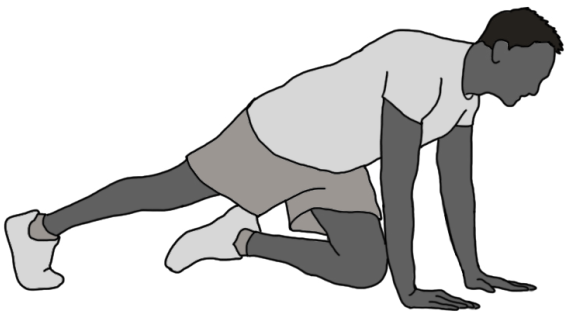
# Movement of the Body



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# Abstract

Movement of the body has many direct and indirect positive impacts on a person’s health. Accordingly, it is important to be aware of the pitfalls of being physically inactive and to make small changes to one’s daily routine, to adopt a lifestyle which is less sedentary. To tackle this issue, this project explores different possibilities of encouraging regular movement and therefore nudging people to take the necessary steps to help themselves by leading a healthier lifestyle.

# Acknowledgements

I would like to start with huge thank you to my mentors Dr. Joëlle Bitton and Verena Ziegler, for their support, feedback, inspiration, time and encouragement.
I am also very thankful for the questions, responses and inspiration received from Mona Neubauer, Prof. Jürgen Späth, Dr. Roman Kirschner, Luke Franzke after my presentations, which helped inspire me to see different perspectives on my work and new potential solutions, as well as bringing different issues to light, which still needed addressing.
A special thanks goes out to Mary Delany for taking the time to act in my video, as well as to Nicole Foelsterl and Matthias Kappeler for input on my storyline.
Furthermore, I would like to thank my fellow students for any advice or input they gave me and especially David Wollschlegel for bringing the project of the Bioscleave House to my attention, as it had a big impact on my project, inspiring me greatly and I probably wouldn't have stumbled upon it by myself. Another student that I would like to thank is Nemo Brigatti for some last-minute feedback on a question regarding my cards, which lead to me make a few small alterations. I am also very appreciative of Marcial Koch, who helped organize the exhibition.
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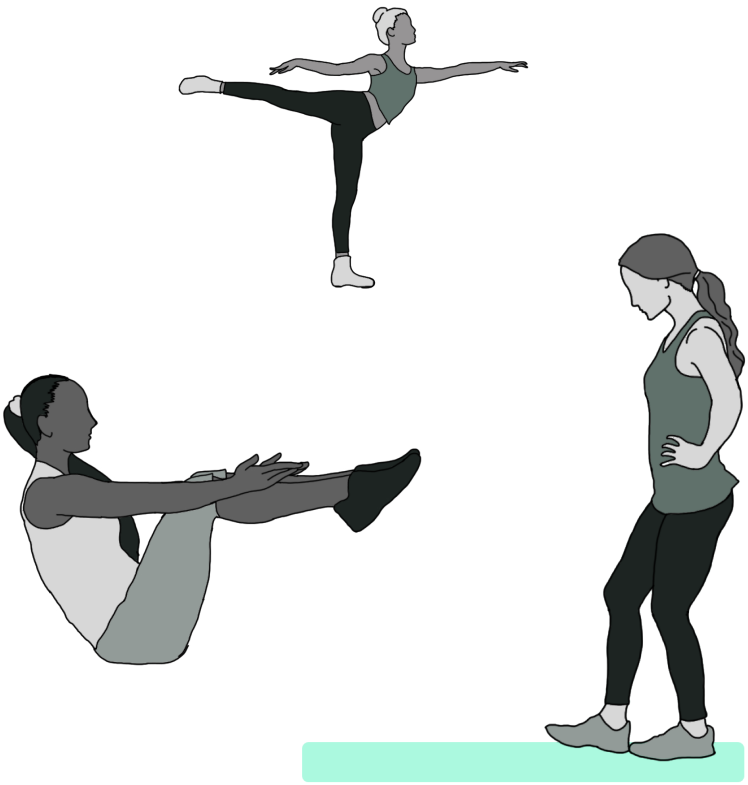
# Table of contents

# 1. Introduction

My thesis deals with the topic «movement of the body». This choice was originally inspired by the wish to find ways to combat the negative effects of a sedentary lifestyle.
Accordingly, during my research field, I dive into how the digitalization brought upon the negative side effect of an increase in sedentary lifestyles, which harmful effects result from this massive habitual shift, and I examine what the general benefits of exercising are, to highlight why people should be more encouraged to do so. This general background provides context and leads into my research questions.
As the sedentary lifestyle is a reasonably well-known issue, with many products and services trying to address it, some of which I will present during the related work section of my thesis, yet many people do not do anything about it despite being aware of its negative effects, the core focus of my research questions deals with motivation and hidden problems.
Additionally, during this chapter, I delve into my motivation for choosing this topic and how this connects to my intended contribution. Lastly, I share which methodologies I have selected to investigate this field with and how I hope that they will provide aid in finding valuable insights.



# 2. Research

# 2.1 Background and Context

## 2.1.1 The digitalisation and an increase in sedentary lifestyles

Thanks to the digitalisation life many aspects of life have become a lot easier. We can easily access countless information, learn many new things and converse with people all over the world. Maintaining contact from afar has never been easier. From shopping, to making appointments, to keeping an eye on work and finances, everything seems to be just a few clicks away. An abundance of games and entertainment keep our minds busy on countless devices. Technology has become a big part of everyday life during this day and age, with the pandemic accelerating this shift and accordingly, we also spend a lot of time using it. The average daily screen time in Switzerland is 5.45 hours, yet Switzerland falls on the lower end of the spectrum, with the average person worldwide spending 6 hours and 57 minutes looking at a screen. The highest averages are over 10 hours with people in Brazil typically spending 10.19 hours in front of a screen, inhabitants of the Philippines' screentime being 10.27 hours and 10.46 hours in South Africa.
It is safe to assume, that most people are not spending this amount of time being physically active, while they are in front of a computer, console, or their phone and this is where a problem starts to show.
From an evolutionary perspective, humans are not supposed to be inactive for prolonged periods of time. A study published by PNAS, a peer reviewed journal of the National Academy of Sciences, in which the Hadza of Tanzania, a modern hunter-gatherer population, were observed, found that even though the amount of resting time was similar to that of people living in industrialized societies, there are differences.
Even when inactive, they are still taking on postures such as squatting, which require higher levels of muscle activity compared to people in industrialized societies sitting in chairs, resulting is much lower muscle activity and energy cost.
This difference highlights that even though mastering physical challenges is no longer essential to our survival as a species, such as it was to our ancestors, the prolonged sitting and lack of energy burning is not how we evolved to operate. Not only the time we spend in front of screens has risen, but work involving manual labor has drastically decreased and many manual tasks

in the home have also been made less physically demanding. There is less movement incorporated into our daily lives than there used to be. The issue with this, is that being physically inactive negates several potential health benefits, you get from being physically active, which I will dive into during the next section.

## 2.1.2 Importance of exercise and movement

Why is exercising so important?
There are tremendous health benefits to exercising, which are often overlooked. Staying physically active plays a strong role in keeping people's organs functioning, preventing illness and slowing the effects of the biological aging process.

#### *2.1.2.1 Slowing effects of aging*

During our life, cells constantly die and replicate. Chromosomes, which contain our DNA play a pivotal role in this process of cell division. These chromosomes have caps at each end, called telomeres, which protect the chromosome's internal regions. Because these telomeres can't be fully replicated, with each round of DNA replication they gradually get worn down. This has the effect that the cell division process gets less efficient as we age and our body struggles more with healing wounds.
However, a study conducted by Larry Tucker PhD, from the Brigham Young University shown that there was a link between those who exercised more having telomeres which are less worn down, compared to those who exercised less. This indicates that people who exercise more are more likely to have slower cellular aging.
This is also shown in a study conducted by Mark Tarnopolsky PhD and a team, in which 2 groups of mice with a genetic disease, which causes them to age prematurely, were observed for 5 months. The first group was sedentary during this time and aged drastically due to their disease. The second group, which suffered from the exact same disease, were lured to run on a miniature treadmill 3 times a week. Surprisingly after the 5 months had passed, these mice were almost in an identical condition as the mice without the genetic disease.

