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Moodify

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RIT

Moodify

By
Jiaqi Liu

A Thesis Submitted in Partial Fulfillment of the Requirements for the

Degree of Master of Fine Arts in Visual Communication Design

School/Department of Design

College of Art and Design

Rochester Institute of Technology

Rochester, NY

April 26, 2023

RIT | College of
Art and Design

Thesis Approval

_____
Thesis Title

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Thesis Author

Submitted in partial fulfillment of the requirements for the

degree of

The School

Rochester Institute of Technology | Rochester, New York

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Name   Title

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RIT | College of
Art and Design

Abstract

Degree: Master of Fine Arts

Program: Visual Communication Design

Authors Name: Jiaqi Liu

Advisors Name: Mike Strobert; Adam Smith

Thesis Title: Moodify

This paper proposes a research and solution to address the major psychological risk factor of pathological rumination, which can lead to depression, anxiety, and other chronic conditions. Rumination and worry are identified as key components of mental illnesses and may be underpinned by the same cognitive process. This paper proposes a combined approach of Cognitive Bias Modification (CBM) and Mindfulness-Based Cognitive Therapy (MBCT) treatments to reduce worry and/or rumination. The proposed solution aims to assist users in comprehending their progress and ultimately improve their long-term cognitive health. By leveraging technology to provide users with personalized training and tracking their progress, this approach has the potential to be a useful tool in the management of mental health conditions. The goal of this research is to contribute to the ongoing effort to improve the lives of individuals suffering from mental health conditions.

Key word: depression, cognitive behavior therapy, rumination, design

Introduction:

Depression is a common mental health disorder. According to the World Health Organization (WHO), more than 264 million people worldwide have depression. Rumination is a common symptom of depression. (Nolen-Hoeksema 1991).[1]Depressive rumination is defined as a response style characterized by repetitive thinking about the symptoms, causes, meanings, and consequences of depression, for example, repeated dwelling on questions like 'Why did this happen to me? Why do I feel like this? Why do I always react this way?' (Watkins 2015).[2]Rumination has been identified as a significant psychological risk factor for depression and, therefore, a treatment target. While traditional therapy approaches exist, they may not be accessible to certain populations due to their cost and time-consuming nature. Non-pharmacological therapies, such as Cognitive Behavioral Therapy (CBT) and Mindfulness-Based Cognitive Therapy (MBCT), have been shown to be effective in reducing rumination. The aim is to contribute to the field of mental health by presenting a relevant and timely solution to an important issue. (Hofmann 2010).[3]This paper proposes an IoT product that utilizes CBT and MBCT to provide such an intervention, aiming to contribute to the field of mental health with a relevant and timely solution to this important issue.

[1] Nolen-Hoeksema, Susan. "Responses to Depression and Their Effects on the Duration of Depressive Episodes." *Journal of Abnormal Psychology* 100, no. 4 (1991): 569–82. https://doi.org/10.1037/0021-843x.100.4.569.

[2] Watkins, Ed. "Psychological Treatment of Depressive Rumination." *Current Opinion in Psychology* 4 (2015): 32–36. https://doi.org/10.1016/j.copsyc.2015.01.020.

[3] Hofmann, Stefan G., Alice T. Sawyer, Ashley A. Witt, and Diana Oh. "The Effect of Mindfulness-Based Therapy on Anxiety and Depression: A Meta-Analytic Review." *Journal of Consulting and Clinical Psychology* 78, no. 2 (2010): 169–83. https://doi.org/10.1037/a0018555.

Context：

Problem and solution

Mental health issues are incredibly common, and many people suffer from them in various forms. According to the World Health Organization (WHO), around 1 in 4 people globally will experience a mental health issue at some point in their life. Mental health problems can range from mild to severe and can have a significant impact on a person's daily life, relationships, and overall well-being. One specific issue that many people struggle with is rumination thinking, which is characterized by repetitive, negative thoughts that often lead to feelings of anxiety and depression. Rumination thinking can be triggered by various life events such as a loss, a failure, or a stressful situation. It is estimated that around 60-80% of people with depression experience rumination thinking. Traditional therapy approaches for rumination thinking, such as visiting a therapist can be helpful for reducing rumination thinking, but it do have some drawbacks，For example，Therapy can be inconvenient and costly, and the stigma surrounding mental health can discourage some from seeking it. Pharmacotherapy for rumination thinking has drawbacks including potential side effects, dependence or addiction, limited effectiveness, and the need for experimentation with different medications or combinations. (Scott et.al 2015)[4]

These drawbacks highlight the need for alternative approaches to address rumination thinking that are accessible, affordable, and effective in the long-term.

