual will feel more severe

F4 : Significant positive correlation

The longer the time-wise distance of the undesirable outcome is, the individual will feel more severe

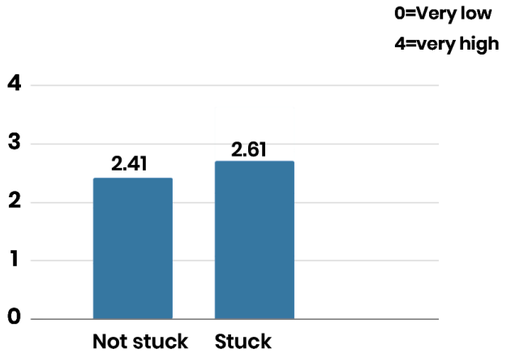
Findings

How people feel when worrying depends on all four factors. The degree of feeling severe when worrying is significantly negatively correlated with factor 2 and is significantly positively correlated with factor 1, factor 3, and factor 4.

Appendix -4 Stuck analysis

▸ **Fig.31 - How IFs influence if people would stuck**

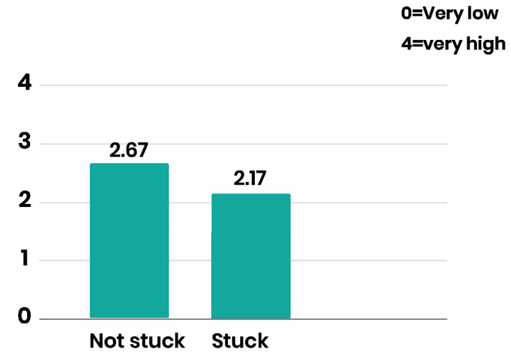
Factor 1:
The perceived cost/imapct of undesirable outcome



F1 : Negative correlation

The higher the perceived cost/impact of undesirable outcome is, the user is more likely to be stuck.

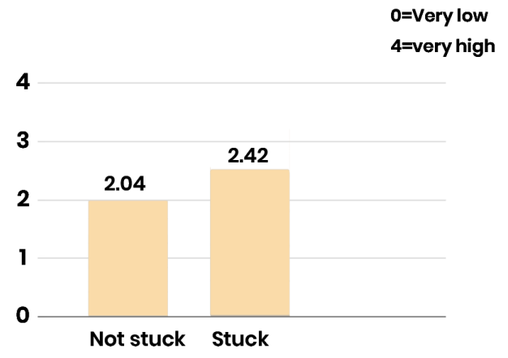
Factor 2:
The perceived controllability and predictability



F2 : Positive correlation

The lower the perceived controllability and predictability is, the user is more likely to be stuck

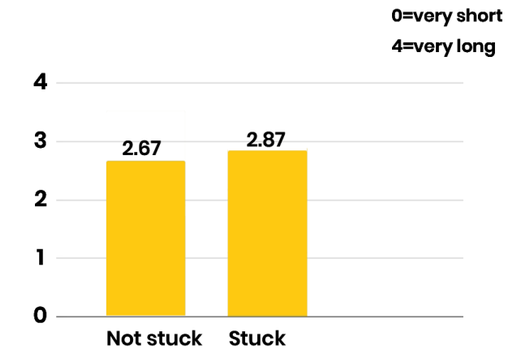
Factor 3:
The perceived probability of undesirable outcome



F3 : Negative correlation

The higher the perceived probability of the undesirable outcome is, the user is more likely to be stuck.

Factor 4:
The perceived distance of undesirable outcome-time wise



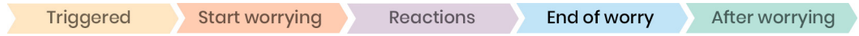
F4 : Negative correlation

The longer the time-wise distance of the undesirable outcome is, the user is more likely to be stuck

Findings

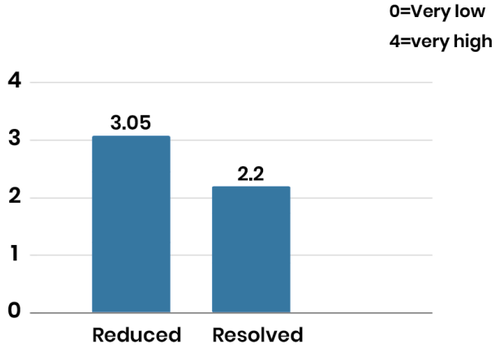
If the user will stuck in the negative feelings depends on all the 4 factors.

Appendix -5 End phase analysis



▸ **Fig.38 - How IFs influence if the worry is resolved**

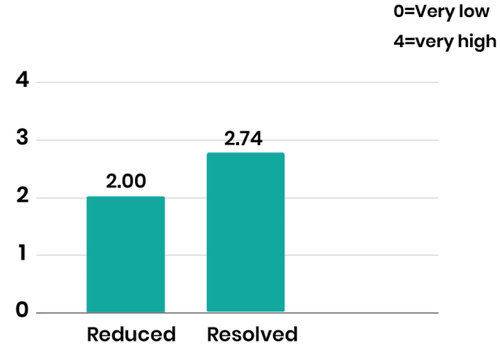
Factor 1:
The perceived cost/imapct of undesirable outcome



F1 : Negative correlation

The higher the perceived cost/impact of undesirable outcome is, the worry is more likely to only reduced not resolved.