#### *2.1.2.2 Brain*

Another area, which is positively affected by exercise, is the brain. An improved blood flow meaning more oxygen to the brain and the growth of new blood vessels contribute to this. The other

core reason is that exercise leads to an increase of BDNF. Briefly summarized, BDNF (brain-derived neurotrophic factor) is a protein, which aids in neurogenesis, which is the growth of neurons (the most common brain cells), and it promotes the survival of existing neurons. Neurons are important because they allow us to perceive information so that we can think, understand, feel, and move. We receive information through our senses and in turn our body can respond to the information which we receive. This means that lower levels of neurons can have many negative consequences, such as a decrease in the ability to learn and an increased struggle with memorization.
Higher levels of BDNF can positively help with maintaining brain function and with preventing Alzheimer's and dementia. Lower levels of BDNF also correlate with anxiety, depression and binge drinking, so an increase of BDNF may improve these conditions.
Another positive effect which exercising can have on depression is an increased production of endorphins, which decrease the ability to perceive pain, and an increased sensitivity to two feel-good-hormones, serotonin and norepinephrine.

#### *2.1.2.3 Organs/body/weight*

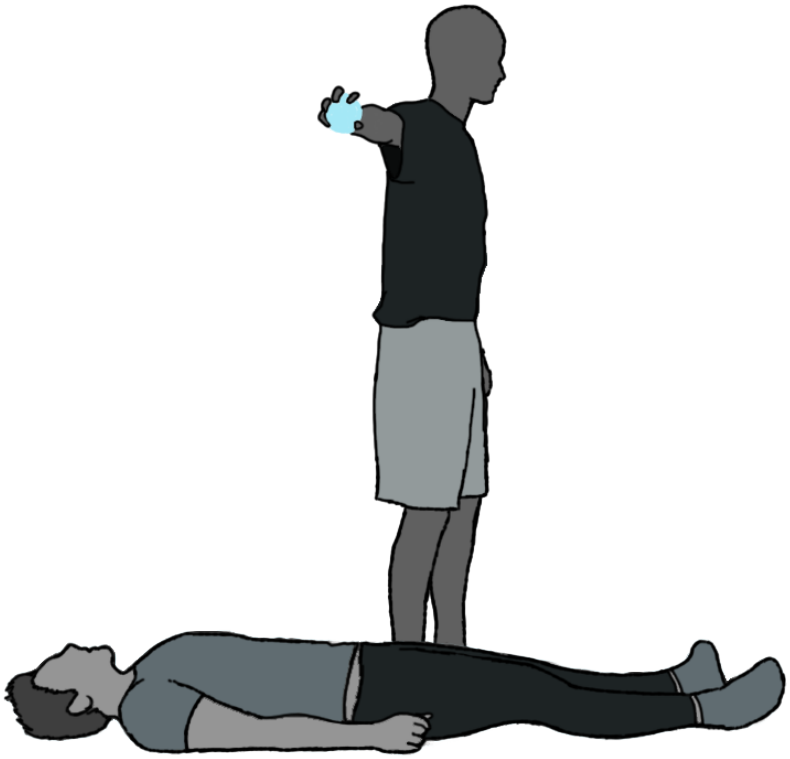
Alongside the growth of muscle mass, there is also an expansion of capillary blood vessels to supply them with blood. In turn, it is easier to supply the body parts with the oxygen that they need.
Exercise also helps to lower blood pressure and boost HDL, the good cholesterol, and minimizes LDL the bad cholesterol the major constituent of plaque and a narrowing of arteries thus lowers the risk of stroke and heart attack.
Another way exercise lowers the risk of high blood pressure and heart disease, is by combatting visceral fat. Not all fat is created the same, while subcutaneous fat has mainly visual effects on the body's appearance and may lead to body image insecurities, visceral fat is much more dangerous. It has been linked to type 2 diabetes, high blood pressure, heart disease, breathing problems and a higher production of chemicals and hormones which can be toxic to the body and cause inflammation. By exercising it is easier to maintain or achieve a healthy amount of fat, because of the burning of calories and an increase in metabolism, which also leads to burning more calories.
There is also a decreased likelihood of developing type 2 diabetes, due to a decreased insulin resistance. When the body doesn't respond well to insulin, a hormone which is meant to control the amount of glucose in the blood, then the body is not able to use the glucose in the blood for energy. This leads to an increased level of blood sugar.
Exercise helps to reduce inflammation, which is an underlying

cause of many diseases and problems, such as diabetes and cancer. It also reduces the risk of many types of cancers in general, such as breast-, bowel-, uterine-, colorectal-, colon-, endometrial-, lung-, gallbladder-, kidney-, liver-, prostate-, thyroid-, ovarian-, pancreatic-, esophageal-, and gastric cancer.
Especially in older people, another positive effect of exercise is that it keeps tendons, joints and ligaments flexible. This means that it is easier to move around safely in your body and there is less of a likelihood of falling, which means a lower likelihood of a hip fracture. Certain exercises also reduce pain in people with osteoarthritis, which is a condition where joint cartilage gets worn down. Because exercising helps with slowing the loss of bone density, it decreases the likelihood of osteoporosis, which is when bones become weak and brittle. Due to this and because exercising helps to maintain muscle mass and function, it drastically decreases the risk of injury.
Another strong benefit of exercising is that it helps with both energy and endurance. This is due to an improved quality of sleep and because exercise trains your lungs and less energy is required to perform the same activities. It also trains the cardiovascular system and this results in a more efficient delivery of oxygen to your muscles. People's daily tasks will seem a lot easier.

#### *2.1.2.4 Balance, posture and flexibility*

Another important aspect of movement and health which is often taken for granted is balance. Just like training muscles, balance can also be trained and be improved, regardless of age. Good balance is important for preventing falls and in the case of a fall, falling in a way that results in significantly less damage. This is especially important for reducing risk of injury in older individuals. However, anyone, even those who are very active, can easily sprain or strain parts of their body when moving, if they don't have a very good proprioception, which is the sense of self-movement and body position.
Other positive impacts of good balance are having heightened control and awareness, combatting joint pain, weakness, or dizziness, overcoming feelings of stiffness or unsteadiness, and improving personal performance in various types of sports. Lastly, when you balance, your whole body acts as one unit and muscle groups which may not usually get a good workout are strengthened. This may result in an improvement of posture, which is also advantageous because posture is the next important aspect which I would like to address. Bad posture has been shown to be connected to musculoskeletal pain, particularly to back and neck pain. Having better posture can help maintain correct form while exercising and decrease the risk of arthritis. Posture and balance

are connected and so is the final point which I would like to address, flexibility. It is important to stretch to increase blood flow in the muscles to prevent them from shortening over time. By maintaining and improving flexibility your range of motion increases and performing certain exercises becomes easier. It combats feelings of stiffness and stops restriction of activities in your daily life, by lowering the risk of developing functional limitation. So, whether it be exercising at a high intensity, training endurance, practicing good posture, flexibility or balance, movement of the body is very important for good health and performing at your best.



## 2.2 Research Questions

These insights have led me to my research questions, as I began to ask myself why things are not improving even though the negative effects of a sedentary lifestyle are very clear. Kids are taught about the importance of exercise in school and there are countless projects, services, and sources of information available, yet this problem persists in a large chunk of the population.

“How might we motivate people to live a healthier lifestyle by making exercise a more enjoyable experience?” This is the how-might-we question that I started off with. However, after my learnings, this question, which I address during my design process, became “How would it make most sense to build movement into people’s daily lives?”

## 2.3 Motivation

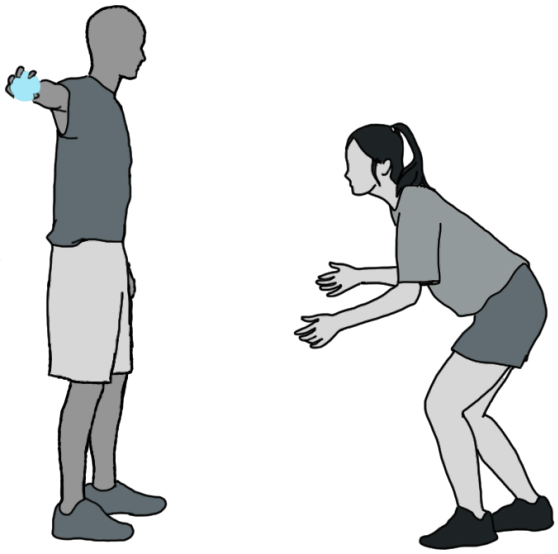
My motivation for covering the topic of movement in my bachelor thesis, is the wish to encourage people to help themselves by making positive changes that impact their own life through getting healthier. I think this topic is very interesting because it plays such an important role in our daily lives and routines. Making even just small changes to try to improve our health can have many knock-on effects and change our mood, quality of life and performance. Another reason that I like this topic, is that it is something that applies to the majority, if not all of the population, so no matter who you are, living a healthy life should help you. In my opinion this is also a very relevant topic in this day and age, as health affects all aspects of life such as mortality during the pandemic.

