# Workplace Focus for Adults with Attention Deficit Hyperactivity Disorder


Master thesis
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# foreword

A psychologist I know once said that it was her belief that some people with ADHD don’t notice their problems until after high school. They fly under the radar as children, especially those of the ‘inattentive type’ (ADD), because they are just seen as dreamy, and are less noticeable than their hyperactive classmates. Only when starting tertiary education, when externally provided structure and regimen falls away, do they notice something might be up.

A friend with ADHD once mentioned to me that he is pretty certain his parents have ADHD as well, judging from the concentration issues and clunky mistakes they run into as well. ADHD is, after all, a partly hereditary condition. Yet, his parents never got a formal diagnosis, and never sought any professional help. Apparently, we have only recently begun accepting ADHD as a real thing in adults.

For a long time, the ADHD of friends around me have has been a topic of conversation. Running late, procrastination, frustration at their laptops as they cannot focus on a task. Having trouble estimating how long something takes, going from “I am done for the day, there was so little to do” to “I forgot about this project, apparently we have to pull through the coming days” more than a few times. Medication helps, and therapy helps, but nothing cures the underlying condition. And being ‘normal’ or ‘cured’ would not even be desirable to many of them, as it brings them good as well: creativity, sociability, etcetera.

“Energy flows where attention goes”. If attention goes all places, then all productive energy is drained before you can use it for the things that are important to you in life.

This project grew out of a want to help these students and adults, some of which are just now coming to terms with the fact that they might have ADHD, or who know they have ADHD and struggle into adulthood. People who struggle focussing and getting things done, and for who this inability to commit or finish can cause emotional distress.

What lies in front of you is the account of all my design explorations, choices, and interviews with the people I have just described, and finally, the concept ConnectMe.

Thanks to Kati, for always being able to spar and talk. Thanks to Joppe and Tim for being my last-minute actors. Thanks to my coaches, Gert and Mailin, for your critical and supportive feedback. Thanks to Daan for always being there for me, even if I just wanted to complain. And of course, lots of love and much appreciation for all those who were open enough to share their personal ADHD experience with me, and helped me along this long and arduous path,

Aron.



# Executive summary

Phase 1 of the project is centered around gathering people's experiences with working and studying with ADHD .

In 1.1 literature research, two lenses are chosen to look through: (1) ADHD as a deficit of stimulation, and (2) ADHD as a deficit of Executive Functioning, a set of self-regulation skills.

The findings of the literature research are structured in a causal loop diagram, that links a lot of the psychological phenomena that come with ADHD with effects like stress and anxiety. A 'task timeline' is also constructed,

This research lays the basis for first phase of user research, 1.2 generative research. The extensive generative research reveals the working/studying attitudes, habits and challenges of 8 participants, as well as the surroundings of their home desk, distractions, and the methods people use to prevent or overcome these.

In 1.3 Problem statement, these findings are used to make the choice to focus on procrastination as this project's main focus.

Phase 2 consists of ideating and conceptualising the solution help reduce procrastionation for students with ADHD.

2.1 is the acount of a co-creation session with four people with ADHD, in order to kickstart the ideation process and come up with ideas.

In 2.2, there is a short description of the first ideation phase, which yielded a concept: TimeToStart. This concept is explained in 2.3.

In 2.4, a second ideation phase is described, this time working around the core mechanism of social pressure and support. This concept is explored with participants with ADHD, where it shows potential to be effective.

The input of participants is taken into account into the design of ConnectMe, which is described in detail in chapter 2.5

Phase 3 consists of the evaluation of the design of ConnectMe with users, and the improvements based on their impressions.

In 3.1, the process of evaluating is described, as well as the results. In chapter 3.2, the improvements to ConnectMe are applied, either by way of redesign steps, or as recommendations.

The report closes off with a reflection.

# Table of contents

# Introduction

ADHD has long been thought of as a children's disorder, that you grow out of during puberty. Now we know that this is not the case: 72% of children with ADHD still have it as adults (Tuithof et al., 2010). That means that an estimated 2.1% of adults in the Netherlands have some form of ADHD.

This means that these people still have symptoms of inattention, hyperactivity, and/or impulsivity at a later age. Besides that, self-regulation can be difficult, among other so-called 'executive functioning' skills.

This can lead to difficulty focusing and finishing tasks. Whenever you want to get something done, you tend to procrastinate. Distractions lurk behind every corner, maybe even more so in the digital environment than the physical one.

This project focuses on just that: how can I help people with ADHD to focus and get things done, through design.

At the start of this project, I made the choice to include all adults with ADHD in the scope of the project. As you will notice, I choose to narrow this to students in the second phase of ideation.

As a graduation project in the master Design for Interaction, this project draws from Human-Centered Design. The perspectives and needs of the people involved, in this case, adults with ADHD, are explored through design research. In the end, a final concept is proposed that aims to help adults with ADHD focus when trying to work.



# Terminology of ADHD

For consistency's sake, it is necessary to establish some clarity about ADHD and its subtypes, and by which name I will be referring to the types

ADHD is a neurodevelopmental disorder that is characterised by three groups of symptoms, based on the descriptions of the DSM-V (APA, 2013):

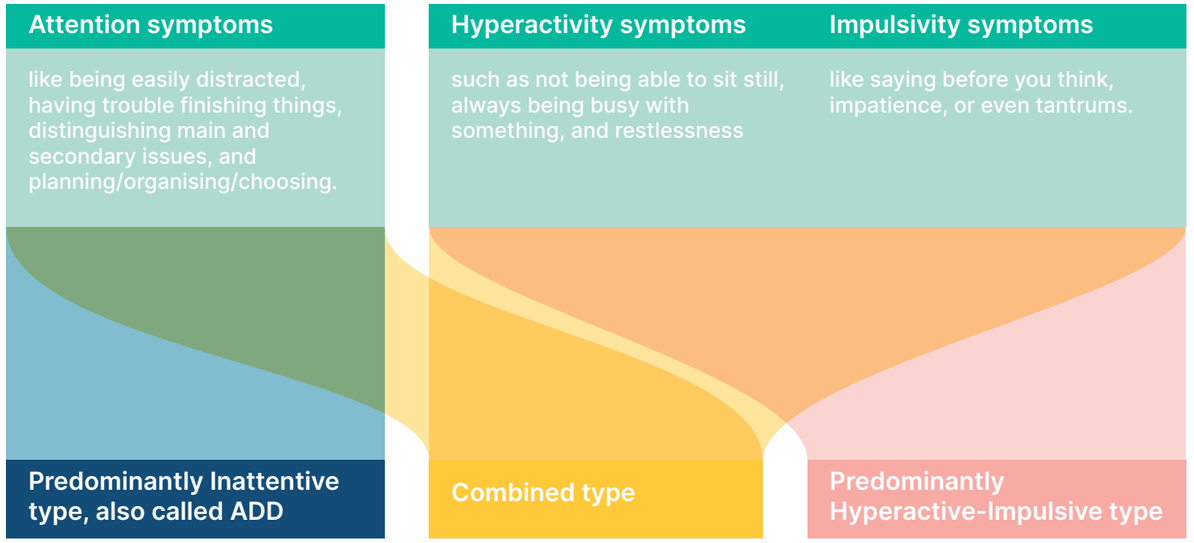



*figure 1.01: the three types of ADHD, and which symptoms occur for which type.*

Most people with ADHD have symptoms from all groups ('combined' type) but another significant subtype is the 'inattentive' type (often still referred to as ADD), which excludes hyperactivity and impulsivity symptoms.

There is a difference in how the 'inattention' is perceived between ADHD hyperactive-impulsive and combined, and inattentive types: the former two are more quickly distracted, going too fast, the latter one is more like dreaminess. (Russo & ADDitude Editors, 2021). While this contrast does not always apply, it does lead to the inattentive type to be less visible, being overshadows by their hyperactive counterparts, especially at a young age.

Attention should be paid to all groups in the research, as their experiences and challenges when working may differ. Many people with Predominantly Inattentive type regularly refer to themselves as having ADD, and point out the difference to 'typical' ADHD. This may be a typical Dutch thing; it was at least noticeable during interviews and informal conversations around the project.

For clarity in this report, I will stick to these conventions:

- **'ADHD' refers to all types of ADHD;**
- **if necessary, subtypes are 'inattentive type', 'combined type', or 'hyperactive-impulsive type' (leaving out 'predominantly' as a shorthand);**
- **the word ADD is avoided when possible. Exceptions include quotes from participants, or when paraphrasing their words.**

# Project brief

The assignment of this graduation project is without the involvement of third parties. This chapter is based on  a document handed in at the start of the project, which can be found in Appendix A.

## The Assignment

The project should aim to **help adults with ADHD focus** while working or studying, with a product placed in or around their workplace.

The project should **identify the distractions** in and around their workplace, such as from their phone or computer, or social distractions, either at home or at work. It should help them deal with these distractions.

The work is anything that is done **behind their computer**, be it at home or in an office, that they consider (study)work. It can be task-based work performed solitarily (this can include reading or performing assignments) or attending (online) meetings or workshops. The social aspect of the last category should be considered. This scope is visually represented in figure 1.02.

## Solution form

The aim is to create a physical product, but I do not exclude options like product-service systems, the inclusion of an app, be it on their phone or work computer.

The product should be helping them focus on their work, in order to finish tasks. In which way this is done most effectively is to be found using generative research, for example:

- by making a planning or helping to stick to it,
- redirecting during moments of distraction,
- cutting out as many distractions as possible, or
- increasing the feeling of reward or enjoyment from finishing tasks.

Research should be done into what the biggest sources of distraction are, and how people currently deal with these.

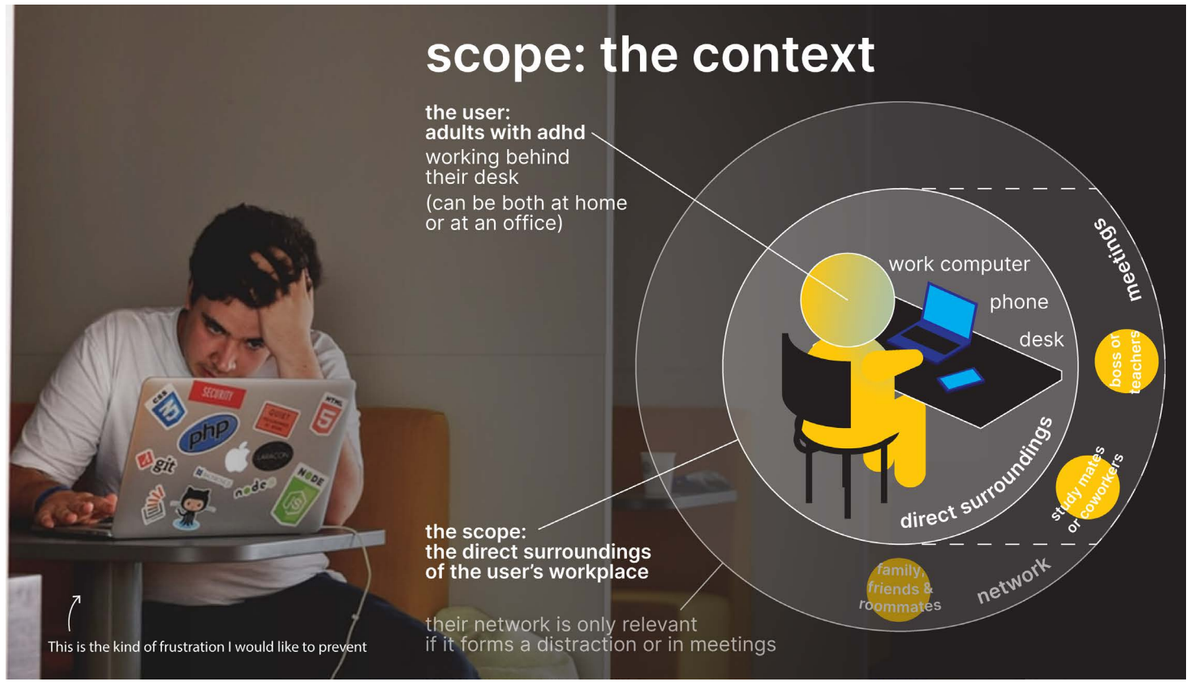



*figure 1.02: the scope as defined in the Project Brief.*

## Personal goals

brought together some aspects of design that I would like to address in the project:

### Generative research:

I'm interested in applying sensitizing techniques + interviews (a probe that is still possible at distance), and session design (online) of gathering information and ideas.

### Early validation of ideas:

In the past I've had to use a highly iterative approach (courses EI and ITD). In EI, still, I wanted to perfect my ideas before testing, which limited their potential and the time I had for improvements. I did not grasp the importance of testing assumptions and ideas in their most bare-bones form effectively. In ITD this worked better because the stakes were lower, and we were forced to iterate every week. In this graduation project, I want to plan a few cycles and iterate quickly.

Although Covid poses challenges in this, I believe my subject and the environment I want to design for lend themselves for testing at a distance.

### Psychology:

In the master (as wel as BEP) I have focused often on projects where a psychological barrier needs to be crossed (showering in public, calling anxiety). In this project I am designing for a specific diagnosis, which is really interesting to me, because I get the opportunity to learn from and empathize with people who can have different ways of functioning and thinking than me.

Taking a group with a diagnosis as stakeholder comes with some challenges. ADHD can also be a sensitive topic for some, as it can become part of your identity, or parts of your identity are being explained as a 'disorder', for which medication can be prescribed. As discussed, the choice to medicate can be sensitive as well, but should be taken into account during research. There are always questions of overdiagnosis and overprescription as well.

There are also opportunities in taking a diagnosis as focus. A lot has been written about ADHD, both academically and informally: there are blogs full of tips and personal stories. Besides that, succesful therapies have been in use for decades, which are valuable grounds to look use as a basis for design. Lastly, a lot has been written about attention management in general, like 'Zo werkt aandacht' by Stefan van der Stigchel.

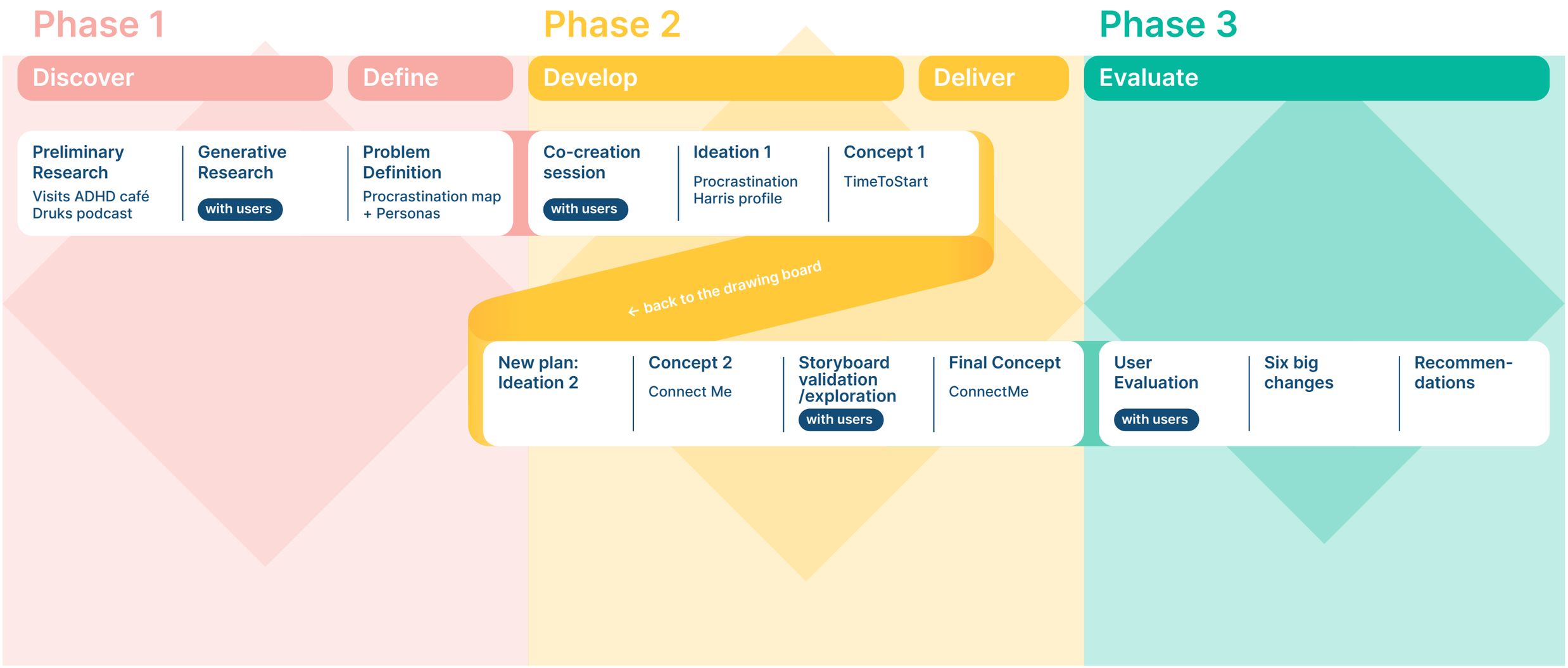
# The project roadmap

The structure of the project is based on the Double Diamond structure for a design process (Design Council, 2019). Each diamond has a diverging and converging half, symbolising a broadening search for information / ideas, followed by a narrowing selection of information / concept. The third diamond 'evaluation' is not strictly in the original structure, but many variations exist.

The reason there are three diamonds or phases, is that each phase is centered around and important moment of contact with the users:

in phase 1: Generative research,
in phase 2: the Co-creation session, and
in phase 3: the User evaluation.

The reason phase 2 folds back into itself is that, in the middle of the project, I decided to go back and redo a few steps, as I was not happy yet with Concept 1.



# Methods

This project is in the master Design for Interaction, and has a focus on Human-Centered Design. This is why, as could be seen on the previous page, I have taken the moments of contact with users as the central points the project is structured around.

I have made the choice to kickstart the project by reading a lot of formal and informal literature, before talking to users. As I do not have ADHD myself, I want to immerse myself and paint a picture of which topics should be addressed.

## Phase 1. Generative research: getting to know the users

This takes the concept of a sensitizing booklet from 'Convivial toolbox: generative research for the front end of design' (Sanders & Stappers, 2012), used to get participant's mind warmed up for interviewing. We discuss the booklet and I ask some more questions. More details about this method can be found on page 35.

The insights are then gathered and clustered 'On the Wall', using a process from the Convival Toolbox as well. This method is further described on page 40.

## Phase 2. Co-creation session: designing with the users

The co-creation session is a creative session, where users, in this case adults with ADHD, are invited to think about the problem statement. It was facilitated by me, using techniques from Creative Facilitation (onlinecreativefacilitation.nl, 2021) for inspiration. More can be found on page 60.

## Phase 2. Storyboard validation / exploration

This research does not follow an established method, but shares the idea of a concept by showing participants storyboards of the intended user scenario. Users are invited to comment on whether this would be of use to them, and in conversation, I explore the possible forms of the concept. More about this can be found on page 87.

## Phase 3. User evaluation: does the concept do what it needs to do?

Users are invited to walk through a high-fidelity, digital interactive prototype, built in Figma. This prototype closely resembles the look and interaction of the final concept.

The concept is evaluated by a combination of interviews, and filling in 7-points scales between word-pairs based on the AttrakDiff scales. Lastly, usability issues are also documented.

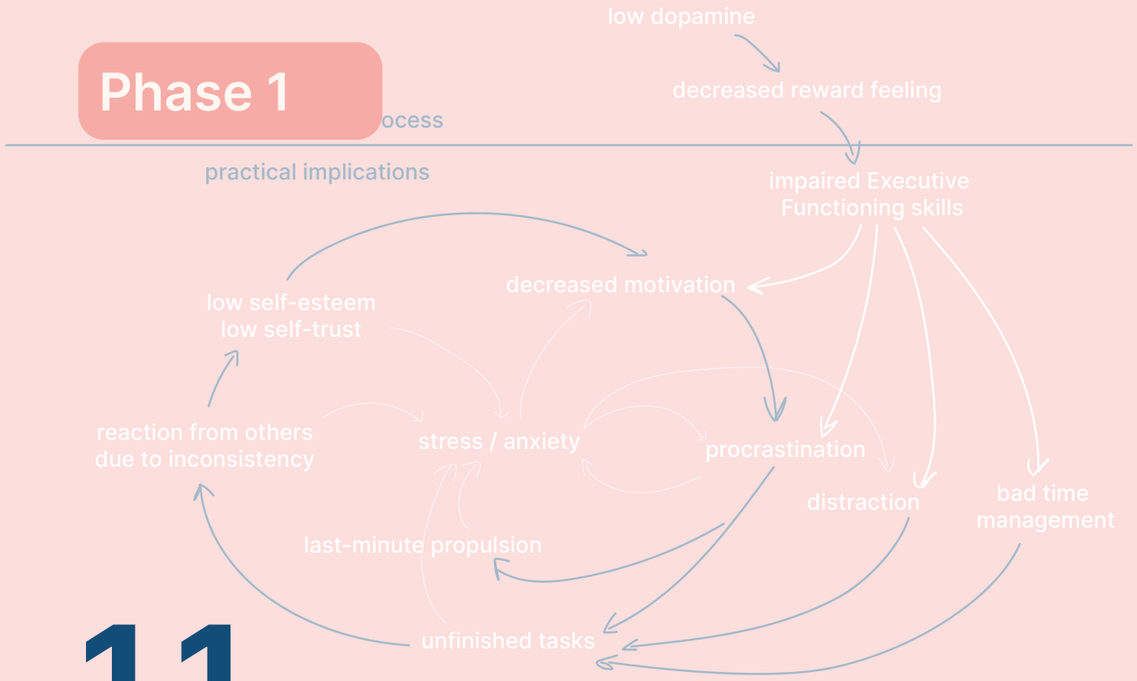
## Online tools

Due to the covid-19 pandemic, nearly all user contact was pushed online. Throughout the project, Miro has been an invaluable tool for online whiteboard collaboration. This was used for participants' 'booklets', as the post-it and drawing features mimic physical creative tools well. It was also used for clustering.

Zoom has been the preferred program for online interviews, due to smooth screen sharing and recording options.

Figma was an ideal program for building digital prototypes, that could be easily opened in a participant's browser following a link.






1.1

# Preliminary Research

Preliminary research is a literature research that will explore:

- the challenges of ADHD at work;
- the psychological process that define ADHD;
- potential strategies for dealing with ADHD while trying to work/study.

The literature will be structured in a causal loop diagram, revealing how the psychological processes of ADHD interconnect, and a 'task timeline', that reflects how ADHD symptoms relate to a real-world application, such as trying to do a task in a day.

The findings of the preliminary research will be used as a basis for the research goal and activities and questions 1.2 Generative research.

Two visits to the online ADHD café are made, where adults with ADHD share their stories and support each other.

# 1.1.1 The working/studying adult with ADHD

## Social aspect at work

How does a person with ADHD fare socially at the workplace?

Adamou et al (2013) point out that while ADHD workers may initially be highly motivated workers, however, depending on the job, they can soon be hampered by ADHD symptoms. They state time management problems, keeping on top of the work load, difficulty following instructions, or showing emotional liability as potential problems.

ADHD At Work (2018) mainly discusses teamwork, and mentions two challenges for a team: a tendency to procrastinate, and impulsive behaviour.

“Their disorganization, their challenges with planning and managing work, and their poor estimation of the time required to accomplish certain tasks all lead to submitting work at the last minute.” Within a team, this may cause other members to have to pull through at the last minute to compensate. Secondly, colleagues with ADHD may display “impulsive behavior where they blurt out things without thinking of their consequences, which can also create friction in the team.” Some people with ADHD can also sensitive to criticism. All of these things can create friction.

If a manager confronts the worker with ADHD about problems in functioning, this will likely be taken personally, and motivating them again will be difficult (Adamou et al, 2013). On the flip side, hyperfocus (also an effect of ADHD) has the potential to lead to workaholism.

This means that being a manager of, or having a colleague with ADHD means to maintain the right balance, harnessing the positives of ADHD. As Michele Novotni puts it (Flippin, 2021): “Sometimes they’ll do brilliant and amazing things, but other times they’re just not there. Everything seems to come harder for them. They’re like ducks, appearing to swim effortlessly, but paddling furiously under the surface.” She goes on to mention that a lot of people with ADHD often have to work harder, in an attempt to keep up. Their colleagues may interpret it as irresponsible, unorganized, even lazy.

## Myth of multitasking

When performing at work, we may be prone to multitask: doing a lot of things at once. And this may feel like we are being very productive, because we are making some progress on multiple things at once. But multitasking as we understand it does not really exist, according to Kirschner & de Bruyckere (2017): “In general, research has shown that when thinking or any other form of conscious information processing is involved in carrying out a task, people are not capable of multitasking and can, at best, switch quickly and apparently seamlessly from one activity to another. The key word here is again ‘apparently.’”

Thus, what actually happens is task-switching. Task-switching happens in three steps:

1. shifting the goal, diverting attention away from the task being done;
2. activating a rule that switches off the instructions and procedures for that task;
3. switching on the instructions and procedures for the new task.

You have to divide your attention between tasks, because there is only so many cognitive resources to go around. Giving precious resources to performing one task interferes with any other potential task.

What we perceive as multitasking is that the people doing it “is that this person [...] [has], through practice, developed the ability to quickly switch between carrying out different tasks or using different media.” They go on to say that this doesn’t mean this is beneficial: it has been shown that the rapid switching leads to poorer learning results, and a poorer performance (Rogers and Monsell, 1995, Rubinstein et al., 2001). The juggling of tasks makes each individual task suffer in quality, with more mistakes made, and taking a longer time when compared to doing tasks one after another.

Furthermore, there is evidence to suggest that there are group differences between people with ADHD and those who do not concerning the cost of task-switching. It appears that people with ADHD experience a higher cost to task-switching than others (King, Colla, Brass, Heuser, & von Cramon, 2007)

Each time a person with ADHD gives in to a distraction, this moment can be considered task-switching. Since these distractions are much more prevalent for people with ADHD, the cost of task-switching adds up. Based on conjecture, maybe this is why hyperfocus can be so engrossing for people with ADHD? Further research into that area comes in the participant research.

**Multicommunicating**

A phenomenon separate from, but akin to multitasking, is multicommunicating: engaging in multiple conversations at once. We now mostly associate this with the smartphone, where this behaviour is ubiquitous, but can also mean using the smartphone during a physical conversation.

Seo, Kim & David (2015) have found that multicommunicating is associated with problematic mobile phone use, and this is explained by ADHD, but also the social need to belong.

“Unhealthy dependence on mobile phone was one of the main reasons for multicommunicating during a face-to-face conversation”. They specify that individuals with ADHD were more vulnerable to the impulse to keep the phone present: “Specifically, those with ADHD symptoms were likely to be trapped by problematic mobile phone use, which in turn was associated with frequent multicommunicating.” In other words, people with ADHD were more likely to multicommunicate, specifically with their phone. How well are you able to communicate, with your phone always in your hands? More about the ever-present distraction of smartphones will be looked for in the participant research.

# 1.1.2 Two frames to look at ADHD

## I. ADHD as 'Stimulation Deficit Disorder': the neurological background

### Stimulation deficit, not attention deficit

What is ADHD, at its core? Some think Attention Deficit may be a misnomer, and ADHD can best be thought of as a deficit of brain stimulation. People with ADHD have a chronically understimulated brain, which in turn causes the ADHD behaviours that we see. "The constant search for more stimulation shows up as distraction. Anything and everything can distract an ADHD adult – sound, movement, physical sensations, ideas, thoughts." (Rayburn, 2015).

### The reward system

This lack of stimulation is, most likely, due to a lack of dopamine delivered at the right time. Dopamine is a neurotransmitter that plays a major role in reward-motivated behaviour, and is often called our 'happy hormone'. Simply put, when our brains want to stimulate a certain behaviour, the dopamine neurons fire.

The DTD (dopamine transfer deficit) theory of ADHD suggests that for ADHD brains, the neurons don't fire at the right time. (Tripp & Wickens, 2009) To understand it we need to know what a cued reward is. A cued reward is a positive reinforcer that is expected, or, known in advance, as opposed to an unexpected reward.

As can be seen in figure 1.03, the dopamine cells of non-ADHD brains fire two times for this cued reward: once when it is anticipated, or 'cued', and once when the actual reward is given. In ADHD brains, the first anticipatory dopamine spike is low to the point of being ineffective. This could explain why people with ADHD are more sensitive to the delay of gratification.

According to Ellen Littman in ADDittude magazine (Littman 2021), the underactivity in these key areas of the reward system makes it difficult to feel rewarded by ordinary activities. "These dopamine-deficient brains experience a surge of motivation after a high-stimulation behaviour triggers a release of dopamine. But in the aftermath of that surge and reward, they return to baseline levels with an immediate drop in motivation."

This causes ADHD brains to be in a constant search for stimulation, scanning the environment, while its owner would really like to stay on-task. "One of the many consequences of reduced dopamine in the synapses is that the significance of tasks is decreased."

How do you focus on what is important if most stimuli are similarly compelling? For stimuli to be attractive to people with ADHD, the rewards should be larger, more immediate, or repeated. They find it hard to stay motivated if the rewards are only mild, or related to long-term gratification.

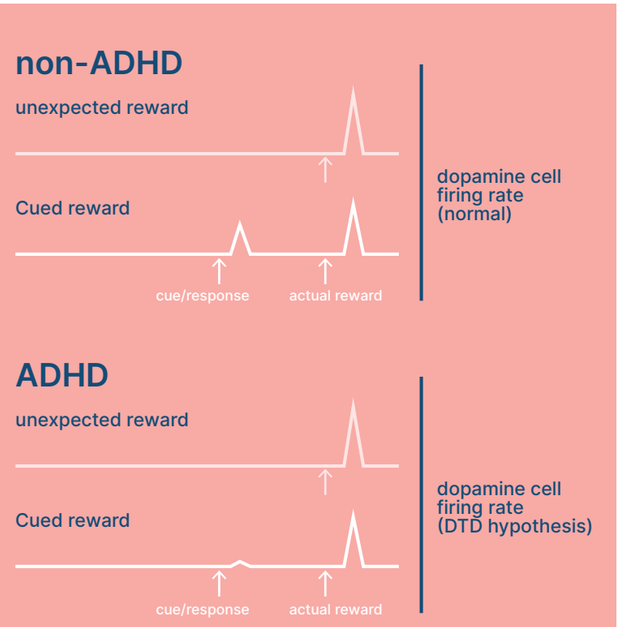



*figure 1.03: dopamine cells don't fire in anticipation of reward in for ADHD brains. Adapted from Tripp & Wickens (2009)*

Thus, the ADHD brain looks for stimulation that causes a dopamine surge, quickly, and intensely. Food, sex, drugs, driving fast, music: these are examples of the activities that they can seek out to elicit a dopamine spike.

"So, ADHD brains are highly motivated — to find that unique balance of stimulation that enables optimal functioning. Whether ADHD brains overreact or underreact to the stimuli at hand, they rarely engage with moderate stimulation that falls "in the gray area."" (Littman 2021) Often, it seems, and ADHD brain is either on or off. This explains why the same mechanism can lead to both outgoing, high-energy and shy, low-energy individuals.

**The tug-of-war**

A point that Littman tries to make is that the person with ADHD is not ignoring what is asked of them by choice, but that they are in a constant tug-of-war with their brains. Understanding the neurology explains a lot about the self-regulation problems that come with ADHD brains. "The owners of these brains are not making conscious choices to ignore external demands, although it often appears that way. Whether through sensation or hyperactivity, ADHD brains compel their owners to scan the environment for engaging stimulation."

- **Living with ADHD means your brain is constantly craving and looking for any kind of stimulation.**
- **People with ADHD don't consciously ignore external demands, but have to contend with their stimulation-deprived brain. But the environment often sees it that way and blames them.**

# II. ADHD as ‘Executive Function Deficit Disorder’

Another way to look at ADHD is to see it as an impairment of Executive functioning. “ADHD is associated with significant weaknesses in several key EF domains. [...] Difficulties with EF appear to be one important component of the complex neuropsychology of ADHD” (Willcutt et al, 2005).

Executive functioning is, broadly speaking, the mental and cognitive abilities with which you engage in goal-directed action. In other words, the skills that allow us to get anything useful done. It is strongly tied to the concept of self-regulation. The skills that are involved in EF are not as cut-and-clear, and many frameworks exist. We will discuss one of them here, that describes seven clusters of Executive functions from ADDittude mag (Barkley & Novotni, 2021):

1. Self-awareness: Self-directed attention.
2. Inhibition: Also known as self-restraint.
3. Non-Verbal Working Memory: The ability to picture things mentally and hold them in your mind.
4. Verbal Working Memory: The inner voice.
5. Emotional Self-Regulation: The ability to take the previous four executive functions and use them to manipulate your own emotional state.
6. Self-motivation: The ability to motivate yourself to get things done when there is no immediate external consequence.
7. Planning and Problem Solving: Experts sometimes like to think of this as “self-play” — how we play with information in our minds to come up with new ways of doing something. By taking things apart and recombining them in different ways, we’re planning solutions to our problems.

This gives us another model that we can use to look at how ADHD can bring difficulties when staying on task. A friend with ADHD, for instance, mentioned to me that the Emotional self-regulation aspect of this is often overlooked by others without ADHD.

In a meta-analytic review, Willcutt et al (2005) have found that the main domains where executive dysfunction plays a role for people with ADHD are response inhibition, planning, vigilance, and working memory.

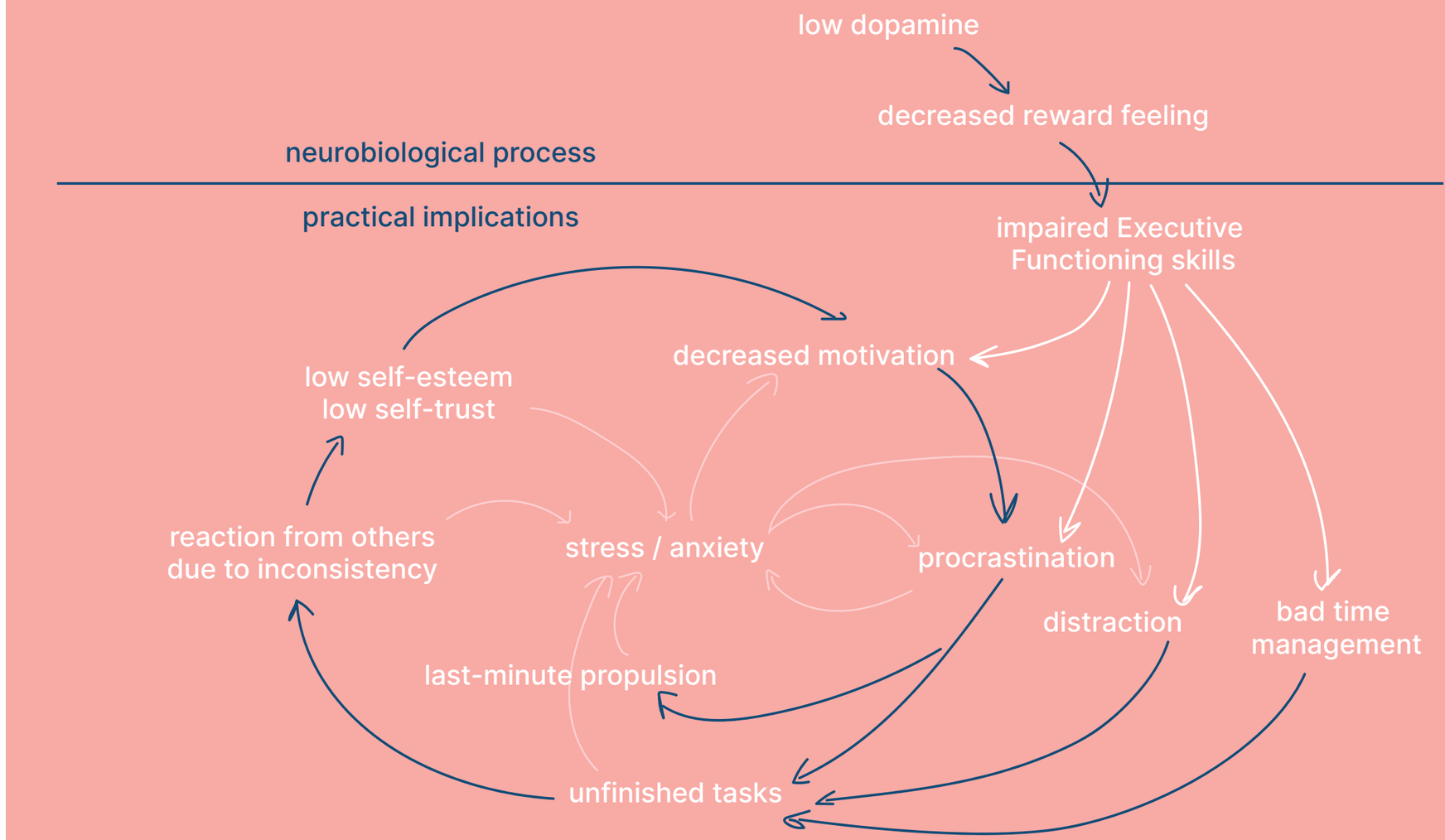
# III. Cause and effect

To conclude: we can see and understand ADHD in different ways. It is named for its deficit of attention, but it can be seen as a deficit of stimulation to the brain, and on a visible level, as a deficit of executive functioning skills.

But how does this affect the adult with ADHD in practice, when performing a task? To conceptualise this, I’ve constructed a causal model (figure 1.04) that connects these models of ADHD to behaviours such as procrastination or distraction. These behaviours, that I’ll label ‘task-avoiding traps’.

## causal loop diagram

*figure 1.04: the causal loop diagram describes the self-reinforcing loops between different behaviours.*



# 1.1.3 The Task Timeline

In the task timeline, I map what can go wrong in a single working day. I call these: 'task-avoiding traps'. These are behaviours caused by ADHD that are getting in the way of getting tasks done.

## 1. Trouble with planning

One of the executive dysfunction domains, as discussed before. I have chosen to include it in the Task Timeline in two ways: prioritising and time blindness, affecting the ability to make a realistic schedule.

## 1.1 Prioritising

One of the effects of the executive dysfunctions of ADHD is that all tasks feel equally important. It is therefore difficult to set priorities.