Then I started my research, and the first thing I need to do is to learn more about rumination.
People who ruminate will think of a thing repeatedly in their mind, trying to find its solution or reason. When the situation is out of control, the person will fall into the vicious circle: Negative emotions can trigger rumination, which is a pattern of repetitive and negative thinking. This can lead to difficulty falling asleep or staying asleep, which can result in feelings of tiredness and sleepiness during the day. These feelings of exhaustion can then lead to a range of negative effects such as poor concentration, decreased productivity, and difficulty managing emotions, which can further fuel negative emotions and trigger more rumination. This cycle can be self-perpetuating, leading to a downward spiral of mental and physical health.

Then I made a hypothesis that we might be able to guide people to transform pathological rumination into ordinary rumination by guiding them break the vicious circle of rumination. As a result, we can improve the sleep quality, At the same time, it can also reduce the possibilities to get depressed. Based on the above research, I decided to do qualitative research on rumination. I choose a young person who has insomnia due to rumination, and ask him to write an insomnia diary, record his insomnia and ruminate, and his sleep after taking different coping styles

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[4] Scott, Whitney, and Lance M McCracken. "Psychological Flexibility, Acceptance and Commitment Therapy, and Chronic Pain." *Current Opinion in Psychology* 2 (2015): 91–96. https://doi.org/10.1016/j.copsyc.2014.12.013.

After analyzing the behavior of depression, I decided to use MBCT (Mindfulness-Based Cognitive Therapy) to cut off the vicious circle. Because Research studies have shown that MBCT can be effective in reducing symptoms of depression, and in preventing relapse in people who have had previous episodes of depression. (Kuyken et al. 2016)[5]

However, I also wanted to change individuals' cognitive thinking patterns in the long term. To achieve this, I conducted secondary research and discovered that King's College London had developed an app-based cognitive training protocol to implicitly alter biased or irrational cognition patterns in depressed individuals. This protocol had shown success in reducing depression symptoms by modifying attentional bias.

After conducting research, I gained a few insights:

1. The use of MBCT therapy can help to eliminate negative thoughts.
2. Utilizing CMB therapy can assist patients in making long-term cognitive changes.

Using these insights, I developed a design concept that included two parts: Aromatic Paper and Mood Disposer and Correcting Cognitive Bias. The first part aimed to guide individuals to record their emotional changes and use visual and olfactory cues to interrupt the relationship between negative emotions and rumination. The second part aimed to leverage CBM therapy to correct cognitive biases and promote long-term cognitive thinking changes.

Design process and details

The first part of the project aims to guide users to record their emotional changes and use visual and olfactory cues to interrupt the relationship between negative emotion and rumination thinking. This approach helps users change from pathological rumination to ordinary rumination, which can be less harmful and more manageable.

To begin, the user writes down the troubling thing on the aromatic paper and writes down how to make it better if they get another chance. The act of writing can be therapeutic in itself and helps the user process their emotions. After writing, the user suddenly feels relaxed. They then tear off the paper and crumple it into a ball before throwing it into the Mood Disposer. The Mood Disposer is a container that symbolizes the act of saying goodbye to bad moods. The act of throwing the paper into the Mood Disposer can be cathartic and helps the user let go of negative emotions.

Finally, the paper triggers the aroma treatment, which surrounds the user with a soothing smell. This helps the user relax even further and fall asleep more easily. In the morning, the user dumps the paper away and starts a brand new day with a positive mood.

To test the preliminary design, a paper model was created, and a survey was conducted with seven testers. The testers were asked to use the model autonomously, and their behavior was observed. The results showed that most people folded the paper irregularly and threw it into the Mood Disposer. Six different patterned notepapers were also

[5] Kuyken, Willem, Fiona C. Warren, Rod S. Taylor, Ben Whalley, Catherine Crane, Guido Bondolfi, Rachel Hayes, et al. "Efficacy of Mindfulness-Based Cognitive Therapy in Prevention of Depressive Relapse." JAMA Psychiatry 73, no. 6 (2016): 565. https://doi.org/10.1001/jamapsychiatry.2016.0076.

designed to test how patterns affect users' behavior or willingness, and the results showed that patterns hardly affect the way people fold, and people prefer to write on paper with a horizontal grid.

Further Refinement and Development: Based on the results of the preliminary testing, the design was refined to improve usability and functionality. The Aromatic Paper and Mood Disposer concept was refined to incorporate a horizontal grid on the notepapers, making it easier for users to write.