## 2.4 Intended contribution

With my bachelor thesis I intended on contributing to the awareness and progress of combatting a sedentary lifestyle, through the lens of a design perspective. My goal is that my thesis metaphorically helps collect stones, to pave a path towards progress, no matter whether the progress be a result of my bachelor project or whether it sparks an idea in someone else, which leads to improved health in society. Ideally, I would like my research to help me end up with an artifact, which encourages people to move more and to be aware of their position and body more during their daily life. The goal is for the artifact to serve as a constant reminder to people for them not neglect their health and to practice both balance of the body and balance in all areas of life. Helping people take steps lead a healthier lifestyle is the contribution I aim to make, so that people can be their happiest and live to the fullest, by preventing injuries, illnesses, keeping the mind functioning with better sleep, memory and coordination and slowing the aging process as well as extending life span. Also on a societal level, if the general population is healthier, and less prone to suffering from cardiovascular diseases, diabetes, and obesity, then there will be less resources for the healthcare system spent on these issues, which may have been avoidable. This means other patients who are less fortunate and may have unavoidable health problems, could have more care allocated to them. As well as this the lower levels of tension and stress should lead to lower levels of aggression in society. There is an enormous value to health, and it should be taken care of accordingly, so I hope that my thesis drives the discussion of this topic, so that the future of many people can be positively impacted.

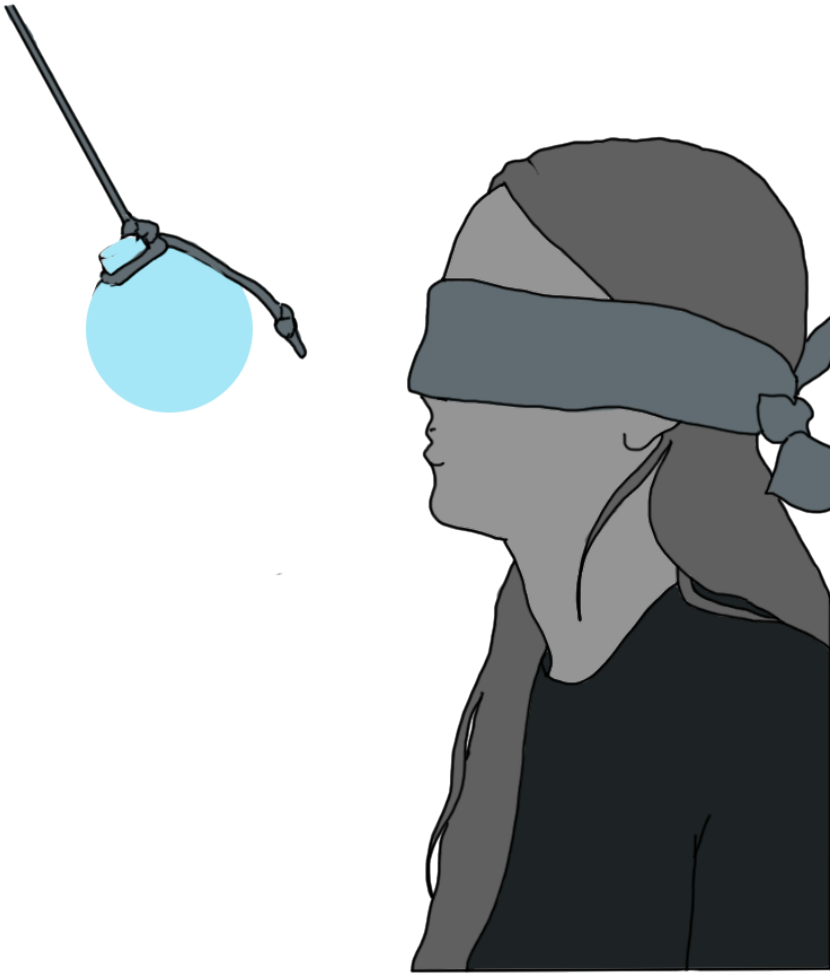
## 2.5 Methodology chosen

After my extensive desk-research to understand the scope of the field, I chose to both make observations and experiments in a playful and experimental way in order gain valuable insights. To me a mixture of observing people I know, observing strangers and observing myself so that I could reflect on my thoughts during the process seemed to be an effective way forward, as I could compare results and better understand and empathize with what potential thought processes could have led to the insights. The observations of my field research take the form of interviews, surveys, a brief journal, and regular relaxed conversations and discussions. Another way in which I was on the lookout for knowledge, was by watching videos and looking at posts, which addressed this topic and people which struggled with exercising and eating healthily, as often those two problems went hand in hand. I thought it would work well to shadow someone who is currently trying to improve their health, in my case this ended up taking the form of watching a vlogger post updates regarding their health journey. Additionally, inspired by the wish to incorporate a cultural probe, I also asked participants of my research to send me pictures which they associate positively and negatively with exercise and movement and to comment on why they feel that way.



## 2.6 Thesis overview

I approached my BA project in a playful and experimental manner and my design process reflects that accordingly. Now I have shared my reasons for tackling this topic in this chapter, during the next chapter I will go over related work to share an overview of what is currently available to address this issue. After the section on related work, the following section will cover my field research, where I go through the various observations and experiments which I conducted and share the findings which emerged from them. In my project development chapter, I go into depth on how the artifact I had in mind changed, after following the double diamond approach and after prototyping and iterating. To finish off, I conclude my learnings and what artifact my process has led me towards.



# 3. Concept

# 3.1 Related work

## 3.1.1 Games

There are many games which relate to my topic. The first example being the various Wii-sports games. In these games, the player can participate in various types of sports and depending on the sports, they need to do different movements with their controller. During bowling for example, the player makes a kind of movement swinging their arm, resembling the movement they would make during a real-life bowling game, only that they let go of a button instead of letting go of a bowling ball. This combines the versatility and convenience of the game and works against the usually sedentary sitting or lying habits one would have while gaming.
Another game that is like Wii-sports, is the game “Just dance”, where the player sees a silhouette performing various dance moves and tries to imitate them. The better the player dances, the better their score is. This game also keeps the players active and on their feet.
As a non-virtual example, there are many variations to the game “fitness dice”, these types of games offer exercise routines picked by the randomness of the dice, one die represents the amount reps or the period of time for which the exercise is supposed to last for and the other die represents the type of movement, many of these games have multiple dice with different exercise exercises on them, to allow for as much variation as possible.

Another game encouraging exercising is Zombies, run, an immersive game and run-tracking app, that lets players listen to a series of audio narrations of over 200 missions. The player automatically collects supplies for building up their base and needs to speed up if they are being chased by Zombies. The player can also set a real-world location to run, and the app will create a mission, which will cover distance needed.
The next product is Capti, an immersive and versatile smart bike, with a built-in screen that allows the cyclist to use the Epic Games Unreal engine to play games or take virtual cycling courses while exercising.
Another example of a game, which encourages movement is the app “Pokémon Go” an augmented reality mobile game. The app works by using the GPS location, to track the movement of the player. Different Pokémon are situated in different areas of the country. To catch Pokémon, the player needs to move around in real life to find some. Because catching Pokémon is the goal of the game, this entices the player to move around in real life. The app also checks the speed in which the player is moving and prevents them from catching Pokémon while driving.


Worth mentioning is that the company Niantic, the creator of Pokémon Go, also have more games dealing with encouraging people to walk. Pikmin Bloom rewards people for spending time outside, you have the option to plant seedlings, and you can get these seedlings to grow by walking around. When they have grown enough, you can pluck a Pikmin out and it will follow you around. Niantic also created Ingress, another app, which uses GPS location to check the player’s real-world location. There are

portals, located at real life points of interest such as statues or historical monuments and the player can interact with these portals and provides a narrative for them. In the game, Exotic Matter (XM) has been discovered and there are 2 opposing teams, with different views on it. The first being the Enlightened who want to harness this energy, the second being the Resistance who see it as a potential threat to humanity.
These games by Niantic all fit into and lead me into my next category of related work, activities which encourage movement by exploration of the real world.

### 3.1.2 Location based activities

One activity which is also location based and is related to my topic is geocaching. This is an activity where users use GPS to hide and to find containers called caches. These are usually waterproof containers that can be filled with various small items. This activity is like a global treasure hunt. There are also many other treasure hunt projects, such as Actionbound, which is an app that works as a digitally interactive scavenger hunt, which also uses GPS.