## 1.2 Time Blindness

Another characteristic of ADHD is an impaired perception of time. Different aspects of time perception are difficult for people with ADHD, among which are:

- time production: accurately feeling when a certain amount of time has passed (Van Meel et al, 2005);
- time reproduction: being presented with a sample duration, and later accurately feeling and reproducing when that amount of time has passed (Hwang-Gu et al, 2015);
- and motor timing: organising your behaviour in time, including preplanning acts, deciding when they shoud start, and monitoring their time course. (Rubia et al, 2003).

↘ **People with ADHD often experience time blindness, meaning they are less aware of what time it is now, how much time is left, and how quickly time is passing.**

## 2.1. Procrastination

As J. Russel Ramsay puts it in an interview for Verywell Mind: "Procrastination is one of the most common problems reported by adults with ADHD. Although virtually every patient with ADHD cites procrastination as an issue, every individual's struggle is unique." (Ramsay & Low, 2020).

For Verywell Mind as well, Low (2020) lists all the factors in ADHD that lead to procrastination for people with ADHD:

- When the task is difficult, uninteresting, or you are not setting the right priorities.
- When you get sidetracked.
- Paralysis/feeling overwhelmed: when you want to start, but feel pressure and cannot get moving
- Impaired sense of time: when you are not able to estimate the time it takes
- Fear of failure / fear of imperfection
- Being demotivated from Executive function failure or negative reactions

More research on procrastination, specifically, is included in chapter 2.2: Ideation

## 2.2. Last-minute propulsion

An integral part of procrastination is that the tasks that need to be done get delayed. Normally, you would work by alternating work time with buffer time (such as breaks). The problem with procrastination is that all task buffers get used up, before even getting started. This way, the whole task has to be done in one go, at the end of the allotted time. This is visualised in figure 1.05.

By procrastinating, all important tasks are moved right up to the deadline, causing people with ADHD to often work at night, or at least, last-minute. This last-minute propulsion can cause a lot of stress, and if done late at night, be the cause of later bedtimes.


*figure 1.05: using up your buffers leads to last minute propulsion*

## 2.3. Sleep-wake cycle

People with ADHD, also have problem maintaining a normal sleep/wake cycle. We know that sleeping disorders are often comorbid with ADHD (Krahn, 2005), and that ADHD contributes to worsened sleep (Alfano & Gamble, 2009). One specific thing that is often reported, is that ADHD is related to sleep onset insomnia: not being able to sleep when you want to (Walters et al, 2008).

The ADHD brain is prone to higher activity in the evening (Littman 2021). This results in later bed- and wake times. Some with ADHD celebrate the night, when they finally have time for themselves and can enjoy the arousal of TV, social media, porn, videogames, etc. All this screentime only exacerbates the problem.

In the Task Timeline, not waking up in time in the morning can be seen as an effect of going to sleep too late, closing the cycle. Bad sleep makes other ADHD symptoms worse, which brings a higher chance of needing another late and sleepless night to finish tasks. This becomes a reinforcing loop.

↘ **ADHD causes a delayed sleeping schedule, and an active mind late in the day.**

## 3 Distractions

We already discussed the mechanism of distraction in the Neurological Background. I want to split up distractions into two categories: distractions from the environment, and distractions from within.

## 3.1 External distractions

These are the most straight-forward of the two, and you can probably imagine which things in the environment are more distracting. Dana Rayburn, who we have discussed as propagator of the idea of ADHD as stimulation deficit disorder, sheds a bit of light on which distractions are particularly bad. "Technology is a huge distraction for my clients. The Internet is like Alice in Wonderland falling down the rabbit hole." The internet, beeping phones, and videogames are what lures people with ADHD in.

Additionally, she notes, her ADHD clients are also more likely to be diverted while shifting between tasks or activities: in transition. These transitions can for instance be in the morning, going to work again after lunch, or when coming home.

Which external distractions are more prevalent and problematic for people with ADHD will be further explored during generative research.

## 3.2 Internal distractions: Mind-wandering

Mind-wandering is what happens when our mind drifts from the task we are doing, and instead focus on internal, task-unrelated thoughts and images. It is something that occupies up to half of our daily thinking time. (Smallwood & Schooler, 2015). There are roughly two forms:

- **Deliberate mind-wandering:** often beneficial, for instance: planning ahead while driving a car
- **Spontaneous mind-wandering:** often detrimental: uncontrolled thoughts, like something popping up while watching a lecture.

This second, unintended form of mind-wandering is what can be considered an internal distraction. Bozhilova et al (2018) propose that this type of excessive and spontaneous mind-wandering is actually what underpins the symptoms of ADHD. The other, deliberate kind of mind-wandering, the purposeful shifting of one's attention to different stimuli, is not a consistent characteristic for people with ADHD (Seli et al, 2015).

Franklin et al (2016) found that the key to this detrimental mind-wandering may not be that the mind with ADHD wanders more often, but that the person with AHD simply is less aware of the wandering: "[our data] suggests the intriguing possibility that it is not simply the frequency of distraction that best explains the detrimental impacts of ADHD but also a lack of awareness of distraction."

They propose that we could design strategies to compensate for the disruptive effects of mind-wandering, by helping people with ADHD gain meta-awareness of their mind-wandering.

One note here is that people with 'low' ADHD (less severe symptoms) were able to consider the trade-off between a cost to their current task and the usefulness of mind-wandering, but 'high' ADHD (more severe symptoms) people were not, "which suggests that it might be inherently difficult for [the group with 'high' ADHD] to engage higher level control processes to control their mind-wandering episodes." (Franklin et al, 2016).

**Types of internal distractions**

Besides the deliberate-spontaneous distinction, we can also use a more practical distinction between internal distractions. In 'ADD In The Workplace: Choices, Changes, And Challenges' (Nadeau, 1998) Kathleen Nadeau makes a practical distinction, which she explains in ADDitude mag (Flippin, 2021). Here, Nadeau identifies three types of "internal" distraction when working:

- "Ah-ha!" distractions: creative ideas that pop up in the middle of unrelated work. To avoid getting sidetracked, jot them down on a pad for later review, then return at once to the job at hand.
- "Oh no!" distractions: suddenly remembering you've forgotten to do something. To prevent these, use a planning system in which you write down all appointments, phone calls, meetings, and so on.
- "Ho-hum" distractions: daydreaming as a way to avoid the work at hand — a sign that you need to make your work more interesting, or to find more interesting work.

↘ **(spontaneous) mind-wandering is something we all do, people with ADHD are just more affected by it.**

↘ **Strategies to become aware of your wandering mind earlier on could help people with ADHD regain focus**

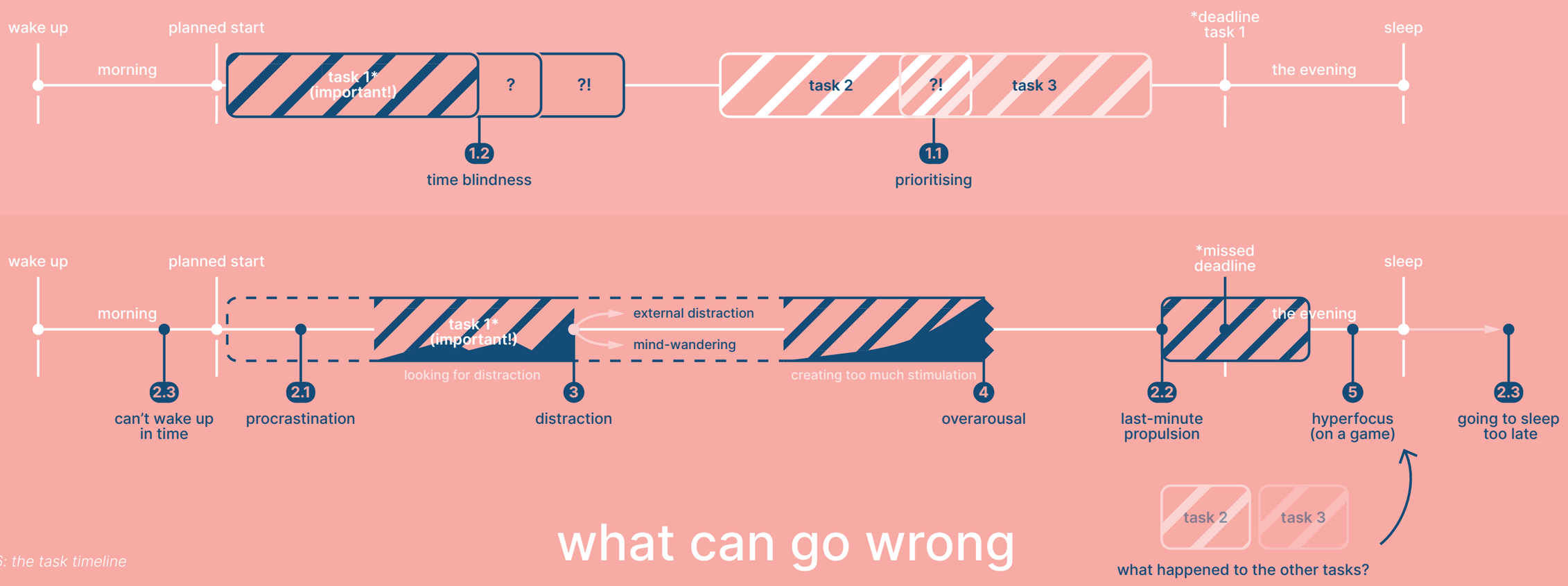



*figure 1.06: the task timeline*

## 4. Over-arousal

For some, optimal functioning means making their current experience more stimulating, where more intense is better, all to protect the brain from ever getting bored. This restlessness is short-sighted, and can lead to a breaking-point: sudden over-arousal. (Littman, 2021)

The short-sighted brain does not account for the sudden crash. It can make the individual irritable or even emotional. The brain demands to seek escape from the discomfort and the individual starts to avoid anything stimulating.

On the other side are hypersensitive brains. They reduce stimulation altogether, by avoiding groups and isolating, and choose places where they can control the level of stimulation, like playing video games at home.

In the Task Timeline, I have chosen to display over-arousal as a result of the person creating more and more stimulation in their environment to try and stay focused.

- ↘ **You can overstimulate yourself to a breaking point and become over-aroused, after which you retreat and avoid any stimulation.**

## 5. Hyperfocus

Then there is hyperfocus: an intense fixation on a project or activity for an extended period of time. Hyperfocus is still quite a colloquial term, that recently has been the subject of research. Hupfeld et al. (2019) have provided support that hyperfocus could be an independent feature of adult ADHD, and that people with ADHD experience hyperfocus more often than non-ADHD people in general, and in some specific settings: while doing hobbies, in school, in the digital world, and in the real world.

Becoming completely engrossed by one particular thing may seem paradoxical to the lack of attention we associate with ADHD, but is due to the same dopamine deficiency that causes the brain to look for stimulation. In this case, the low dopamine levels make it difficult to consciously switch gears.

“Children and adults with ADHD have difficulty shifting attention from one thing to another,” says ADHD expert Russell Barkley for ADDitude mag. “If they’re doing something they enjoy or find psychologically rewarding, they’ll tend to persist in this behavior after others would normally move on to other things.” (Flippin, 2021)

Hyperfocus is not inherently a bad thing, it can be very useful as well. But it is very hard to control, as it doesn’t reliably come and go. The object of hyperfocus is often something enjoyable, such as videogames or social media. But some are able to hyperfocus om something productive, or even use it as a reward, allowing themselves to hyperfocus on something fun after completing a dull task.

Ned Hallowell says in ADDitude mag (Hallowell, 2020) that at its best, hyperfocus can be described as a ‘flow’, becoming one with the task at hand. At its worst, it is a trance in which you perform the same pointless act over and over again.

The problem arises when nothing interrupts this trance, and it can go on for hours without noticing, losing all connection to the real world. “This sort of intense focus isn’t something you can just buck up and talk yourself out of,” says Barkley. The result is missed meetings or deadlines, becoming engrossed in side jobs, or annoyed family members who want your attention.

In the Task timeline, I have chosen to represent hyperfocus late in the evening, on something fun like a game.

- ↘ **Hyperfocus is achievable with something enjoyable, but hard with menial tasks.**
- ↘ **Hyperfocus can be useful but is usually very unreliable.**

# 1.1.4 Strategies for adults with ADHD

## I. Cognitive Behavioural Therapy

The tried-and-true therapy for ADHD is Cognitive Behavioural Therapy, or CBT. CBT is a short-term, goal-oriented form of therapy that changes negative thought patterns, such as low self-esteem, and change how the participant feels about their abilities and self.

“Originally a treatment for mood disorders, CBT is based on the recognition that cognitions, or automatic thoughts, lead to emotional difficulties. Automatic thoughts are spontaneous interpretations of events. These impressions are susceptible to distortion, such as unfounded assumptions about yourself (or others), a situation, or the future.” (Sherman, 2021) This kind of unhealthy internal dialogue stops you from working towards your goals, develop new and productive habits.

“CBT aims to change irrational thought patterns that prevent individuals from staying on task or getting things done. For an individual with ADHD who thinks, “This has to be perfect or it’s no good,” or “I never do anything right,” CBT challenges the truth of those cognitions.” These distorted thoughts have a large effect on behaviour patterns, and so, changing the thoughts can change these behaviour patterns. This is effective for treating anxiety, but also other emotional problems.”

Adults with ADHD, especially if it has long gone undiagnosed, can have become self-critical and pessimistic. CBT aims to turn around these pessimistic thought patterns. Some of these thought patterns are:

- All-or-nothing thinking
- Overgeneralization
- “should” statements (it should be like this and is not, resulting in self-criticism)

A principal in CBT is that learning to recognize such distortions can help you make changes in your life.

It should be noted that CBT does not replace medication, and does not treat the core symptoms of ADHD (inattention, hyperactivity, impulsivity). Rather, it intervenes in everyday challenges such as procrastination or time management.

“Most adults with ADHD say, “I know what I need to do, I just don’t do it.” Despite having plans for what they want or need to do, they do not carry them out. CBT focuses on adopting coping strategies, managing negative expectations and emotions, and unwinding behavioral patterns that interfere with the strategies.” (Sherman, 2021)

CBT does the following things (ADDitude editors, 2021):

- It addresses physical skills and habits, like using a planner
- It replaces your dysfunctional thought patterns with functional ones.
- It reveres-engineers, from anecdotal events that exemplify the problem, which factors (including ADHD) contribute to the functional problem. This provides some ideas for coping strategies
- Adopting mantras is useful: ‘if it’s not in the planner, it doesn’t exist’
- It addresses prioritization as a skill.
- It addresses selective attention to criticism, and learning to respond to it in a more helpful way.
- Works on breaking down problems: if you just cannot get started, the first step is too big. Look into a task well before the deadline to prevent being last-minute.

Since procrastination is one of the most common problems reported by adults with ADHD, (Ramsay & Low, 2020) CBT tackles procrastination by looking at examples from the patient’s life. They review the ultimate goal, and the individual’s relationship with the task, discussing the plan and breaking it down if necessary. This process is called chunking!



## II. other strategies

These strategies are often based in Cognitive Behavioural Therapy, or used in coaching as well. There are a million lists of ‘tips and tricks’ online, which I will of course not all list here. These are a cross section of some of the methods talked about that can help people with ADHD.

### Good habits

This approach limits itself not to the realm of the desk, and is entangled with the way the user is going about their day: it is about building good habits and developing routines. Building good habits is one of the things aforementioned Cognitive Behavioural Therapy is focused on. There are some specific areas of habits that deserve attention for their benefits.

### Exercise

Exercise can be thought of as a type of medication. John Ratey, M.D., says: “Exercise turns on the attention system, the so-called executive functions — sequencing, working memory, prioritizing, inhibiting, and sustaining attention.” (Williams, 2020).

### Mindfulness

Mindfulness involves paying close attention to your thoughts, feelings, and bodily sensations. It helps to develop a greater awareness of what is going on with you moment-to-moment.

We know that children who participated in mindfulness exercises had fewer ADHD symptoms, and greater attention than those who did not participate (Napoli, 2005). It stands to reason that these benefits are also possible for adults.

### Task & time management

These approaches have a lot of potential, but require willpower from the user.

One approach to task management is chunking. Chunking means breaking an assignment, task, or time, up into manageable pieces, or ‘chunks’. This can be especially useful to people with ADHD, because it helps to create overview, and makes each chunk a doable thing of its own.

Harvie (2018) proposes a process by which individual pieces of an information set are broken down and then grouped together in a meaningful whole. Applied to time management, chunks are either combinations of tasks or blocks of time.

1. Making a list, with the most important and urgent things at the top.
2. Organising time into blocks, with specific purposes. Plan the most demanding tasks during productive hours.
3. Doing one task at a time. Avoid task-switching: if you think of things you need to do later, write them down.
4. Start with small chunks (20-25 minutes, with a break) and gradually increase time. Take 5 min break.

This process is quite similar to that of the ‘Pomodoro technique’ (Cirillo, 2021). It seems both the single-tasking aspect and chunking time into blocks of around 30 minutes with short breaks have been popular strategies since the release of this technique, and many others have taken these concepts and applied it in their own manner.

According to Tony (Team Tony, 2020), once a list of tasks is made, they should be chunked into ‘commonalities’. Basically, this is clustering. Chunk 12 tasks that are overwhelming into 4 overseeable groups. He also recommends relating the list to your purpose. And to relate the to-do to your desired outcomes.

↘ **It is important to make both your tasks and time comprehensive. There are many chunking methods to cut up tasks, and time into time blocks.**

## Changing the environment

Leuklevenmetadd.nl (Schrijver, 2021) recommends creating a nice study space at home. This is essential if you have ADHD. It is a good idea to create a dedicated space, that is only for studying. So, no studying on the couch, but at a tidy desk. You can train yourself to see this as a trigger for the 'studying mindset'. Make it so going to this place feels like 'going to work'.

ADDitude mag (Rodden, 2021) has a more in-depth advice for how to treat your environment. When you have ADHD, you need to compensate for aforementioned executive functioning deficits by externalising what is hard to do in your mind. So, make information external: use cards, signs, sticky notes, lists, journals, apps. In the same way, you can make time external by using clocks and timers. Lastly, you can externalise motivation, by using point systems, or making yourself accountable to others.

## Rewarding yourself

Verywell Mind (Low, 2021) tells us that it works to reward yourself more immediately for little steps taken towards reaching goals, instead of only a big reward at the end.

If you want to take steps to self-reward, you need to set up a reward system. (Low, 2020b) tells us that the process can be described simply as three steps:

1. "Identify the problem behaviors that should be changed
2. Establish a set of rewards to be earned for good behavior
3. Stick to the plan "

"Use lists to help keep yourself focused and on track. Check off each item as you complete a task. Set up a color-coding system to help keep you organized. Use a daily schedule or planner, use Post-its or dry erase board for reminder notes."

Rewards need to actually motivate you to be effective, and which rewards motivate you is personal. So, you need to figure out what you actually want. Anecdotally, a friend of mine mentioned that they tried to reward themselves by having a cigarette. This works, because there is a little effort involved in the reward as well. If taking the reward is too easy, you start to do it impulsively.

Another strategy (Main, 2017) is to alternate your 'shoulds' and 'wants'. The analogy is that you eat pie, but you eat carrots to. If you alternate, the pie becomes the reward. If you start with the carrots, you eat less pie on the whole. "Whenever you accomplish the not-so-interesting work you set out to do, reward yourself by doing something fun. Then choose another item from your 'should' list. And so on."

↘ **You can reward yourself by alternating between tasks you have to do, and things you want to do.**

## When getting distracted

If you notice you are pulling away from the task you are meant to do, don't just give in and let yourself be distracted for a long time. ADDitude mag (ADDitude editors, n.d.) says: stop, look, and listen.

If a task is not going well, you can set a timer for about 15 minutes to take a break. "When the timer goes off, stop and tell yourself, "It's fine. Smart people can get a lot done in a little bit of time." Look into your mind's eye and review what you still need to do. Perhaps you'll decide that you've done enough and come back to the task later. Don't overreact: allow logic to rule, not your emotions."

## Hyperfocus

In case of hyperfocus, the jury is still out on whether it is desirable or not. Here are two different strategies, either you want to foster it or keep it under control.

According to Kathleen Nadeau for ADDitude mag (Flippin, 2021b), there are two options:

- If you want to foster it: make the tasks you do more compelling.
- If you want to control it: set up external cues to redirect your attention, so you don't get lost in it.

## How to stop procrastinating

How do you stop procrastinating? ADDitudemag (Novotni, 2021) (Rubin, 2020) proposes several strategies:

1. Do something fun first (but set a timer so you start after it)
2. Create the right environment. People with ADHD are somtimes most productive in unusual surroundings. "P
3. Setting intermediate deadlines. If you like to work under pressure, use this to your advantage.
4. Don't beat yourself up about not doing something. Try to diminish guilt.
5. Take a 'sloppy first step'. If you need to write, just write out gibberish first.
6. Break down into steps, and put this step into a post it in sight. Put on your blinders and work on this step. You can also create external pressure by enlisting help from someone to sit with you while you do a boring chore.

Specifically, if you are procrastinating on a task for multiple days:

7. Suffer for 15 minutes. You can do anything for 15 minutes. If you add up these 15 minutes every day, you are getting more done than you think.
8. Do it first thing in the morning. The night before, make a vow to do this dreaded task. If there is anything you can gather/prepare the night before, do it.

# 1.1.5 visiting the ADHD café


*figure 1.07: banner for the ADHD café, now online. (source: Facebook.com, ADHD café Breda page)*

Critical to any human-centered design process is getting to know the users. In this case, this is adults with ADHD. Since my frame of reference is mostly students with ADHD, for adults older than this age range, I need to find other sources.

The ADHD café is an initiative all over the Netherlands, with local communities. I decided to visit two meetings in the same location, that have been pushed online due to covid. Before the pandemic, the meetings would regularly attract 20 to 30 guests, but these nights we cap out at around 12.

The purpose of these ADHD cafés is a place to talk and share your experiences with ADHD in an informal and accessible way. It is organised by volunteers.

Every café deals with a theme as a starter for conversation.

- On my first visit (19 February), this was ‘Comorbidity’, the co-occurence of a condition in addition to ADHD. So, for instance, also having been diagnosed with an anxiety disorder. In this case, ADHD stays the primary disorder.
- On my second visit (19 March), the theme was Distraction & productivity (couldn’t be more on the mark!).

The visits tought me a lot about being an adult with ADHD. People talk a lot about their work rhythms. Often, they work really hard but acknowledge this is not always healthy. Multiple people say they have had (or been close to) a burnout, and name an obsessive drive to always do better. Asking around among friends reveals something similar: for people with ADHD, it is all at once, or nothing.

Other topics of discussion include: difficulty sleeping, boredom, distractions, hyperfocus, and productivity in general. All insights can be found in Appendix C, and will be used in the Generative Research clustering.



# 1.1.6 DRUKS: de podcast

One of the participants in Generative Research recommended me a podcast with Francien Regelink, which lead me to her own podcast: ‘DRUKS: de podcast’. She is a writer and marketing expert (among other things) who has to spend a lot of her time in a big office, as well as doing many side projects. A few years ago, she wrote the book ‘DRUKS’ about life with ADHD, and this year she has recorded a short-form podcast with a befriended GP, based on themes from the book.


*figure 1.08: cover image of DRUKS: de podcast. (source: Apple Podcasts)*

For the research, I listened to episode 1: Kennismaken - De Ontmoeting (Regelink & Van Vuurden, 2021a) and episode 4: Error - vastgelopen (Regelink & Van Vuurden, 2021b).

The first of these focuses on Regelink's job and way of working, and the second on how she gets stuck in life, and deals with that.

Here are, in short form, some of the things she says about living with ADHD:

- **You should have the courage to say it if you get jammed.**
- **When people asked whether she has done a complex task, she can have the tendency to cover up the fact she didn’t do it. Often, she blocks herself, because she could not find the answer to one thing (out of many) and is afraid to admit this.**
- **Before getting started, it is hard to ask through to find out what is actually expected of you. It is great when colleagues know this and ask through as well.**
- **Even a tiny task becomes a whole thing, she feels unnecessary amounts of pressure. As an example, she gives the task of replacing an inkjet cartridge in the printer. She doesn’t know where to start, where the cartridges are, who to ask, etc. She gets up and starts doing something else, which also doesn’t work out. This small, basal thing doesn’t succeed, which can get in the way of the whole day.**
- **If there are too many stimuli, it becomes impossible to hold on to a thought.**
- **She always sees obstacles down the road, that others don’t yet see.**
- **A strong point: associative thinking.**
- **Another strong point: others that have an idea that needs to be worked out, which still needs a creative perspective**
- **Some people think that people with ADHD don’t think before they do. That is not true, they often think a whole lot, perhaps for too long, even. There just comes a point where they suddenly have no more time and have to do it now.**

“Actually, I should just say to my employer: trust me, don’t let me write out a whole plan, just let me do it. And yes, there is the risk that it goes wrong, but that’s also the case if I do have a plan.” (“Eigenlijk moet ik gewoon tegen mijn werkgever zeggen: geef me het vertrouwen, laat me niet een mooi plan schrijven, laat het me gewoon doen. En ja, dan is er ook het risico dat het misgaat, maar dat gaat ook mis als ik wél een plan heb.”)

# 1.1.7 Conclusion

ADHD can be seen through two lenses:

1. As Stimulation Deficit Disorder, meaning people with ADHD are chronically understimulated and therefore driven to always look for more ways to be stimluated;
2. As Executive Functions Deficit Disorder, lacking in a set of Executive Functioning skills, meaning they have difficulty self-regulating.

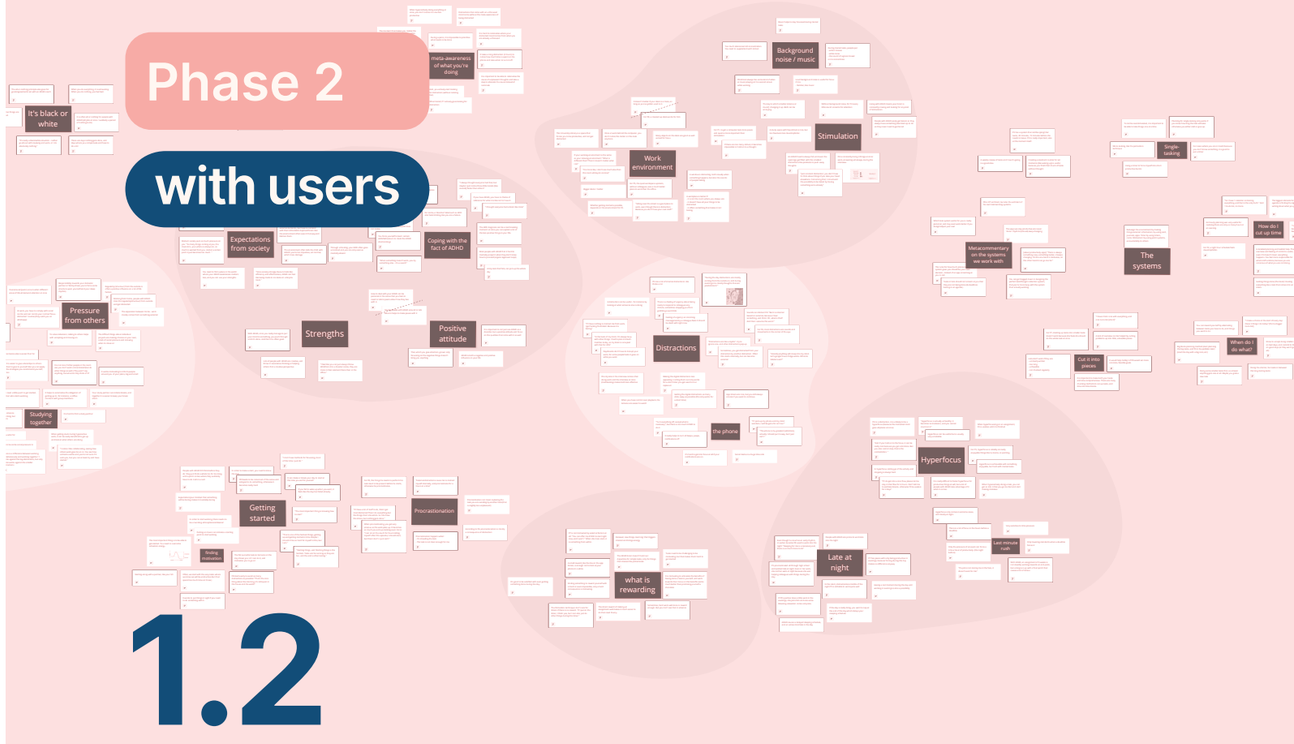
In a causal loop diagram, we can see that a lot of the problems from ADHD are self-reinforcing loops, leading to anxiety and stress.

If a person with ADHD has to do a task on a given day, there are a lot of ADHD-related factors that can get in the way, such as:

1. trouble with planning;
2. procrastination;
3. distraction;
4. over-arousal;
5. and hyperfocus.

There is no 'cure' for ADHD, but there are strategies to deal with its effects. Besides medication, there is Cognitive Behavioural Therapy, and there are good lifestyle choices such as healthy habits, or learning time management. In the case of this last option, cutting up time and tasks into smaller chunks is a popular strategy.






# Generative Research

The generative research is the most important research of this project. 8 Participants are asked to fill out a booklet with sensitizing activities, followed by an interview.

The insights based on their words and drawings are gathered 'on the wall', and clustered into 9 groups of insights:

1. getting started;
2. coping with ADHD itself;
3. social pressure & support;
4. self-awareness;
5. the working environment;
6. distractions;
7. hyperfocus & rushing;
8. what is rewarding;
9. the systems they use.

These insights are used to narrow down the problem in chapter 1.3.

# 1.2.1 The research method

The main research of this project will be a deep dive into the working habits, distractions and problems of people with ADHD.

Techniques will be inspired mostly by ‘Convivial toolbox: generative research for the front end of design’ (Sanders & Stappers, 2012). The theoretical background behind generative research is dealt with on the next page.

The research is performed in these steps:

- I will find 8 participants that are as representative of the total target group as possible.
- Each participant is invited for a short preparation session. They are explained the idea, and asked to fill out consent forms.
- Participants are then asked to fill out a sensitizing booklet, preferably spread out over a few days. This will get their mind sensitzed to my research topic, ADHD and working/studying.
- Each participants then joins me for a longer interview, and are asked to explain their answers and drawings from the booklet alongside some new questions.
- The results will be analysed in two ways:

  1. All (recorded) interviews are listed to again, noting the most important quotes and insights. These notes are called 'statement cards', and these are clustered to form the most important insights.

  2. All sensitizing booklets will be reviewed, and the exercises that gave the most interesting results will be visualised. Any insights based on the booklet are also added to the clusters above.
- A choice will be made about the scope and focus of the direction of the project.



# theoretical background

## Tacit & latent knowledge

If I want people to reflect on and express their needs and values, I need to tap into knowledge below the surface. Sanders (2002) distinguishes two subsurface types: tacit and latent knowledge.

Tacit refers to things we know, but cannot verbally communicate. Latent refers to thoughts/ experiences that we have not experienced yet, but which will be knowable in the future.

These types of knowledge are hard to reach, and therefore we cannot directly ask a question like: ‘what are your needs and values when working?’ But asking about a specific situation, people will often be able to say what they like or dislike.

## Sensitizing

This is the basis for many of the sensitizing methods and exercises from the ‘Convivial toolbox: generative research for the front end of design’ (Sanders & Stappers, 2012): “Insight into the deeper layers of understanding requires that the participant as been thoroughly involved in the problem or situation for some time.” One of the exercises is the timeline: the participant starts off with a blank timeline, first adding the things as they happen, then adding the emotions they felt, and lastly explaining why they felt that way.

## The workbook

This exercise, along with many others, is handed to the participants in the form of a physical workbook or diary. They are given this some time (often one or two weeks) before the session, “By having them immerse themselves over a longer period, they can become more sensitive to their awakened meories and associations and have the opportunity to gather stories that illustrate things they find interesting or worthwhile.”

In my research, participants will receive their workbook 4-7 days before the session. It will difffer in two areas from the understood method:

- **The sensitizing workbook, which I refer to as the ‘(sensitizing) booklet’, is distributed digitally via Miro instead of physically.**
- **The resulting session is closer to an interview than a generative session, as I wanted to emphasize finding information over new ideas in this first research phase. There will be generative session(s) later in the project.**

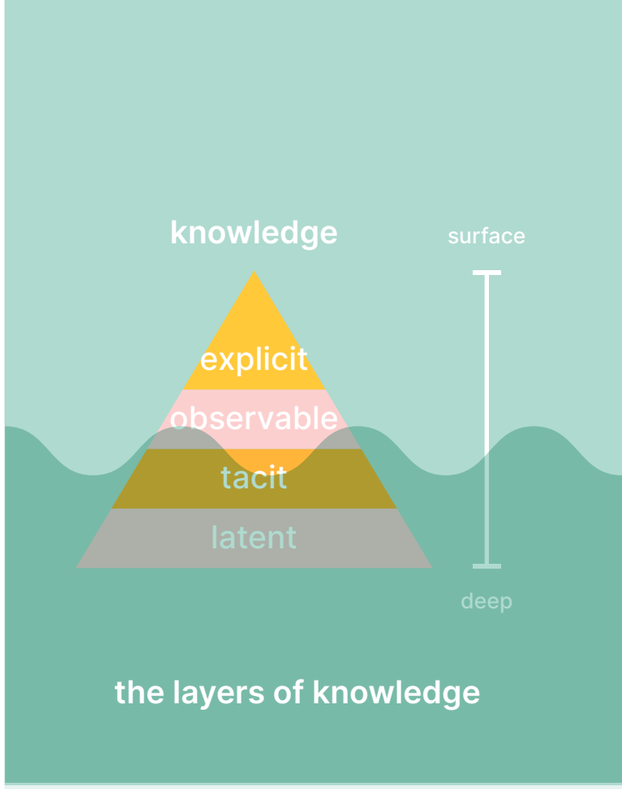



*figure 1.09: generative research: layers of knowledge (Sanders, 2002) and one of the ways to reach deeper, the timeline exercise (Sanders & Stappers, 2012)*

# 1.2.2 the research setup

## research goal

The goal of this research is to find out how the participants, as adults with ADHD, deal with working/studying, especially when at their desk.

I want to refine the scope of the project by specifying the problem, and deepening my understanding of their circumstances.

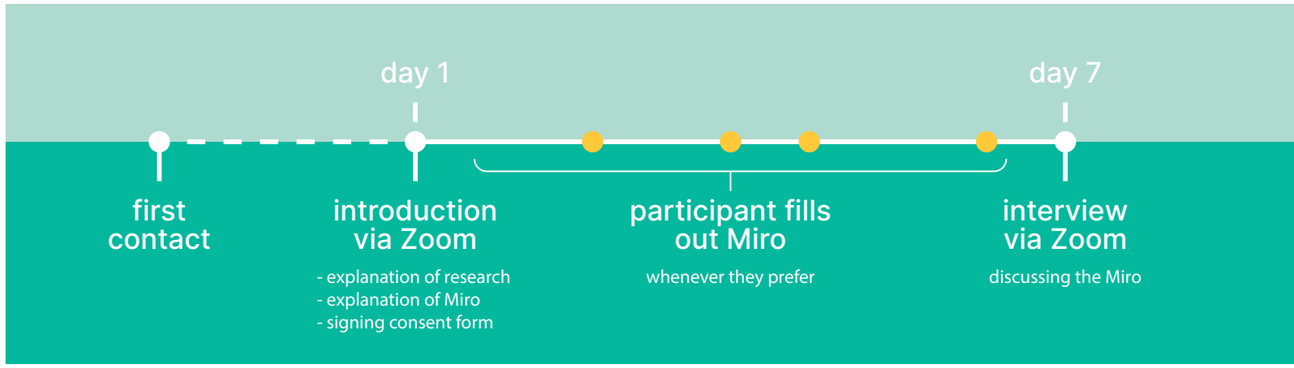
I will try to answer these questions:

- What does their typical working/studying day looks like, and where are the pain and pleasure points for them in that day?
- What does their workspace look like at home, and what are the worst distractions for them?
- What is the relationship between distraction and procrastination, and which of them is a bigger problem?
- Which tasks are easy for them, and which are difficult?
- Which solutions, methods or coping mechanisms do they already use, and which work for them?

## research timeline

Each participant gets about 7 days to fill out the sensitizing booklet in Miro, with a minimum of 4 days, to give them time to do one block a day. Participants are free to spread out the Miro process over time the way they prefer.

Participants are mentioned that it is okay if they make a mess of the booklet, and should feel free to fill it out however they want.



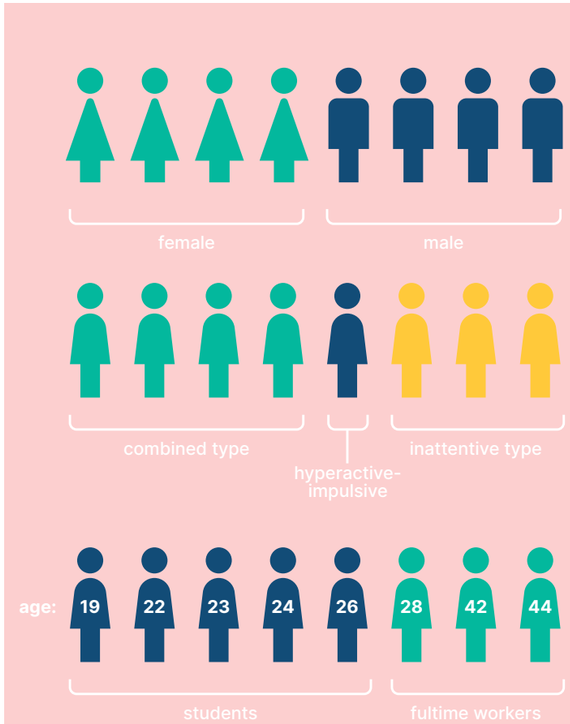

## participants

Another important question is whether the participant group is representative.