For the Correct the Cognitive bias part, I decide to use CBM to correct the user's cognitive thinking in the long-term. The user enters an app and selects couple images about people's mood and emotion. The app then tells the user if they are right or wrong. This approach helps the user learn how to recognize their emotions and understand how they affect their thoughts and behaviors.

Result:

The design solution includes three main features: My Progress, and Psychologist. My Progress allows users to view their CBM Training scores and time records. and the Psychologist feature allows users to view their appointment history with the psychologist. These historical records assist users in comprehending their progress over time and give them the ability to monitor their training status and improvements.

Users can view their CBM Training scores and time records under the My Progress feature. Additionally, they can view their disposer usage history under the Disposer tab and their appointment history with the psychologist under the Psychologist tab. These historical records assist users in comprehending their progress.

This way, users can not only block their rumination thinking in the short term, but also improve their cognitive state in the long term. They can also view their training progress in the app and see if they are making progress. This is also valuable data if they need to visit a therapist in the future.

Evaluation & Discussion

To evaluate the effectiveness of the design solution, I conducted usability testing with six interviewees who had been previously interviewed. Based on their feedback, the majority of users found the design solution to be helpful. However, some users expressed concerns regarding the potential monotony of the training process, which primarily involves identifying images. Additionally, since the mood disorder device is currently only a concept, some users were unable to provide feedback on it.

Future iterations of the project could include 3D printing of the mood disorder device to receive more comprehensive user feedback. Overall, the design solution provides users with a means to not only address their short-term ruminative thinking but also to improve their cognitive states over the long term. The inclusion of historical records and progress monitoring features can also be beneficial for users who may need to share their progress with a therapist in the future.

Furthermore, based on the research review conducted, the design solution effectively addresses the problem statement by providing a tool to assist users in managing their mood disorders. The importance of this research is underscored by the fact that mood disorders can significantly impact an individual's quality of life, making effective treatment and management crucial.

Conclusion：

In conclusion, mental health is an important issue that affects a significant portion of the population. With the increasing use of mobile devices, mobile apps have become a convenient and accessible tool for individuals seeking to manage their mental health. However, many existing apps lack personalized and engaging features, which can limit their effectiveness. In response to this need, my project proposes an Iot device that combines cognitive behavioral therapy techniques with personalized and interactive features, such as the mood adjust device and the image recognition training process, to enhance user engagement and improve mental health outcomes. Through the evaluation and discussion of the usability testing and user feedback, I have gained insights into the strengths and limitations of my design solution. While there are still opportunities for further improvement, such as the 3D printing of the mood detection device, I believe that this project has the potential to make a positive impact on the lives of those struggling with mental health issues.

Appendix A: References and Bibliography

Nolen-Hoeksema, Susan. "Responses to Depression and Their Effects on the Duration of Depressive Episodes." Journal of Abnormal Psychology 100, no. 4 (1991): 569–82. https://doi.org/10.1037/0021-843x.100.4.569.

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Appendix B: Thesis Defense Presentation

Research

Macro | Demographics

Trends in the number of U.S people with mental or emotional problems | 2015-2021

+45%

2015 2016 2017 2018 2019 2020 2021
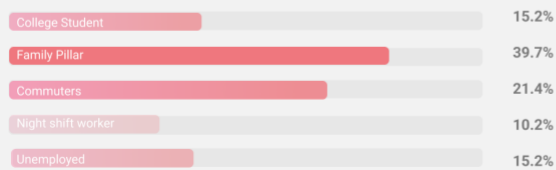
Universality

1 / 3

Insights According to statistics collected following Covid-19, the proportion of people suffering from emotional issues has increased to **one in every three people**.

Distribution in different social identity | US | 2021

College Student   15.2%

Family Pillar   39.7%

Commuters   21.4%

Night shift worker   10.2%

Unemployed   15.2%

The consequences that bad emotions can lead to

62%
58%
42%

- Bipolar Disorder
- Sleep Deprivation
- Stress

Insights In recent years, sleep disorder is becoming younger due to increased stress among young people. People between the ages of 18 and 30 have the most serious sleep disorders.

Micro | Individuals

I interviewed people experienced depressed or anxious from college, workplace and high school, and recorded the key finding below.

Miss. Wilson

"I toss and turn at night because I am always experiencing a lot of negative emotions.."

Elderly Patients

"I feel like my memory is failing and I am afraid of delaying things."