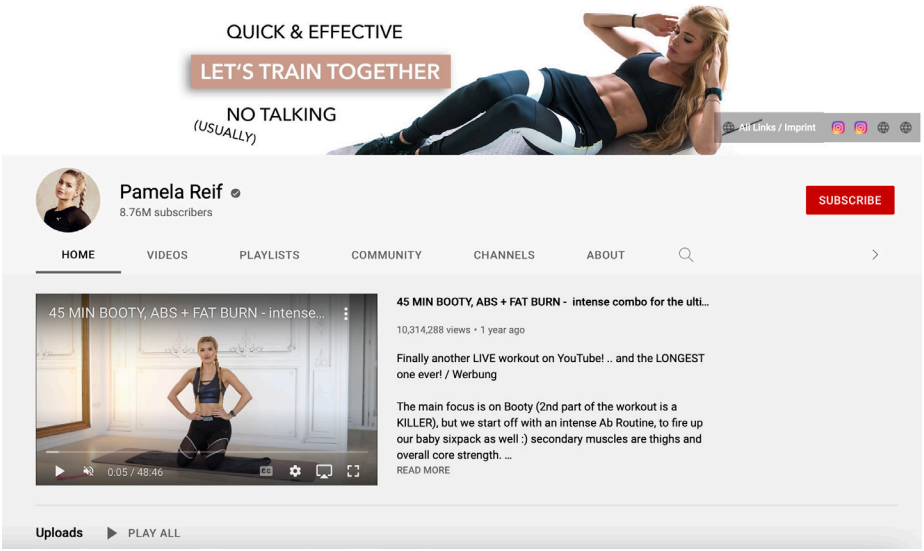

Although more an awful lot more dangerous than geocaching, with a high possibility for negative outcomes due to viruses and malware and a wide range of partakers from trolls to innocent curious people to scammers, the next activity also encourages traveling around to find objects and information. This location exploring based activity, which inspires movement and works against sedentarism, is known as “UBS dead drops”. It was originally a method of espionage tradecraft to pass information to

one another, by hiding items in a secret location to avoid the need for direct meetings. Even though it is ill advised to plug a random UBS stick into your computer, there are many Redit pages filled with users talking and asking about where to find some.

### 3.1.3 Videos

Another project relating to my topic is “the ministry of silly walks” this is a sketch by Monty Python, in which he walks around in a rather strange way. As time goes by you can see other people walking, or almost dancing in very creative unusual ways. He has a discussion with someone who wants to develop a silly walk and who demonstrates it, but the walk is not silly enough in Monty’s eyes. What I think is interesting about this sketch is that when watching it you want to see if you can come up with a new walk or see how difficult it is to walk like that.
2 similar Gameshows, which both play with making their contestants exercise by introducing many interesting obstacles and physical challenges are the series Takeshi’s Castle and Total Wipeout.
In Takeshi’s castle, Takeshi Kitano, a Japanese comedian, sets up nearly impossible challenges for contestants to get to him. In case of a successful attempt to storm his castle, the winner gets a cash prize. In total wipeout, the contestants are timed and individually try to complete an obstacle course, in as little time as possible to outperform their competitors. Many obstacles and challenges are based in pools of water or mud, like in Takeshi’s castle. The contestants are gradually eliminated, and the final contestant wins the game and receives a cash prize.

In addition to series and skits, in general there are countless YouTube home workout channels, which make their mission to educate and help the viewers feel inspired to work out and be more physically active.

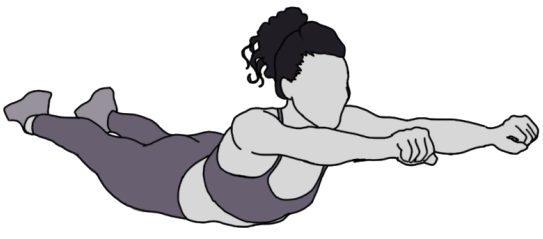



## 3.1.4 Places

The Bioscleave house is known as a lifespan extending villa and can be found in East Hampton, New York. This project by Madeline Gins and Shūsaku Arakawa, works towards training and testing coordination skills and keeping a heightened body awareness by turning simple tasks into a more complex training and challenging the senses. The house has steep, uneven, sloping floors with poles to assist people in maneuvering in such a terrain. Many of the interior and exterior walls are painted in bright and vibrant colors. The windows are at odd heights and the rooms also require effort to get to.

# 3.2 Concept and angle

Reading about the Bioscleave house also heavily influenced my process. This aspect of creating an environment which subconsciously encourages movement by altering one's surroundings, lead me to explore the idea of working with people's surroundings. The goal of creating new habits and encouraging people to overcome the hurdle of starting a healthier way of living, could be accomplished by them looking at their surroundings in a new light and engaging with their environment in a different way.
My topic has also shifted away from encouraging people to exercise in a workout-manner and gravitated more towards rediscovering movement during the age of digitalization.
However, the focus still remains on tackling the sedentary lifestyle shift which has occurred in the recent years and addressing the hurdle people face, when they want to make the shift to a healthier life. After the desk-research and the learnings from my field research it has also become clear to me that for my concept, that I need to move away from the how might we question of "How to make physical activity a more fun experience" and approach the question of "What experience could movement be built into?"
My concept should have the focus of being encouraging, practical and have a focus on movement and being in touch with your body rather than a forced workout routine.
Due to the abundance of exercise apps, which already exist, the angle which I would like to take is a more playful, experimental, and speculative angle. A focus point of my concept remains the daily lives of people and ways in which movement can be integrated and take on a bigger role.



# 3.3 Field research

## 3.3.1 Interviews

I have conducted 5 anonymous interviews. The participants were 80% (4) female and 20% (1) male. 2 of the Interviewees were between the ages of 18-25, 2 between the ages of 51-60 and 1 being over 60. Their occupations were 40% learners, (1 participant being a full-time student and 1 participant currently doing an apprenticeship), 20% working full time, and 40% being on a flexible schedule (1 participant being retired and 1 participant being a stay-at-home-mom, whose child has grown up.) From the interviews I have gathered various insights, which I later compared to what people said in casual conversations which I had about the topic of by thesis. What stuck out to me was when asked what the reason is why they don't do more exercise than they currently do, the most common excuse of the participants that was named, was a lack of time. This translated into, with the limited time that they had, they would rather be doing other things and don't enjoy exercising enough to make time for it when they didn't have much to begin with. Other factors which were talked about were huge perceived efforts, which built barrier to entry and made 3 of the 5 participants reluctant to start exercising more. A lot of time goes by before they see results and 1 participant mentioned that the positives were not enough to make them want to begin. Not only that but the negative consequences also didn't really do much in persuading the participant from starting on their exercise journey. Another discussed topic was what their view on the settings of the exercise was. These questions included where and when they liked to exercise and if they preferred to exercise alone or with other people.
The less the participants claimed that they enjoy sports, the more they rely on encouragement, whether this be through a social aspect for example having an exercise group or friends reminding them to join the workout, or whether it be instant gratification through a reward or through some tasty food when they successfully completed their goal. What one participant mentioned was that it was particularly hard to learn where to start, in regard to eating healthily and doing enough physical activity. This was due to the way they were raised, growing up unhealthily and their family also lacking a healthy lifestyle or wanting to change. They mentioned that they were only taught the very basics in school, such as the food pyramid and due to an

abundance of misinformation, contradictory diets, and different advice it was a hard learning curve. However, eventually it did become easier after they learned what worked for them and adjusted accordingly. Another learning point which was frequently mentioned was that exercising was great for concentration, creativity, clearing the participants' heads and letting off steam. Additionally, the wish to change is important, as it shouldn't be imposed onto someone, it must come from within, this aspect is also important when it comes to maintaining the new healthy lifestyle. A big problem is losing focus and needing to get back into the rhythm and almost start all over again.