In terms of gender and ADHD subtype, the group has turned out respresentative. I have tried my best to get a good age range as well, by asking around within my network if anyone knew older adults (above 30) that could take part in the study. I tried a lot of channels (Facebook, the ADHD café) but it was much harder to reach this older group. This is because:

- Even though there are a lot of diagnosed adolescents and students, many in the older population remain undiagnosed;
- My network is relatively young, so it was harder to find adults to ask whether they knew people their age;
- In any case where people got my contact information, they didn't contact me in the end. It went much better when I got to send the first message. This was especially true for the ADHD café, where most people seemed enthousiastic during the sesion but forgot later;
- Lastly, I was not allowed in many Facebook groups, and the one I did had strict policy of not sending links or recruiting;.

In the end, 5 out of 8 participants are therefore students. The sampling here is closer to 'opportunistic' than 'representative' (Sanders & Stappers, 2012).



# 1.2.3 The sensitizing booklet

The main way of gathering data is through a sensitizing booklet, where participants are not just asked questions to be answered with words, but also to perform assignments that are visual.

## the interview

The interview followed the outline the sensitizing booklet has set up. Beforehand, I shortly reviewed that participant's filled out booklet, to see where I would have some more deepening questions.

These questions, along with a fixed question form were ordered per day block and asked if the subject had not come up yet during conversation.

While doing the interviews I started using the question form less and less, because they often gave little additional information, and it hampered natural conversation. Instead, I made a mental (and physical) note of some topics I wanted to discuss, and only used the form as backup.

*Day 1.1 asks some establishing questions such as their ADHD type, what kind of work they do, and how much ADHD affects them in general.*

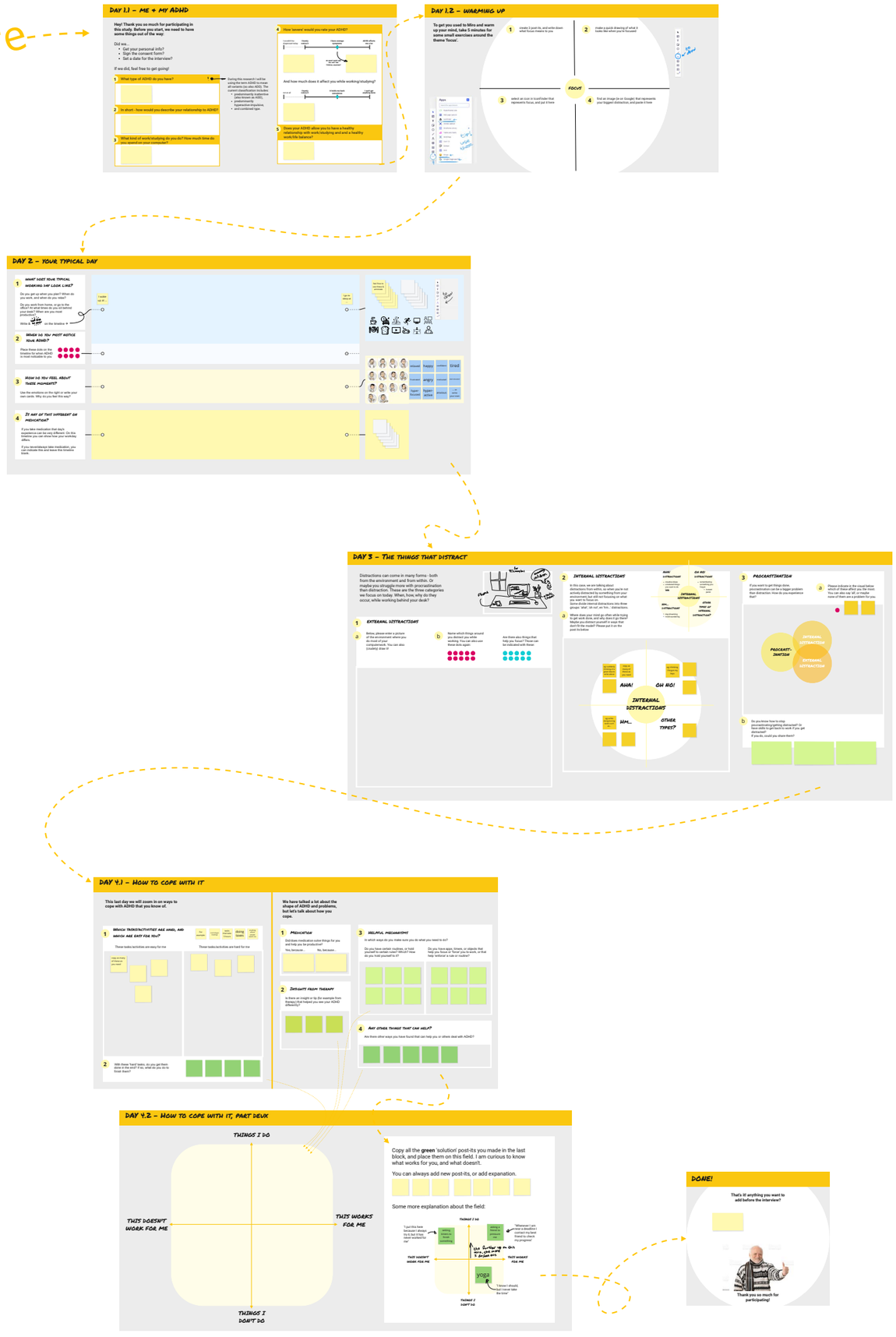
*Day 1.2 is mostly used to get them used to Miro, with four simple association exercises about focus. Two participants got an earlier version with a mindmap exercise, but there was a risk that participants would take this exercise too seriously and spend too much time on it.*

*Day 2 is about their typical workday. Here I want to find out at which moments during the day pain points related to ADHD can occur, and so participants are asked to construct a timeline.*

*Day 3 is about distractions. Here I want to find out what their work/study environment currently looks like, and which things therein distract or help them focus. They are also asked to write down their internal distractions, and to what extent internal distractions, external distractions, and procrastination are a problem for them.*

*Day 4.1 Is all about solutions. After asking them which tasks are easy or hard for them, there are a few different questions around helpful mechanisms, insights or solutions that they know of.*

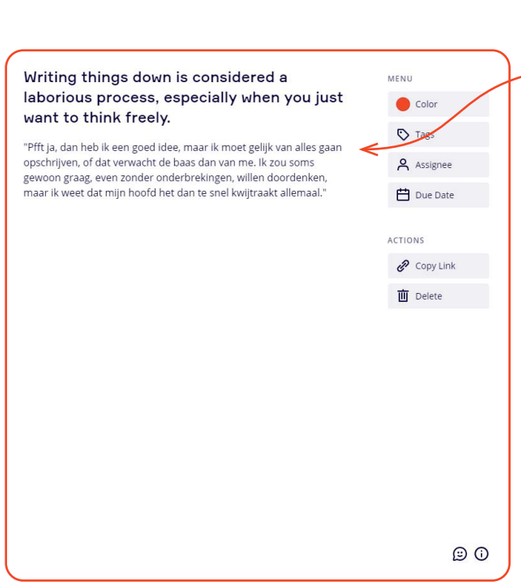
*On Day 4.2 all of those solutions are put on a set of axes, where the participants are asked to rate them on the axis of whether it works for them, and the axis of whether they are using them.*



# 1.2.4 Analysis method

The most extensive part of the analysis focuses on the interviews (and the sensitizing booklets, where relevant). A workflow for analysis was constructed based on path B from the Convivial Toolbox.

The value of this path, according to the Convivial Toolbox, is that it provides information and inspiration, simultaneously.




## 1. statement cards

All interviews were then reviewed, with the respective Miro ready. Any time something interesting is said, this is put into a card as evidence: a 'statement card'.

Based on this evidence, I write the statement as the card's title. This insight can be a conclusion drawn from what is said, or a paraphrase:

> Writing things down is considered a laborious process, especially when you just want to think freely.

The evidence shows up when a card is opened. Evidence can, in addition to quotes, be text from Miro cards or drawings, or observations such as at the ADHD café.

If a participant says something really telling or expressive, this can be directly quoted as insight:

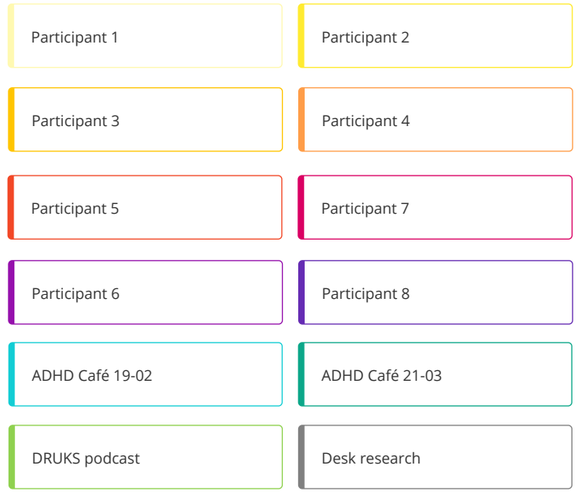
> "I HATE it when people tell me the way things should be."

And in some cases, the insight is extra valuable, or what is said is shared between multiple participants. These cards have coloured backgrounds:

> It's harder to start things you know cost a lot of time

## 2. other cards

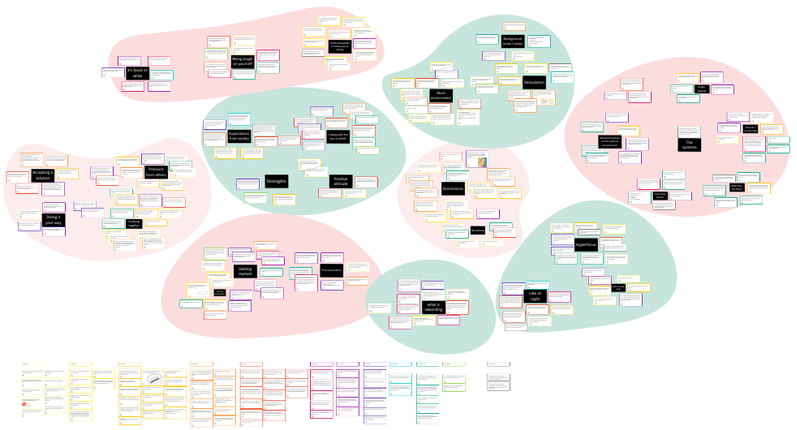
The insights are colour-coded, as can be seen here on the left. Findings from the ADHD cafés, DRUKS podcast and Desk research are also turned into statement cards.




## 3. clustering

All statement cards are then mixed up in an immense clustering operation, in which I've tried to find connections, contradictions and consensus.

1. The 10 or so most interesting cards are chosen from each column;
2. These are then tried to fit into clusters, in order to find the major themes;
3. Ad infinitum: an iterative process of finding places for other cards from the columns, new clusters, reorderings, etc.
4. This leads to a large field of clusters, which can be seen zoomed out below.



# 1.2.5 Results

## 1 Too many cards, too many clusters

Generative research, desk research, the ADHD café and the DRUKS podcast amounted to almost 400 insights, clustered into 29 topics, which were again clustered into 9 themes, summarised in the wall on figure 1.10.

All clusters are included in Appendix D.

The most important insights are gathered on the next pages. Each insight is labeled ↘1 through ↘22.

To make differences between participants clear, all participants are labeled P1 through P8, or ADHD café participant if it was said during one of those sessions.

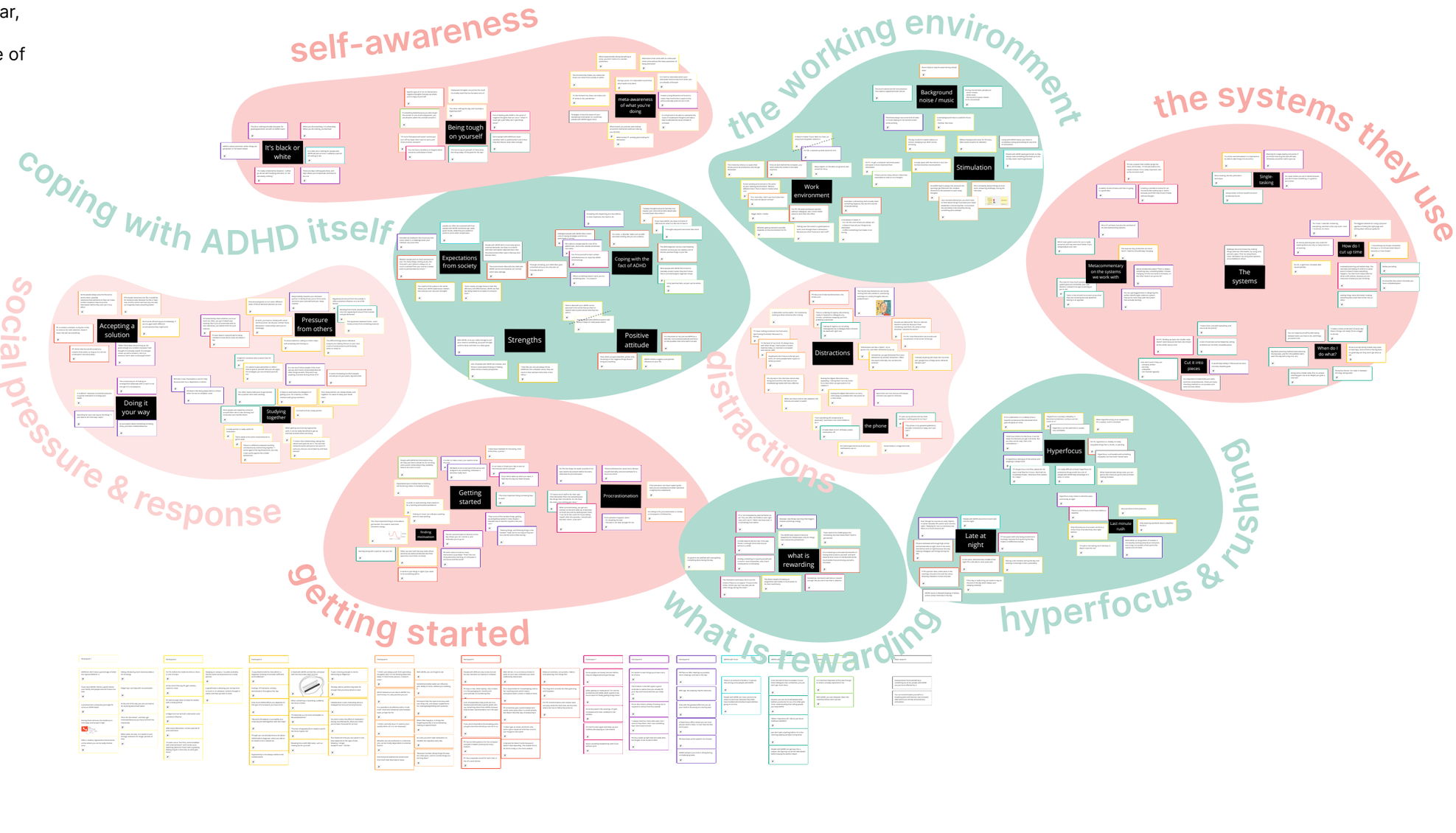



*figure 1.10: 'THE WALL': the collection of clusters of insights, used to select the most important ones, as well as for inspiration.*

## 1.2.5 Results

# the main insights

*'if I have a lot of stuff to do, thén I get most distracted  Then I do everything but the things that I should do. So I do have the stress, but nothing gets done.' - ADHD café participant*

*'I thought everyone had a brain like mine' - ADHD café participant*

*P7: 'I can sit on the couch for hours telling myself: after this episode, I should start, but then I don't. I just can't.'*


*figure 1.11: Based on illustration by P3*

*P3: 'Since society strongly favours traits like efficiency and effectiveness, ADHD can feel like being made to ice skate on a bicycle track.'*

*P6: 'Often I find ideas others bring up not good enough as a solution [to an ADHD-related problem], because then I "had thought of it myself already". If a stranger comes up with a solution, I do try it because I don't want to disrespect them'*

## 1. getting started

For many people with ADHD, getting started is difficult. By this I mean both in the morning, getting up, and getting started on specific tasks without clear boundaries.

People with ADHD face a bigger challenge here, as the disorder causes a delayed circadian rhythm, meaning they are still drowsy when they are expected to be active.

**↘1: Every day, in order to start working, a threshold needs to be crossed. Once crossed, it becomes much easier to keep working: the first succesful task motivates you to go on.**

**↘2: If the morning doesn’t go as expected because they wake up later than wanted, it can already feel like the day has failed.**

**↘3: An important part of motivation is your mindset, and expectation of the task at hand. If you think it’ll be boring, it becomes boring. If you dread the task, or become anxious due to work piling up.**

## 2. coping with ADHD itself

**↘4: People with ADHD find it hard to mentally accept when they get stuck somewhere along the way in a task: that can jam up the whole day**

## 3. social pressure & support

ADHD in a social context can be quite complex, especially when it comes to pressure. It is hard to generalise something that works for everyone. This subject is also different for the working adults (who mostly deal with colleagues and a boss) and the students (who have to set up social pressure themselves, aside from group projects).

In most cases, it was important to strike a delicate balance in social pressure. For the students, when someone asked them whether they had done a task they disliked, participants could get irritated, even recalcitrant, and be even less likely to do the task. On the other hand, one participant noted, if no-one asked them whether they did their homework, they also didn’t feel enough pressure to get up and go do it.

**↘5: Most of the students I talked to liked to work together with study partners, so there is the subtle social pressure of having to look like you’re working. This seemed to be one of the most effective ways to stay on task.**

**↘6: In most cases, there seems to be a difference between what I would call ‘active’ and ‘passive’ pressure. Having a person in the room works for most people, less so if that person is also judging them if they did not do something.**

**↘7: Social pressure is also a good way to force a start through a coffee moment, or a break at the right time. Studying together offers the opportunity to discuss problems and spar about solutions**

*P2: 'In the moment my chaos can make a lot of sense to me, sometimes'*

*P1: 'I've done nothing this day and my body is digesting itself'*

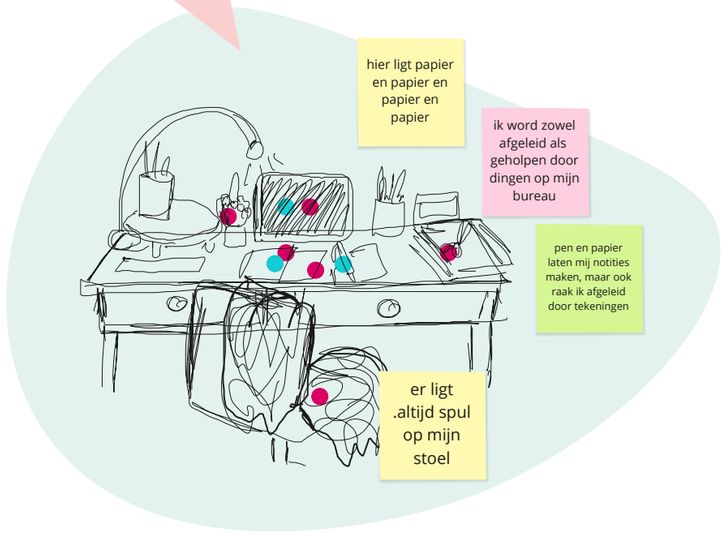



*figure 1.12: P1's self-drawn working environment*

# 4. self-awareness

**↘8:** **while in an unproductive state of mind, it seems to be hard to realise or reflect on this, and thus, bring yourself to focus.**

**↘9:** **For people with ADHD, it's either black or white: days where nothing happens, days where everything happens. If one thing fails, everything fails. This can be pretty tiring.**

# 5. the working environment

**↘10:** **Participants had a lot to say about the amount of stimulation the liked in their work enviroment, whether it be visual or auditory, under their control or not.**

**↘11:** **In general, there should be little stimulation coming from the space itself (Little, but certainly not nothing) Quiet places like the university library were mentioned. It seems that for a stimulation to be useful, it should be under your control, like music.**

**↘12:** **It helps if your workplace is not the same space you relax in, to mentally separate your work and chill times, but also because your room at home probably has all your things to be distracted by.**

# 6. distractions

**↘13:** **Multiple people acknowledge that the phone is their biggest distraction, yet they don't turn it off, because they are afraid of missing something.**

**↘14:** **A lot of strategies to combat digital distractions only work temporarily: you can put away programs a few clicks, limit your time on apps, but any boundary you put up can just as easily be torn down in the moment.**

*P8: 'During the day distractions are mostly coming from the outside in, and during evenings it is mostly thoughts that are predominant.'*

*P4: 'Just constant distraction; you don't have to think about things if you take your head elsewhere. Concerning that, I circumvent the possibility to be bored by having something extra already'*

*'If I pick up my phone and my mind wanders, I will be gone for an hour' - ADHD café participant*

*'If I do get into a nice flow, please let me stay in that flow for 6 hours. Don't tell me to eat/ take breaks, otherwise I'll be useless for 2 days' - ADHD café participant*

*P1 'If a job is not staring me in the face, it doesn't exist for me'*

*P7: 'Most of the time, it's not external factors, those don't do much to motivate me. You could, so to speak, promise me 1000 euro if I'd start working right now, but even then I wouldn't. If I start, then it is because there is suddenly something from within me that says: okay, I'll do it now.'*

*P8: 'So I have 1 calendar containing everything, and that is the only truth.'*

*P3: 'I should keep my breaks somewhat boring so a 10 minute break doesn't become a 3 hour break.'*

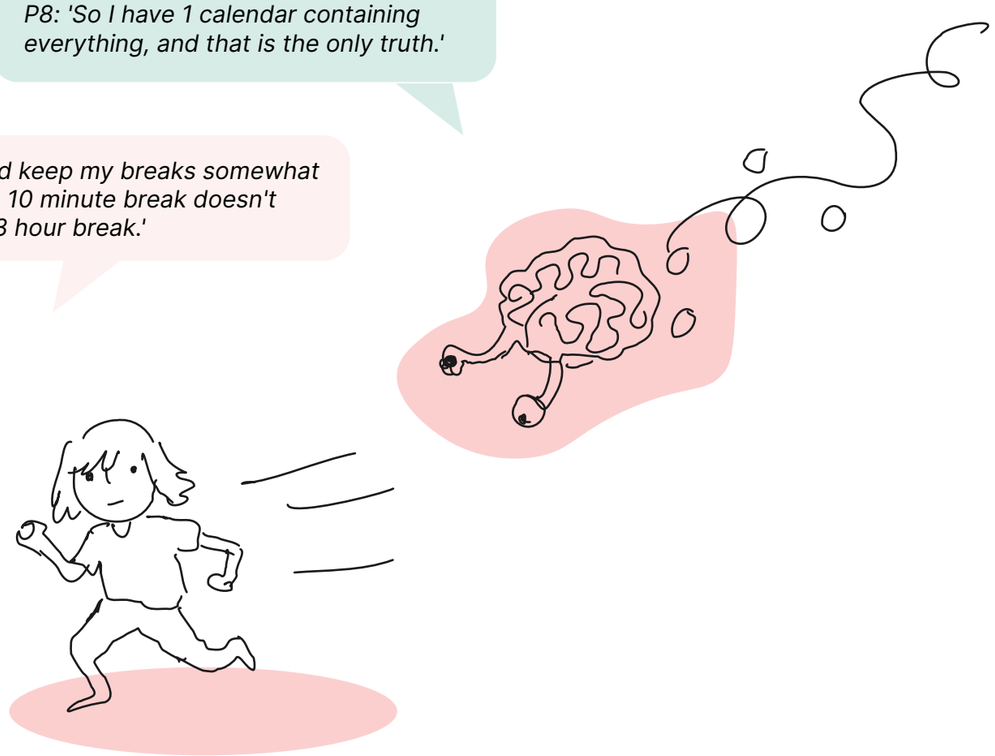


*figure 1.13: P1's conception of 'focus': 'a big pink brain, maybe it has eyes'*

# 7. hyperfocus & rushing

Once in a while, people with ADHD get focused. But, if they do, they can get really into it: hyperfocus. If this hyperfocus is on something productive, it is probably because there is a deadline later that day.

**↘15: People with ADHD are very sensitive to time pressure: a rapidly advancing deadline or test can force a bout of focus.**

**↘16: Most often, hyperfocus is actually on something enjoyable, like TV or hobbies. It is harder to hyperfocus on uninteresting things. Most importantly, you cannot count on it.**

**↘17: Most participants saw hyperfocus as something useful, holding on to it for as long as possible if it came. It has drawbacks as well: you go too fast, start making mistakes, and it can become tunnelvision.**

# 8. what is rewarding

**↘18: It is not like promising yourself chocolates after a job well done; self-rewarding is not an effective strategy for people with ADHD.**

**↘19: External rewards are often not enough to motivate people with ADHD. A much more motivating factor is a hard consequence.**

# 9. the systems they use

With systems, I mean: bullet journals, tasks systems, self-imposed rules. What mainly stands out is that there is not a lot of coherence in which systems are used. Some people use two to-do lists, a long-term one and a short-term one; some preach that one task list is the only way to get work done.

Therefore, the systems used can be considered very personal, and of course, subject to change. But it does seem likely that people with ADHD are  occupied more with these systems, and what works for them, than others.

**↘20: It seems beneficial, if not necessary, to be able to build your own task system, or at least adjust something that exists. Combined with the earlier insight that things should be done 'your way', people with ADHD need to design for themselves.**

**↘21: No person with ADHD likes a judgmental app. Combined with the earlier conclusion that people with ADHD are sensitive to judgment and rejection: no red flashing signs when you have failed to complete a task in time. The exception to this is when the person has made a conscious choice for this, as a consequence.**

**↘22: Everyone recommends people with ADHD to cut up tasks into manageable pieces, but people don't know how to do this, or feel they should do a task all at once.**

# 1.2.6 Conclusion

For people with ADHD, it is often black or white. A good day, or a bad day.

Every morning, a barrier has to be crossed to get started. If this does not go as planned, it can feel like the whole day is ruined.

Also, there is an important but complex role for social pressure and support in getting things done. Social pressure (for example in the form of deadlines or not wanting to disappoint) is, for some people, essential to get anything done, but social interference is quickly seen as annoying and demotivating. Someone who you study together with is a good way to reap the benefits of this social pressure.

The working environment should be understimulating to not be distracting, but there should not be zero stimulation, as that can feel claustrophobic. Another big distraction is the phone. Some people have tried a lot of strategies to reduce their phone use, but every strategy only works for a short time.

### Which things can be beneficial?

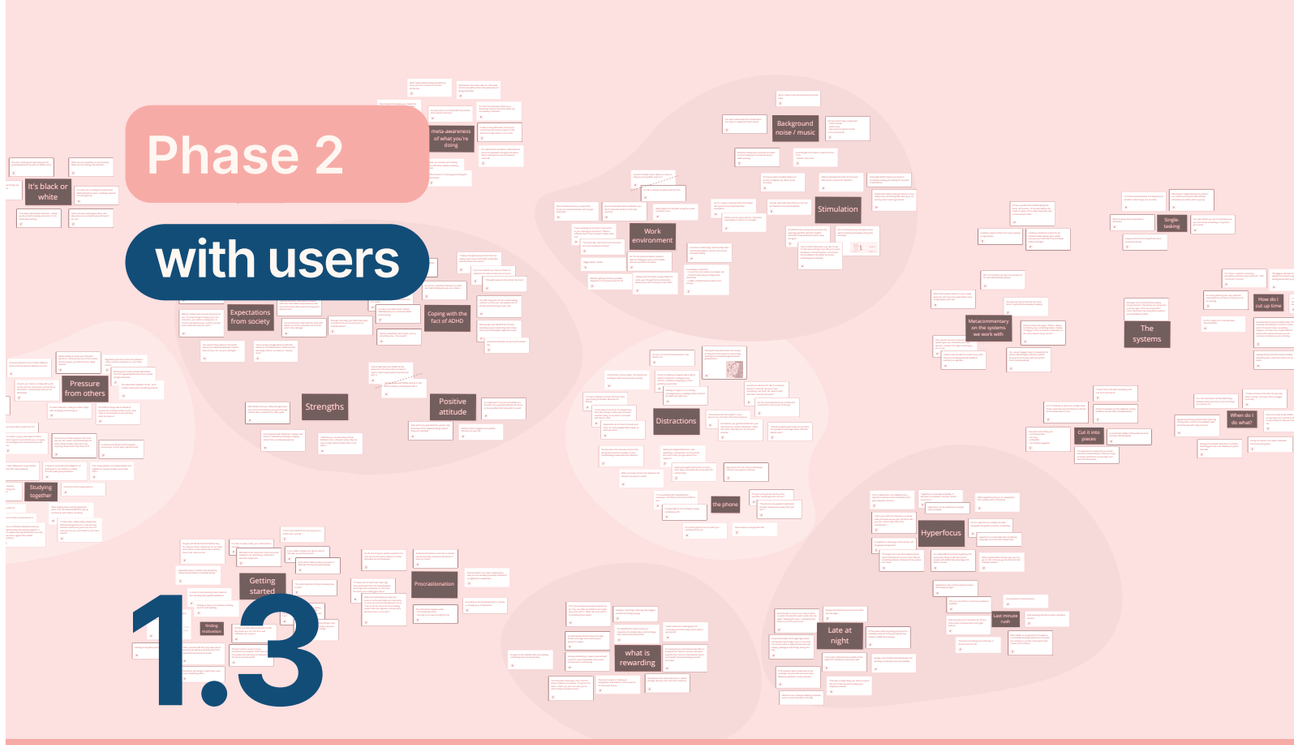
Hyperfocus is an interesting phenomenon, where people with ADHD get so engrossed with an activity that time and their environment don't reach them anymore. This can be useful when needing to speed through an assignment, but it cannot be counted on, and is also a bit unhealthy.

Self-rewarding doesn't do much to motivate people to start working. External rewards also don't for some, but that does seem to be at odds with other research. It seems that external rewards are felt very intensely, but the expectation of that reward is not.

For an app or system to 'work' for a person with ADHD, they need some freedom to customise it and make it their own.

People with ADHD are also much more sensitive to feelings of rejection or judgment, also when an app does this.






# Problem statement: procrastination

The findings from the Generative research are used to narrow down a direction. The main problem I want to solve is that of procrastination.

This chapter will use insights from the Generative research to map which things make it easier or harder to get started, as well as make a choice in which kind of people I will be designing for.

# 1.3.1 What is unique to ADHD?

Non-ADHD readers may look at a lot of the issues and behaviours that arose during the research, and say: ‘Well, is that really unique to ADHD? I also sometimes experience this.’

And that can be true in some cases: some of the behaviours are not unique to people with ADHD, as the behaviours of ADHD exist within a continuum of typical human behaviour. However, people with ADHD exhibit these more intensely, more severly, and more chronically than those without ADHD.

In other words: everyone can be forgetful or distracted sometimes, but the vast majority of people do not experience these challenges every day, in the severe and debilitating ways people with ADHD do.

With this in mind, it is important to point out which of the found factors are unique to ADHD.

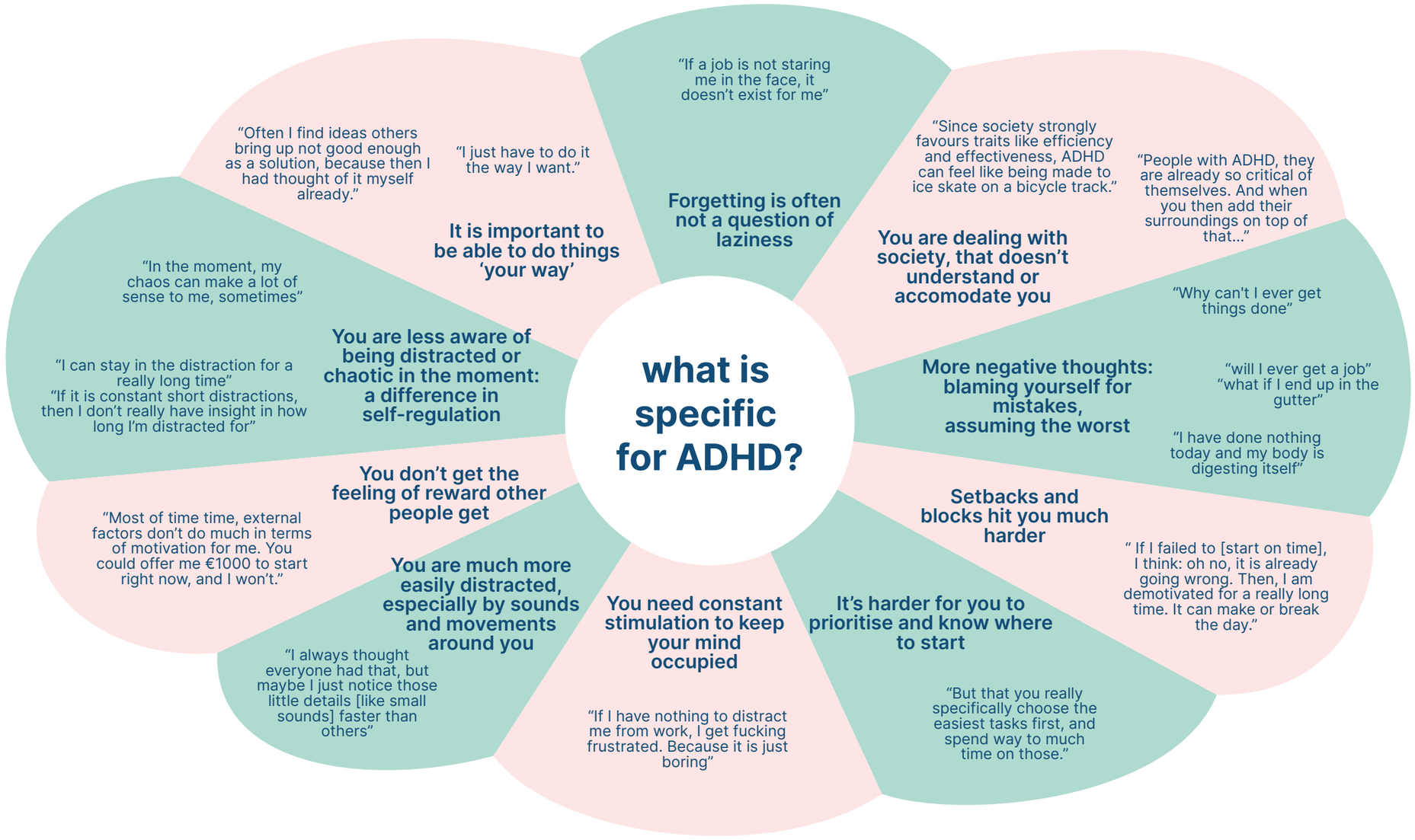



*figure 1.14: Things that are specific to ADHD.*

# 1.3.2 The direction: Procrastination

In order to make a positive change to the lives of people with ADHD, I need to narrow down the scope of the project. I have chosen to focus on procrastination as the main problem, because, based on insights ↘1 and ↘2:

**↘1: Every day, in order to start working, a threshold needs to be crossed. Once crossed, it becomes much easier to keep working: the first succesful task motivates you to go on.**

**↘2: If the morning doesn't go as expected because they wake up later than wanted, it can already feel like the day has failed.**

- This means getting a good start can be thought of as the source of productive or failed days. If we can reduce procrastination, we help people feel good about what they are doing.
- Another benefit: this gives a clear moment in the day to focus on (the first time you want to get to work)
- And procrastination is recognised universally: procrastination is reported as a problem by almost all people with ADHD (Ramsay & Low, 2020).

On the right (figure 1.15), I have included a map of all the factors found in the Generative research that influence procrastination either positively or negatively.

## New problem statement:

**A lot of adults with ADHD have trouble motivating themselves to start working/studying.**

**Especially in the morning, if you have to do something for the first time during the day, you can procrastinate.**

**What can help a person with ADHD to stop procrastinating and get started?**

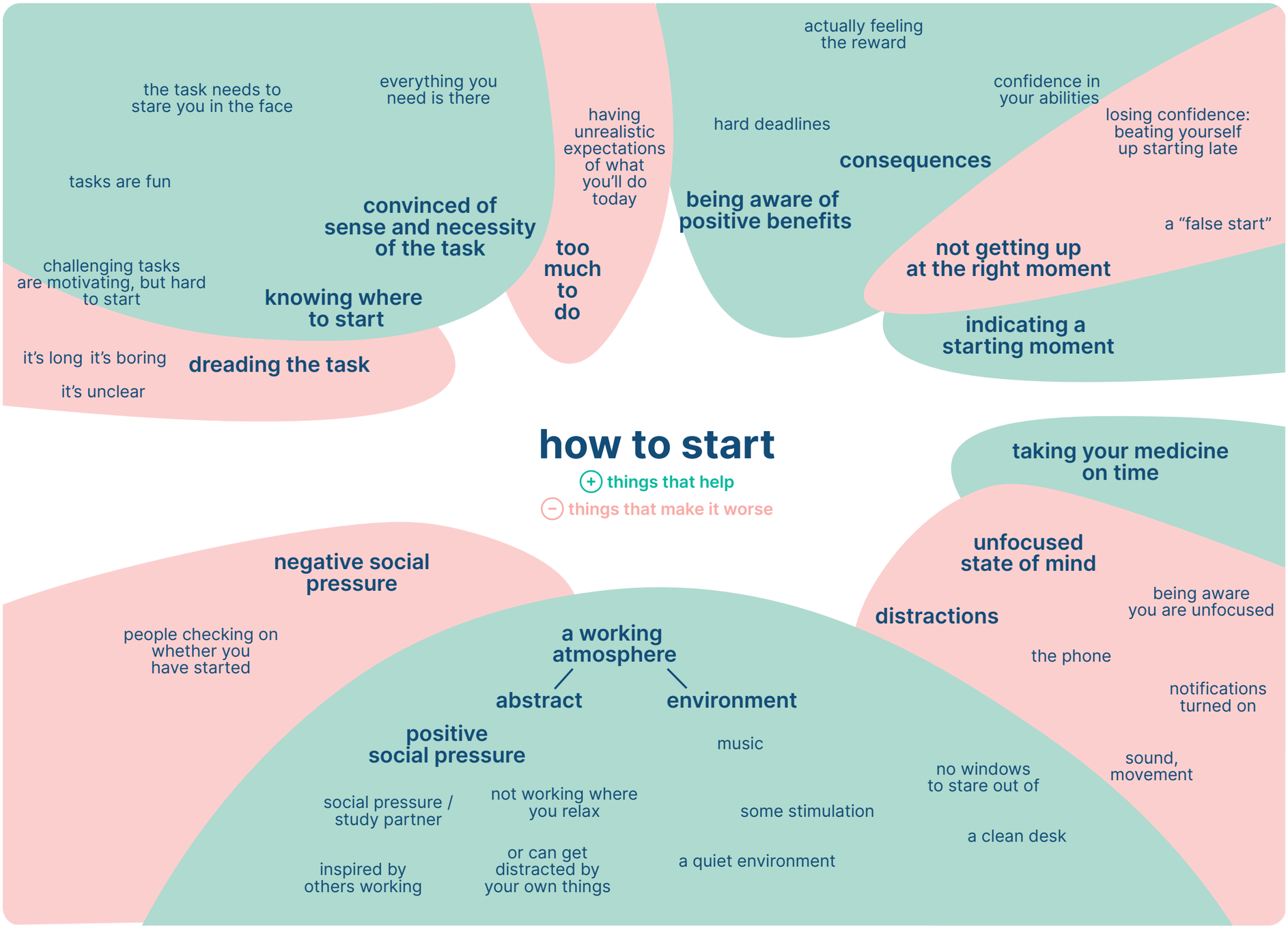



*figure 1.15: Procrastination map. Shows all things that help reduce procrastination in green, and things that worsen procrastination in red.*

# 1.3.3 Personas: who am I designing for?

From having conducted the interviews personally, I have a clear view of the motivations and challenges of my participants. For you, as reader, they do not have a face.