Miss. Miller

"I always feel so tired and lack of energy even when I just woke up."

Elderly Patients

"I suffer from insomnia at night, which causes me to be uninspired during the day, less focused, and more prone to making mistakes. Then the mood deteriorates even further.."

Elderly Patients

"Sometime I feel like I am the only one that abandon by happiness."

Elderly Patients

"I feel everything around me turns blue."

Expert study | Psychologist

Psychologist

Many people experience bad emotions as a result of rumination. It makes it more difficult for people to identify pleasant feelings and circumstances, which can result in depression if negative emotions are allowed to dominate for an extended period of time.
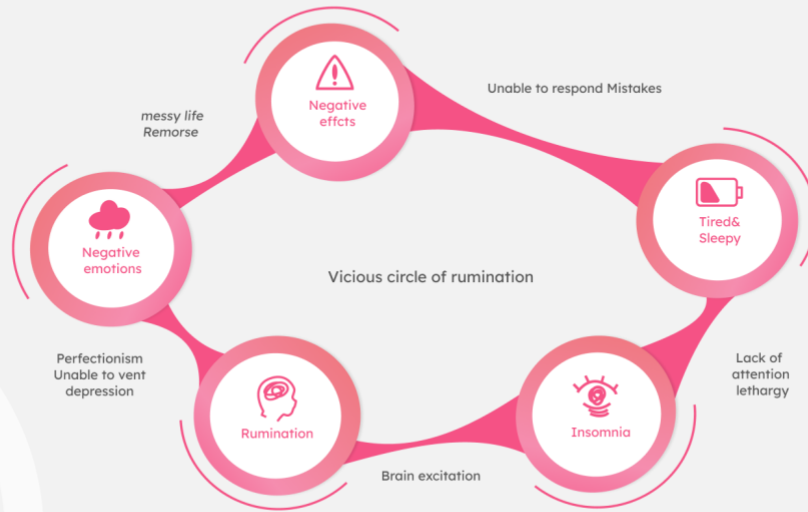
Why do People immerse in negative emotions?

When people experience a negative event, they will have certain negative emotions. Most people can get out of such negative emotions soon, but some people may immersed in it for a long time.

Rumination

The vicious circle of rumination

People who ruminate will think of a thing repeatedly in their mind, trying to find its solution or reason. When the situation is out of control, the person will fall into the vicious circle shown below and easily develop into depression.

Negative effcts

messy life
Remorse

Unable to respond Mistakes

Tired& Sleepy

Negative emotions

Vicious circle of rumination

Lack of attention lethargy

Perfectionism
Unable to vent
depression

Rumination

Insomnia

Brain excitation

Secondary research

Cognitive Bias Modification (CBM) is a non-pharmacotherapy approach that has been used for depression. CBM is a type of cognitive training that aims to modify negative thought patterns and biases. It involves repetitive practice of cognitive tasks designed to change the automatic cognitive processes that underlie negative thinking.

MBCT （Mindfulness-Based Cognitive Therapy） clearly focuses on depression and negative thoughts so that participants can gain experience in identifying these symptoms and have confidence in their ability to respond appropriately.

How might we break this vicious cycle and effectively improve the situation in the long term by leveraging MBCT and CBM therapy?

Ideate

Design Rationale

There are two ways to improve this situation. On the one hand, interrupting rumination is a good start. On the other hand, in order to achieve long-term benefits, individuals must develop positive cognitive identification abilities. It takes both directions concurrently to assist a person in truly breaking free from a rut.

Stop the Rumination
Cutting off repetitive ruminative thinking can be a powerful way to interrupt the vicious cycle and stop the accumulation of negative moods.

Correct the Cognitive bias
Depression tendency can cause people's cognition bias on to identify positive expressions and positive situations. Correcting people's cognitive biases is key to tackling depression and anxiety at the root.

Diary thearpy
Writing down the reasons for the bad mood you ruminate in your mind can help people get out of the rumination whirlpool.

Aromatherapy
Some relaxing scents such as lavender, jungle fragrance can help people fall asleep. Relieve insomnia caused by rumination.

The CBM experiment of KCL
In 2017-2018 KCL's Clinical Psychology major proposed a hypothesis that people's image cognition can counteract mental health. They asked 30 depressive-prone volunteers to do positive expression recognation training during the year. Result shows, most of the testee's depression tendency has been improved and they named the method as **Cognative Bias Modification.**

MATCH SMILING FACES...
ANY SMILING FACES

Design Statement

Moodify is a beacon of hope that will guide you out of the night of emotions. It assists individuals in overcoming rumination through the use of a bad mood disposer kit. Additionally, it can assist individuals in correcting their emotional cognitive biases through CBM training, allowing them to achieve a state of healthy emotional well-being.