### 3.3.2 Self-observation

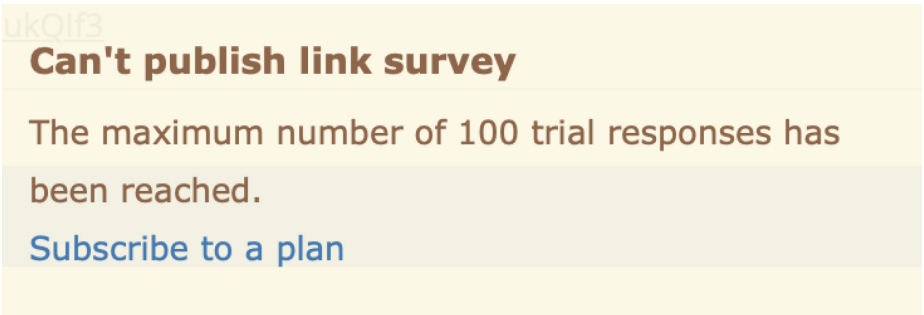
For a week I loosely tracked my exercise habits and eating habits, without trying to increase how healthy I was being and without setting any goals, I simply wrote down whether I naturally exercised (not counting walks or commute) and weather I ate healthy or not. Then I also wrote down why not if I did not behave in a healthy manner that day. What I noticed, after reading my 1-week diary, was that I was much more inclined to maintain a healthy diet than I was to maintain an exercise routine. In my opinion from what I observed and thought about, this is because eating healthily requires restraint from bad habits and is focused on "saying no". No, I will not have a bowl of ice-cream, no I will not have a burger or a donut. I will get my nutrients and eat a balanced diet without binging or overindulging. Exercise, however, requires actively forcing yourself to partake in good habits. You need to make time for it and not only say no to the other activity you'd rather be doing, but also make yourself physically tired and push through. It is much easier to procrastinate exercise and to avoid it.
I also noticed that due to being a night owl and feeling tired after exercising, I had a huge preference for exercising in the evening, while I am still energized to help unwind and tire me out. This turned out to be counterproductive, as when plans for the afternoon or the evening arose, I was far more likely to put off exercising until the next day or ignore it completely. Doing it in the morning and getting it out of the way would be most helpful, however it depends on the circumstances, if I am already getting up very early, I would be unlikely to add even more earliness to that. As a general trend in myself, it would help to make it part of a routine and the more I would "need to make time for it" the less likely I would be to do it.

### 3.3.3 Observing strangers online

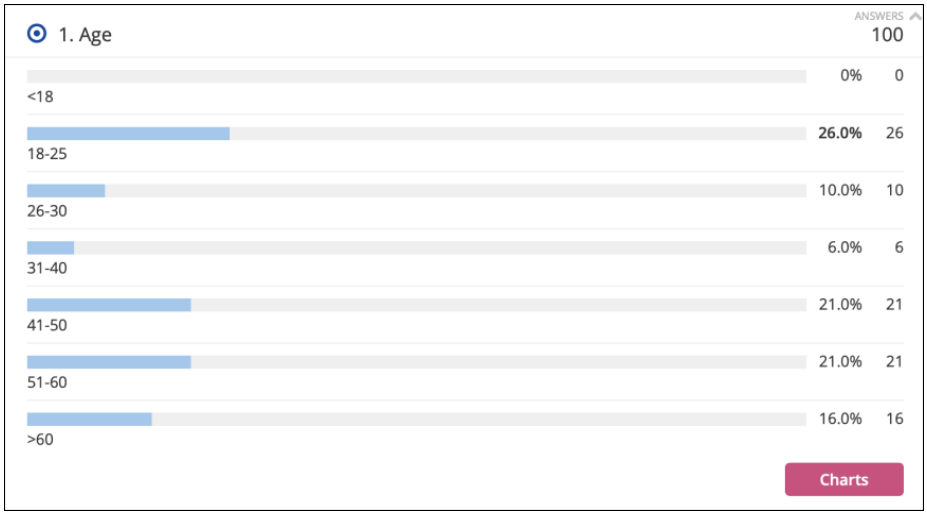
Next, I searched for other people to observe and found that on YouTube, there were a few Youtubers that tried to share their weight loss-journey. To me it was important to look at examples to avoid fitness-gurus and instead to observe people who had not yet succeeded and try to analyze what they are struggling with and why this might be. 2 Youtubers which I fixated in were “Amberlynn Reid” and “Zachary Michael”. Amberlyn Reid is a girl who has been wanting to lose weight, for a few years, however loves food and doesn’t truly enjoy exercising. A pattern which she follows is to try out unsustainable fad-diets, struggle to stick to them and cave, resulting her to start again with a different one. Relapsing into this vicious cycle is one of the things that Zachary Michael comments on. I think it’s also important to listen to what other commentors observe as to gain a bigger perspective. One of the reasons that I think his input is particularly interesting is not only the long amount of time that he has been dealing with Amberlyn but also because he himself has gone on a weight-loss journey in the past and succeeded. The focus of my thesis is exercise and movement itself and not weight loss, however I think it is still an important point to think about and that it can also bring to light what some people also struggle with and how they perform, especially since it is easier to measure weight-loss to the naked eye than health, unless you are a healthcare professional or a specialist.

### 3.3.4 Survey

I have also created a survey consisting of 12 questions, in which 100 people have participated. The first 2 questions regarding age and gender are obligatory, however the rest of the questions are skippable. Due to this not all questions have the full scope of answers and because most questions were asked giving the participant a comment box to answer, many questions also have multiple insights per person.

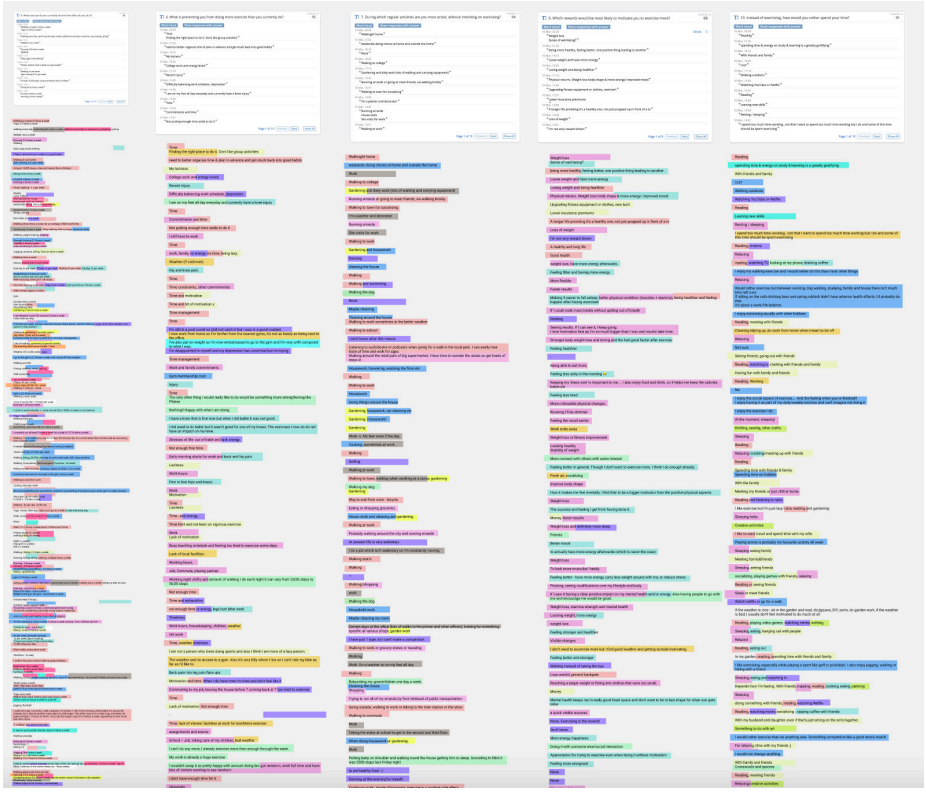


The survey questions were posed in English and the participants of my survey were 77% female, 21% male and 2% non-binary. There were no participants under the age of 18, however the rest of the age groups were fairly evenly spread out and composed by 26% of 18-25 year-olds, 10 % of 26-30, 6% of 31-40 year-olds, 21% of 41-50 year-olds, 21% of 51-60 year-olds and 16% were over the age of 60.




As for some general information about the participants, when the participants were asked if they would like to do more exercise than they currently do, 96 people shared their current view. 20.8% (20) Replied that they would like to do a lot more. 32.3% (31) answered they would like to do some more and 35.4% (34) replied saying they are quite happy, but they could improve a little. Only 11.5% (11) said that they were completely satisfied with the amount that they currently do.
This means that 88.5% of the participants would benefit from a concept, which improved their likelihood of exercising.
There was also still some room for spreading awareness in regards to the benefits of exercising, as out of the 94 participants who answered the question which of the following health benefits they are currently aware of, the highest known benefit was “weight management and prevention of diabetes and heart conditions”, which had an awareness rate of 88.3% (83 participants). Also well-known were “better sleep” 81.9% (77) and “stronger bones and muscles” 77.7% (73). A medium amount of people were aware of “the production of serotonin and norepinephrine which helps with depression and anxiety” 69.1% (65), “prevention of many types of cancer and other diseases“ 55.3% (52) and the “anti-aging effects on the brain, prevention and slowing of dementia” 51.1% (48). Much less known were the “anti-aging effects on the skin” 29.8% (28) and “additional benefits” which 6

people commented on, 4 out of which listed additional benefits, such as improving VO2 max and competitive skills and resilience.
To get an idea of what type of sports is most common in my group of participants, I asked the participants what kind of exercise they currently do. There was no restriction on answers per person, so many named more than 1 reason. Out of the 96 participants which replied to this question, there were 55 mentions of walking, 35 mentions of the gym/weights/HIIT/or various workout classes, 23 mentioned jogging or forms of running, 23 mentioned bike riding, 15 mentioned Pilates or yoga, 11 hiking, 9 swimming, 7 skiing, 6 various forms of dancing, 5 tennis, 5 gardening, 3 squash, 2 none, 2 golf, 2 football and other mentions included softball, bouldering, climbing, floorball, badminton, “infrared heat therapy”, tai chi, archery, hockey, material arts, “housework”, “no specific type”, netball and boating.