With these personas I want to give you some empathy for the kind of people I will be designing for.

### Specifying the target group

Later on in the design process, I will be choosing to focus on students with ADHD. This means that, of these four people, I will first and foremost be designing for Lisa and Niels.

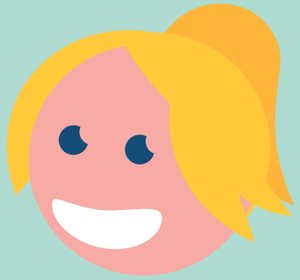
## Harold

"There is always so much more to do, so much to learn about!"

"ADHD is my problem, I should solve it on my own"

**works in tech**
**type: combined**
**age: 30**

Harold is always looking for more ways to be productive, and has tried countless apps and task systems. But there is always something better around the corner.



## Saskia

"Focusing on the negative gets you nowhere. It is important to focus on the strengths that come with ADHD."

"Don't ask me to plan everything out. You need to trust me to do things my way, and allow me to fail as well."

**works with people**
**type: inattentive**
**age: 40**

Saskia doesn't like looking at ADHD as a disorder.

Before her diagnosis, she was always doing everything at once, which put her at risk of a burnout. Some serious reflection has changed her way of thinking.

## Lisa

"Since I only recently got the diagnosis, I am still searching for my perspective on ADHD"

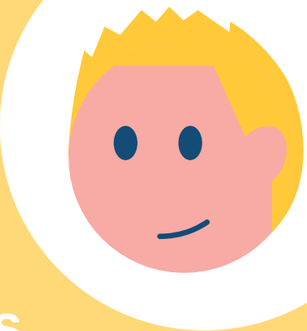
"If I start the day procrastinating, the work keeps piling on and I get increasingly anxious"

**studies a language**
**type: inattentive**
**age: 20**

Lisa has a lot of creative outlets, like drawing and making things.

Lisa can become overaroused when there is too much pressure or things going on around her.

For Lisa, it takes a lot of willpower to get started. Once she has finished one task, she regains confidence and usually works through th day.



## Niels

"Every quiet moment is filled with podcasts, videos, music: I even fall asleep with my phone in my hand."

"I don't think a lot about my ADHD. I've been doing things this way for years and nothing has burned down yet."

**studies in science**
**type: hyperactive-impulsive**
**age: 25**

Niels has trouble sitting still. Any sound or movement around him is immediately distracting.

His chaos can make a lot of sense to him, in the moment. He is not aware of his unfocused state of mind then.

Niels doesn't give himself a lot of time to think, as there is always something taking up his attention in the background.

# 1.3.4 Conclusion

Based on the insight that a false start in the morning can ruin a whole day, the problem statement was focused on procrastination:

*A lot of adults with ADHD have trouble motivating themselves to start working/studying. Especially in the morning, if you have to do something for the first time during the day, you can procrastinate. What can help a person with ADHD to stop procrastinating and get started?"*

Four personas were constructed to combine the experience of all Generative Research participants, their different challenges and ADHD types into an overview that can be designed with.

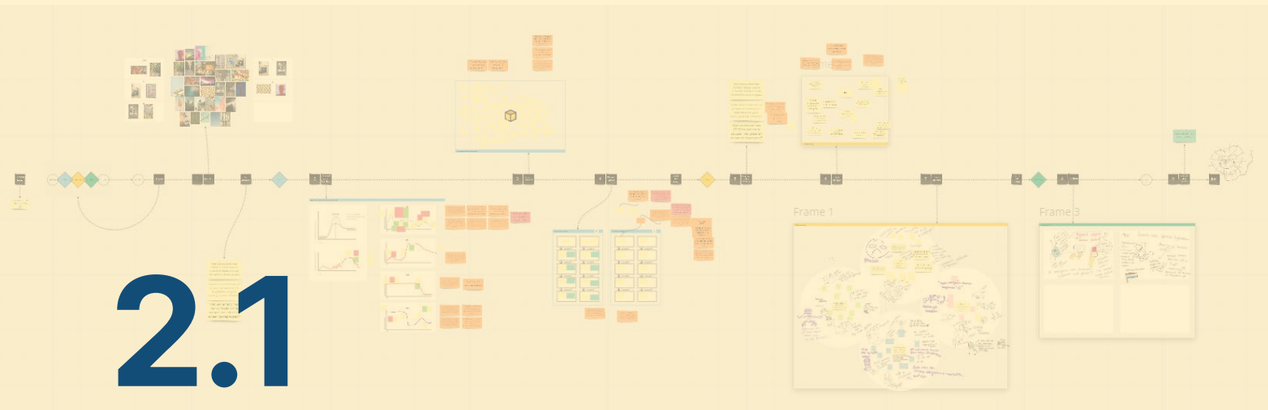


Phase 2

with users

*"Whoever is in the room, is the right person."*

*- Marc Tassoul*



# 2.1 Co-creation session

Ideation is arguably the most challenging phase in any design process. Involving others, preferably users, in this part of the process is very valuable to exploring interesting directions, and getting a quantity of ideas. That is why I organised a co-creation session at the start of ideation, with a group of four students with ADHD.

A second reason for this session I want to find out whether I have the problem phrased in the right way and test some of my assumptions about procrastination and ADHD.

This chapter contains the account of how the session was designed, and the insights it generated.

# 2.1.1 Session design

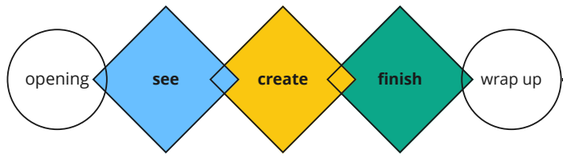
In order to generate new, specific insights into procrastination, and kickstart the ideation process, a co-creation session was organised.

Four students with ADHD (three of which were earlier participants, and one of which is a fellow DfI student who was familiar with the project) were invited to spend two evening hours to think with me about procrastination in a Zoom session.

I asked the participants to help me solve the problem statement:

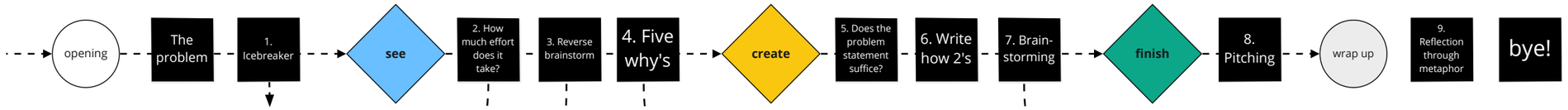
- **A lot of adults with ADHD have trouble motivating themselves to start working/ studying.**
- **Especially in the morning, if you have to do something for the first time during the day, you can procrastinate.**
- **What can help a person with ADHD to stop procrastinating and get started?**

They are told that the goal of this session is to generate ideas, and we will walk through a small design process to do that. The session was split into three phases, to reflect the structure of a small design process:

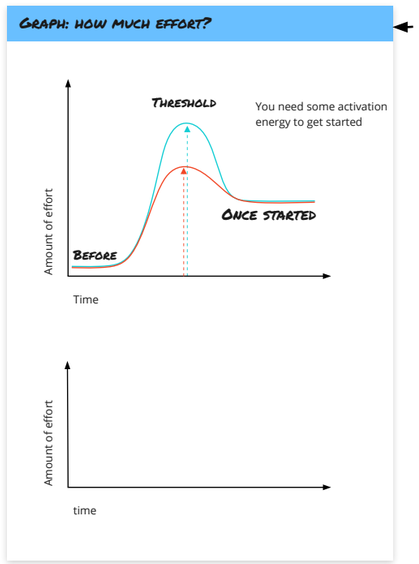



A lot of the activities are inspired by my participation in the IDE elective Creative Facilitation in september 2020. Because this was the first time the course was given online, many of the techniques and experiences from our year were documented in a website (onlinecreativefacilitation.nl, 2021), which has been an invaluable resource in setting up this session. That also goes for the mindset from you need to lead the session. You need to trust the process and be open to everyone's ideas. As Marc Tassoul says: 'whoever is in the room, is the right person'. Then, there is the possibility of really innovative outcomes.

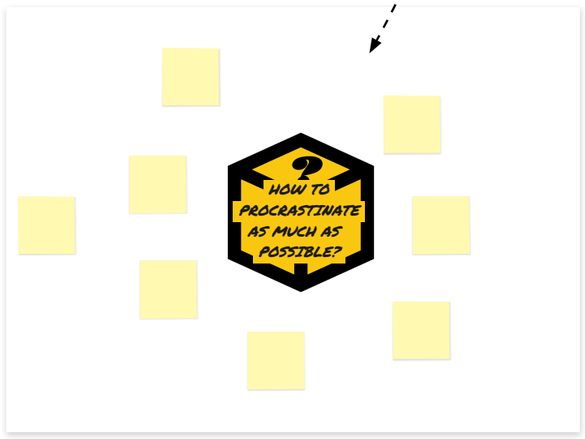
The activities were prepared in a Miro board, an overview of which can be found in Appendix E. The most interesting of the activities will be highlighted here.



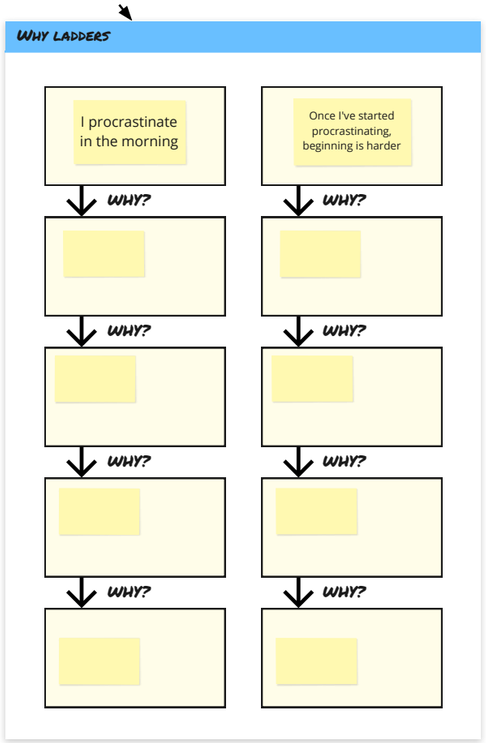

1. The icebreaker is a picture association, where participants choose 2 picures to tell something about themselves.




2. Each participant is asked to draw a loose graph of how much effort it takes them to get started, in order to find and discuss the pain points.




3. Participants take 5 minutes to brainwrite as many ways to procrastinate as possible, both to get warmed up about the subject in a fun way, and get to know the basics of brainstorming.




4. Five Why's is a laddering exercise, where participants split in two teams and answer a question in five layers.
'I procrastinate' > 'why?' > 'because I don't want to work' > 'why?' > 'Because I am tired' > etcetera.

5. After getting a good view of the problem, the participants then decide whether the problem statement I put before them formulates the problem well.

6. The participants formulate four How 2's (Hoe Kun Je's), questions that will be answered in the brainstorm. These are different approaches to solve the problem, or offer different parts of the solution. Deciding on these is done in a discussion.


7. The How 2's are put in the center of a brainstorming canvas. Participants are instructed that they are free to draw, write, whatever they like. Each of the four participants starts with one canvas, rotating around until everyone has had each of the H2's, building on each other's ideas.

8. The participants are split into pairs again, and both pairs choose an idea that they would like to elaborate. They take a few minutes to draw out the idea and then pitch it to the group.

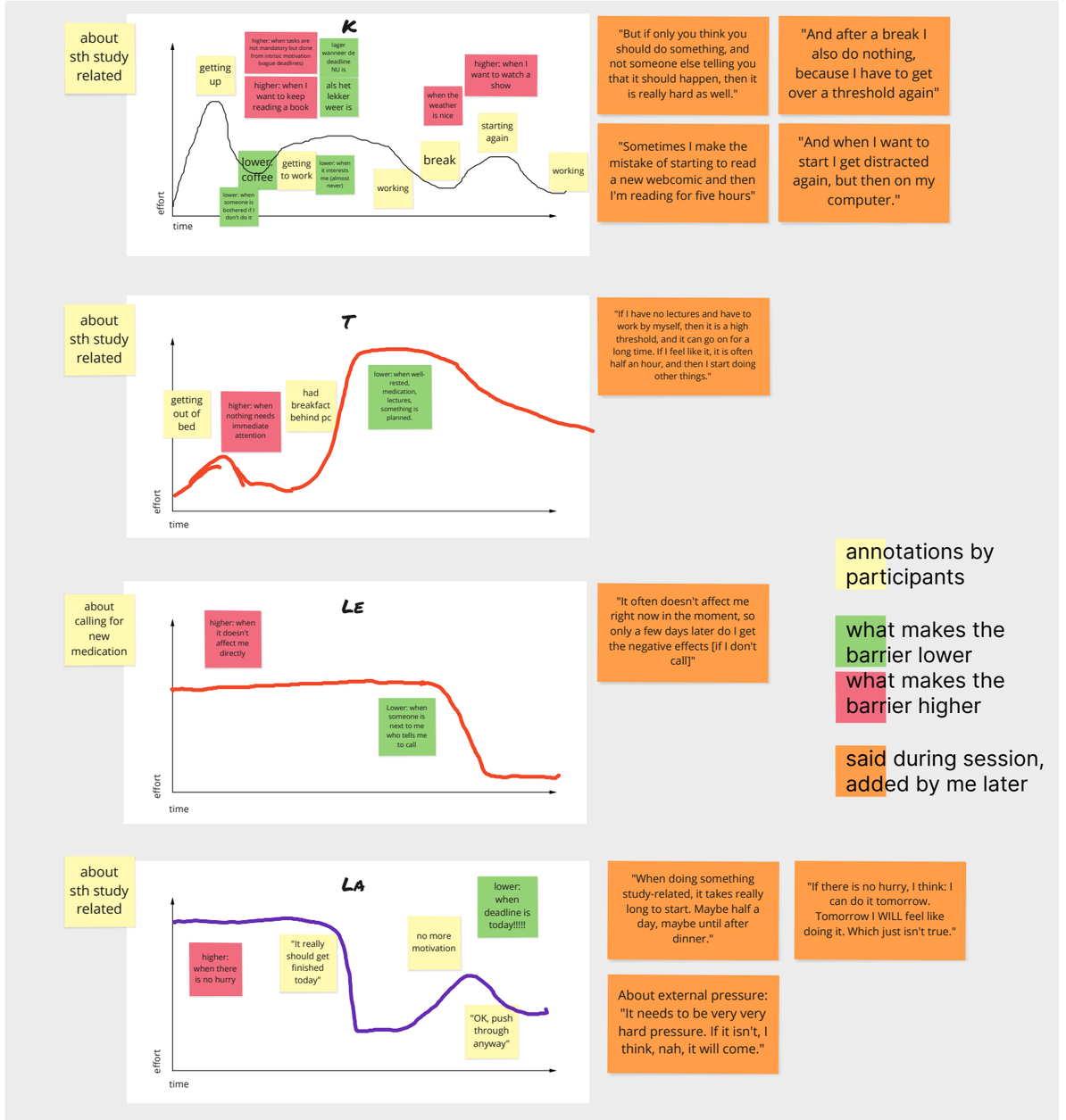
9. We close the session with a reflection through metaphor. We take a turn reflecting in the format of: 'This session was like a ..., because ... .' For instance: 'This session was like a river, because it flowed well nicely'.

# 2.1.2 Insights from the session

What came out of the session is two fun ideas that serve as inspiration for ideation. But the most valuable outcomes are the insights that the participants gave when talking about their procrastination behaviour. The filled in Miro boards can be found in Appendix E.

## ② How much effort does it take?

In this activity, all four participants draw a graph of how much effort it takes to get started on their tasks in the morning. One participant ('Le') interpreted the idea a bit differently, and filled it out about a specific task: calling the apothecary.





From this exercise, we can generalise three findings relevant to the project:

- ↘ **After a break, starting again is just as hard as the first time starting that day.**
- ↘ **The problem of procrastination for students with ADHD is not about starting 30 minutes later than you want, but about being able to waste half a day.**
- ↘ **3 of the participants mention some kind of social pressure as a way to lower the threshold to get started.** Either in the shape of others being bothered if a task is not done, or someone being there with them until they have done the task. But according to one of them, the pressure needs to be very hard for it to work.

## ③ Reverse brainstorm

The participants were asked: How to procrastinate as much as possible? This was easily the most fun exercise of the session, and participants had a lively discussion about it.

- ↘ **A lot of the behaviours were seeking social contact: inviting people over, calling, getting sucked into group apps.**
- ↘ **Also, some of the behaviours were researching their own behaviour: googling how to stop procrasting.**
- ↘ **Something that everyone recognised: telling yourself 'Just one episode' 'Just one game' 'Just for a little while' and getting sucked into doing it for hours. People gave themselves the illusion that they would surely start after that.**

## ④ Five Why's + ⑥ Writing How 2's

During these exercises, some of my assumptions were broken, mostly in the discussion about the process.

I had written down, as prompts to explore in exercise 4:

- 'If I don't get up in time, the day is already ruined.'
- 'Once I start procrastinating, starting becomes harder'.

In exercise 6, my example-How 2 was:

- "How to never procrastinate"

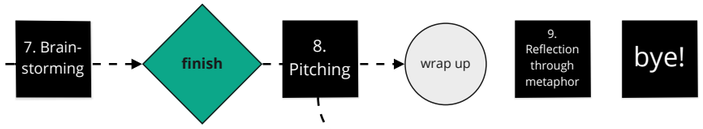
These turned out to not exactly be quite unnuanced.

- ↘ **Once you start procrastinating, it does <u>not</u> become harder to start. In fact, they said: procrastination is always going to happen. It is unrealistic to have that expectation of yourself.**
- ↘ **About getting up in time: actually, the case is more that "if I don't start at the time I had in mind, it is already ruined." So, if they imagined starting at 9:00, and it is 9:01, then they procrastinate until an hour later.**

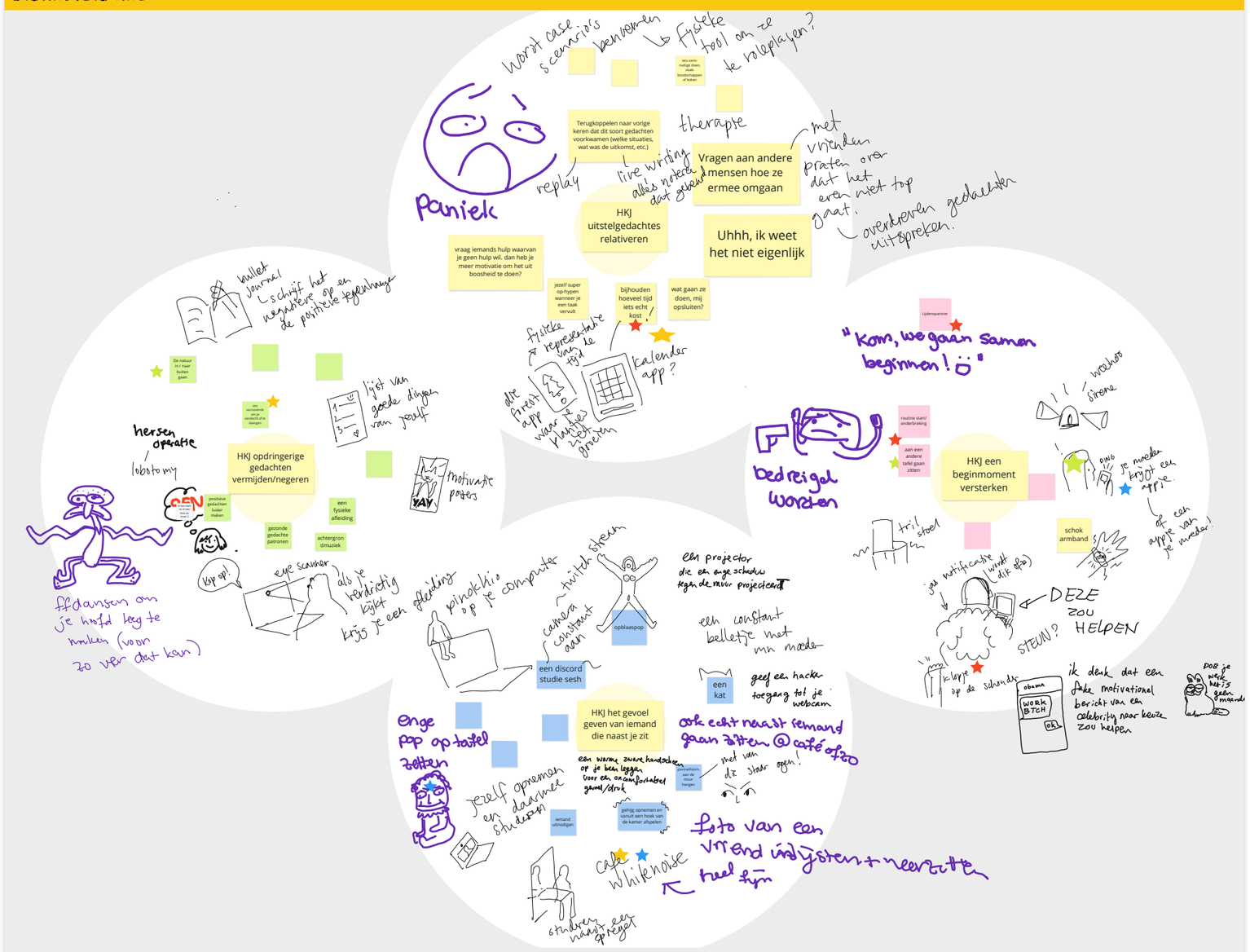
The complete filled out Miro boards are in Appendix E.

and pitching the two best ideas. This was a fun exercise, though not as insightful as the earlier phases. In the end, I decided not to use the ideas, but to move on with some of the insights on the previous page.

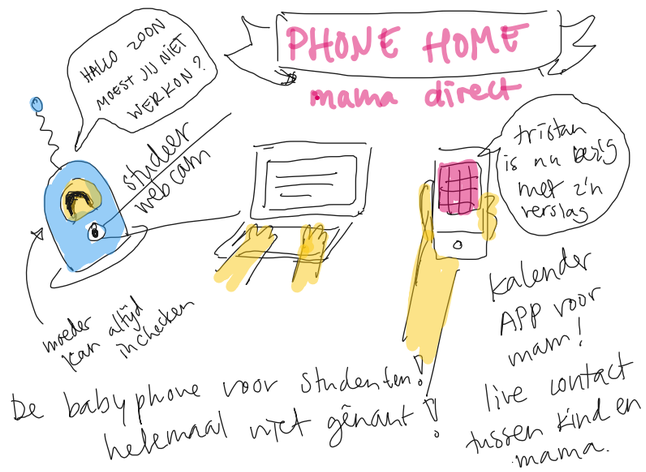
↘ **Interestingly, both ideas used a form of social pressure to get to work, either by being checked on, or by trying to compete.**




## BRAINSTORMING




## IDEA PITCH 1




The first idea was a kind of baby monitor, where your mother checks on you whether you are studying, and can yell at you if you are not.

## IDEA PITCH 2


The second idea was a Guild System app that allows you to compete on time-bound tasks with others, and get into a motivation guild if you finished them.

# 2.1.3 Conclusion

The session was a blast, and a good inspiration for the coming ideation phase. The session had a very conversational tone, with a good balance of chaotic people (fun, energy, ‘gezellig’) and thinking people (talking, drawing) within the participants, which helped the session along.

Even though the ideas that came out in the end were not the most useful, some of the new insights into procrastination can serve as a basis for a mechanism that can help people, for instance by breaking the illusions they have about their own procrastination behaviour at the right moment.



Phase 2


# 2.2 Ideation 1

We have reached the fuzzy stage of the process, and this chapter is therefore not as coherent as I would like.

The two weeks that comprise the first ideation phase were a back-and-forth between drawing ideas, going back to my own research, and diving into literature about procrastination.

5 ideas are chosen that are promising, and they are evaluated on a list of criteria to determine which to continue with.

In the end, this will lead to a first concept, shown in the next chapter.

# 2.2.1 Approach to ideation

Ideation was largely unstructured, so it is difficult to give a good overview of the process. There was a lot of reading papers on procrastination, drawing H2's, listening to podcasts, back and forth.

The main method for ideation was braindrawing, a method where a physical sheet of paper has one question in the middle that starts with How To (H2). A timer is set, and during that time you are only allowed to draw solutions and ideas for that question.

More theory about procrastination was researched in order to formulate the right H2 questions. The most interesting theories are mentioned on this page.

For more information on the process, and the extended reading I did, you can look in Appendix F.

## Self-forgiveness & emotions

We know from research that it is better to forgive yourself for procrastination than to feel guilty. The people who were able to self-forgive get more done than those that do not. (Wohl et al., 2010).

Negative emotions, such as the guilt from procrastination, only lead to more procrastination, as put by Martinčeková, L., & Enright, R. D. (2018). if we want somebody to procrastinate less, we may want to take the route of positively influencing their emotional state.

This is relevant, because procrastinators are likely to give priority to this emotional state above long-term goals (Sirois & Pychyl, 2013). As Sirois & Pychyl put it, "We believe that tomorrow will be different."

## Procrastination as an emotion management problem

Timothy A. Pychyl, (Pychyl, 2015), likes to define procastination as an emotion management problem, instead of a time management problem.

He agrees with  Anderson (2016) that you as a person area always blameable for procrastination, as you have to take the responsibility to solve it. However many precautions, systems, and intentions you have in place, there will always be the moment where you have to say: "Well, I'll just get started." You have to take one little step, even if you don't feel like it.

To learn to self-regulate is to struggle with your own agency, to take up the responsibility to make your own choices. "Procrastination is a deeply existential issue. It is about living the life you want."

The takeaway is that, while we can lower the barrier towards that starting point, the starting point itself is and should always be the responsibility of the person themselves.

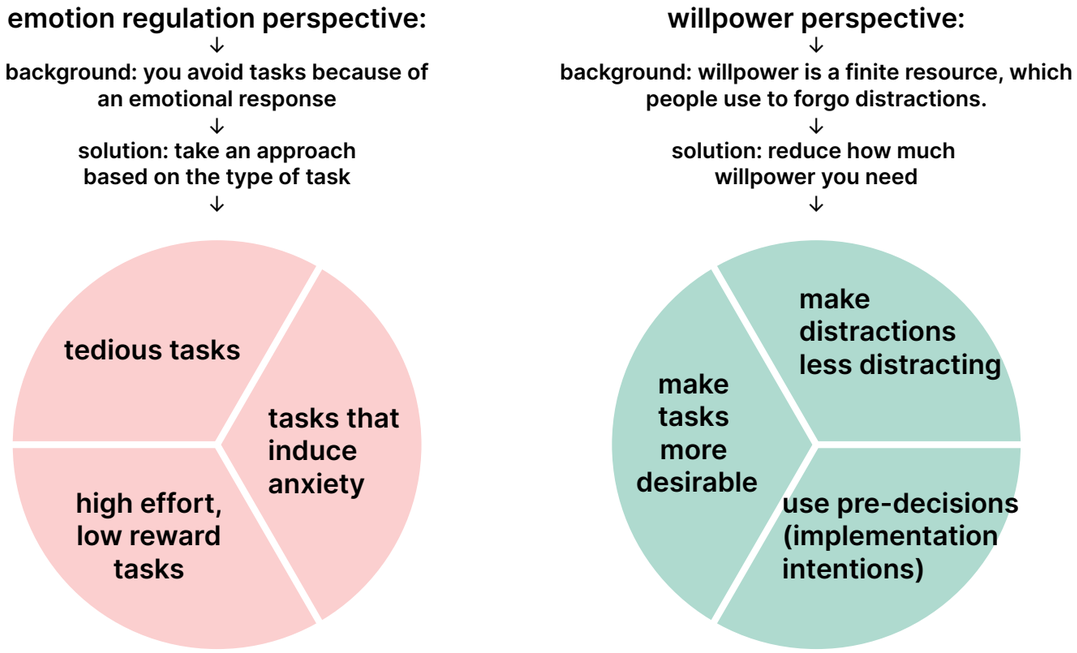



*figure 2.01: six solution directions for design for procrastination*

## Recommendations when Designing to Address Procrastination

invaluable source of inspiration was In the proposed framework by Andreae et al. (2019) they discuss two perspectives: the willpower perspective, and the emotion-regulation perspective (which is where the three task types are discussed), both of which offer three strategies to reduce procrastination, as seen in figure 2.01.

In analysing which solutions already exists, two strategies jump out. The first are apps solve 'tasks that induce anxiety' by offering breathing/posture/relaxation exercises. The second is the strategy to 'make distractions less distracting', either by removing distractions, pleasantly overwhelm, or by applying negative reinforcement.

## Idea discussion

Near the end of ideation, I asked my partner (who has ADD) to discuss the ideas with me for some quick feedback. I needed to involve someone to spar a little bit, and some good ideas came out of it.

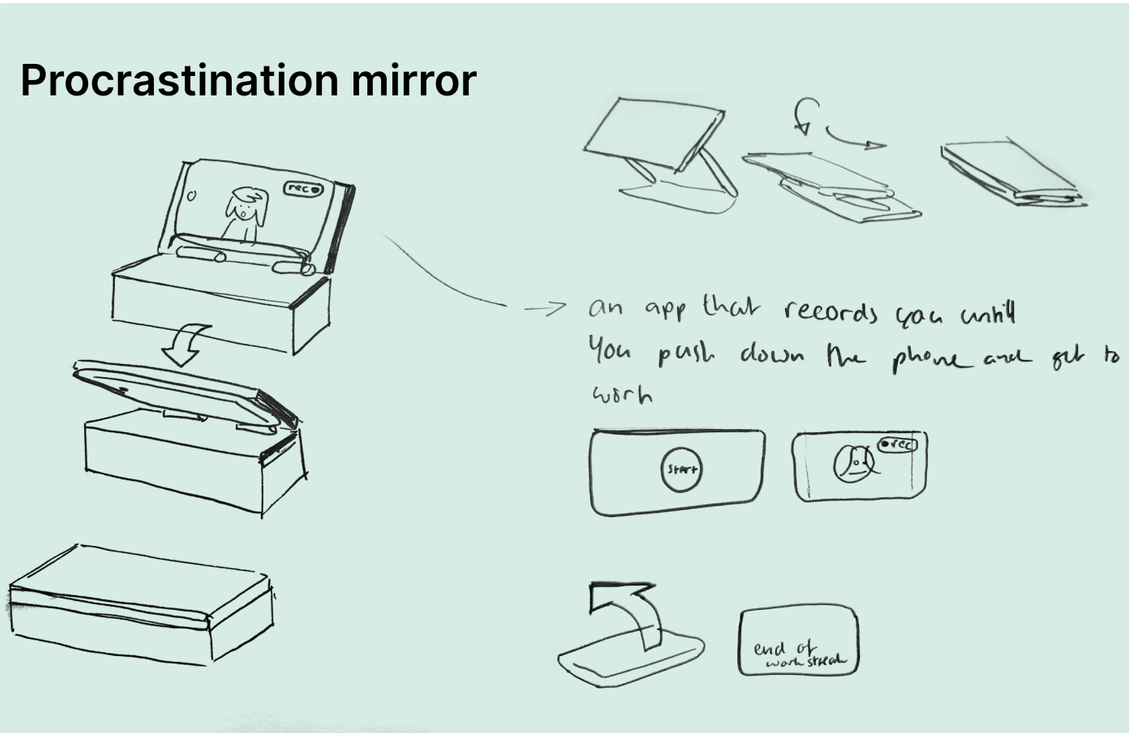
# Five ideas

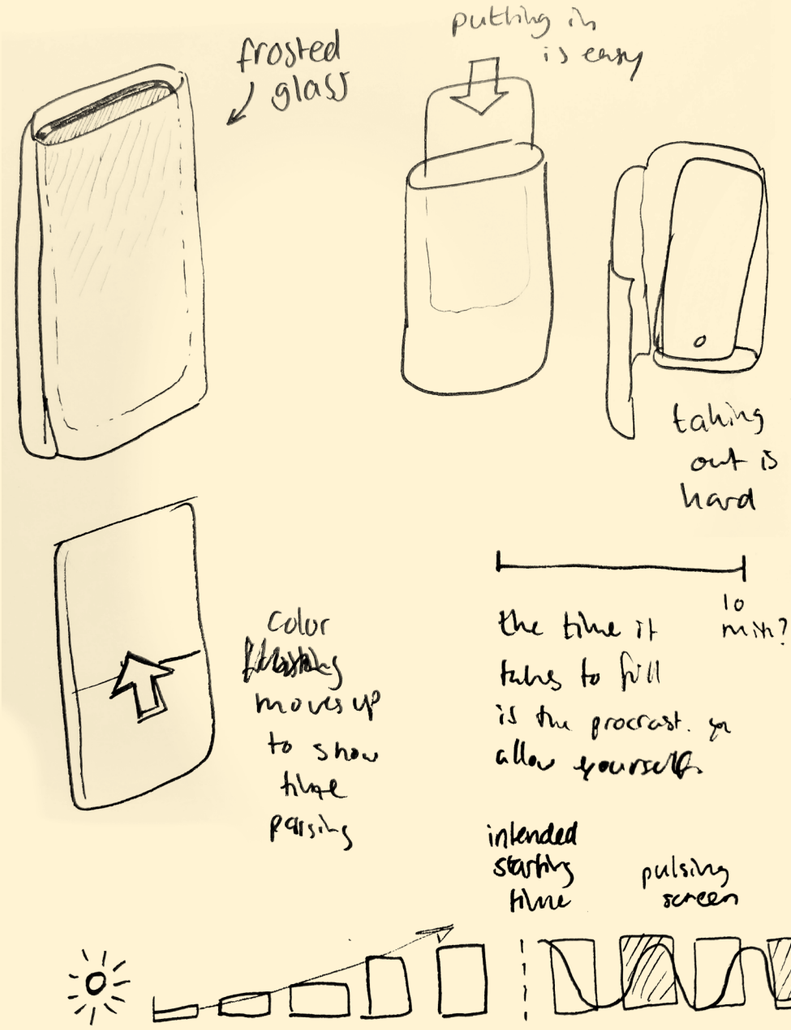
From ideation, 5 ideas were chosen to compare with each other. These will be evaluated with a Harris profile in the next subsection.

## Procrastination mirror

When starting off, it can be difficult to put your phone away. The procrastination mirror splits this into two parts. First of all, you put your phone on the stand. It starts recording you in this phase, and shows you on the screen.

This mirror makes you more self-aware, and reminds you that you are procrastinating. When you are actually ready to start, you get to tilt the phone down and away, getting the 'mirror' out of view.