CBM Training
By allowing participants to choose positive emotional expressions and scenarios, CBM training can assist individuals in developing positive emotional awareness.

Bad Mood Disposer
Bad Mood Disposer interrupts rumination by allowing people to write about their bad moods and activating the fragrance in a way that alleviates their worries.

Contact Psychologist
Contact Psychologist assists people in increasing access to a psychologist nearby. It helps achieve a more convenient online consulting and appointment scheduling service.

My Progress
My Progress assists people in keeping track of Bad Mood Disposer usage records as well as consultations with psychologists.

Design Specification

I plan to design a product that guides people to sleep through smell and physical interaction. It will have the function of aromatherapy and release the fragrance through heating. At the same time, I will integrate the function of diary, and design a special interactive way for paper, which can guide people to put down their worries.

Main Functions

Aromatherapy

Use the fragrance emitted by the heated aromatherapy paper to help users sleep better.

Diary

Use diary to guide users to sort out and express their emotions before going to bed.

Throw

Use the metaphor of throwing away paper to throw away bad emotions.
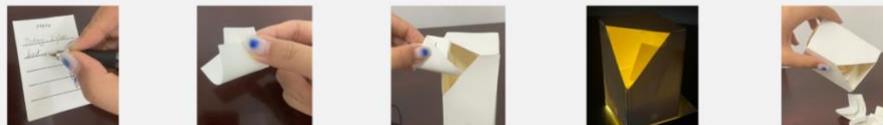
Bad mood disposer

I used a paper model to test in student group. In this survey, I selected 7 testers, and I asked them to use this model autonomously. By observing their behavior I found **most people would fold the paper irregularly** and throwing them into the bad mood disposer.

Aromath Diary

I designed six different patterned notepapers to test how patterns affect users' behavior or willingness. The result shows **patterns hardly affect** the way people fold, and people would write on **paper with a horizontal grid**.

Sketches

Design Details

CBM
Training

When a user makes an incorrect selection, a red error alert appears briefly, and the user must then continue selecting until the selection is correct.

Once the user has made all of the selections, the button will change to **Submit**. By tapping on it, the result card for this training will be displayed.

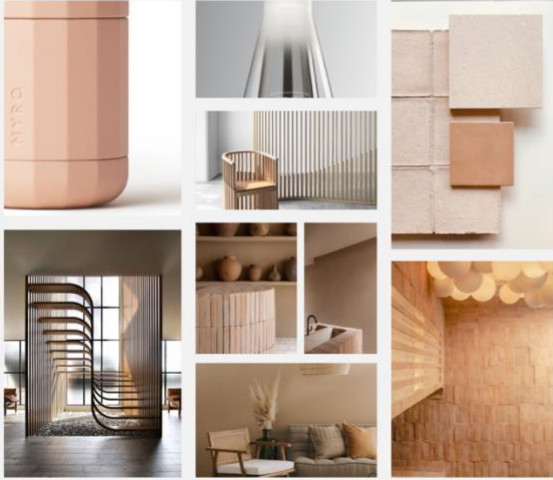The system will rate your training by **speed and accuracy**, two factors

Training Report

2022
Apr. 24

Time Used:	1 m 30s
Score:	85%

Bad Mood
Disposer

The shape of the device represents **a beacon that leads the user out of the rumination.**

Bad Mood Disposer

Get **BAD MOOD DISPOSING** experience

Bad Mood
Disposer Kit   ★★★★★ 5.0
(142 reviews)