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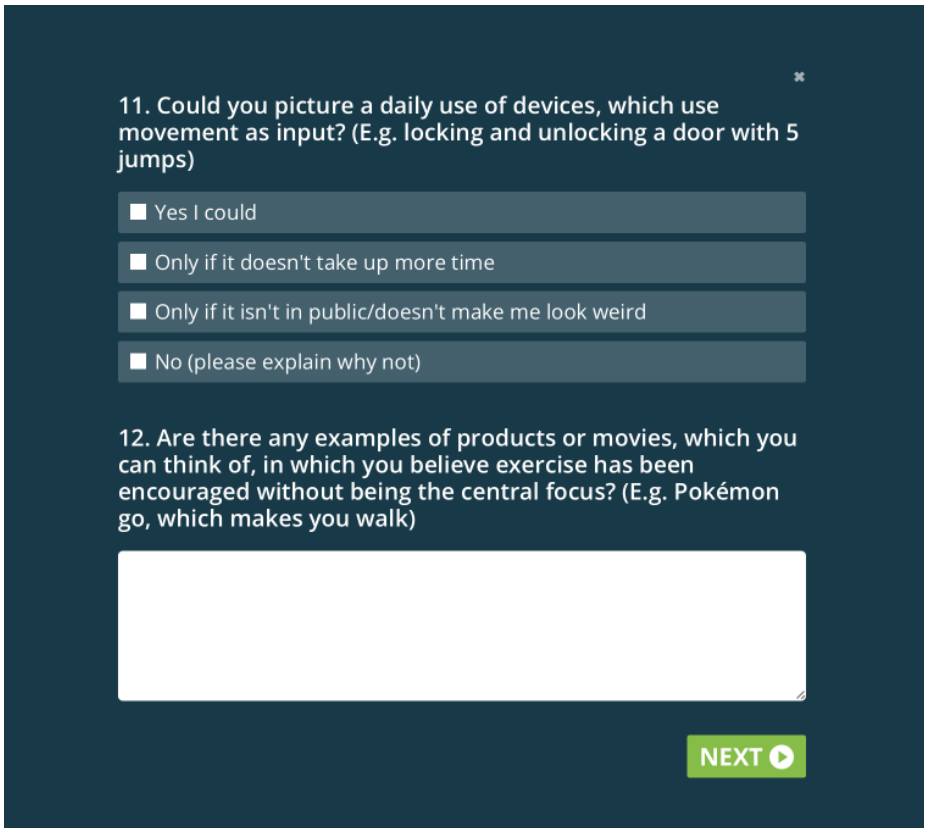
Following this question I asked, during which other activities they are most active without intending on exercising, this was to get an overview of their general level of sedentary activity and where in their routine this is disrupted. The majority of the 94 participants named exercise that they did when commuting or moving around, 33 named walking or another form of commute, 22 answered that their work keeps them active, 20 felt like their housework was keeping them up and active, 14 said they are very active when they are shopping, 12 gardening, 7 taking care of someone else, such as babysitting or walking their pets and 14 participants either said the question was not applicable or named an exercise.
In order to get a better idea of where they see issues, I asked about what is preventing the participants from doing more exercise than they currently do. Just like the feedback I received from my interviews unsurprisingly the most common answer of the 95 participants was a lack of time. 37 participants answered time, with no additional context and 31 answered time while naming excuse or another task which they had to do. 23 said that they either were not motivated, didn’t enjoy it or were overwhelmed by laziness. 20 didn’t feel like it due to tiredness, exhaustion, a general lack of energy or depression, 14 participants felt like the location had a deciding impact on them and were turned off by bad weather, a difficult location or a lack of a course or facilities. 11 were not able to exercise due to health conditions or temporary pain, 7 were completely happy with the amount they do and thus did not want to do more, 3 were put off by the cost and 2 felt embarrassed when exercising.
As time was yet again the top obstacle named and everyone has the same 24h hours a day, the lack of willingness to make it a priority, made me include the question how they would rather spend their time, instead of exercising. 32 of the 91 participants answered socializing or spending time with friends and family, 28 sleeping or relaxing, 27 reading, 20 said there is nothing they would rather do than their favorite physical activity or gave no clear answer, 15 would rather be watching movies, series or going to the cinema, 11 would prefer eating or drinking, at a restaurant or cooking at home, 8 answered social media or games, 6 would rather do something creative, 5 work, 3 spend their time on personal development through education or by learning new skills and things. 3 participants would rather spend time in the

garden, 1 sexual activity and 1 sewing. Connecting to this, I asked which rewards would be most likely to motivate them to exercise more. Out of 88 participants 42 said they would be most encouraged if they saw results, either in appearance such as weight loss or looking more toned, or in capabilities such as feeling less likely to run out of breath or being more flexible with more stamina. 31 answered getting a positive feeling, such as feeling happy, proud, accomplished, or energized. 11 answered money, discounts, or small gifts as rewards, 10 health, 9 nothing, 5 social interaction and 3 going outside or good weather. I asked where it would be easiest to integrate exercise into their daily routine and for this question the 93 responses were so different timewise and task wise, as everyone has a different routine, there is no clear trend which emerged from this question. Additionally, I asked if they could picture using movement as input for daily devices and gave the example of unlocking a door with 5 jumps. 91 answered and they were allowed to select multiple answers, 34.1% of them could, 20.9% could but only if it doesn't take up more time, 36.3% only if it didn't make them look weird, 25.3% didn't and gave insights to why not.
The last question was if they can think of any products or movies, which encourage exercise, without that being the central focus and even though I already knew the majority, this still served as inspiration for my research of related projects and work.



### 3.3.5 Asking about associations

I also asked 8 people to send me images which represented which positive and which negative associations that they have with exercising, and many described how the picture represented their view. The pictures which I was sent regarding positive associations were people on a beach running or jogging. Various athletes, playing sports and holding a trophy. A t-shirt saying “I work out to eat second breakfast”, a smoothie bowl, an icy glass of water, an empty gym, a picture of nature that is in a sunny environment with very green grass, 2 elderly ladies walking and smiling, a picture of a dancefloor of a club, a blurred picture of a woman walking or jogging in the city, a picture containing a basketball, tennis balls, a rugby ball, a soccer ball and tennis bats. A picture of a field at night. A picture of a woman climbing stairs, with her shadow wearing a cape and standing like a superhero, and picture of a silhouette of a man with his fists clenched staring off into the distance, probably excluding confidence or resembling the picture of the stair-climbing-woman.
Their positive associations included feeling refreshed and a sense of freedom and accomplishment. Inspiring athletes. Views and seeing new things combined with the possibility to explore, this was mentioned by 2 participants, 1 of which sent me a picture of a landscape with a sunset which was taken in real life during a hike, not from google. Weight-loss, looking visibly fitter and having better health. Being able to indulge in more unhealthy food as a treat after using up lots of energy. Icy water after a long workout. Positive social connections and having the whole gym for themselves.
The negative pictures included dirty gym showers, someone lifting weights at the gym and struggling while others gathered around and stared, a meme of Gollum with the caption “how I feel after missing a week at the gym”, someone running in the rain with no umbrella and wet pants. A man staring at a woman at the gym. Another picture of a man staring at a woman at the gym, with text saying, “this creepy old guy at the gym kept coming over and staring at me... so I told my husband, and he came over and worked out next to me.” A woman with a bright pink sweaty face who may have rosacea if it’s not sunburn. Another Lord of the rings meme about running. 2 pictures showing a knee injury. An overfilled, extremely crowded gym. A cluttered shed or possible gym space and lastly a woman alone in front of the computer, working out. Negative associations showed occasional injuries, a feeling of boredom, bad weather and obstructions which made a physical struggle more unpleasant. Feelings of uneasiness and exhaustion.