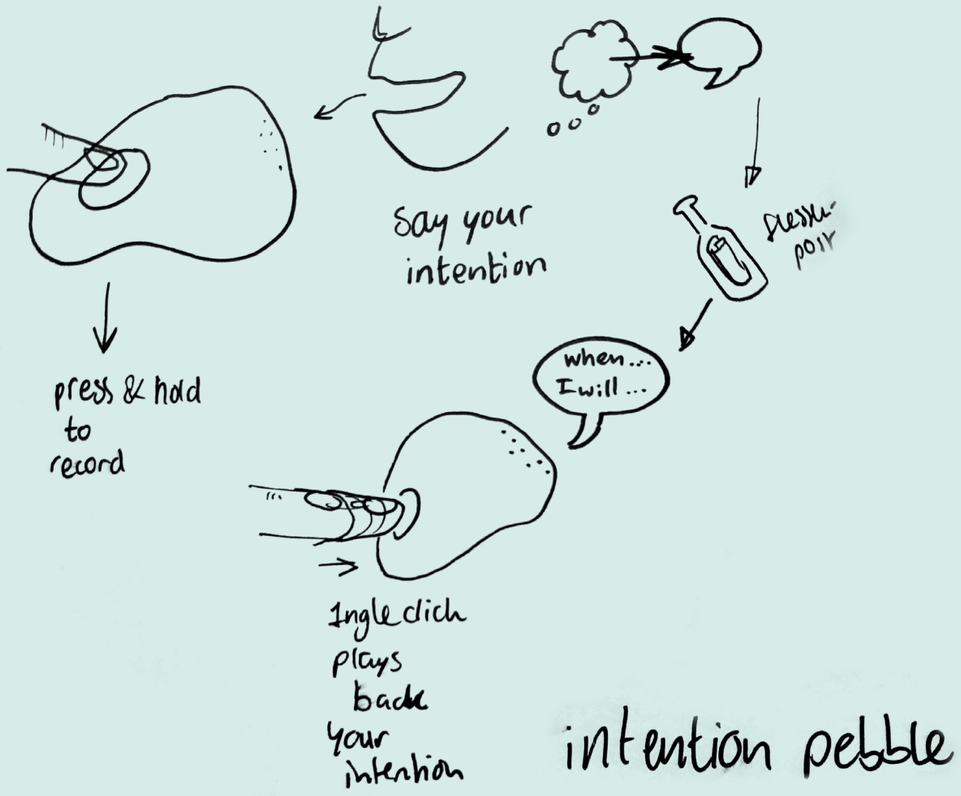



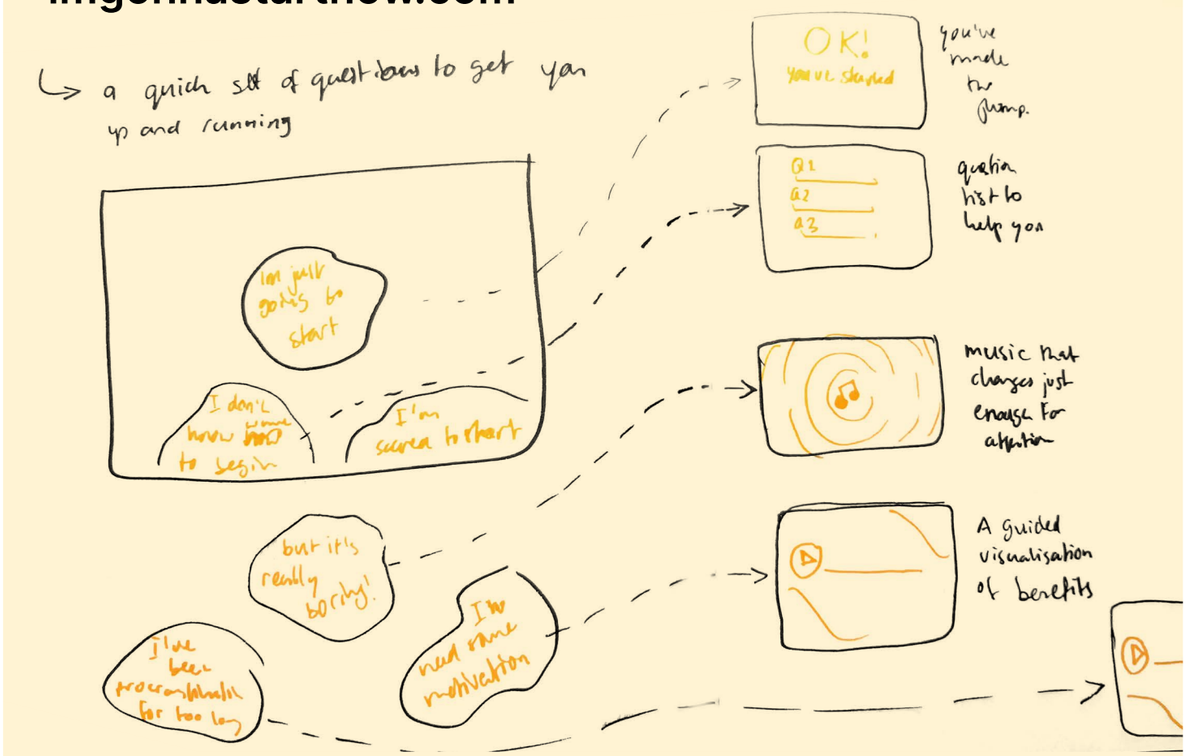

## Time to Start

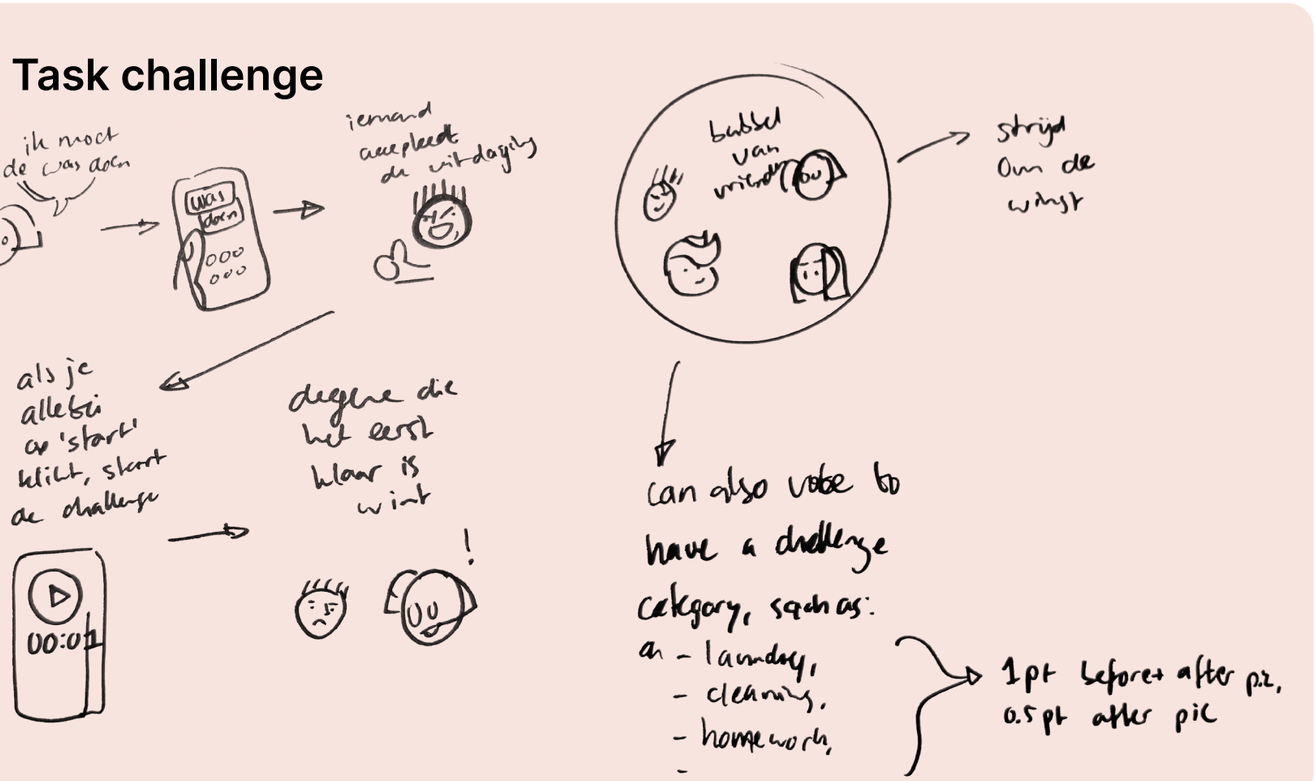
## Time to Start

When you are ready to start your day, you put phone into a sort of sleeve, the front of which is transparent, but blurred. The phone is hidden from your view, and whatever is on the screen cannot reach you directly. If you want to take it out, that is always possible, but takes a little more effort than sliding it in from the top.

Once it is put in, a special timer starts on the screen, and the screen fills up with light. After a 'procrastination allowance' time is reached, the screen is full, and pulses a few times. This makes the user more aware of time, but also allows them some leeway to procrastinate away.




## Intention Pebble

A small hand-held pebble that records your voice, and can play it back the next morning. Often, it is better to plan and set intentions on the evening before, but writing in journals can be too much of an activity. What is the best way to let somebody think about their intentions for tomorrow morning, while making saving this intention as low-threshold as possible? With the pebble, you can hear back your intention the next morning. The pebble softly reminds you of its presence by making a droplet sound at a good time in the evening, and in the morning, so you don't forget.

## Task challenge

In this app, you compete within your bubble of friends on doing daily tasks as fast as possible. You invite people to compete with you on doing laundry, somebody accepts, and then you both start at the same time. The person who finishes first (and sends photo proof) wins this challenge.

You earn points and have a leaderboard within your own bubble.

## Imgonnastartnow.com

A website that combines a lot of the insights from the research, which uses the idea that a lot of people research ADHD and procrastination while procrastinating.

When finding the site online, it offers you different ways to combat procrastination, depending on which problem you have.

It splits the solutions up into the three basis for procrastination there are: for tedious tasks, unrewarding tasks, or tasks that cause anxiety.

If you don't know where to begin, it asks you some questions.
If the task is too boring, it offers you music and other stimulation.
If you are dreading doing the task, it offers you a spoken guided visualisation of the benefits of having done the task.

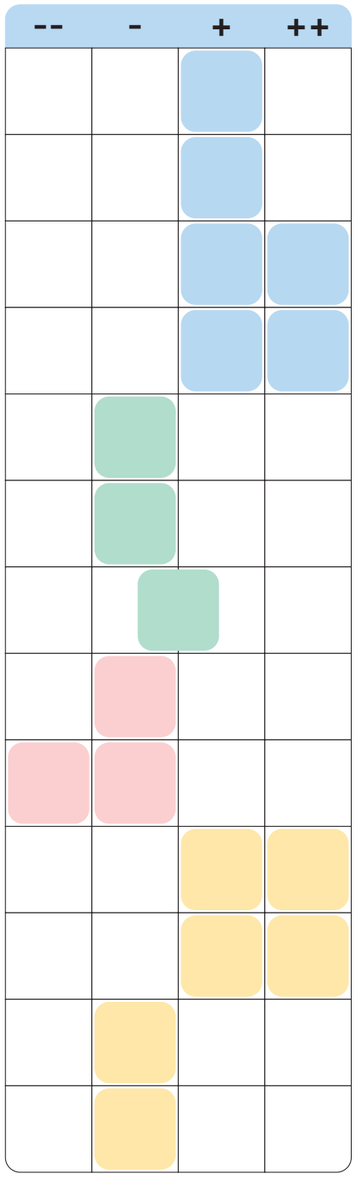
# Harris profile choice

The Harris profile (Zijlstra, 2020) is an easy visual way to choose between concepts or scenarios, based on criteria of decreasing importance. A complete explanation of this process is in Appendix G. Each concept is rated on each criterium, criteria at the top are usually more important, and thus any of the concepts can seem to 'lean' more to the right or to the left.

1. It should help users procrastinate less
2. It should be fit for adults with ADD/ADHD
3. It should be usable on/around the home desk
4. It should be original
5. There should be a low barrier to buy/ start using it
6. It should address second-order procrastination
7. It should take the user and their ADHD seriously
8. It should not make the user dependant on it to get things done
9. coersion/judgement/negative reinforcement only if the user makes a conscious choice for it
10. It should have a physical component and not exist (only) in digital space
11. Stimulation should be as much under the control of the user as possible
12. It should give users the feeling they can do things 'their way'
13. It should create a 'working atmosphere'

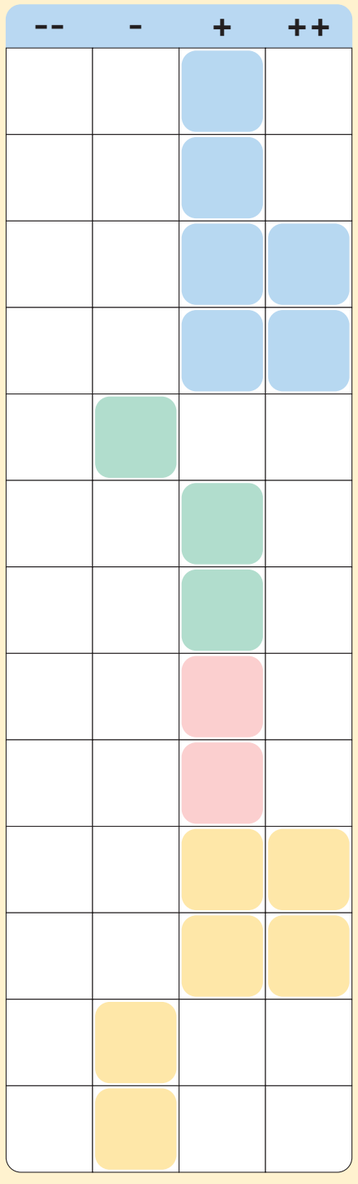
I believe it has a firm chance of working, but that nobody wants to point a camera at themselves unless they have to. And it can become a distraction of itself. The shutting of the objects, I think, will be done out of frustration more than to actually start.

## Procrastination mirror



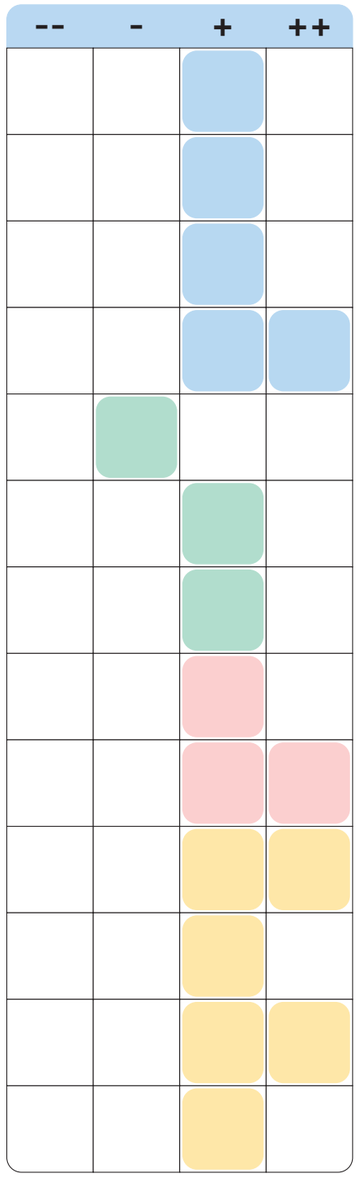

Best idea, has a lot of options for finetuning still. First the working principle should be verified, after that, it is important to solve whether people actually use it everyday. Is an external reward necessary?

## Time to Start



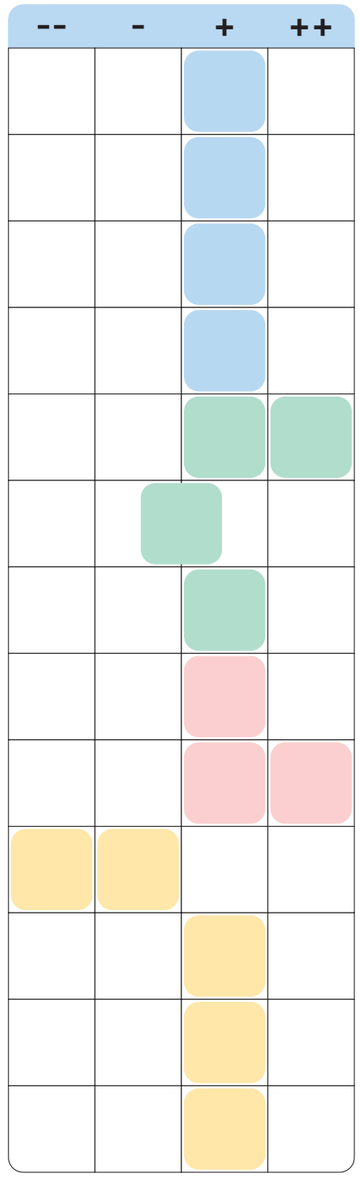

The second-best idea, if people become willing to use it. There is a question of: how do you want to use it? Overexplain it? Or leave the usage free, with a risk that people never use it? This one needs a lot of user research to find out how people naturally .

## Intention pebble



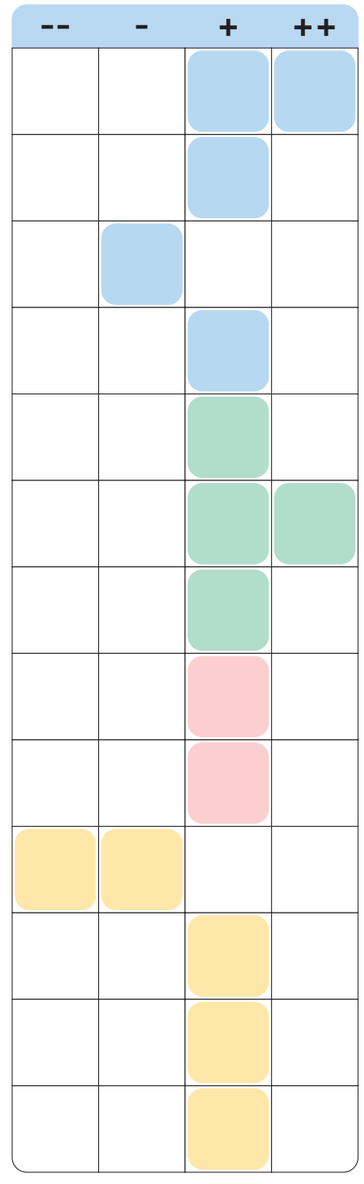

Is bound to become a potpourri of ideas from the research, and the core of it is not clear enough yet. Feels like it could be a podcast, but isn't because that already exists.

## imgonnastartnow.com




This is a nice idea, and I have the most trust in the working principle here, but it solves a slightly different problem: doing small, measurable, specific tasks instead of work/ study procrastination.

## Task challenge



# Conclusion

The project will continue with the idea 'Time to Start'. The deciding factors are that it is usable on/around the home desk, and the fact that it performs much better on the ADHD-related criteria than 'Procrastination mirror'.



Phase 2

2.3

# Concept 1: TimeToStart

With the help of the Harris profile, one idea became the most promising: the TimeToStart app. This chapter will detail this idea into a concept, and explain my choices. The conclusion and reflection at the end explain why, in the end, I chose to switch gears and go back to ideation.

# 2.3.1 Concept: timetostart

The concept is a combination of a physical product and a companion app.

The physical part is a transparent box you can put on your desk. The phone slides in without effort, but takes a little effort to take out, because you have to perform an extra action.

If the phone is inserted, the phone detects a tag in the product and an internal timer automatically starts. The phone screen then starts filling up with light, until 10 minutes have passed. It will try to attract some attention by pulsing, after which it assumes you have started working.

Before inserting, in the app, users are able to set their desired procrastination time to whatever they think is realistic.


some procrastination is inevitable

# 2.3.2 Concept background

### Breaking the illusion of procrastination

This concept uses this insight from the desk research:

- ↘ **People with ADHD often experience time blindness, meaning they are less aware of what time it is now, how much time is left, and how quickly time is passing.**

As well as on these insights of the co-creation session:

- ↘ **People with ADHD delude themselves when procrastinating, believing that 'one more game' or 'one more article' will be all, while they always keep procrastinating for longer than they think.**
- ↘ **Once the desired starting moment (an exact moment on the clock) has passed, they failed, and think: "I will try again in the future"**

This concept aims to make time more visible during the period of procrastination. It should help people break the illusion that you are not spending a lot of time doing procrastination activities.

### Giving you leeway

It takes into account another insight from the co-creation session:

- ↘ **Some procrastination is bound to happen.**

It allows you to procrastinate for a certain amount of time, giving you some leeway, as some procrastination is bound to happen. Secondly, once the timer 'goes off', there is no audio alarm, but a pulsing of the screen. The reminder is strong enough to be noticed, but not so distracting to become grating and annoying.

It is intentional that there is no action required after this point, such as a button that needs to be pressed. Hopefully, the user is already working at this point, and it would be a shame to break that flow and expect them to redirect their attention to their phone.

The concept also creates a moment where the user is expected to commit to working, as they are putting their phone away. This makes sure that the biggest single source of distractions is taken care of.

# 2.3.3 Something to validate

Whether this concept would actually have the desired effect on people is still questionable, but very testable. For this, I had prepared a simple prototype setup that would offer the timer to people in the shape of a video. I would ask them to select a video of 10, 15 or 20 minutes of time before they would start, play the video on a propped up phone that faces them, and ask them whether it helps to shorten the time they procrastinate.

This basic version of the prototype can be seen at the bottom of the page.

An important realisation about testibility: the desired behaviour, 'having started', is really hard to measure. Once you have started,  you don't want to be distracted by having to push a button to indicate that you did.

The concept circumvents this by assuming you have started, and then there is nothing to do. Should there be some kind of reflection moment built into the app, for instance when taking the phone out again? It is good to have the user realise whether they actually started at the desired time, whether the concept helped them, or to let the user iterate on the starting delay so it fits their needs.

Other questions that should be answered:

- Would people buy such a product, what do they need to be convinced?
- Would people remember to drop in their phone when starting ot work?
- If you manage to start before the timer runs out, does the presence of it bother you in that case?
- Do people even notice the screen when they procrastinate?
- How much freedom should people have in setting the time? Would people take the effort to think about this beforehand?

# 2.3.4 Conclusion

Based on the idea that some procrastination is inevitable, and that people with ADHD have to stick to their 'desired' starting time, or if that fails, they procrastinate much more, I designed the concept TimeToStart.

This concept aims to make time more visible during the period of procrastination. It should help people break the illusion that you are not spending a lot of time doing procrastination activities. It also takes your phone away as a source of distractions, and makes the choice to start working more tangible.

Whether this mechanism has enough of an effect to make a noticable difference remains to be validated.

After some thinking, I decided that this concept is not what I want to continue with. I did not expect the mechanism to be effective or new enough to be the core of my final concept.

While there is a chance such a time visualisation has promise for overcoming time blindness, I don't think people would be willing to pay for a product that houses your phone, the rationale being that the app should also be able to work without that product.

At this point, I decided to go back to the drawing table, and rethink my strategy for designing.



Phase 2

← back to the drawing board

# 2.4 New Plan: Ideation 2

Rather than broad ideation, this time I have made the choice to focus on one mechanism: making meeting a stranger to study with as low-threshold as possible. I have also decided to fully limit myself to students for this concept.

Around this mechanism, a storyboard is designed that outlines the experience of a user. This storyboard is then discussed with students with ADHD, who give input on its potential usefulness, and their preferences.

# 2.4.1 New approach:

## building a concept storyboard

### Justification of new approach

If I am to move this project into detailing one concept, another approach is needed than endless ideation in all directions. I need to:

1. solve the problem of procrastination for people with ADHD, but now also
2. the problem of having too many insights, theories and directions at my disposal.

My solution is to problem #2 find a good, solid core and build around it. I have chosen to zoom in on social support and pressure as a way of helping people limit their procrastination behaviour.

# The core: social support and pressure

Based on this insight from 1.2 Generative research:

↘5 **"Most of the students I talked to liked to work together with study partners, so there is the subtle social pressure of having to look like you're working. This seemed to be one of the most effective ways to stay on task."**

Having a study buddy is useful, especially for people with ADHD. During generative research, almost all social support post-its were placed somewhere in "these things work for me". These quotes are here on the left. Some other findings from the research:

↘7 **Social pressure is also a good way to force a start through a coffee moment, or a break at the right time. Studying together offers the opportunity to discuss problems and spar about solutions**

A caveat is that in the same resesarch, I found that most of the participating working adults actually preferred to work alone. But it does need to be said that all three adults were already aware of their ADHD, and working with it, for quite a while.

So, for the first iteration of this solution direction, I mostly want to target the slightly younger student part of the target user, and think about adding a support function for (recently diagnosed) working adults later. From now on, I will mostly refer use the word 'studying' as the desired behaviour, omitting 'working' in most cases.



Similar insights come from the co-creation session:

↘ **3 of the [4] participants mention some kind of social pressure as a way to lower the threshold to get started.** Either in the shape of others being bothered if a task is not done, or someone being there with them until they have done the task. But according to one of them, the pressure needs to be very hard for it to work.

# meet a stranger, right now!

The solution will involve a platform in which people can find a random study buddy with ADHD right now, or connect to a friend. Just push the button and be connected to someone else. They will then stay together, making study agreements for the day, and enjoy each others mediated presence as a subtle pressure to stick to the study plan.

Some people may have support networks at the ready to contact if they ever get stuck, but a lot of people don't. Or they feel uncomfortable asking a friend, not wanting to bother them (over and over) to talk about study or ADHD related problems. Also, if friends or family are your 'pressure-supplier', it apparently feels worse to be checked. As one participant noted:

*"Often I find ideas others bring up not good enough as a solution, because I had thought of it already myself. If a stranger comes up with a solution, I do try it because I don't want to disrespect them"*

This concept should take some discomfort out of the way. Even though you are connected to a stranger, you can be sure of both things:

1. you are both there for the same thing (either studying or having a chat)
2. you know what the other is going through, because you both have ADHD.

### Other people studying creates a working atmosphere.

Most examples of a working atmosphere included other people working, creating a subtle pressure.

↘ **(page 54) There needs to be a 'working atmosphere' to be able to start.**

# low barrier, exciting experience

An important thing about being 'checked on your study progress' is that It needs to be on your own volition. Therefore, getting this check or pressure when you have a need for it can be really helpful. The main objective is to make the barrier to find a buddy as low as possible, so that it is easier than overcoming your procrastination behaviour in that moment. If the person becomes convinced that meeting a new buddy is easy, then I expect they are very likely to do it, as people with ADHD are often excited to jump in and try new things.

What if it becomes too easy to find a new buddy for a conversation? Won't people with ADHD use talking to people as a way of procrastinating?

Well, as I found during the co-creation session, a lost hour may not be a problem in the grand scheme of things:

↘ **The problem of procrastion for students with ADHD is not about starting 30 minutes later than you want, but about being able to waste half a day.**

# Storyboard validation/ exploration

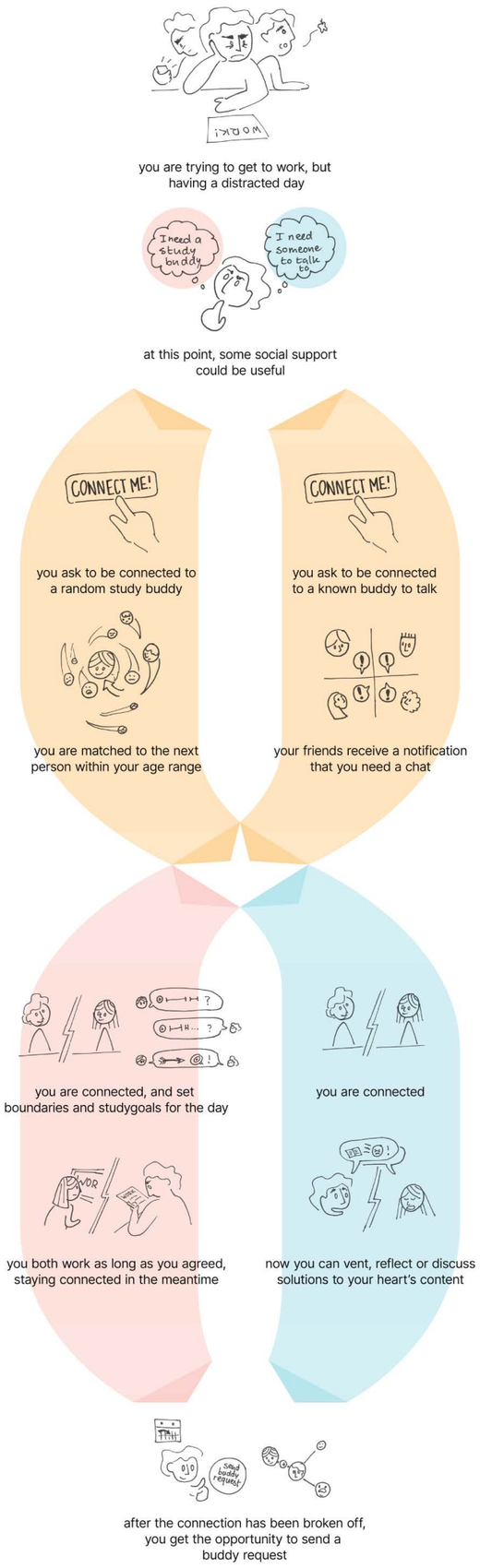
# Concept: ConnectMe

*find others with ADHD, find someone who you can talk to, study together.*

The main focus is to lower the threshold to ask for support. The concept aims to bring people together as fast as possible. You are connected to the first other person within your age range, either to study together or just talk.

This concept consists of a storyboard that explains the main idea, which can be used as a talking piece to discuss the usefulness of this with people with ADHD.

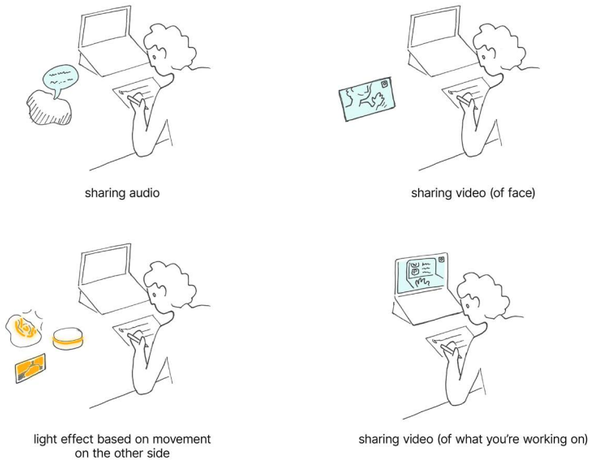
The concept purposefully does not disclose whether it is a phone app, PC program, has physical components, etc. The storyboard only talks about function, to be able to explore and talk about the concept free of the constraints of any specific medium.




# 2.4.4 validation/ exploration setup

They are shown and explained the concept

① They are asked which kind of mediated presence is useful




② They are asked how the 'connect me' moment should feel


③ They are asked whether this concept could help them against procrastination

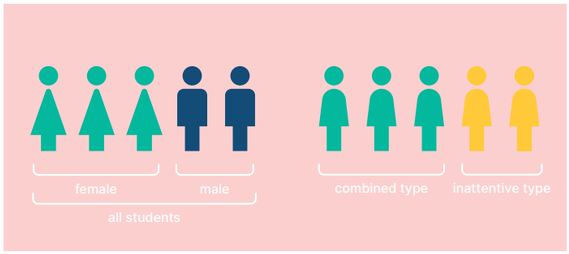
This test has two goals: to validate whether the main mechanism (studying together) would be effective against procrastination, and to explore how some interactions should be shaped to be most useful to the user.

## Validation

- **Would this concept encourage you to stop procrastinating?**

## Exploration

- **Would they be willing to be connected to strangers, under which conditions?**
- **When studying/working together, what kind of mediated presence is helpful?**
- **How should the 'call for help' moment feel?**




## Participants

5 Participants had a low-threshold discussion with me, about 20-30 minutes.

It should be noted that 4 out of 5 participants were recruited through the Student Onbeperkt WhatsApp group, this means that they:

- → are all students at the TU Delft;
- → have already sought connection to a platform for functional disabilities;
- → have taken the step to contact me personally.

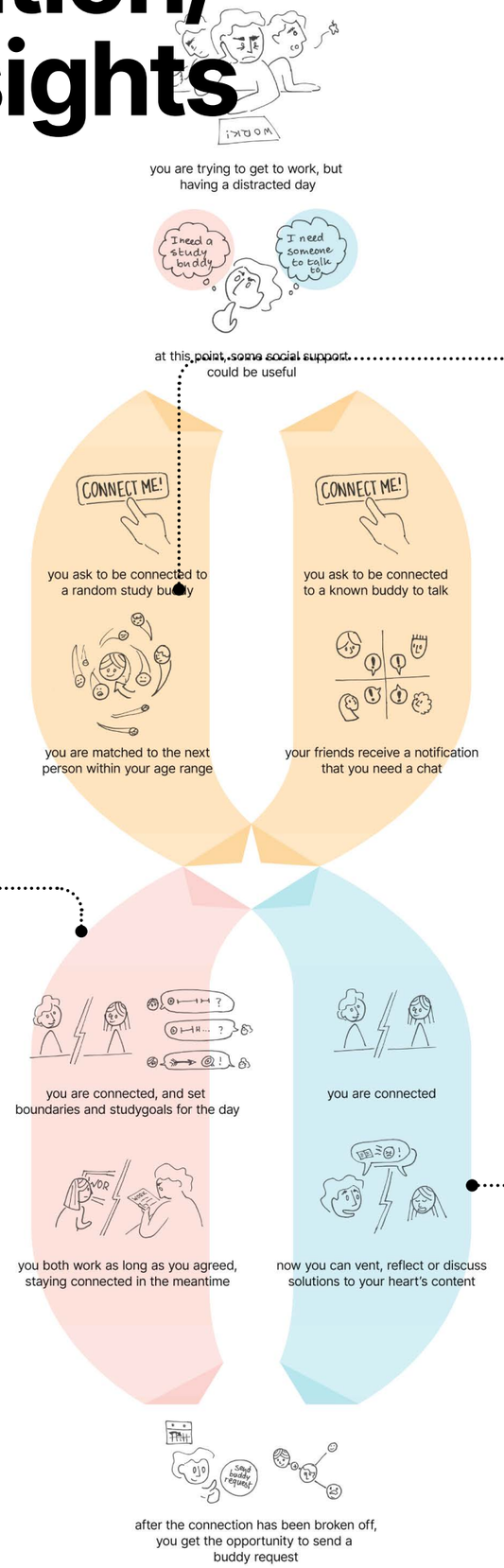
This test, as a result, focuses on the experiences of students and studying together, and leaves out the group of adults for now.

It also excludes people who, as noted by some of the participants, are more 'introverted' in the group, and not likely to take part.

# 2.4.5 Exploration/ validation insights

These are the most important insights from the five little interviews. Of the five participants, all of them were affected by procrastination behaviour, or at least told me they were having problems with procrastination when they started attending university.

To the main question to be validated: “**Would this concept encourage you to stop procrastinating?”,** all people said they saw the potential in the concept to help against procrastination. One person said it wouldn’t help them right now, (because they had a grip on life, a close circle of friends to talk to) but had it come at the start of their studies, it could have.




→ **Boundaries**

→ One participant noted that this concept has the most potential in the making agreements about partitioning the day, enforcing breaks with timer.

→ Both parties should agree on the goal: walk through planning/goals, or just be present while you studying.

→ **Synchronised breaks**

→ Everyone would like to synchronise breaks with their study partner. Multiple people said they would like the app to keep track of time and enforce breaks.

→ Most people would like to be connected during the breaks, although one person noted: “A break is only a break if it leaves everything that takes your attention behind”, needing to leave the computer.

→ For some, taking a break is just as much of a threshold as starting. Sharing breaks helps.

← **Meeting strangers**

← I had expected the threshold for meeting a stranger to be very high, but everyone said they would be fine with it. these things lower the threshold:

↳ You are both there to help each other

↳ You are both entering an unknown situation

↳ You share an understanding because you share ADHD.

← **What conditions/factors apply when meeting a stranger?**

← It may be nice to select based on interest or have at least one thing in common.

← Overlap in studies is mentioned by two people, especially when meeting physically.

← Two people say they are more open to meeting new people at the start of the quarter, when there is less pressure.

← Age is not important, but the phase of life you are in can be relevant. A connection with someone in a similar phase is nice, though you can also learn a lot from other phase. (high school, studying, working, etc)

← **Talking points**

← It woud be nice to choose a category of what to talk about beforehand (study, work, living rhythm, medication, relationships, etc.).

← Venting already happens a lot in the Student Onbeperkt chat, so it will probably be used

← When studying/talking, it would be good to integrate some proven methods to try or discuss together.

## What already exists at the TU Delft

Four out of five participants were found via the Student Onbeperkt network. During our talks, some of the existing initiatives of the TU Delft came up.

## Study Buddy project

The TU offers to match you to a study buddy for (half a) year. This involves an older student guiding a younger student, focusing on organising the student’s study activities and approach. Since the corona pandemic, it is no longer limited to people with a disability. Anyone can apply, cross-study as well.

## Student Onbeperkt

Started out as a platform to inform the TU Delft on how to execute the policy plan to make the TU more accessible to people with a disability or chronic disease.

Currently a platform for people with Autism, ADHD, disabilities, and other functional impairments. Very low-threshold, consisting of a WhatsApp group for members, monthly get-togethers, and other social initiatives.

People use this to vent frustrations, or find people to study with for the day. I’m told my concept aspires to a lot of the goals Student Onbeperkt does, only more structured/streamlined, and focused on ADHD specifically.

↓ **Audio**

↓ Constant audio connection with the other, hearing the background noise, is probably most distracting. Several participants note that sound is more distracting than video.

↓ Audio should only be available in breaks, or when asking a question.

sharing audio

↓ **Video**

↓ Most people prefer a video feed, specifically of the other's face.

↓ Only one person would prefer a sound connection over video connection if the platfom is on the same device as the study activity. Video is nice if it is a separate device.

sharing video (of face)

light effect based on movement on the other side

sharing video (of what you're working on)

↑ **Light effect**

↑ The light effect is not very popular, and some expect it to become very distracting. One person notes it could be nice, but they would not buy a something for it.

↑ One person notes they would feel better about it being a separate object from the computer being worked on.

↑ **What someone else is doing**

↑ One person notes they would be distracted by seeing the other's work and would start reading it.

↑ Another person notes they would not be comfortable constantly sharing their screen due to privacy concerns. Adding it as a default option would create the social expectation to do ti.

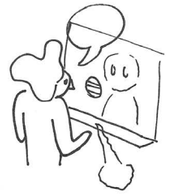


falling into someones arms

tapping someone on their shoulder


calling for help

asking for a leg-up



walking up to a service desk

↘ **Other things to take into account**

↘ Most people who reached out to me are quite outgoing. Does this concept reach more introverted people as well?

↘ There is a risk that people with ADHD will use this concept as a way to procrastinate, by talking to others all day. How can I minimise the risk of people using this as a way to procrastinate?

↘ This concept definitely has a use right now, but how about after the corona pandemic? One participant strongly preferred meeting physically. It will still be useful according to another, but perhaps the option to meet others physically, or integrate something into the workspaces of university, could bring another benefit.

## Conclusion:

**The concept can be effective as a way to overcome procrastination behaviour at a certain moment, and has the potential also help in other areas, such as sticking to work and break times, finding new contacts, and just venting about your grievances.**

↖ **How it should feel to seek help**

↖ The analogy should be more two-sided in case of the concept, because you are both offering and receiving help.

↖ All of them are applicable in some part of the process, except for the service desk, that should not be the feeling people get at all.

## Most important changes to the concept

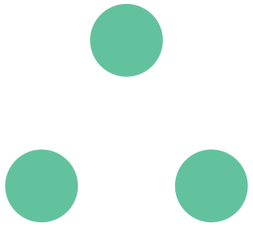
↘ **When finding someone to talk to, you first get to choose a broad category, to match you to someone who is open to talk about this.**

↘ **When studying together, shared breaks are introduced. The concept enforces the agreed upon time schedule by forcing the breaks.**

↘ **The connection, or 'mediated presence' during studying, is limited to just a video feed of the person. During breaks people are unmuted, as well as at the request of a person (for instance to ask a question).**

# 2.4.6 UX Design for ADHD guidelines

As I have chosen for a mostly digital solution, I want to dive a little deeper into how to make the UX/UI side of my concept fit for people with ADHD. Searching for design guidelines on the internet yielded little, and fractured, results. That is why I decided to draw from multiple sources, including my own research, to set up a framework of guidelines. These guidelines will be used to evaluate the final design.