$ 89.99   − 1 +   Order

Pairing Your Disposer

Searching for
available devices

BMO-003
Available

Connected

Connect your
device manually

connected
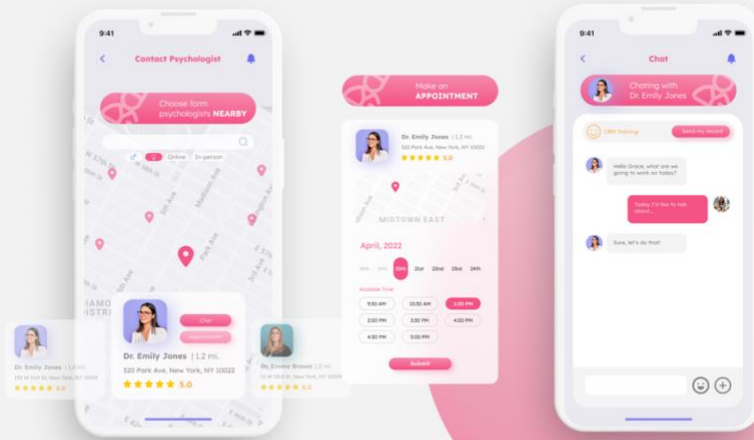Bad Mood Disposer Kit

Start

The user will first come to the store interface. They can place an order for the disposer kit (including disposer and fragrance notepaper) directly from this page. Before they begin using it, connect the product to the Wi-Fi network for pairing. To initiate the instructions, press **Start**.

Step 1 : Write down
your bad mood

Please write down your thoughts
on the notepaper.

Next

Step 2 : Put the bad
mood into the disposer

Crumple the notepaper in to a
ball and toss it into the disposer

Previous   Next

Bad Mood Disposer

Step 3 : Put the bad
mood into the disposer

Bad mood is transformed into a
fragrance that wafts around you.

Previous   Done

More bad mood?
No problem!

Bad Mood
Notepaper   ★★★★★ 5.0
(984 reviews)

$ 9.99   − 5 +   Order

The behavior of throwing away the scented paper that records destructive emotions implies throwing troubles out of users' mind.

Contact
Psychologist

This feature helps users to find a psychologist nearby. Doctors that meet the user's filtering criteria have **Chat and Appointment** options to choose from. Users can choose whether to chat online or make an in-person appointment according to their needs. In the chat window, users can also send their CBM Training Record to the psychologist.

My
Progress

Users can view their **CBM Training** scores and time records under the My Progress feature. Additionally, they can view their disposer usage history under the **Disposer tab** and their appointment history with the psychologist under the **Psychologist tab**. These historical records assist users in comprehending their progress.

Bad Mood Disposer

Jiaqiliu

Project Info

Moodify is an IOT project that leverages CMB and MBCT therapy to help people reduce rumination thinking and cure depression in the long term.

Designer
Jiaqi Liu

Committee
Mike Strobert, Adam Smith

Timeline / Year
Fall 2020 – Spring 2023

Domain
Video Streaming Service

Tool
Figma, Illustrator, Photoshop, After Effect

Background

An increasing amount of people have experienced excessive grumpiness when suffering from sleep deprivation.

Why do we get more emotional when we're tired?
How can I relieve a person's anxiety and depression?

Research

Macro | Demographics

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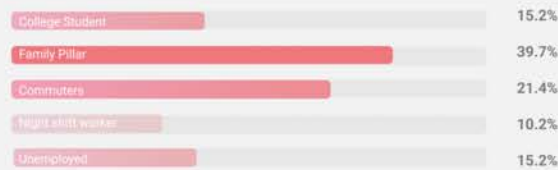2015   2016   2017   2018   2019   2020   2021
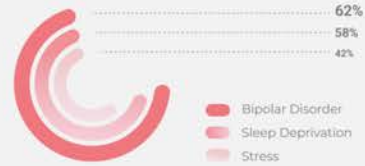
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Elderly Patients

"Sometime I feel like I am the only one that abandon by happiness."

Elderly Patients

"I feel everything around me turns blue."

Log Out   bar

Expert study | Psychologist

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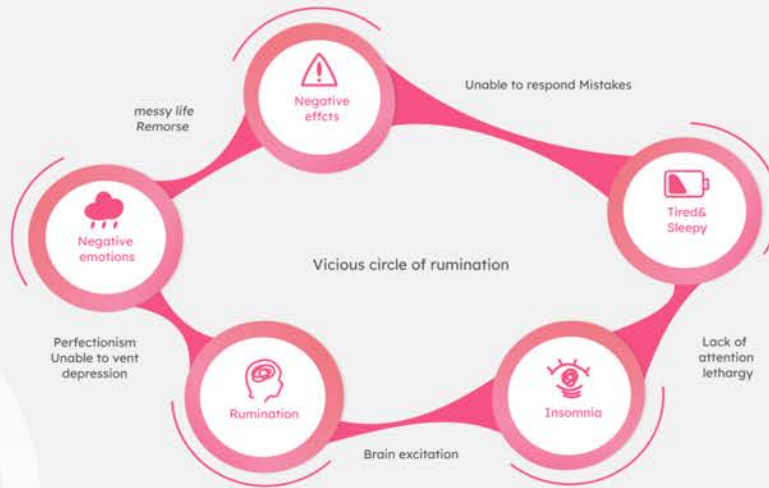
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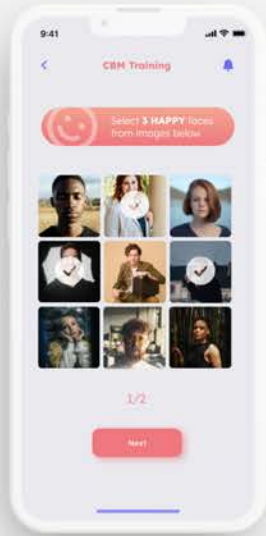
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Training