## 3.4 Summarized findings

The most common excuse was lack of time. If people don’t enjoy it enough, then they won’t want to make time for it. If they don’t like doing it, is also less likely to make them feel energized. This means a focus should be on making it both pleasant and possible to easily incorporate into daily life. The willingness to take the first step was also an issue, so giving the possibility of taking small and simple steps or adding movement to your life without being aware of it could help. Sustainability of the new habit is also very important in preventing someone from slipping back into a sedentary lifestyle. Motivation is important and, keeping a daily streak could help foster consistency. Lastly, bundling hobbies or important tasks with movement, like exploring, running errands, or socializing could also be beneficial.

## 3.5 Next steps

Now that I am better informed and aware of the problems and the wishes of the people I have learned from, I would like to start coming up with possible ideas and solutions to address these problems and help people to incorporate exercise into their daily lives and then create tangible prototypes so that I can properly test them in person, not just in theory. After this I will be able to start whittling down my ideas and picking a direction to move forward with.

# 4. Project development

# 4.1 Annotation

The development of my project took many turns, as I did a lot of brainstorming and explored many different hypothetical ideas. Due to the many options and directions that my project could have taken, it took me quite a long time to single out one idea and stick with it. In the early stages of this bachelor project, right after the insights which I gained from my research, I started out by trying to come up with solutions that could tackle the issues that people had with exercising and make it more fun and more integratable into their daily lives.

# 4.2 Initial ideas and brainstorming

Here are some of my initial thoughts of hypothetical services or projects.
1.A bar-crawl but for exercise.
The idea is that a group of people who possible don't know each-other, can enjoy spending time together, bonding and trying out something new. This social activity would be a much healthier alternative to drinking and there would be an element of exploration and a feeling of adventure, which is missing when visiting the same gym repeatedly.Instead of a drink or a shot when you enter a bar, you get protein drinks, iced water, and other refreshments when moving to different locations. The routine changes every week and the tour itself provides a big change in scenery and a variety of exercise, from climbing to weights to single rounds in games such as laser tag.
2.Office with anti-sedentary equipment
In stark contrast to sitting in front of a desk all day, a field of surroundings that tackles the sedentary lifestyle could provide many health benefits and boost concentration and decrease sluggishness. Methods to do so could include a chair which throws you off after sitting for a long timeframe or one that has an integrated bar, which you can lift with your legs, while you are sitting, as a

kind of way to work out and release pent up energy opposed to a fidget spinner or other device.Many people also smoke to create the need for more breaks and get a change of scenery, maybe 5min of jogging could be allowed as a valid break and be normalized. Maybe talks or less information which needs to be provided could be shared on the go or through headphones, while everyone moving around.

3.A Maze with an integrated obstacle course.

A maze, which could function as an obstacle course. If you picture needing to exit an escape room and needing to perform tasks and riddles to do so, then this maze would have a similar idea behind it, only the tasks are physical. Images of the TV series “total wipeout” come to mind, only in a maze rather than out in the open. You can either quit or get through the maze while coming to grips with various physical challenges and obstacles.

4.Sports guide-pet

This idea stemmed from a discussion about a Tamagotchi. For those who don’t know a Tamagotchi is a handheld digital pet, which you need to feed it rigorously or else it dies. This need of a routine, followed by consequences if you break your routine and a mix of both your ambition to keep the streak going and care for the pet which you are trying to protect is quite interesting. There could be a character or avatar-pet connected to your health statistics of your phone or wearable watch if you have such a device. To keep this avatar happy, you need to look after it and it sends you a notification or beeps when you need movement or when there is some sort of problem or neglect regarding your daily activity. It could also be a physical object, which acts as the watch itself or a tracking device for measuring and evaluating distance and speed. Maybe it could be attached to or placed into a ball, tied to a wheel or exercise equipment, and be integrated as a tool for daily workouts.

5.A physical way of playing an instrument

I thought that combining music with activities would work quite well, as many people enjoy music with a passion and in many ways, it is already connected to movement. At clubs, dancing or just getting a boost of energy, when listening to music in the background while being active. There are many websites that connect clicks on random buttons or areas with random sounds and it is easy to get lost in experimenting and trying out different sounds or making beats or tunes. Combining the exploratory and experimental aspect of this with physical activity and movement could be a great solution. There is very little movement involved with playing the piano, guitar, or many other instruments aside from possible standing up. A piano could be projected onto the floor, and you need to step onto different buttons or jump onto

different buttons to cause a sound to appear. The same could be done with a 12 x 12 chess field squares. DJ controller CUBES (I think a target audience of this idea could be kids, who would have fun jumping around trying to make music.) Combine with dancing so the dancing itself carries the song. As a kind of sequel to this, I thought the same could be done with a projection of a phone-keyboard to onto the floor. However, this is much less practical for real life purposes.

6.Moving floors for standing activities.

Cooking and doing another interesting or necessary activity often requires standing. While cooking may be dangerous while moving around, for activity such as brushing your teeth, there could be a conveyer-belt or running-machine-strip that moves you, so you need to walk to remain at the table, this could function as a multitasking way of getting exercise while doing necessary daily activity.

7. Treasure hunt museum

Building or museum where there are gaps in the floor (with a net in case someone falls down) and you need to cross these gaps by swinging on a rope. To see the artwork, you explore and get moving.

8. Needy living space

Anti-sedentary living space, while working/while it is not on sleep or shower mode, every 20 or so minutes, a sound and light will appear in a different area of the living space, the resident needs to find it and turn it off, which gets them up and active and get back to what they were doing.

9. Cops and Robbers app

Similar to Pokemon-go, a location basded game where you are encouraged to go out and be active. Instead an anonymous real life “cops and robbers game”. What role you haveswitches every week. 1 week you need to avoid getting caught (if you make it through you get a point), the next you need to try to find users (if you catch someone you get a point). The users who are “cops” see a username and the location and they need to try to get in the vicinity of 5m from the “robbers”.

10. Present unlocked by movement

A new type of present, where the present is in a special safe/box that only opens when it’s been moved 5km, encouraging people to go walking/running to see what’s inside. A way to make the anticipation for gifts build up and to integrate an adventure.

# 4.3 Experiments, thoughts and prototypes

## 4.3.1 Experiments and thoughts

I made storyboards for of 3 of these ideas, but my next experiments were unrelated to these ideas, however I do later circle back to one of these ideas. I experimented with balloons, string and the idea of reaching and pulling something down or lifting yourself up. I thought it could be interesting to have an area of the exhibition full of helium filled balloons, in which the balloons have QR codes on them, at an angle which is hard to photograph from below. The visitor would need to climb or jump up to get a balloon down to scan the QR code so that they can see a picture, text, quote, or the thesis. The idea to me was thought of a way to have an explorative museum interaction and to add some mystery and some reward.
I also thought of cutting a hole in center of the table meant for my exhibition. This could make room for a pole, which could be attached to various other sticks, you can picture it like a tree and its branches. Instead of leaves, on each side of the table there could be strings coming down. The string goes from one half of the table's branch to the other half's branch. This could be a game, where various objects are attached to the end of the string, let's say each side has 20 separate strings and objects and there is one visitor standing on each side. Each person needs to try and pull the objects on their half down as quickly as possible and the objects and string which is pulled down by the other person, causes the object on the other side to shoot up to the roof so that they can no longer reach it. Whoever has the most objects pulled down on their half, or whoever has the least objects on the roof/branches wins. Maybe if it were a tight and secure rope, they could also try to pull each other up. In the next built physical prototype, I was inspired by this aspect of reaching.

## 4.3.2 Chair balance prototype

I picked the chair idea from my original brainstorming list which was part of the idea to create an office which inspires movement. However, instead of addressing getting off the chair and moving

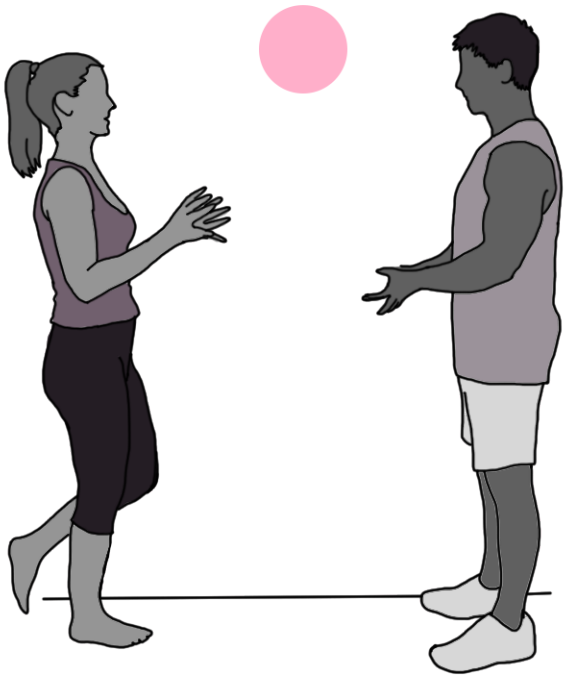
around, I tried to tackle the issue of how a lack of movement in an unideal position affects posture and how people tend to slouch or lean their head too far into their work. In short, combatting effects of the sedentary lifestyle with encouraging good posture. To try to come to grips with this problem, I stuck with the approach of the previous string idea and the metaphor of reaching and pulling oneself up. The chair idea is situated in a typical office setting, in a typical office chair. There is an object to grip, such as a handle or another object, which works well as an affordance and this object is attached to a string. When the string is pulled, you can picture the same effect as when someone fastens their laces. The amount of string and distance is shortened between 2 bands, which go around each of the wearer's shoulders to under their armpit. These shoulder-hoops, which the wearer can pit un by sliding their arm in and adjusting the size, get pulled closer together at the back, pulling the wearer's shoulder back which has the effect of them sitting up straighter.