1) The first one might seem a no-brainer: avoid overstimulation by reducing the amount of things or options on screen.

Visual tranquility also has another layer: that of avoiding overly bright or contrasted screens. 69% of people with ADHD self-report sensitivity to bright light, compared to 28% of non-ADHD people (Kooij & Bijlenga, 2014). Even though adding a general dark mode might suffice as a solution, taking this into account for the main design is a plus.

## Visual tranquility

① **Not visually overwhelming:**
Prevent overstimulation from options or fullness of the screen. Take into account a sensitivity to brightness and high contrast.

② **No unnecessary motion:**
Motion is distracting, but in transitions can support understanding. Avoid unnecessary animations, especially in the background.

2) From anecdotal reports from friends, a periodic animation in the background of a website stopped them from paying attention, going so far as to close the site before they reached their goal.

The substantiation comes from Elizabeth Schafer's lecture for Inclusive Design 24 (Inclusive Design 24, 2019), who says motion can be used in transitions and to support understanding, but unnecessary motion should be avoided. ("Unnecessary motion is distraction", but also "Use motion to enhance understanding").

## Understandability

③ **Readability:**
The text should not contain unusual words/abbreviations if it can be prevented

④ **Predictability:**
Consistent navigation & identifications. Navigational mechanisms are in the same place across multiple pages. Components that have the same functionality are identified consistently.

⑤ **Input assistance:**
Help the user avoid and correct mistakes when inputting, by giving instructions near user input and making context-sensitive help available.

⑥ **Feedback:**
Feedback after an action should be immediate and clear.

3-6) The understandability guidelines are curated from the 'Understandability' section of the Web Content Accessibility guidelines (W3C, 2008). On forums, these were pointed to as being especially relevant for people with ADHD.

To this, I chose to add 'Feedback' as a separate guideline. For people with ADHD, it is important to know the consequence of their action quickly, and that their action is being registered at all.

## Non-intrustiveness

⑦ **For alerts, timers, or other interruptions (especially sound):**
These can be justified, but users should at least have a feeling of control over them.

⑧ **Avoid negative reinforcement:**
The user should not be made to feel judged, or that they are doing a bad job, when they make a small mistake, forgetting something or responding late.

7, 8) The non-intrusiveness guidelines are taken from the Harris profile criteria: "Stimulation should be as much under the control of the user as possible" and "Coersion/judgement/negative reinforcement only if the user makes a conscious choice for it"

# Conclusion

The concept Connect Me was conceived as a way to find a study buddy with ADHD, as low-threshold as possible. It starts as a storyboard that is discussed with people with ADHD.

Through this process it was discovered that it can be effective to overcome procrastination, and also can be beneficial in other areas, such as sticking to work and break times, or venting your problems with ADHD.

An important addition is the agreement and enforcement of shared breaks. It was also found that there was a strong preference for the connection to be video/audio, with audio being turned off automatically while studying.

Lastly, UX Design for ADHD guidelines were conceived, based on existing guidelines online as well as my own research. These will be used to detail the final concept.



Phase 2


# 2.5 Final concept: ConnectMe

With the insights from the previous chapter in mind, a final concept is designed. This chapter first briefly introduces the concept, before diving into the background with a storyboard. Then, some of the specific choices are explained.

# 2.5.1 final concept:

connect me

adhd study community


We'll match you to another student with ADHD, right now.


Set your schedule together.

Share breaks & study together.

Become buddies, build your community!

How do you go about building yourself a support network? Is no-one available to study together? What if you need some advice on something ADHD-related? The quickest way is to get matched to like-minded strangers.

Connect Me is a free platform that allows you to build your personal ADHD study community.

## concept choices 1:

# 2.5.2 The medium

On which tech medium should this platform sit? A website? Smartwatch? An external device, built into your desk? This choice is mostly informed by the way people join the platform.

| Why an app? | Why a website? |
|---|---|
| **Separation between work-platform device** | |
| The medium being separate creates peace of mind | Having your buddy somewhere on screen can feel like working together |
| At home, if the timer goes off, a separate device notifying you can help to drag you out of the study mood. | In public spaces, you have to choose where to plug in headphones.What if the break timer goes off? |
| **Engaging the user** | |
| It is easier to notify people if a buddy wants to make contact | The threshold to go there is lower than downloading an app |
| Out of sight, out of mind: people with ADHD are prone to forget it if it doesn't stay within their field of view | There is more screen space for visualising time in detail, without it feeling cluttered |
| **Less distractions** | |
| You are able to take it with you if you want to talk during a walk on a break | Leaving your work space means leaving all stimulation behind |
| Your phone is engaged while you are working, the chance you sit with it for a long time is lower | If the phone screen is on while studying, you might look at notifications |

*table 2a: advantages of different mediums*

The first contact, where the platform should prove itself to new users, should be as low-threshold as possible. Participants noted, in Storyboard validation/exploration, that they would not buy something separate just for the platfrom. So our options are limited to a desktop website or a phone app.

### A mix of both

A lot of the differences in table 2a come down to personal preference. The most important difference is the amount of commitment people need to get started. That is why for the concept, a website is designed to pull people in to try it, and the app is offered as an option after that.

Most of the further design and prototyping will focus on designing the desktop app, as the low threshold of the first use is paramount.

In figure 2.02, the overall division between the two mediums is represented. The main difference is that, on the desktop website, it is possible to start a study session with a random person without making an account first.

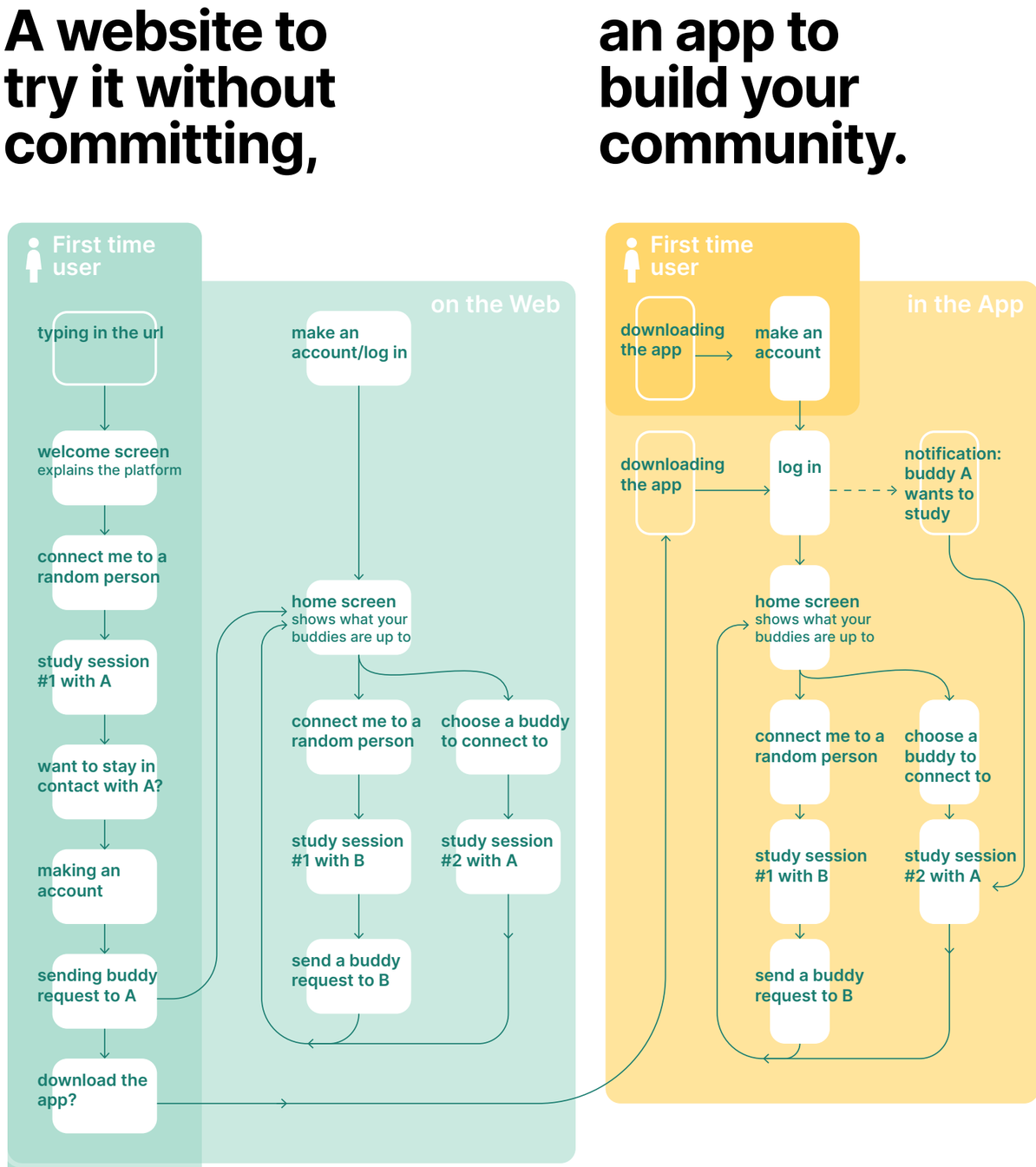
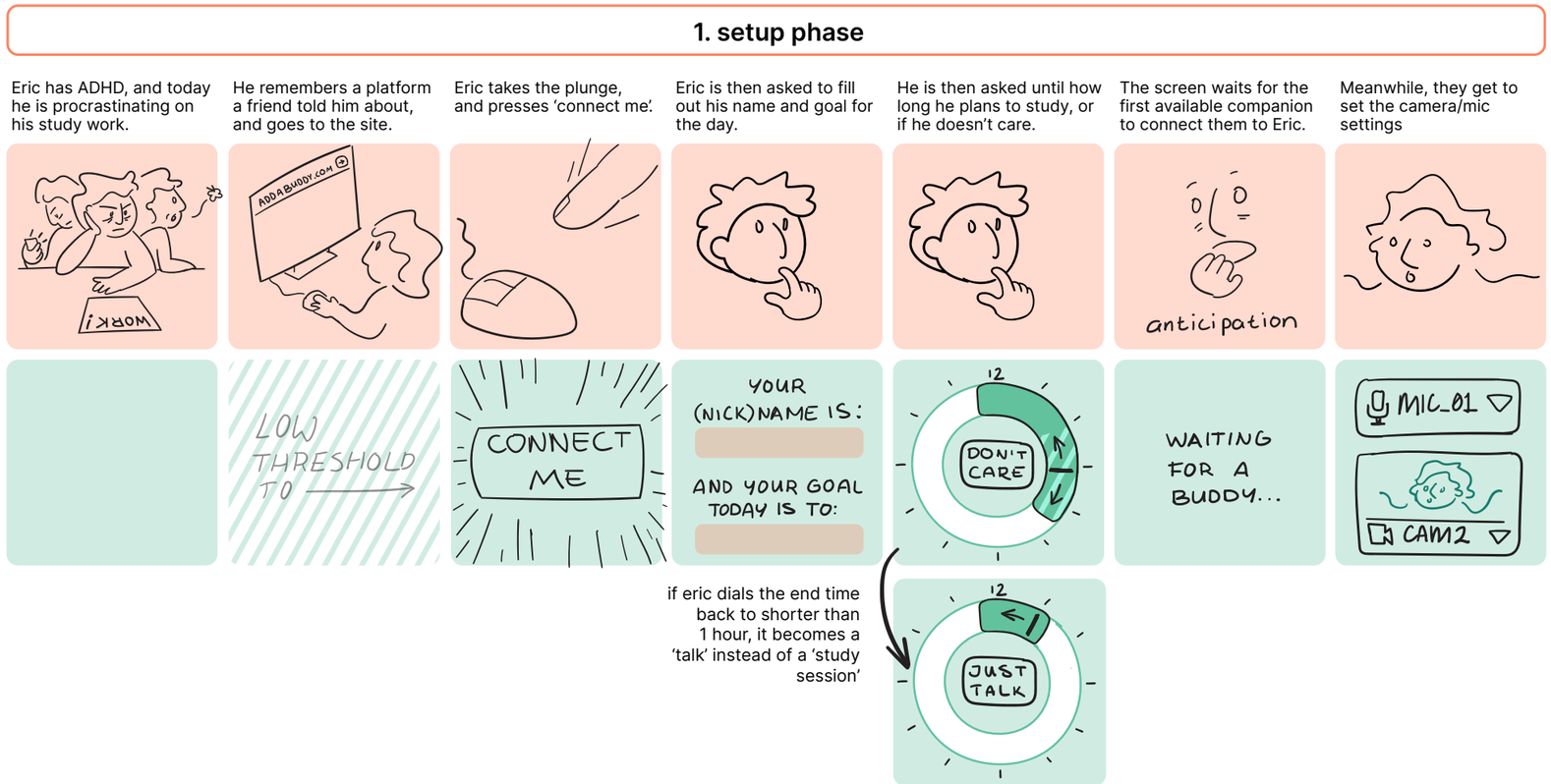



*figure 2.02: overhead flowchart of how a user walks through the platform*

# 2.5.3 Storyboard

## first use, phase 1&2




### 1. setup phase

The welcoming page of the website only needs to explain enough to convince the user to click 'connect me'. This moment is meant to feel as if the platform is already finding a match for the user, as if the user is already 'in'. The next steps are actually still necessary for matching the user.

### 2a. trustbuilding phase

In this phase, two strangers have to build up enough feeling of trust to spend part of a day together. Before connection occurs, both parties have to agree based on a name, goal, and end time. In case they have an account there will be a profile picture as well. After this, they are immediately connected There was an idea to gradually build up the amount of connection, starting with only voice, but I assumed this would lead to a more awkward start. This will be evaluated during the concept evaluation. The buddies are offered the option to do a little ice breaker, in the shape of 'What am I?', with post-its digitally pasted on to their faces. Lastly, they review their goal for the day.

### 2b. boundary setting phase

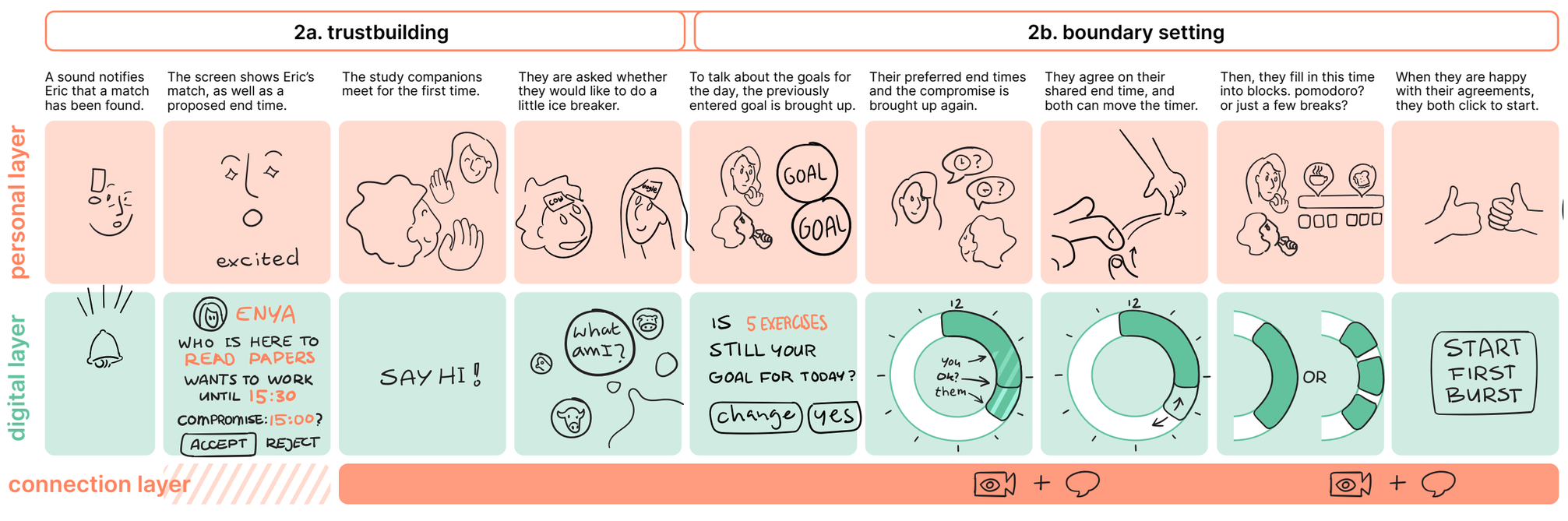
In this phase, the users confirm or change the compromised end time they were shown before, after which they can partition the time into blocks: 'bursts'. The platform partitions time automatically, but they get the option to tweak the time blocks to their liking. During this phase, both users can change the settings.

Since for the platform we are desiging the huma-human interaction (mediated) as well as human-computer interaction, this storyboard is split into layers.

This layer shows what the interaction should feel like for the user;

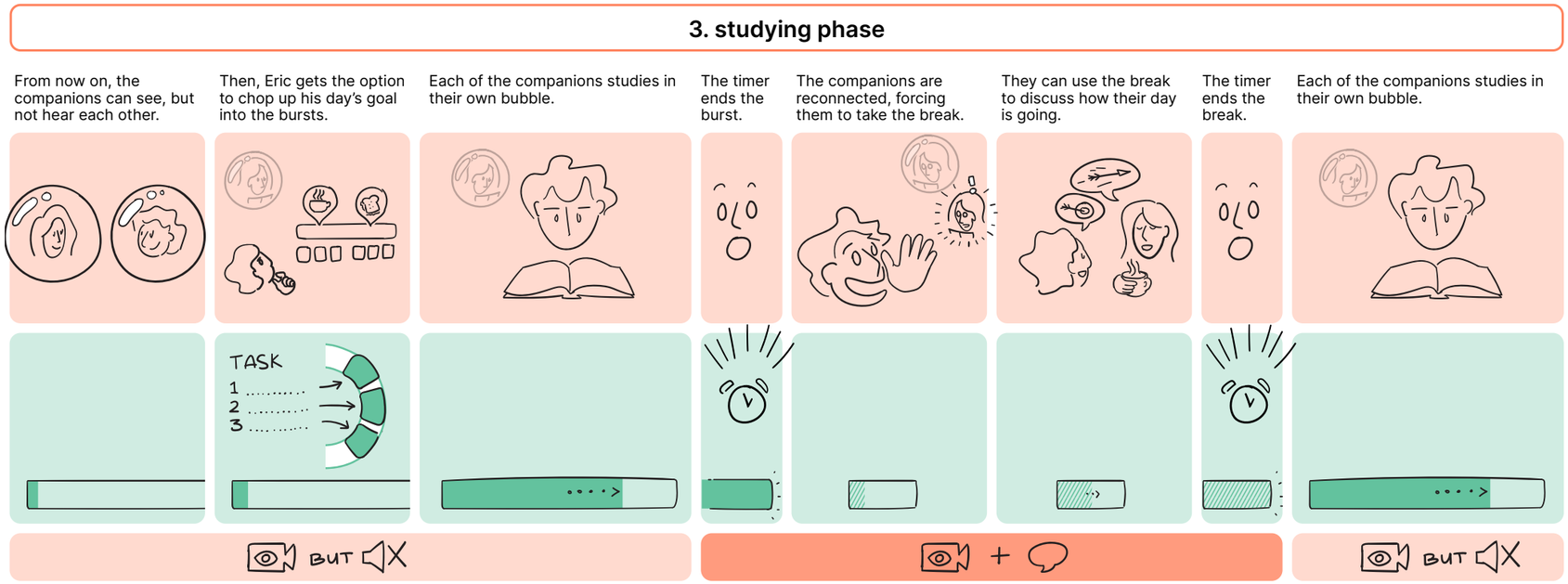
This layer shows what is happening on-screen;

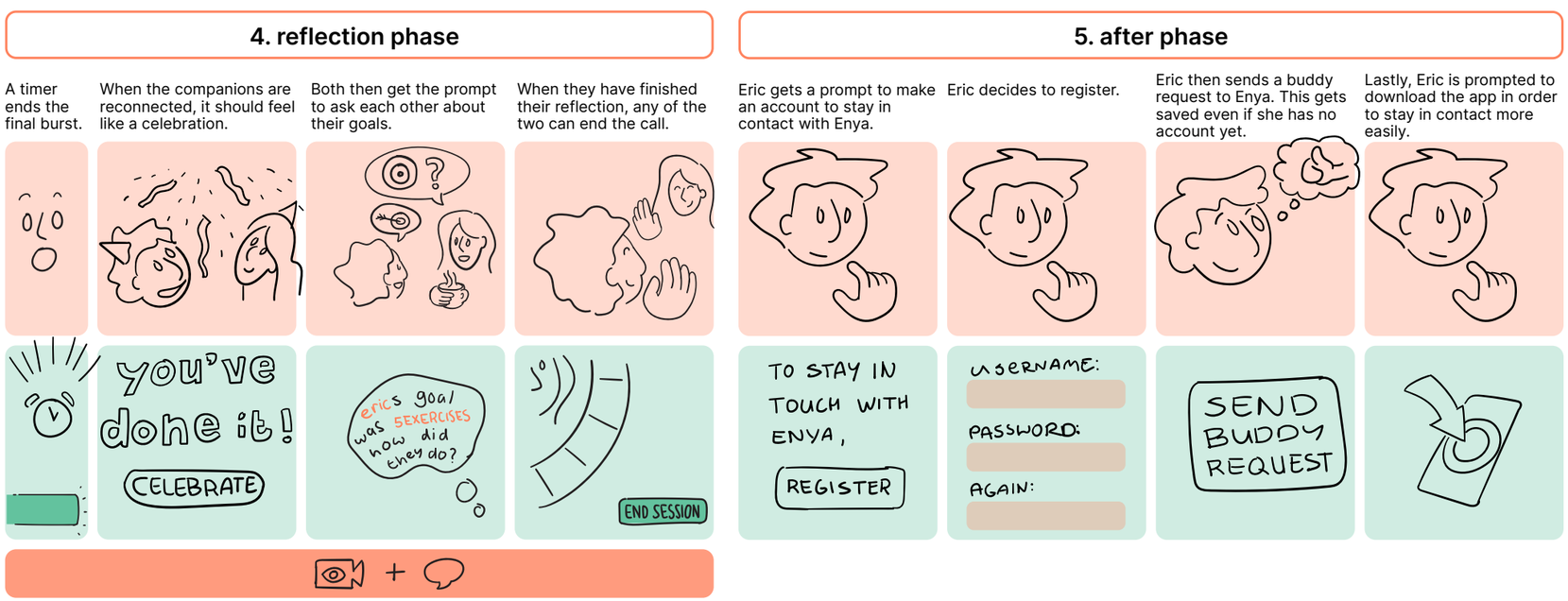
If applicable, this layer shows how connected the study buddies are.



# storyboard

## first use, phase 3-5




### 3. studying phase

During the studying phase, the buddies only have full connection during breaks (or if one of them wants to ask a question in the mean time). During the study bursts, audio is automatically turned off. Other types of 'mediated presence' were explored in 2.4.2 storyboard validation/ exploration, but participants prefered a simple face camera on in the background.

During this phase, participants can optionally use the agreed-upon time blocks to specify the tasks of that day. Since everyone has their personal preferred way of planning for the day, and to not create the expectation to do this together, I want to keep this optional.

### 4. reflection phase

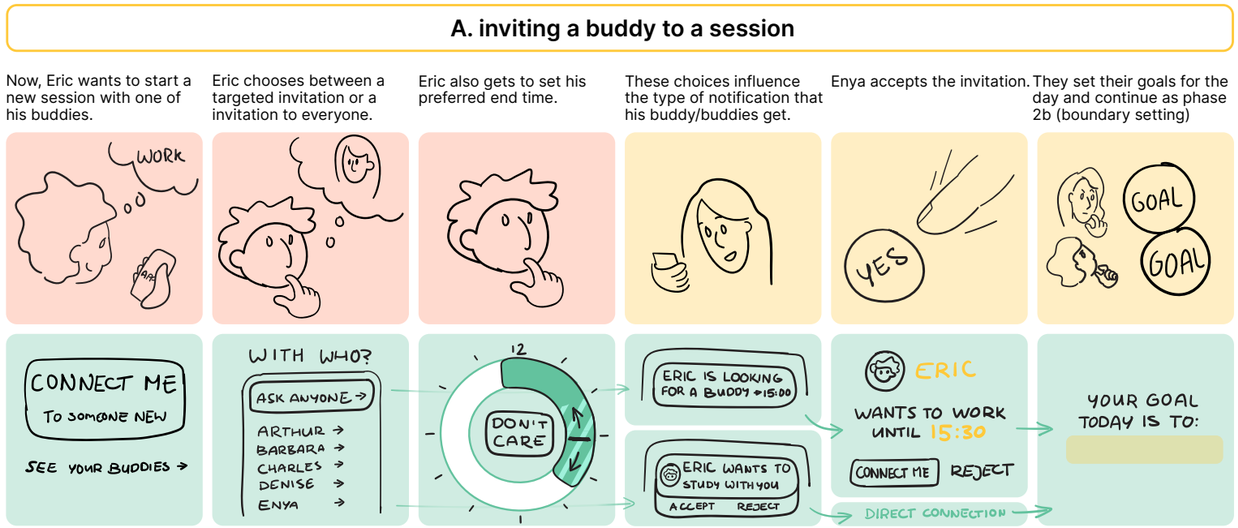
Maybe the most important part is the shared reflection. Buddy A gets the prompt to ask buddy B whether they have reached their goal, to increase the chance they will have a conversation about this. This conversation is meant to help build an awareness of how much is achievable for them in a day.

During this, there are options on the screen to overlay filters over their camera (in the vein of Snapchat / Snapcamera filters) to reflect their mood. When the final timer that starts this reflection phase goes off, a celebration filter is automatically started, because getting to the end of a study day deserves recognition in and of itself.

### 5. after phase

Regardless of whether the end of the session was sudden or as planned, the user is asked whether they want to stay in contact with their buddy,

# storyboard
## session with a buddy

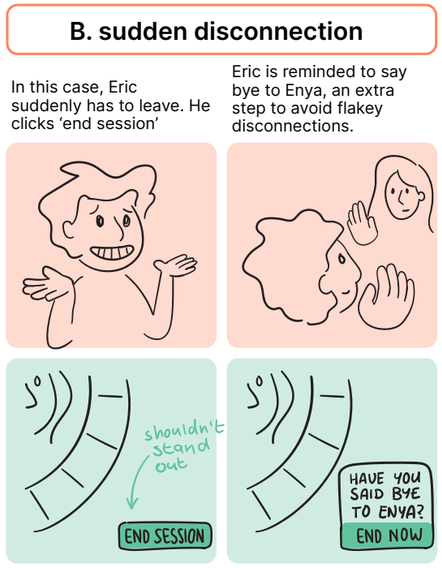



### A. inviting a buddy

If you have added a buddy, you are able to call on them via the app for a study session. Once you've built a network, you can also send an invitation to all your buddies to see if anyone has time. In the first case, the notification is stylised as a call they can accept or reject, the second case is a more open-ended notification without a direct call to action.

In this case, the process is a little more streamlined. The invitee does not indicate a desired end time before connection, and goals for the day and end time are decided after connection. Because you already know each other, it is assumed you can figure this out with less mediation, and will value facing fewer hurdles before connection, as to feel more like an online meeting than a mediated study date.

# some edge cases:
## sudden disconnection




### B. sudden disconnection

Ending a session should always be possible, but not as easy as hanging up a phone call. To prevent people from disappearing, they are prompted to inform their buddy of them leaving.

# not finding a match

### C. the matching algorithm

A plaform such as this will always have the difficulty of user numbers. You will only be connected quickly if there is someone with similar needs as you, and people will only use it if they trust enough other to use it.

There are a few rules to make sure people will be connected as soon as possible, while still taking into account their wishes relating to end time:

1. Anyone who selects 'don't care' is connected to the earliest available person;
2. Anyone who selects a time less than 60 minutes is assumed to just want to talk, and connected to the earliest available person who also just wants to talk;
3. Anyone who sets a time over 60 minutes is connected to the earliest available person who set a time within a 20% margin of their time;
4. After waiting for more than 10 minutes, it prompts you whether you are sure you don't want to click 'I don't care'
5. The '20% margin' and '10 minutes' can a variable of how many active users there are on the app that are open to a new conversation

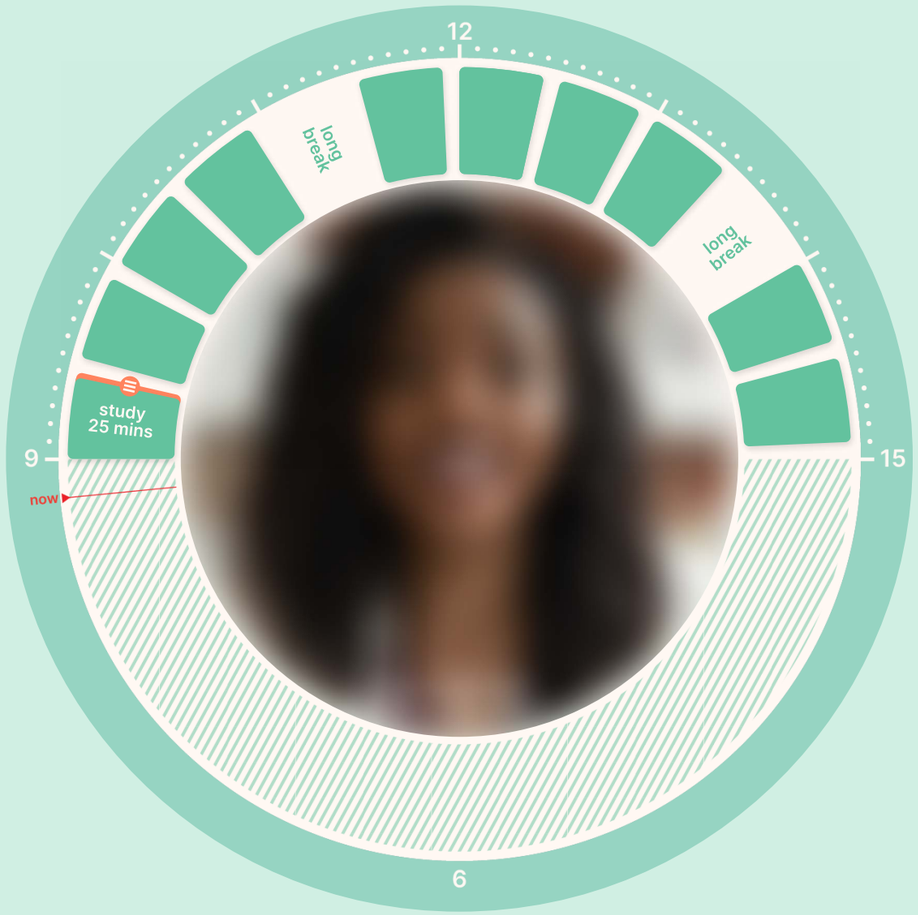
# concept choices 2:
# 2.5.4 visualising time

One of the pillars of the concept is the way time is visualised. As discussed in secion 1.1.1 III, time blindness affects a lot of people with ADHD.

In the last exploration, it was found that setting clear boundaries with your study buddy is one of the ways in which this concept can really add to the experience of studying together.  People responded well to the idea of having shared breaks.

How do you agree on a planning with someone digitally, maybe even a stranger? This clock planner is my answer to that question.

The clock should be intuitive in interaction, because agreeing on a schedule is important, but should not become a laborious process.




## Center focus

The two most important features on the screen, the clock and the face of your buddy, are both centered around the middle. This connects these two features, and guides the eye to the middle.

## Both companions can edit

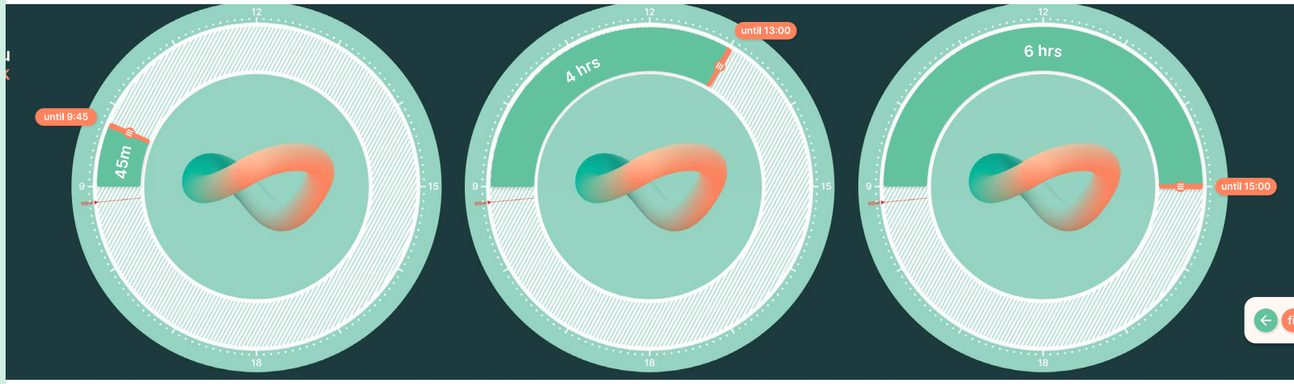
The clock automatically updates to any of the suggestions any of you do, so the relationship between the companions stays equal.

## Detailed bursts & breaks

The study periods (bursts) and breaks are able to be moved, and changed in length.

## Set an end time on your own

Before being connected, the most important choice you should make is until what time you would like to study. If your preferred time is shorter than an hour, ConnectMe assumes you want to talk, not study, and will find you a converstation partner.

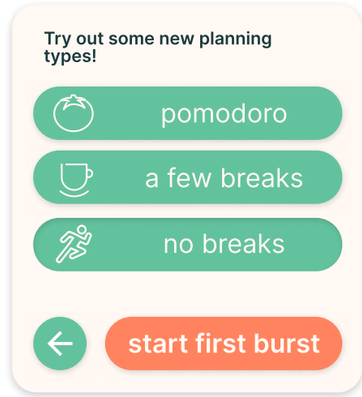


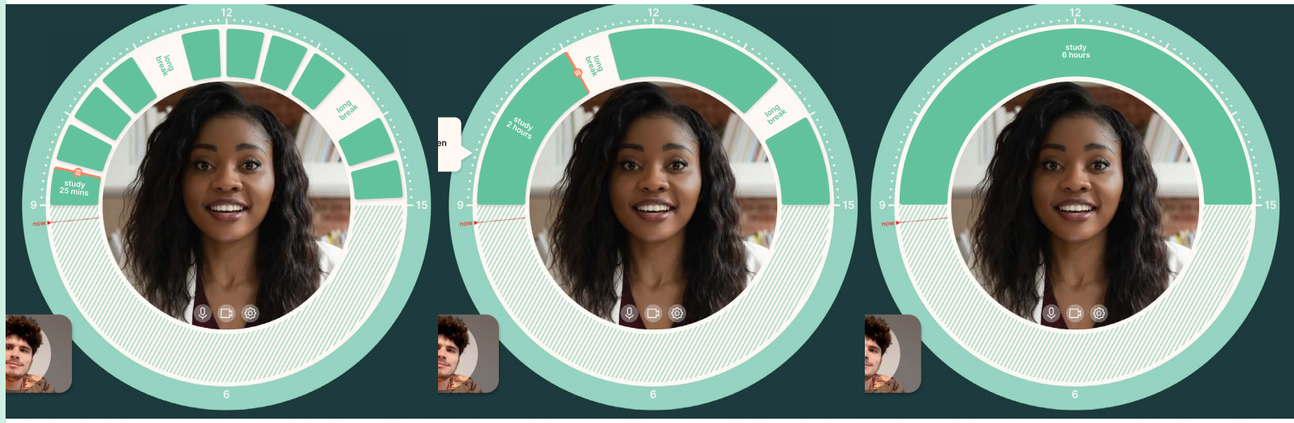

## Fill it in together

After agreeing on an end time, the buddies should agree on how to partition the time in between. The default option is a ‘Pomodoro technique’-type schedule, with 4 study periods (bursts) of 25 minutes with short breaks in between, and a longer break thereafter.

They are also able to select ‘only long breaks’ or ‘no breaks’, The Pomodoro schedule was chosen as the default option, because it can help create awareness of how much is personally achievable for you in half an hour, and therefore create realistic expectations.

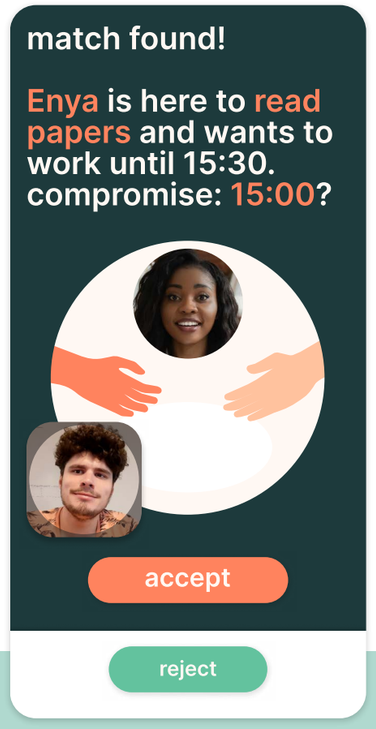
It is hard to find figures for the effectiveness of the Pomodoro technique, but a lot of students have mentioned this as a technique they occasionally use and find useful. The added social factor of a shared experience can make this method useful even for participants who normally are not motivated by this method.