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1/2

Next

2/2

Submit

2/2

Submit

2/2

Submit

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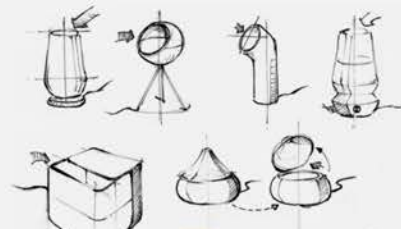
Training Report

2022
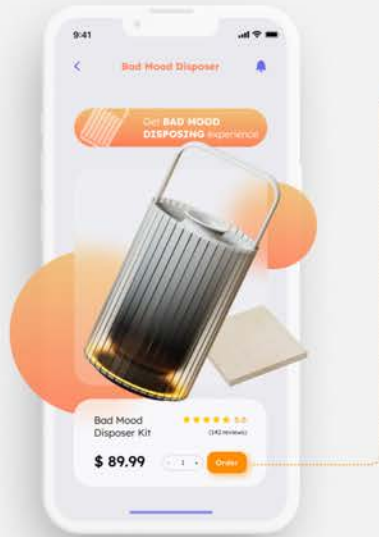Apr. 24

Time Used: 1 m 30s

Score: 85%

The system will rate your training by **speed and accuracy**, two factors

Bad Mood
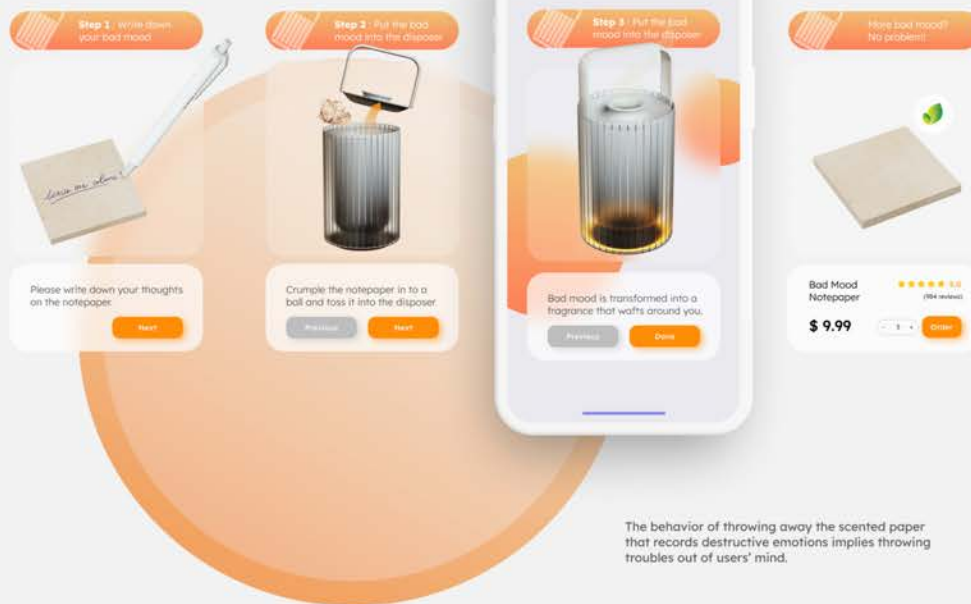# Disposer

The shape of the device represents **a beacon that leads the user out of the rumination.**