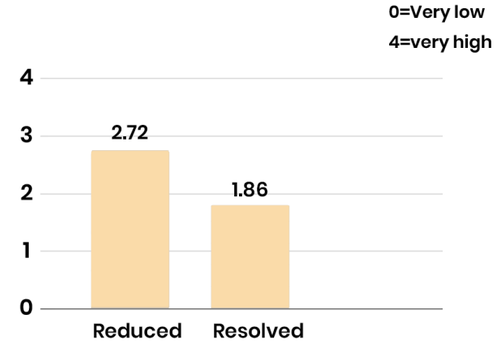
Factor 2:
The perceived controllability and predictability



F2 : Positive correlation

The lower the perceived controllability and predictability is, the worry is more likely to only reduced not resolved.

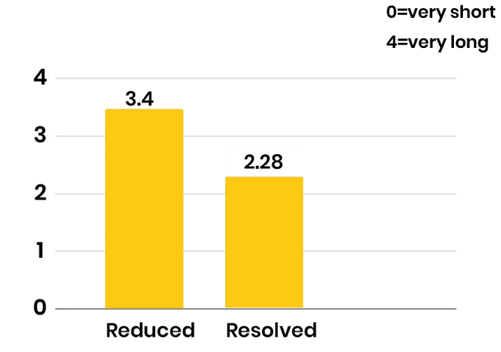
Factor 3:
The perceived probability of undesirable outcome



F3 : Negative correlation

The higher the perceived probability of the undesirable outcome is, the worry is more likely to only reduced not resolved.

Factor 4:
The perceived distance of undesirable outcome-time wise



F4 : Negative correlation

The longer the time-wise distance of the undesirable outcome is, the worry is more likely to only reduced not resolved.

Findings

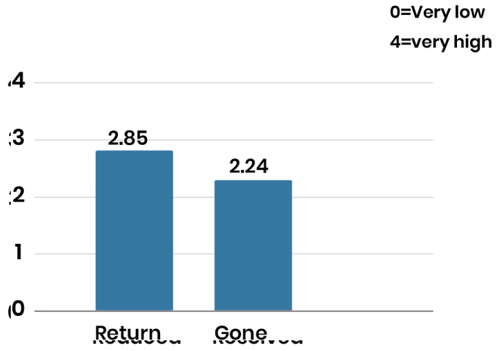
The degree of reduction of feeling worried depends on all the four factors. The reduction degree of feeling worried can be seen as a liner outcome. The worry ends means the highest degree of reduction. The degree of reduction of feeling worried is significantly positive correlated with factor 2, and is significantly negative correlated with factor 1, factor3, and factor 4.

So there might be an opportunity to help end their worries with enhancing factor 2, and reduce the impact of factor 1, factor 3, and factor 4.

Appendix -6 After worry analysis

▸ **Fig.42- How IFs influence if the worry will be gone**

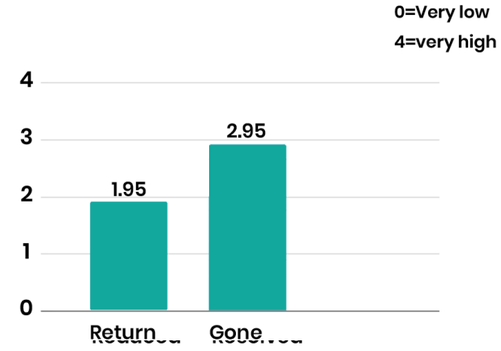
Factor 1:
The perceived cost/imapct of undesirable outcome



F1 : Negative correlation

The higher the perceived cost/impact of undesirable outcome is, the worry is more likely to return.

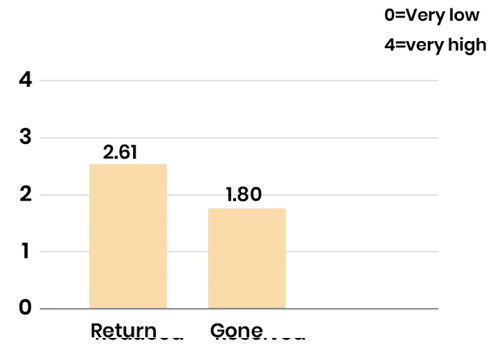
Factor 2:
The perceived controllability and predictability



F2 : Positive correlation

The lower the perceived controllability and predictability is, the worry is more likely to return.

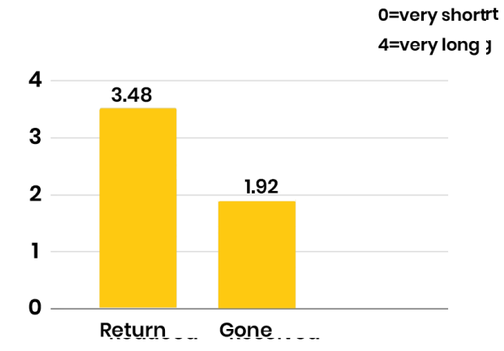
Factor 3:
The perceived probability of undesirable outcome



F3 : Negative correlation

The higher the perceived probability of the undesirable outcome is, the worry is more likely to return

Factor 4:
The perceived distance of undesirable outcome-time wise



F4 : Negative correlation

The longer the time-wise distance of the undesirable outcome is, the worry is more likely to return

Findings

If the worry will return or be gone depends on all the 4 factors. The return or be gone of the worry is significantly positively correlated with factor 2, and is significantly negative correlated with factor 1, factor 3, and factor 4. Similar to the insight of phase 3 reaction, there might be an opportunity to avoid worry return by enhancing factor 2, and reduce the impact of factor 1, factor 3, and factor 4.