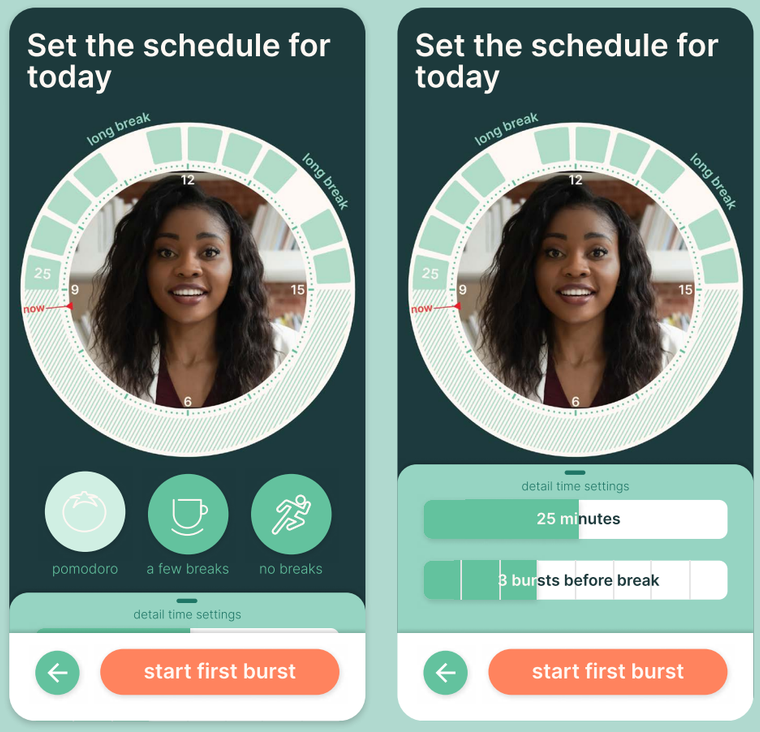
# concept choices 3:
# 2.5.5 The App

In this report, most of the design focus is put on the desktop website, as that is the point of first contact for users. But some aspects are explored for the app as well. For instance: setting and specifying the clock.

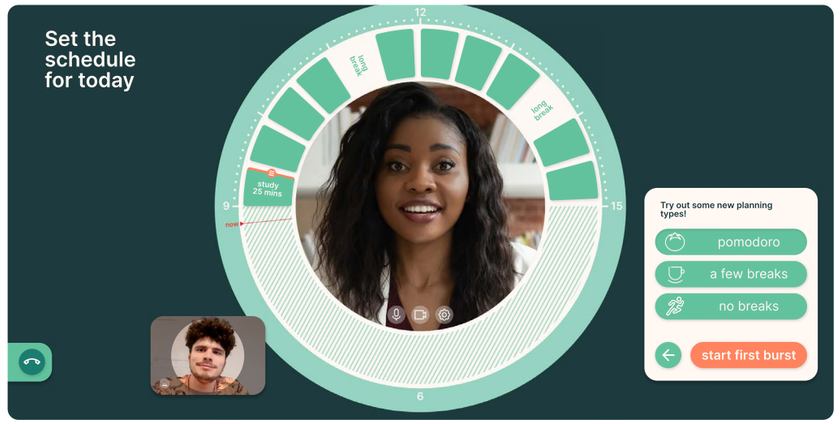


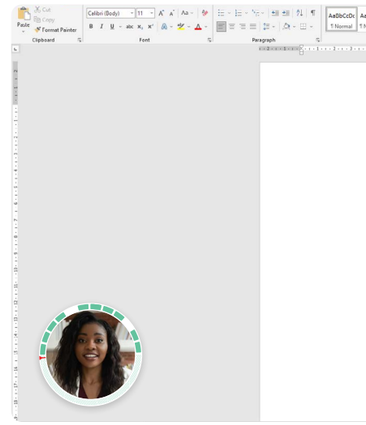

I chose to keep the camera view of your companion in the middle, for consistency. This means that there is very little space on your phone screen left. To solve this, a separate menu was added to set the time blocks.

Other small tweaks were made to make do with less space: changing the clockface to the inside, while taking most text outside of the blocks. Also, the self-camera view is hidden if there are too many other things on-screen.

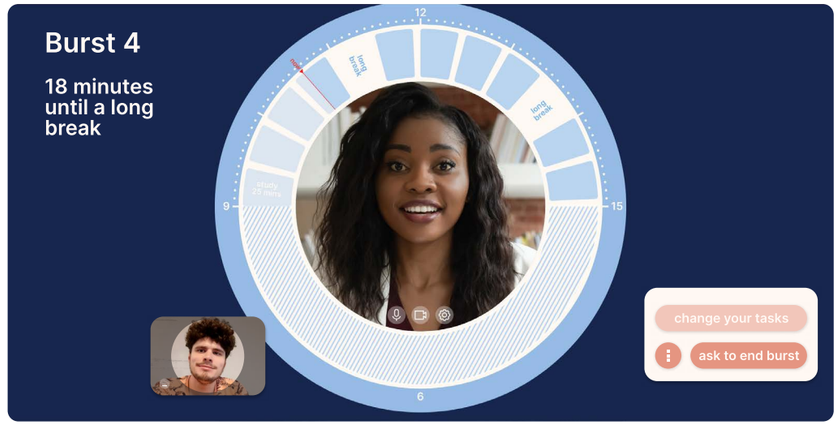


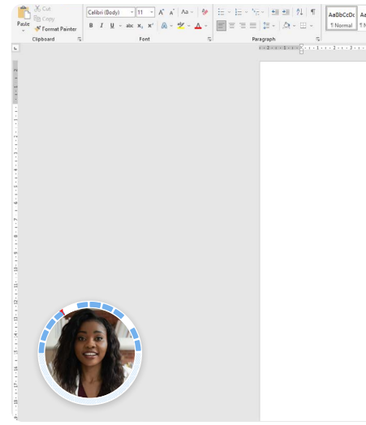

# concept choices 4:
# 2.5.6 The colours

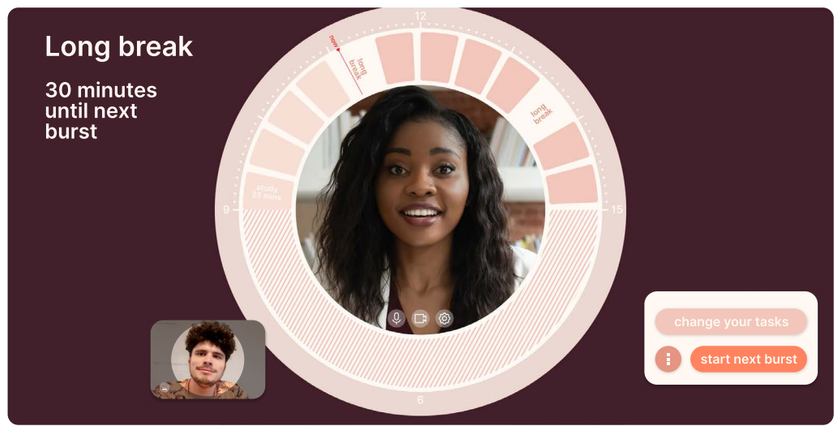


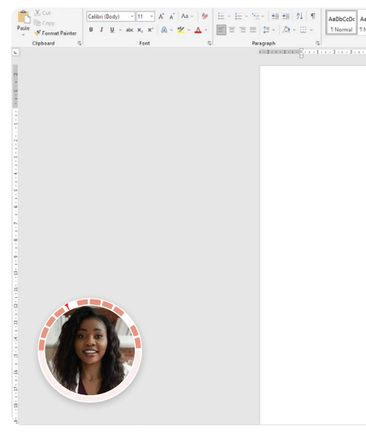



In oder to signify at a glance the phase in which phase you are in, the whole UI changes colour scheme. Green is the product colour, used nearly all the time. During a study burst, the screen fades to blue. During long and short breaks, the screen fades to a red-brown colour. The blue, as a cool colour, represents focus. The red-brown exudes warmth, representing relaxation. These colours also change in the floating overlays, seen when the website is out of focus.





## concept choices 5:

# 2.5.7 Mediating a meeting

Meeting a stranger online can be a scary affair. To make sure this process is as smooth as possible, there are some points in the concept where ConnectMe tries to mediate the interaction.

### The handshake

As can be seen in figure 3.01, Once a match as been found, you will see two hands that represent you and the other party, shown to be reaching out to each other, analogous to the helping hand of someone offering support.

If one of the parties accepts, the other party will see this as a hand moving in. If both parties accept, a handshake seals the deal, and the two are connected.

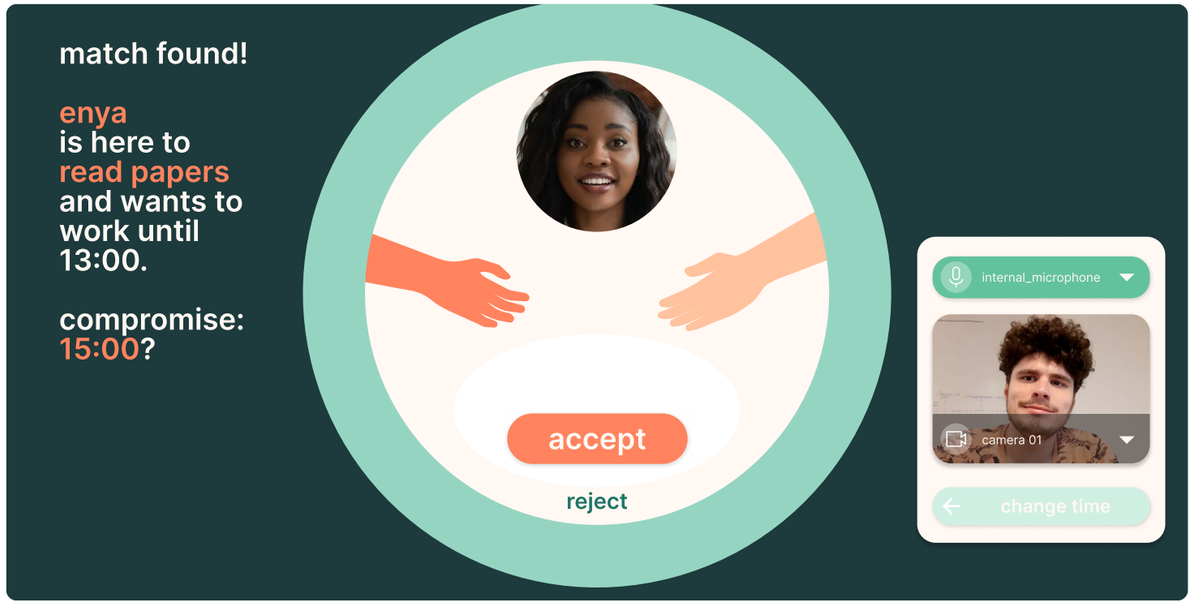
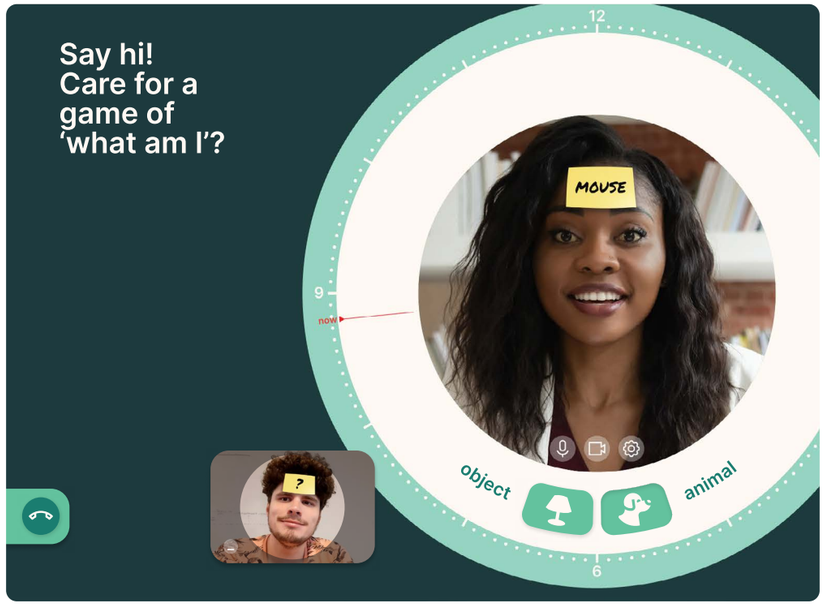



*figure 3.01: Prototype screen 1.6a: proposing an end time compromise.*



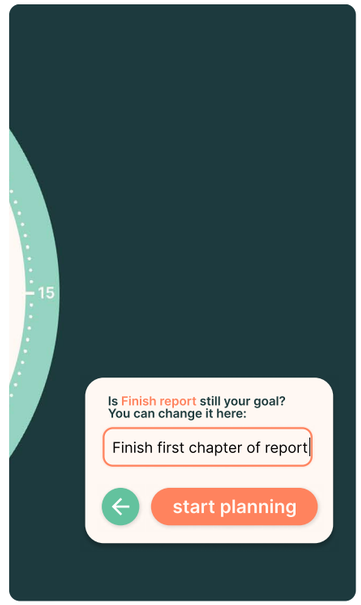



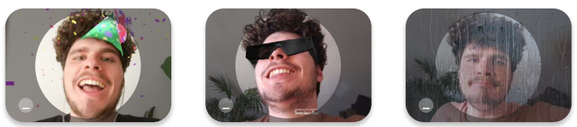

*figure 3.02: a. Part of prototype screen 2.1, playing a guessing game* *b. Part of 2.2, refining your goal.*

### Session introduction ↑

At the moment of first contact, before agreeing on a schedule for the day, you are offered the option to play a guessing game, where an object or animal is digitally pasted on your forehead. Only your opponent can see what is on you head, and you guess what you have by asking yes-or-no questions. This is meant as an icebreaker and energizer. After this (figure 3.02b) you get the option to refine your goal in order to stimulate you to discuss it with your partner.

### Session conclusion ↓

Every session ends with a little celebration! At the end (figure 3.03), you will see a screen with three digital filters to play around with. They should describe different moods. You are also asked to fill out whether your study partner has met their goal for the day, to stimulate you discussing this with your partner.



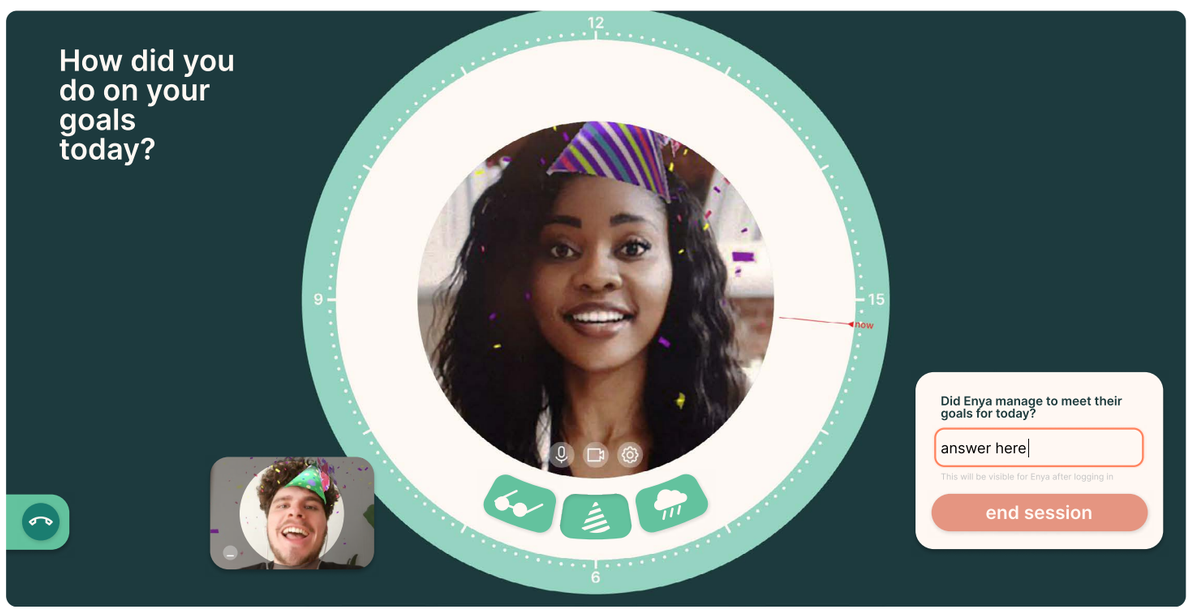



*figure 3.03: Prototype screen 4.7, a fun ending to a study session.*

# 2.5.8 Conclusion

The design process for ConnectMe started with designing the clock mechanism in detail. Since time visualisation and your study partners are the most important visible features, this is what the concept is built around.

The second step is detailing the experience users should have by way of a storyboard. These storyboards were then worked out into a design program (Illustrator) and a prototyping program (Figma), to make the step to a high-fidelity prototype as easily as possible.



Phase 3

with users

3.1

# User evaluation

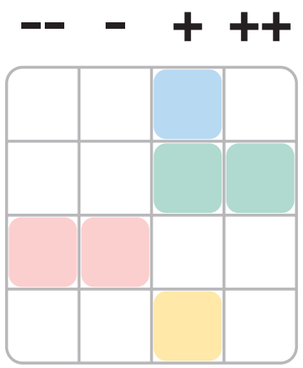
It is time to evaluate the design of ConnectMe against some criteria. In this chapter, firstly, the criteria will be selected and discussed. Then, these are evaluated by a walkthrough by usersof a high-fidelity prototype, with an interview and survey afterwards. The findings of this evaluation will be used in the next chapter.

# 3.1.1 What needs to be evaluated?

In order to find which questions I need to answer in the concept evaluation, I have gathered the most important evaluation points from throughout the project.

The most important questions come from the design brief, and the specified goal after the first research.

There are some things that are specific to this concept, that need to be evaluated. I also curated criteria from the Harris profile and the UX Design for ADHD guidelines that I thought were most important to get input on. Lastly, I decided to document any usability problems.




Specified design goal (page 54):

**1.1 Does ConnectMe help people with ADHD reduce the time they procrastinate?**

Original goal in design brief:

**1.2 Does ConnectMe help them deal with distractions, remain focused, and finish their tasks?**

Concept-specific evaluation points:

**2.1 Does ConnectMe do enough to get people in a 'working atmosphere'?**

**2.2 Does ConnectMe mediate the meeting of a new person well?**

**2.3 Does ConnectMe provide an effective enough way to plan a day together?**

From the Harris profile criteria:

**3.1 Is ConnectMe designed well for people with ADHD?**

**3.2 Does ConnectMe leave enough room do do things 'your way'?**

UX Design for ADHD guidelines:

**4.1 Does ConnectMe satisfy the UX Design for ADHD guidelines?**

**4.2 Document any usability problems in the prototype.**

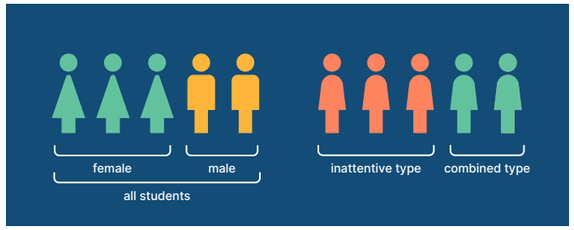


# 3.1.2 Research setup

The research was conducted with 5 participants, all of whom where students. Two of these participants had participated in the "Storyboard validation/exploration" (page 86).

For this research, a high-fidelity, digital interactive prototype was built in Figma. Participants are asked to walk through this prototype during a Zoom call, followed by a survey and interview.

The first setup of this evaluation was based on the idea that two participants would actually meet in the Zoom call at the same point as they would meet in the concept. During a pilot test, this was deemed too much of a hassle, while not conveying the experience enough to make a difference in the ability to judge the merits of the concept.




## The survey

In the survey, questions are asked using a 7-point scale (-3 to 3) based on the AttrakDiff method (UID, n.d.). This method asks participants to rate a design on a wordpair (for instance 'ugly - attractive'), -3 being the negative of the two, and +3 the positive.

Two of the AttrakDiff categories (Pragmatic quality & Attractiveness) were chosen to be able to evaluate how attractive the concept is to participants. This scale was also used to evaluate some of the "UX Design for ADHD" guidelines, for instance by using the wordpair 'visually overwhelming. - visually tranquil'.

## The interview

The interview consisted of just 7 questions (with some sub- and follow up-questions) that were only asked if the subject had not come up yet before. The questions were meant to lead to conversation, to get beyond the answer of 'kind of' or 'I think so', to a layer where they were more honest about their opinion.

### introduction

Participant enters the Zoom meeting and is introduced to the test.

### prototype walkthrough

Participant opens a link to the Figma prototype. They share their screen and go through the process of a user new to ConnectMe. They are asked to think out loud about what they see and think they should do.

Evaluates:
4.2 Usability issues

### survey

Participant fills out a Google form with modified Attrakdiff scales and some other questions.

Evaluates:
1.2 Distractions
4.1 UX Design guidelines

### interview

Participant is engaged in an interview about their thoughts of the prototype and concept.

Evaluates:
1.1 Procrastination
2.1 Working atmosphere
2.2 New person mediation
2.3 Planner
3.1 ADHD design
3.2 Doing things your way

# 3.1.3 Evaluation results: does it reach its goal?

## 1.1 Does ConnectMe help people with ADHD reduce the time they procrastinate?

All participants agreed that, while using ConnectMe, it will help against procrastination. P5: 'I think that, once you are using it, it will work.'

However, 3 out of 5 participants mentioned that they would be able to procrastinate on finding a buddy, and in that way, it still would not solve the problem. These participants also indicated this would be solved by adding the option to plan a session or place a request to find a buddy later, P2: 'It's quite possible for me that when I'm in a good study flow, I can think of what I want to do tomorrow, but then I get up that day and the whole day is broken, and it takes untill eleven to drag myself to my desk'. She goes on to say that, had she planned a ConnectMe session at 9, she would be motivated to start.

**Insight 1: ConnectMe helps against procrastination, but could do more to address second-order procrastination.**

**Insight 2: Adding an option to plan your sessions beforehand can stop second-order procrastination.**

## 1.2 Does ConnectMe help them deal with distractions, remain focused, and finish their tasks?

As can be seen in figure 3.04, participants rated their envisioned distraction level when using ConnectMe to be much lower than when studying without. 4 out of the 5 participants mention the benefits of peer pressure and social accountability. P3 notes: 'social external agreements are better motivators than personal inner agreements'. However, P5 mention that more often than distraction, not wanting to start is the problem

**Insight 3: ConnectMe helps reduce feeling distracted giving an external, social pressure.**

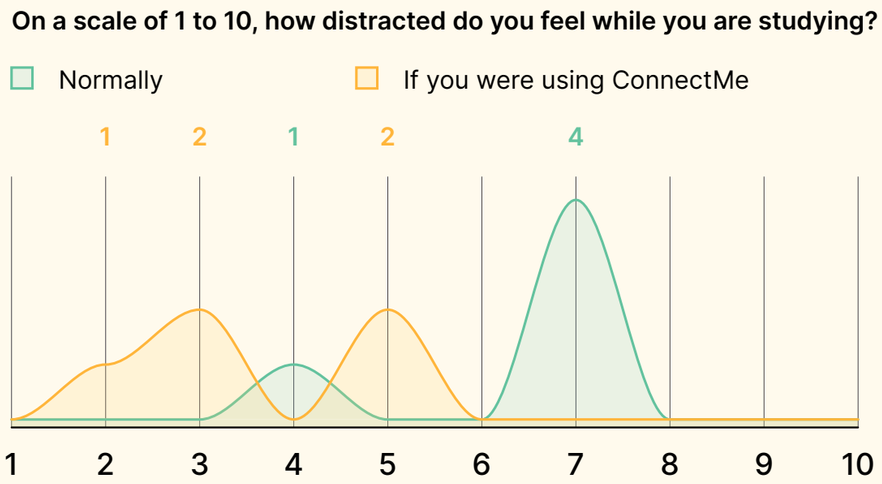



*figure 3.04: ratings of distraction with and without ConnectMe.*

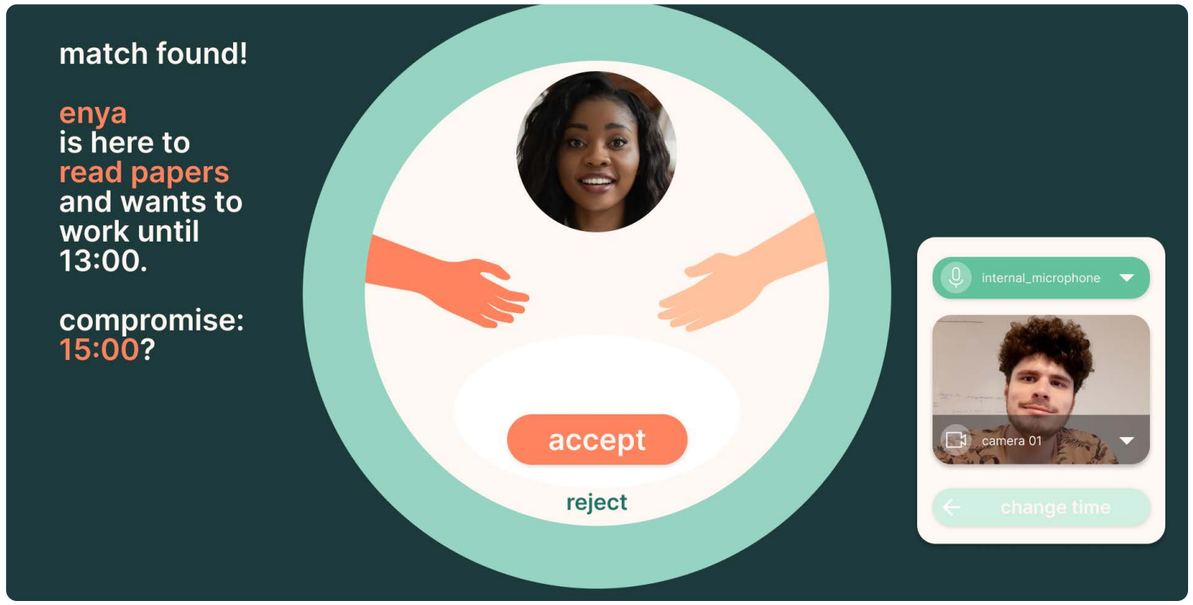



*figure 3.05: Prototype screen 1.6a: proposing an end time compromise.*

## 2.1 Does ConnectMe do enough to get people in a 'working atmosphere'?

All five participants responded positively to this question. P3: 'Especially because of the overview, and that you are being so consciously busy with what you want to do.' P4: 'Certainly because of the constant overlay. Then you can look the person you are working with in the eyes. That is one of the most important parts of a working atmosphere.'

**Insight 4: ConnectMe succeeds at creating a working atmosphere.**

## 2.2 Does ConnectMe mediate the meeting of a new person well?

Judging from the participants' answers, though ConnectMe already does a lot to facilitate meeting a stranger, this is one area where it can still be improved. The 'compromise' is not well-understood by partipants. Most participants agree that the moment of first connection is good as it is, but that breaks can get some more guidance.

### The end time compromise

In the screen in figure 3.05, P2 and P3 express confusion about the compromise that is proposed. Who is proposing this compromise? P3 would expect an extra step where they agree to a deviated time, if this is more than an hour. Plus: it is much easier to agree to work shorter than work longer, this could lead to disbalance in the interaction between two strangers, as P3 expresses some feeling of guilt if their match would stay longer just for them. On the flip side, P1 says they would be fine with doing some other to-dos if their partner wants to study longer than them.

### Moment of contact

P1 recommends adding a way to see what kind of coursework/major the other student has, so you can judge whether that would be useful to you today.

P5 thinks it would be useful to somehow indicate

your mood in an easy way, specifically with ADHD relatable terms such as 'I feel cloudy' 'in the mood for conversation'.

### Breaks

P3 mentions that the moment of first contact is facilitated nicely with the game and goal discussion, 'but in the breaks, I think, you are thrown off the deep end, I would want some opportunities [for conversation or games] there.'

P3 here agrees with the point that P5 made about mood signifiers. ConnectMe needs to address the fact that sometimes, you would like to talk about ADHD-related issues, and sometimes, you don't have the time or don't feel like it. People with ADHD can find it difficult to manage their own, and others' expectations, so it can be difficult if the other person has other expectations from the conversation.

### Before clicking 'connect me'

One participant remarks that they would like to read much more about what is going to happen once they connect to another person, and would read this information thoroughly before they would dare to do so. P5: 'Because I think that really is something that people with ADHD get worried about, you know, oh, this other person has an idea about what to do and I come in there vaguely like, I don't know what the big plan is.'

**Insight 5:** **Making a compromise in the end time, especially when your desired times are far apart, needs to be facilitated more, and should be a more conscious process.**

**Insight 6:** **There need to be more opportunities for activites or conversation starters during breaks. The difference between people who want to talk about ADHD and those who don't should be addressed.**

**Insight 7:** **The information that is available before committing to 'connect me' should be worked out, to give new users the chance to work up the courage.**

## 2.3 Does ConnectMe provide an effective enough way to plan a day together?

The planning system was well-liked by the participants. Some of them told me they would expect to be able to cut up the time into smaller chunks, and were happily surprised to P4: 'Yes I thought that was one of the stronger points of the UI, and it is very easy for my to stay at work with 5 minute breaks.' Participants offer ideas for small improvements, such as being able to input tasks together before the first burst starts.

One point P3 makes about the planner, is that 'no breaks' gives you the idea that you will be productive the whole time (it says 6 hours), and the pomodoro version already looks like you're losing time to be productive (see figure 3.06). There could be more explanation about why we are offering these options, and what the benefits of frequent breaks are. Counter to this, P5 has to laugh when they click on 'no breaks', as it suddenly seems absurd to work so long without break (although they regularly do this without realising it).

**Insight 8:** **The ConnectMe planner does a good job of cutting up the day in an intuitive and easy way.**

**Insight 9:** **There is an opportunity for a better explanation of the time schedule options, why they are there, and what the benefits of frequent breaks are.**

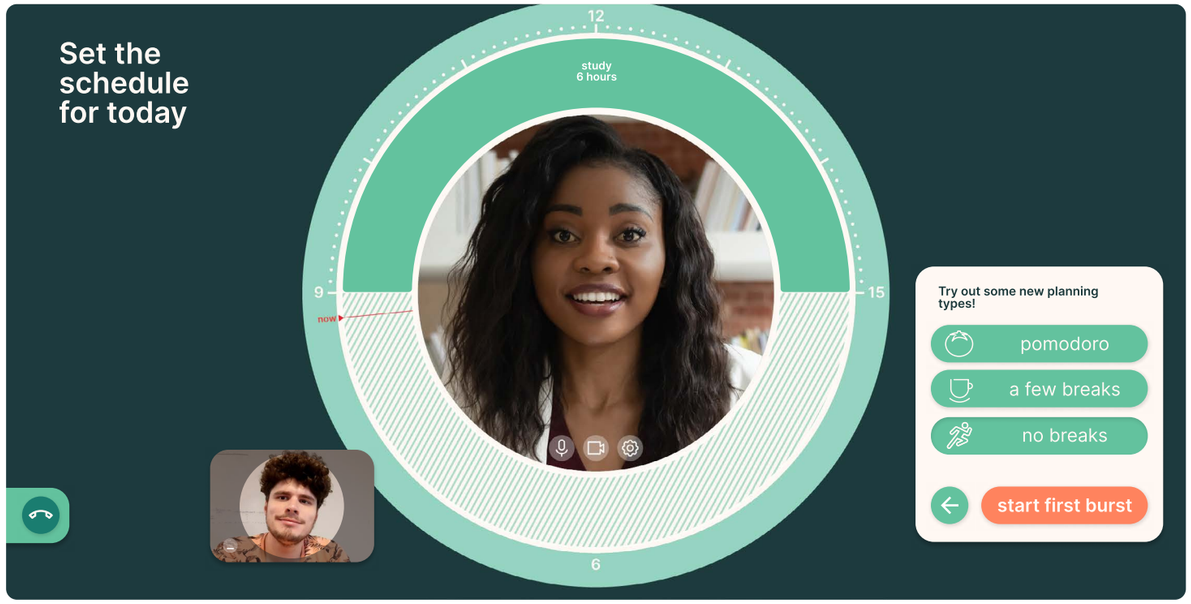



*figure 3.06: Prototype screen 3.1e: a no-breaks scenario feels like you have a lot of time to be productive, but also allows for the realisation that it is 'stupid' (P5)*

## 3.1 Is ConnectMe designed well for people with ADHD?

All participants agree that the platform does a lot to accomodate people with ADHD in things they normally run into. Participants name the clarity (overzichtelijkheid) (P1, P4), the colour palette (P2), the fact that it is not overstimulating (P3), and the separation of time into blocks, which they imagine triggers a little dopamine rush when finishing it (P4).

Small improvements are mentioned, such as the readibility of the text in the homepage (P2).

More about whether this design is fit for people with ADHD, specifically, will be done in 4.1.

**Insight 10:** **Participants believe the concept is well-designed for people with ADHD.**

## 3.2 Does ConnectMe leave enough room do do things 'your way'?

For most of the participants, the planning system with short bursts and breaks was something they already applied in their life, or that they would like to apply, and as such, connected to their current way of working already.

Participants used this to request some features that, for them, would make this a more all-round study together tool.

P1 would like to see a more elaborate planning system, where they can tick off tasks, or maybe even draw your own planning.

P2 would like to set multiple goals per day.

P4 would want a screen sharing option and collaborative whiteboard tool, in order to really study together.

One participant, P5, mentions that they do not like working with the Pomodoro technique, because they find it hard to get in the flow, and once they are there, they don't stop for the break timer. However, they concede that doing it together with a partner would work much better.

**Insight 11:** **The planning system connects well to the way people with ADHD already (want to) study.**

# 4.1 Does ConnectMe satisfy the UX Design for ADHD guidelines?

A modified AttrakDiff scale was used to evaluate the UX Design for ADHD guidelines that I was unsure ConnectMe would comply with.

As can be seen from the UX Design for ADHD guidelines section of figure 3.07, most qualities are rated well enough. The biggest worry is responsivity, which rates noticably lower than the rest.

My assumption is that this is largely due to prototype limitations. The figma prototype, for some of the participants, lagged considerably. Actions like dragging the planner to another time become very laborious. It is possible the participants had a hard time looking past this limitation to judge the actual design. I think this is also the cause behind the 'unpredictable' score in the pragmatic quality section.

'Controlling' is the only other score below two. As P1 says: 'The system had a tiny bit more control, but not in an annoying way.'

**Insight 12: ConnectMe scores sufficient on all UX Design for ADHD guidelines, except for responsivitity, which could be due to prototype limitations.**

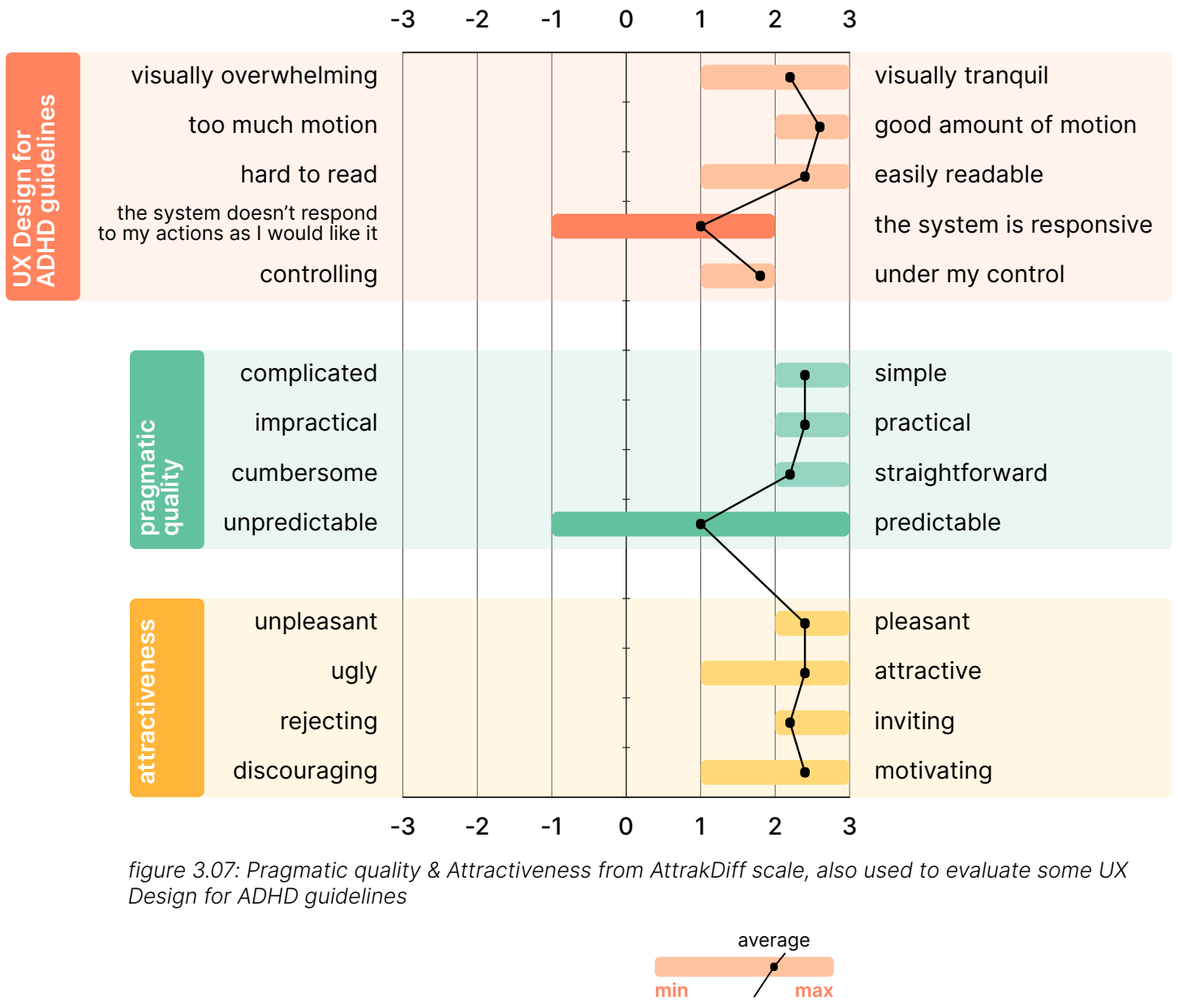



*figure 3.07: Pragmatic quality & Attractiveness from AttrakDiff scale, also used to evaluate some UX Design for ADHD guidelines*




# Some other things I found:

## Did people like it?

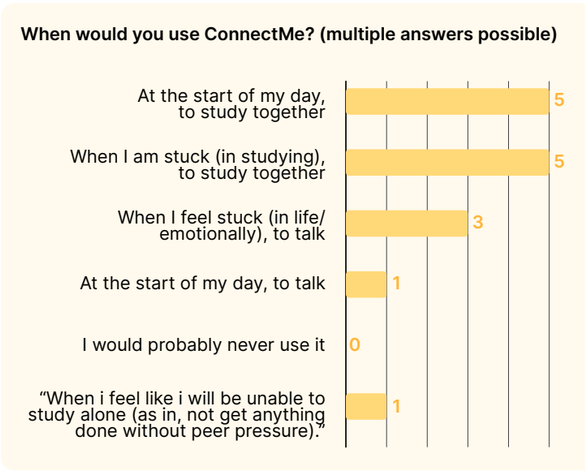
Forthis, we can look at the AttrakDiff scales again (figure 3.07), at the Attractiveness and Pragmatic quality now. I hope people were not just being nice, because the participants were very positive about the concept in general. Only 'predictability' scores are low, which I hope is mostly because of aforementioned prototype limitations. If the predictability has to do with the lack of clarity of what would happen next in the concept, this would be another argument to work out the information available to users before they click 'Connect Me!'.