Bad Mood Disposer

Get **BAD MOOD DISPOSING** experience

Bad Mood Disposer Kit
★★★★★ 5.0 (142 reviews)
$ 89.99   − 1 +   Order

Pairing Your Disposer

Searching for available devices

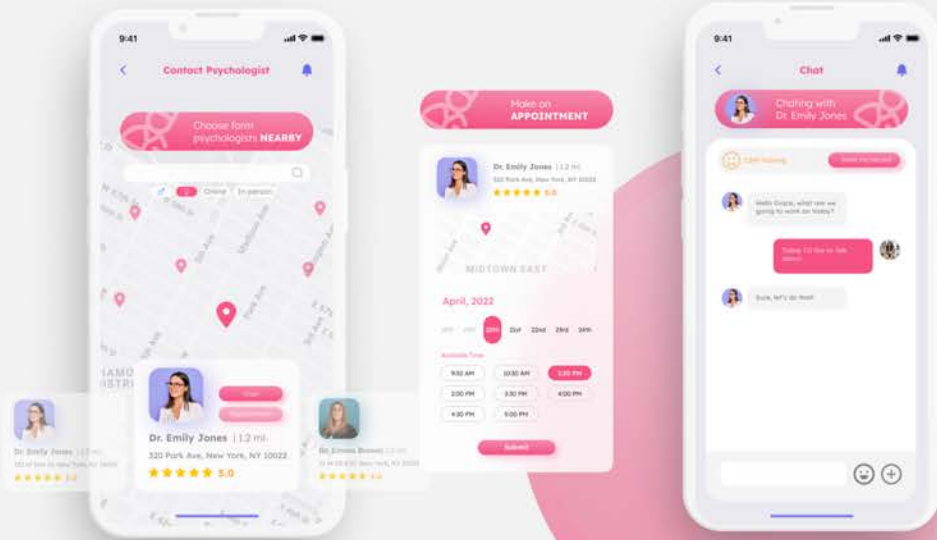Connected

Bad Mood Disposer Kit
Start

The user will first come to the store interface. They can place an order for the disposer kit (including disposer and fragrance notepaper) directly from this page. Before they begin using it, connect the product to the Wi-Fi network for pairing. To initiate the instructions, press **Start**.
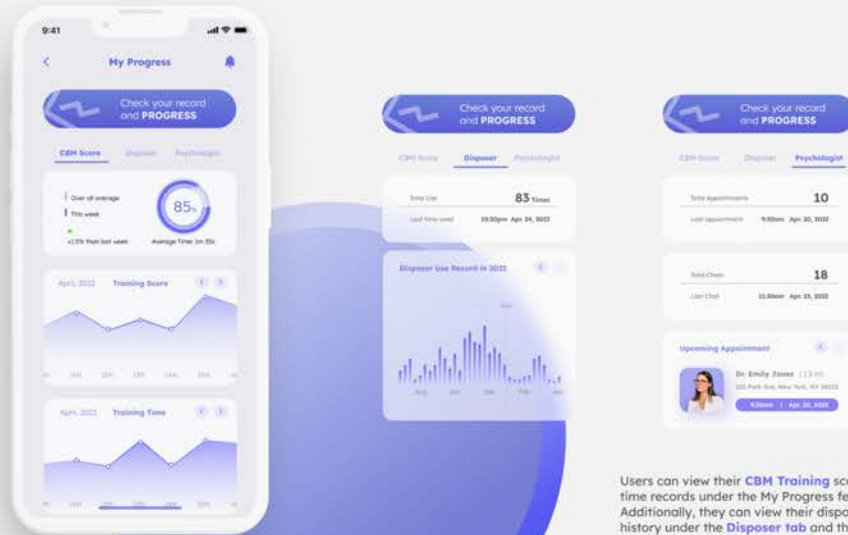
Bad Mood Disposer

Step 1 / Write down your bad mood

Please write down your thoughts on the notepaper.
Next

Step 2 / Put the bad mood into the disposer

Crumple the notepaper in to a ball and toss it into the disposer.
Previous   Next

Step 3 / Put the bad mood into the disposer

Bad mood is transformed into a fragrance that wafts around you.
Previous   Done

More bad mood? No problem!

Bad Mood Notepaper
★★★★★ 5.0 (984 reviews)
$ 9.99   − 1 +   Order

The behavior of throwing away the scented paper that records destructive emotions implies throwing troubles out of users' mind.

Contact
Psychologist

This feature helps users to find a psychologist nearby. Doctors that meet the user's filtering criteria have **Chat and Appointment** options to choose from. Users can choose whether to chat online or make an in-person appointment according to their needs. In the chat window, users can also send their CBM Training Record to the psychologist.

My
Progress

Users can view their **CBM Training** scores and time records under the My Progress feature. Additionally, they can view their disposer usage history under the **Disposer tab** and their appointment history with the psychologist under the **Psychologist tab**. These historical records assist users in comprehending their progress.

**Visual
Communication
Design
MFA**

Communication
Interaction
Motion & 3D
Design Studies

About the Program