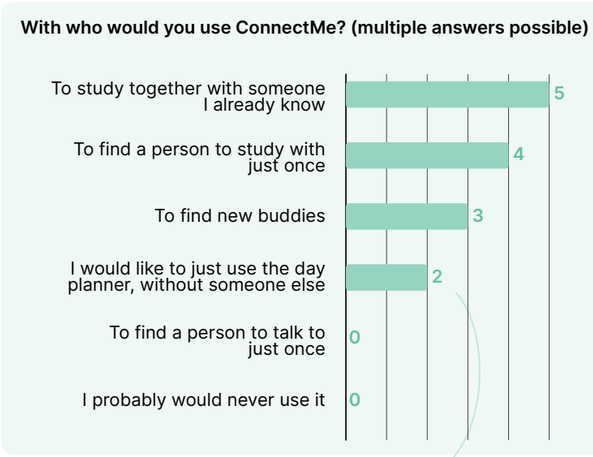
## In which scenario would people use it?

Something I was personally curious about was the way participants would prefer to use ConnectMe. Would they only study together, or also just talk? Would they try to find new buddies instead of just inviting their friends? In figure 3.08 you can see the results.

Everybody would be open to use ConnectMe both at the start of their day, and as a way to get out of a rut when studying.

And, finding new people is almost as popular as studying together with existing friends. (luckily, nobody clicked 'I would probably never use it'!).




*P3: "Sometimes I'm overwhelmed and can't handle interactions I can Imagine I then just want to use the timer planner part of the app"*

*figure 3.08: scenarios that participants see themselves use ConnectMe in*

# 4.2 Document any usability problems in the prototype.

The most important usability problems will be dealt with on the next pages, where the major improvements will be discussed.

# 3.1.4 Conclusion

ConnectMe does a good job of helping people deal with procrastination, distractions and creating a working atmostphere. It can do more to help against second-order procrastination, but adding the option to plan sessions ahead can solve that.

More attention should be paid to a few areas where contact between people is facilitated, such as the compromise proposal (which is unclear) and breaks (where there should be more options for activities).

Overall, ConnectMe is designed well for people with ADHD and the time planner system is liked by participants.



Phase 3

3.2

# Final design proposal

Based on the findings of the evaluation, improvements to ConnectMe are proposed.

This is done partly by improving the design, partly by including them as recommendations. There are six bigger improvements that I would like to make to the concept.

This chapter also contains the final reflection of the report.

# 3.2.1 Six big changes

The most important insights, opinions and usability issues from the evaluation are used to make a final iteration to ConnectMe.

## ① Planning sessions in advance

Based on "**Insight 1: ConnectMe helps against procrastination, but could do more to address second-order procrastination.**" and "**Insight 2: Adding an option to plan your sessions beforehand can stop second-order procrastination.**"

Once you have an account, you now have two options to connect: 'Connect me now' and 'Connect me later'. The latter option will, aside from letting you choose between a buddy or stranger, indicate a preferred start and end time. A notification will be sent out to your selected buddies, and if one of them responds, you will get confirmation via the app. This way, you can make your intention to study explicit at a time you are feeling productive, and also get a reminder of your intention once a friend has responded.

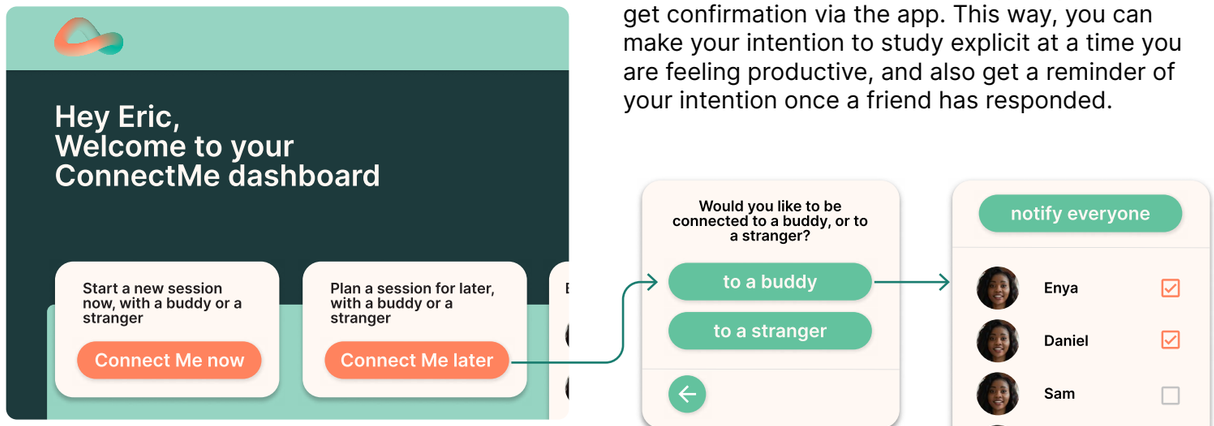
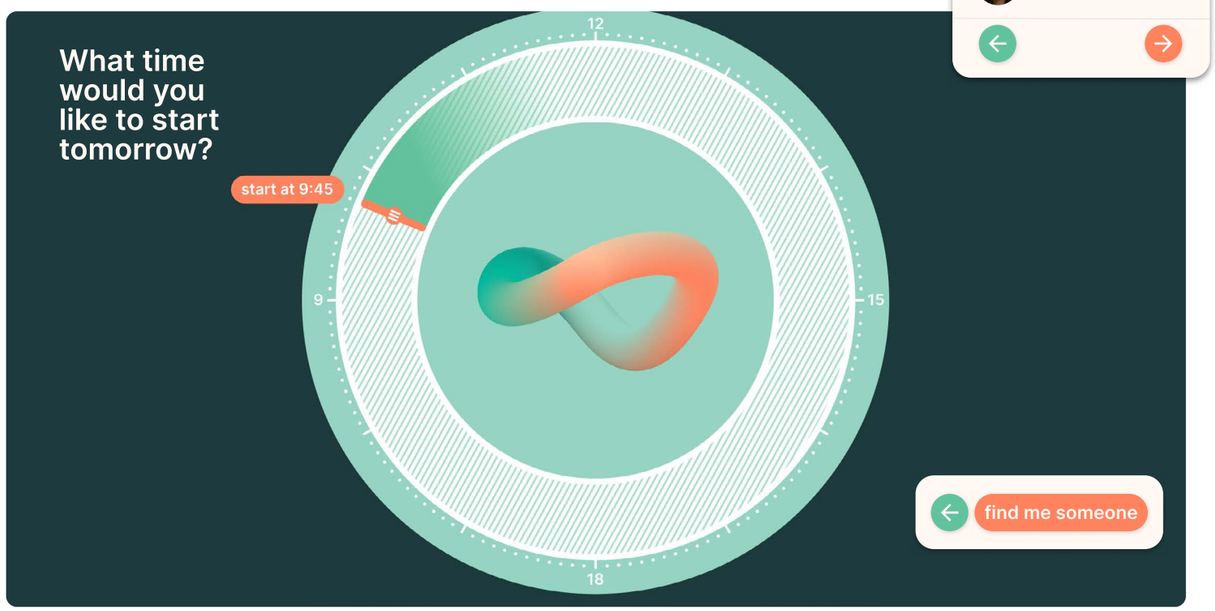



*figure 3.09: New screens that allow you to plan a session.*




## ② Conversation starters & games during breaks

Based on "**Insight 6: There need to be more opportunities for activites or conversation starters during breaks. The difference between people who want to talk about ADHD and those who don't should be addressed.**"

As noted before, the break is a moment where you will notice that you do not know each other well, more than the first introduction. Here, I add two options to ease the interaction.

1. The fortune cookie: meant to be a small, enticing roll of the dice, with some kind of conversation prompt. As can be seen in the bottom right of this page, it can contain open questions, tips, or points that invite the user to think about ADHD, studying, or the way they use ConnectMe.
2. The possibilty to play the 'What am I?' game from before

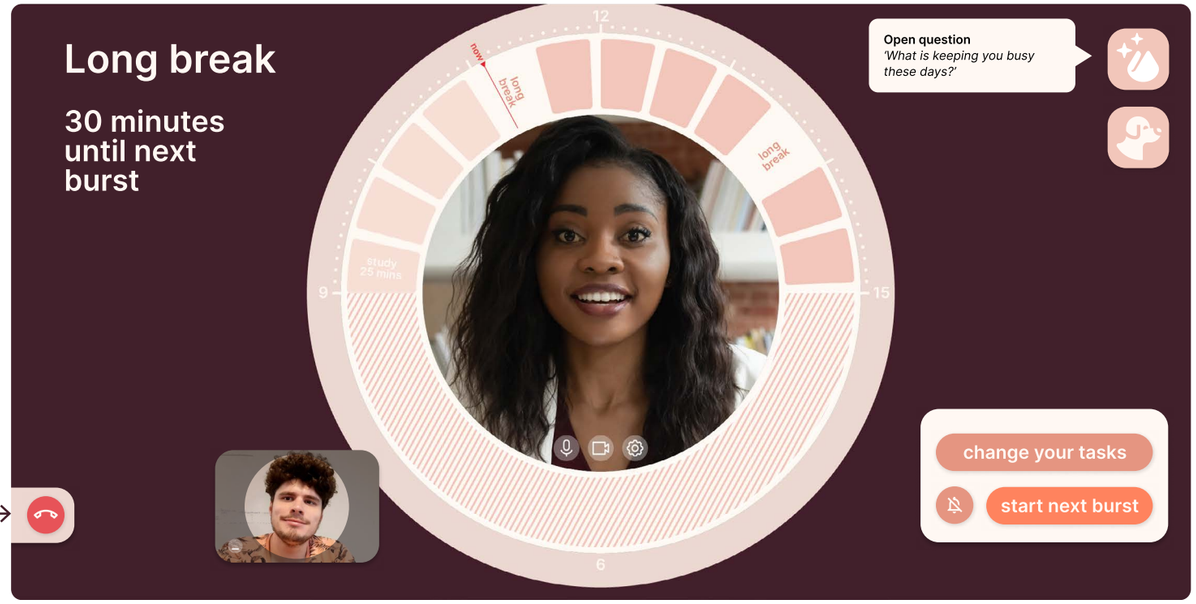



*figure 3.10: New screen 4.4, with two break activity options. The text cloud only becomes visible if the fortune cookie is given a click.*

A small change based on a usability issue. Multiple people thought they could call somebody during session, or did not interpret the session as a call. P1: 'Ah, I can call someone!' The 'end call' button is now a definitive-looking red.

**Open question**
*'What is keeping you busy these days?'*

**Tip**
Use the short breaks to get up and leave your desk, and the long breaks to talk.

**Reflection point**
Ask yourself whether you feel like discussing ADHD-related questions with your partner.

# ③ Communicate needs & manage expectations with a mood signifier

P5 thinks it would be useful to somehow indicate your mood in an easy way, specifically with ADHD relatable terms such as 'I feel cloudy' 'in the mood for conversation'. P3 also felt like there should be some way to indicate to your partner how talkative you want to be that way.

People with ADHD can find it difficult to manage their own, and others' expectations, and so, can ask too much in terms of conversation from the other, and may find it difficult to refuse a difficult conversation about ADHD-related topics, especially if they can become a bit personal.

Giving this option does two things:

1. It creates a moment where you are forced to think about current mood and needs;
2. It allows you to communicate this via a few simple options.

Deliberate emphasis is placed on 'In the mood to talk' and 'not in the mood to talk', to be able to decline a match if your needs are not aligned in this regard. It also creates the expectation that, once connected, the two partners will make a conscious choice in how to spend the breaks,.

My hope is that, even if people dislike the mood options/system, they will still be nudged to discuss their needs on their own accord with their partner.

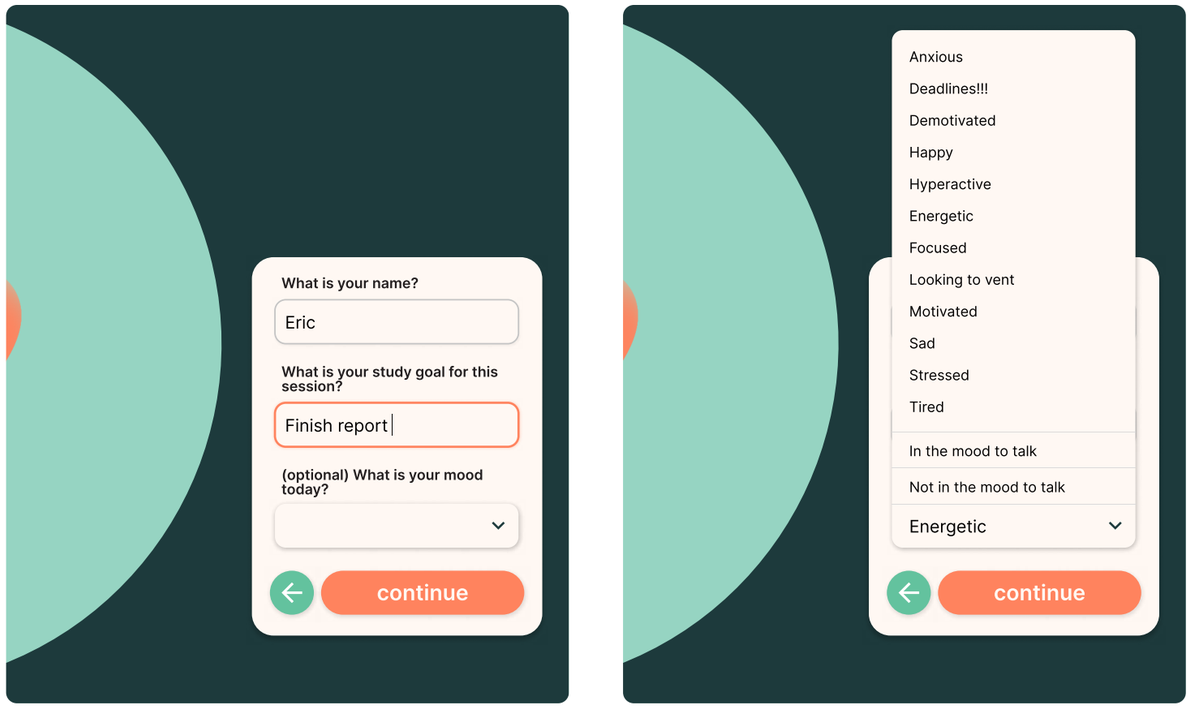



*figure 3.11: Half of new screen 3.1, the first thing you see after 'Connect Me!', with options given voor the moods people can select.*

# ④ A better way to compromise

Based on "Insight 5: Making a compromise in the end time, especially when your desired times are far apart, needs to be facilitated more, and should be a more conscious process."

The old 'match found' screen, as seen on page 117, left some things to be desired. People did not understand what was meant by the compromise, and who proposes this. To make this more clear, two ways to compare time have been introduced. The clock has been brought back, to have a visual represntation of what you are agreeing to, and how much you are both deviating from your preferred time.

Secondly, Your own time, goal, and mood are made easily comparable by placing two cards with all personal information close together.

The accept button is moved to a more predictable location, where all other continuing buttons are in the design. This could weaken the link between the 'accept' button and the shaking of hands, but it is more clearly connected to the question now.

Lastly, 'reject' was replaced by 'decline', following a suggestion by P5.

The compromise *I* had to make in this view is that the microphone and camera settings are gone. These will still be available in the screens around it.

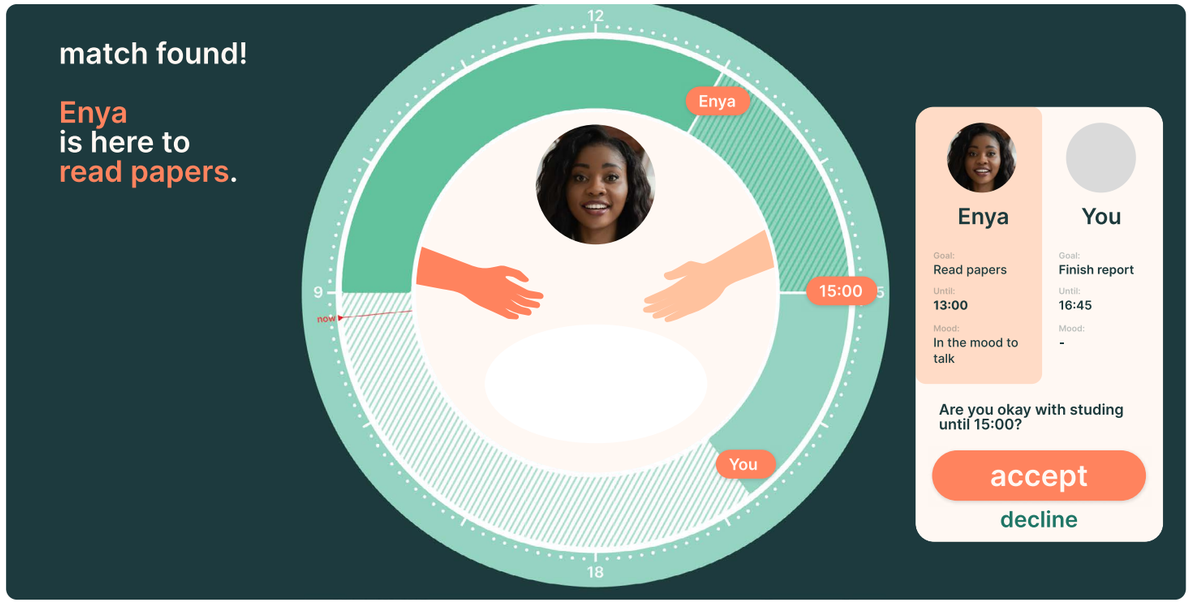



*figure 3.12: New screen 1.6, with more information about the potential partner. The profile picture and mood are missing from 'Your' info card, because as a brand new user, you cannot set these.*

As mentioned by participants, if your expectation is that you can study until around your desired end time, it can be quite a leap to deviate two hours from this without an extra step. If, after a certain amount of time ConnectMe could not find someone whose end time is within an hour after your desired end time, you will get a pop-up as in figure 3.13, which allows you to make the conscious choice before being offered an out-there time.

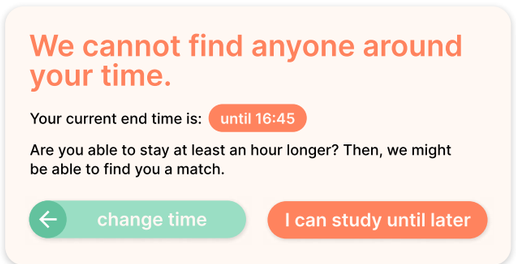



*figure 3.13: Overlay for screen 1.5, in case no match can be found.*

# ⑤ Evaluation & communication with your future selves.

After the end of the session, there should be the opportunity to reflect, and communicate those thoughts to a future you. You could always write down important things for the next session somewhere else, but ConnectMe has the opportunity to remind you when you need it the most.

As P2 said: P2: 'It's quite possible for me that when I'm in a good study flow, I can think of what I want to do tomorrow, but then I get up that day and the whole day is broken'. P3 recommended taking a moment for reflection after the session, but noting that they always skip the reflection in similar apps because they don't feel like it.

I have chosen to make the reflection on whether this study schedule works for you short and sweet, only giving you the option to save the current schedule.

Then, there is the option to write down your thoughts in a note to yourself. Whether you want to preplan your day for tomorrow, or remember a task or an important life lesson, there should be space for that.

Both of these reflection options are as non-intrusive as possible, so if they do not suit you, you can click through to the next screen to send a buddy request.

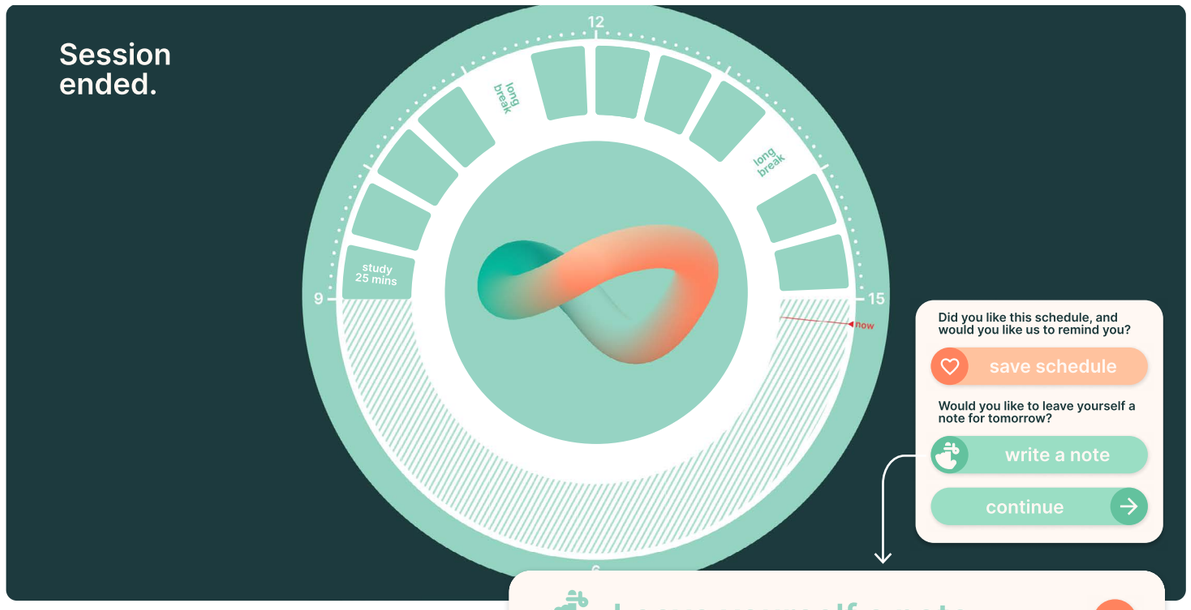
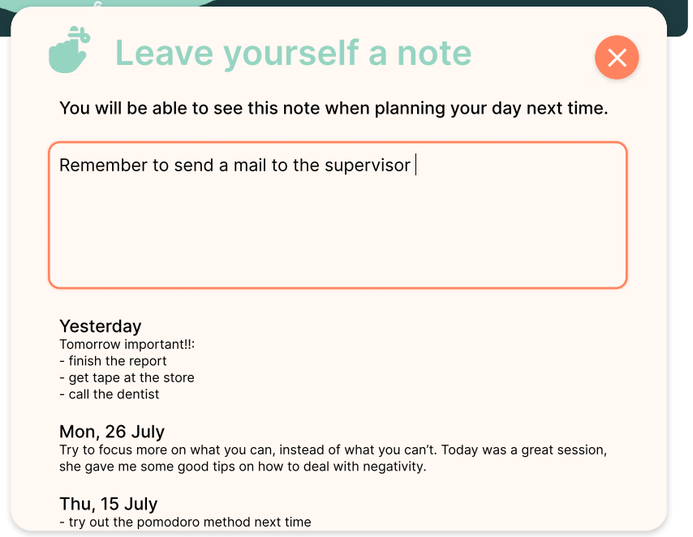



*figure 3.14: New screen 4.8, with two reflection options. On the right is the overlay that opens upon clicking 'write a note'.*

During relevant moments (such as when planning your day), this icon will show up in the top right corner of the screen. Here, you can find your notes. The notes are also added to the 'Tasks for today' view, as can be seen in figure 3.15.






# ⑥ More goal/task options

P2: 'Wait a minute, can I also make multiple goals? No? That's inconvenient, I want to study for a whole day.' 'Sometimes I know it will be a day where I need four separate goals to stay a little focused.'

Setting multiple goals is not yet possible before meeting a new person, but you are at least able to set subgoals in the 'Tasks for today' view.

Each burst now has the option to add multiple tasks/goals. Additionally, to increase the feeling of accomplishment, you are able to check off tasks or goals you are finished with. As can be seen in the bottom right of this page, check marks for completed tasks will also appear in the burst in the clock view.

P5: 'And if you do it [plan your tasks] on your own, you suddenly spend 20 minutes on that. While, if you do it together, you think: okay, shit, we're starting soon.'

In order to give you the option to do it together, the 'Tasks for today' overlay will also already be accessible as a separate step, before starting your first burst. This is to motivate people to fill it in quickly, not spend the entire first burst perfecting their schdule.

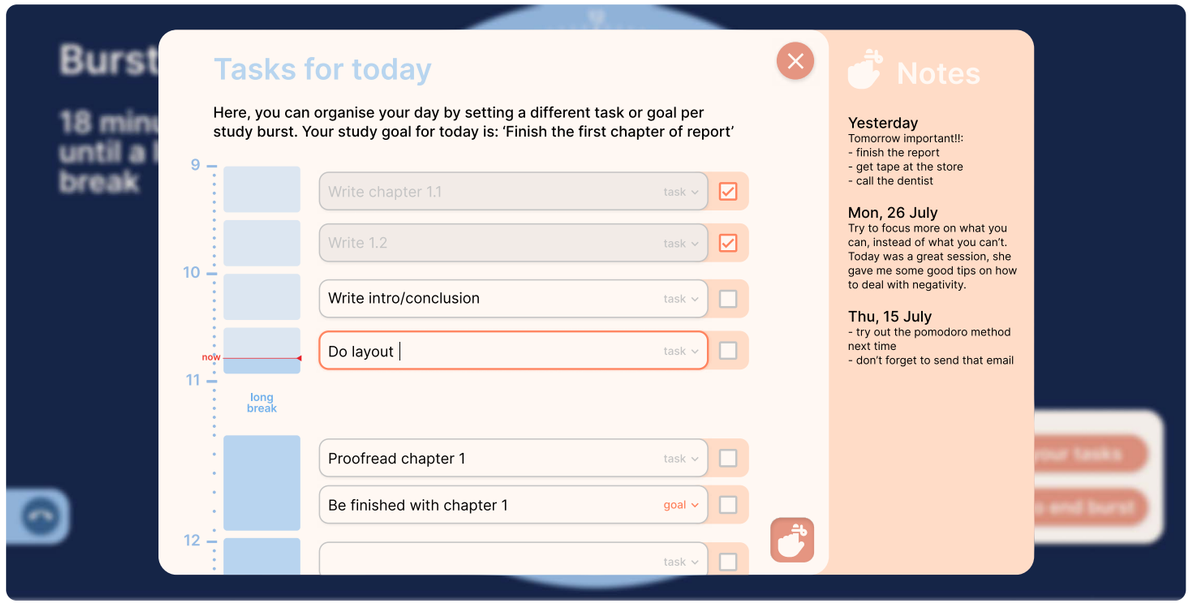
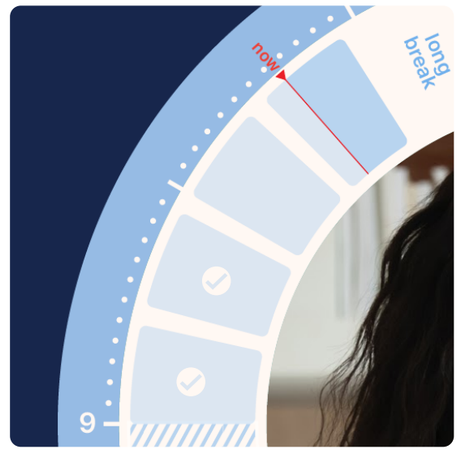



*figure 3.15: New screen 4.2, wich the option to add more tasks per burst, and add subgoals. Bottom right: check marks appear in the bursts if a task has been completed.*

Hover detail: when you want to add a new goal or task, a [+] appears to add a new row.



# 3.2.2 Recommendations

**There are some aspects to ConnectMe that deserve more attention before it can be released to the world. The most important of these revolve around the market introduction: how does ConnectMe find a userbase, and how is it being paid for?**

## Market introduction

As noted by several participants, for this kind of concept, word-of-mouth is the most important way to get new users. Maybe some users can be reached by advertising, but it runs into two problems:

1. Getting the point and value of the concept across takes some explaining;
2. ConnectMe only wants to reach a very specific demographic.

Both of these can be solved by using the now very widespread influencer marketing. Ther are, however, some controversies surrounding influencer marketing and mental health, like with the platform BetterHelp, a provider that promises online therapy for a monthly fee, but does not always make good on its promises (Lawblogger, 2021). Influencer marketing should be treaded carefully, perhaps working in such a way that the influencers are given freedom to review, or are unpaid, and are already knowledgable on ADHD or have it themselves (such as the YouTube channel HowToADHD).

The more promising direction for market introduction is starting small, in ADHD-related communities. As there is more and more attention given to studying with disabilities, more support groups and communities are being launched(such as Student Onbeperkt at the TU Delft). I would recommend starting with a few of these groups, in the Netherlands, and slowly expanding to other cities, and later, countries. The communities can introduce new students every year,  spreading word around campus. Eventually, people with ADHD who do not participate in the local community also hear about ConnectMe.

## Monetisation

Since this graduation project has no client or organisation, the end result is very user-centric. However, this platform should at least be able to financially sustain itself. If the userbase remains small, it could be possible that any server upkeep, moderation and complaint handling can be done by, for instance, a group of volunteers with a small budget from their University to keep the servers afloat. But the better scenario is one where a lot of people start using ConnectMe.

Consumers have become very used to cloud platforms for video conferencing being free. Skype has been free for a long time, and Zoom and Microsoft Teams only place a limit on the call length, which many students can avoid by using their university's subscription.

Which parts of the platform can be monetised?

- Advertising on the website goes against the aim of the product, as that introduces unwanted distractions to a group that is more vulnerable to these.
- Having users pay to be connected goes against another aim of the product: to make the barrier to try it out as low as possible. Paying to meet a new person, especially if you need it, feels wrong in a way. This is different than paying for, for instance, tutoring or life coaching, as in this case, you are paying for someone's time and expertise. In ConnectMe, the person that is giving you the social support is not paid by us, leading to a very different situation.

One direction that should be further explored is funding by the institutions that users attend (Universities, colleges, maybe later expanding to high schools as well). If ConnectMe can start in a few communities, starting for instance at the TU Delft with Student Onbeperkt, the model can expand by offering other institutions a license subscription that allows for their students to use it.

In this scenario, a single ConnectMe should remain free for everybody, but making an account is reserved for students at universities that subscribe to the ConnectMe system.

## Expansion to other groups

I expect that people using the platform like using ConnectMe enough to want to use it as their standard online studying app. In that case, it becomes hard to gatekeep the platform for non-ADHD people, as ADHD students will invite non-ADHD friends, who will use the platform only with their friends.

This would warrant opening up a version of ConnectMe to the non-ADHD, non-disability public, as long as the monetisation method allows it. If this is to be the goal, I would recommend researching how to best retain the benefits to ADHD students in a broader version.

This could be done by keeping separate home pages, but giving both groups the choice to be matched to non-ADHD people if they are both okay with that. The benefit to both student groups is that there is a larger body of potential matches available.

A remark several people have made is: why not expand this concept to other groups, like autism or learning disorders? I would recommend researching about the specific needs of these groups, and try to adjust the UX.

## Even further expansion

All this could lead to several versions of ConnectMe that are separate, but touch and intermingle at certain points. You could have a buddy list consisting of both neurotypical, ADHD, and autistic friends from different parts of the world, with all of whom the UX is slightly different based on both your needs. This way, ConnectMe becomes a gateway to gaining understanding in the needs and personal experience of people quite different than you.

Of course, this becomes a bit of a pipe dream, way out of the scope of this project. It would be a very interesting project to figure out how to have these versions of ConnectMe interact, and are separate and similar at once, without confusing the user.

## Expanding to adults

During the project I have chosen to zoom in on students as a subset of adults, but the concept could also be expanded to adults above studying age. I would recommend researching the needs of adults in this, whether they would just like it as a way to have someone to talk to, or if they would also like a working-together option. One student participant already mentioned that they have a friend who works, who would still like to work with others online. I think it could be really useful for students with ADHD to talk to someone 5 or 10 years older, who has progressed a bit from where they are, to see how they cope and get some tips.

## Possibility for more people at once in a session

Because of the complexity of matching people, making agreements about your day, ConnectMe is limited to a one-on-one experience. However, when planning a session with a buddy, it feels restricting to be limited to this. Especially when you have sent out a request to multiple people, and more than one person wants to join you.

I would recommend looking into how to alter the UI to accommodate more than two participants at once.

## Dark mode

Simple idea one of the participants mentioned: include a dark mode that is easier on the eyes at night.

# 3.2.3 Reflection

Graduation can feel like a Sisyphean task. Even though I knew graduation is always a long and laborious process, the project has taken more of my time, energy and mental capacity than I though it would. Now, at the end of a long journey, is a good time to reflect on what went well, and what can go better in the future.

## Goal of the project

Did I reach the goal of the project? I think that can be best answered with a 'yes, but'. The concept ConnectMe is something I am proud of, and it really does help against distractions, procrastination, and is well-designed for students with ADHD. The 'but' is the parts of the goal that I left out in the end. I wanted to take a broader look and include non-student adults as well, and had set my sights on making an (at least partly) physical product. My final concept is not this, but I think it is good that I accepted this fact in the end.

## Personal ambitions

The personal learning goals can be summarised as: (1) generative research, (2) early validation of ideas, and (3) focus on psychology.

The generative research, with sensitizing techniques, was a succes in the regard that it was fun to talk to all these wonderful people who were willing to invest the time to share their experience with me. Setup, execution, interview, those all went very well. I learned a lot. Now, an area where I can still improve is the bringing back the results to a core, something small and workable. I will come back to this in 'commit, commit, commit'.

The early validation of ideas is something I would have liked to play with a bit more, but the storyboard validation/exploration was a good exercise in this. During the ideation phase, it would have been interesting to choose an idea sooner, and so have the option to do small tests earlier on to see how people respond.

As for the psychology aspect, I am happy with how I applied this in the project. The amount of information that comes with the diagnosis ADHD is overwhelming, but it is really refreshing to work with such a specific group of people, who are always enthousiastic to share their experience and help. I had to work hard to empathise with this group because our thinking styles are different, but that is what made this project fun.

## Why did I ideate for so long?

Somewhere after the co-creation session, I noticed things were not going as well as I would have liked. Ideation is always hard for me, and I know this. That is why I had already asked others to think with me in such a session, and kept reminding myself to go on, research more, think of more ideas. But I was satisfied with none. In the end, I chose a concept (TimeToStart) that I did not really believe in.

Because I had been ideating for so long, and felt a little lost, I chose a concept that I felt I could do a lot of designing around still. I was looking forward to the design activities of designing a physical object for your phone, and doing little tests for the interaction of the app with people. But I was not confident in the main working principle behind the app.

Additionally, that Harris profile, while a useful tool, can also be something to hide behind. Especially because my five ideas were all not very worked out, I can imagine for each of the criteria how it both can and cannot tick the box.

So, during ideation, I kept broadening and branching out. That is certainly a theme to this project, and my work in general. This brings me to my next point:

## Commit, commit, commit

The solution is often not to keep your options open, but to make choices. Narrow it down, commit to an idea! See it through to a point where it gets to prove itself. This is something I know, and yet, I always have difficulty with.

During the start of the project, I had decided to keep it as broad as possible, set up an ambitious generative research, and during that, discover some really interesting underlying problem that I could devise a smart solution to. So, this research was also broad. But that meant the results were also very broad, and all of them were interesting, so I did not dare to cut in the insights and narrow the scope. But that kind of behaviour leads to a lot of snap decisions when you suddenly feel you are late at making a choice, and you have to make it now.

And I think my expectations also lead me to ignore or dismiss obvious insights or solutions, such as the social support at the start.

And so, for the lagest part of the project, I had an information overload. This is one of the reasons I dislike such long, individual projects: you have to make so many choices on a lot of levels, and can get stuck in feeling you are not doing well. For someone like me, who prefers sparring with people, working in teams, doing detail work, this was a challenge.

## A marathon, not a sprint

During the first phase of the project, I was putting a lot of effort into staying motivated, accepting bad days, and staying at work. I have been doing far better at that than previous individual projects, at least up to the midpoint of the project.

Because, everything in this project has taken longer than I expected. My solution, nearly every time, was not giving myself more time in the planning, and accepting that the project would take longer, but work harder. Every time I convinced myself: 'but if I just pull through these next few ..., then I will be satisfied'. The result of this is feeling like I cannot permit myself a bad day, and working on weekends. I treated the project too much like a sprint to the end, instead of the marathon that it is.

My attitude to graduation, even since before it has started, is that it is a hurdle I should get past, as if graduation itself is a problem I should solve. That has caused me to look at this project like something I should power through, instead of something that is to be enjoyed as well. That is not to say that I never had fun while working on it! But enjoying it, for me, should be more integral part of the process.

## Advice to my future self

If I were to have such a long, individual undertaking again, this is what kind of advice I would give myself (or anyone who reads this and is ready to graduate):

- If the assignment is broad or unclear from the start, think about what is interesting to you, and try to narrow it down. You can always zoom out again. Limitation breeds creativity.
- Any interview with users: it takes twice as long to process as it did to talk. Decide on the exact method of processing beforehand, so you can see if you can spare the time and effort to do that.
- Make frameworks (based on literature and user research), but also make choices. 'This is the field of things that are important, and this is where I am going to focus on'. Dare to leave out information that is secondary.
- Mental health almost always deserves attention, even if it feels like tasks should be done now, now now. Find acceptance that not everything will be as you like it, and take time off if you have been sprinting for too long.
- Talk to the coaches about shared expectations, but also your worries. You can start to imagine all kinds of expectations, opinions and have-to's that only exist in your own head.
- Enjoy it! You are here for half a year, try to make the best of it.

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