### 4.3.3 Surfaces of balance

Inspired by a previous balance board prototype, which I built, as seen in the image below,

the next prototype which I built around this time, also yet again addressed the aspect of balance. It was a surface of obstacles

just like the other version, this is a bonding exercise for 2 people, one who is trying to balance, the other who is there as support to watch out for and hold on to the balancing person. The goal is that the visitor needs to move through/stand on/get used to the obstacles without looking down, their senses are the main focus and I thought that different parts of the “floor” could be coated with different materials for an interesting experience (sand, fake-feathers, glass-type feeling, foam, fabric/silky...)
(Before I thought of covering the floor in materials and not looking down I also thought it would be interesting to paint it like an optical illusion -floor.) I used papier-mâché to create the “stones”/ obstacles for the visitor to balance on, but the floor is not created yet, the still need to be stuck together and I am going to attach them to their own floor. The “egg” shaped papier-mâché which I originally used for this floor prototype I repurpose in my next prototype.



# 4.4 Iterated Prototypes

## 4.4.1 Iterations

#### *4.4.1.1 Footwear*

After the 2 previous prototypes, I decided to revisit and mainly focus and iterate on the skateboard balance idea, rather than the surface of obstacles. The goal which I had, was to have the visitor connect with their body and motions and to practise their balance. To get a taste for what works and what doesn't, I tried out balancing on various surfaces and items, such as marbles, pens, heels, and slippery surfaces and noticed how heat protection spray will make a floor particularly slippery, so it was interesting to work with. After this, I also thought it would be interesting to revisit the idea of making wearable like we did in the previous module embodied interaction, however, to focus on shoes or equipment to do with the visitors' feet, rather than an outfit. I believe the wearables had many options and lots of potential and that the progress of the previous project was stifled and could greatly be improved on. I also believe in the old project there is an immense amount which could have been improved in visually and that I never got to work on this aspect. Next instead of trying to balance on various types of surfaces and objects, I tried sticking objects to one of my shoes and experimenting with my balance, I did so by using duct-tape. It was interesting to try out walking around with different shaped soles and to balance on and different materials. I must say that I enjoyed walking around more than staying put while trying to balance.

One of the shapes which I made, I made out of the "egg" shaped papier-mâché which I originally used for my old floor prototype. I filled it with sand, however this didn't have the effect, which I was hoping for, due to the added weight, which made it easier to balance on. I needed something which was light, yet still dense enough so that the eggshell shape wouldn't crack of someone were to stand on it. Next, I filled it with Styrofoam, and it worked much better. After duct-taping the eggshell filled with cut up Styrofoam onto the shoe, I asked a family member to stand on it. I added some extra Styrofoam over the edge of the shape, and it squashed down to fit perfectly into the shell when someone stands on it. I also tried out different shapes, the other shape which worked quite well was an upside down triangular prism shape, with a rounded edge at the bottom.

This I also cut out of Styrofoam. The slope needs to be curved

enough so that the wearer doesn't immediately fall to either side, but not too much so that it's not too easy to stand on without practicing your balance. It's quite like balancing on the eggshell, but instead of being able to "fall" in every direction, you are mainly focused on not leaning forwards or backwards too much. There could be two of them, one for trying to balance without leaning too largely forwards or backwards and one for trying not to lean left or right and stand straight without falling sideways. Now that I had the shapes and how they affect the balance of the person standing on them, it was time to ponder what the best way would be to attach them to the wearer's shoes. I was thinking either these shapes could either directly be integrated into a shoe to make aesthetically interesting footwear or they could be attached to anyone's shoe and like an additional piece of equipment. After searching a reasonable amount of time, I came across an ice-cleat, a type of snow gear that you can attach to your shoes to help add drop. I thought something like that would be great to attach the balance-shapes onto various shoes with, so that anyone can easily try them out, while still wearing the shoes they currently have and not needing to worry about size. It would have 2 strips, which bend into the center of the shoe (kind of like a hook) the strips would be on the outside of each side of the shoe, so that a rectangle could slide in and be slid back out. This rectangle surface would have one of the different balancing-shapes stuck to it, so that to try on a different shape to balance with, you would just need to slide the rectangle-form out and insert the other form. I thought that it would be dangerous to have 2 shapes attached to the visitor's feet at all times, so that the user only has one on their foot at a time and tries to balance on that foot, so that they can catch themselves with their other foot just incase. As the device is easily taken off the shoe, it can easily just be moved onto the other shoe.

#### *4.4.1.2 Hat*

As well as the shoe-balance-shapes that can be attached to anybodies shoes, I also explored another wearable dealing with the aspect of posture. This goal was the same goal that my "chair prototype" tried to address, so I thought about what could be improved. In my opinion the problem with the chair is that you can only use it in a room/somewhere with a chair like that and that it is very impractical and also very hard to move or get into. The object was a "hat" that is shaped like a disk/frisbee. This hat has compartments, with balls in them (that make some sort of noise or contain a bell) and when the person's head moves/ if they hunch, then the balls will roll down accordingly and make noise. This was inspired by the method of placing a book on your head

and trying to walk with it while standing straight. Combining the balancing on the shoes and trying to maintain good posture and standing up straight, would add a layer of difficulty to the balance exercise and would tackle to birds with one stone. I came to the conclusion that both of the ideas work, as i had a few family members try them out. Now that I am. And after testing the functionality, the next step would be to focus on the exterior, assembly of the parts and visual style. Giving them a similar look and feel, would help turn them into the set, which I had envisioned.

### 4.4.2 Modular toolkit

After thinking about ways to combine them and having a mentoring, in which the multifunctionality was discussed, the idea shifted more towards a modular add on toolkit. The aspect of having the option of either using one of them or to add layers of difficulty by using multiple and performing 2 tasks at the same time looked promising. Instead of 2 different options, the idea was that the same piece of equipment could be used in 3 different ways, one being balance, one posture, and one other function. This compact set of 3, would enable challenges and would give people the freedom to make it as easy or hard as they would like. It could be situated as a giftshop product, that is simple, portable, and minimalistic. It could easily be brought to the office or to the beach.
In conclusion, the product would be toolkit that contains elements that can attach to each other and transform for different functions. The 3 functions which I wanted to tackle were balance, posture, and flexibility. This would offer minimalistic game-like elements for kids or adults to experiment with. The goal would be to form a connection between the body and the mind. This connection between the body and mind was also one of my key learnings, as well as small activities such as helping each other to balance working great as icebreakers and encouraging bonding.

# 4.5 Final project

## 4.5.1 Last changes

#### *4.5.1.1 Repurposing objects*

Even though the versatility, compactness, and portability of my toolkit stayed the same, the form of my final project has gone through one last transformation. I believe that I can finally say that I envision how it will be when it is put together at the exhibition and I am very thankful for the feedback from the audience after my 3rd progress session presentation, as it helped to bring new aspects to my attention, which I now plan on incorporating into my final artifact. The first main point which was brought up during the discussion of my presentation, was the question if it is necessary to create the need of acquiring new equipment to perform the movements with or if it would make more sense to use objects which we already have. This changed my mind on how I imagined the content of the toolkit to be. Instead of a modular add on toolkit, which contains 3 elements that can attach together and transform for different functions, I thought it would be interesting to work with the use of daily objects. The method of doing so would involve prompts and exercise ideas, to encourage a creative repurposing of objects in the user's near vicinity as exercise tools. This alternation of equipment and performable tasks would work towards preventing the routine from getting repetitive and spicing it up with enough variety of new movements.

#### *4.5.1.2 An excuse to move*

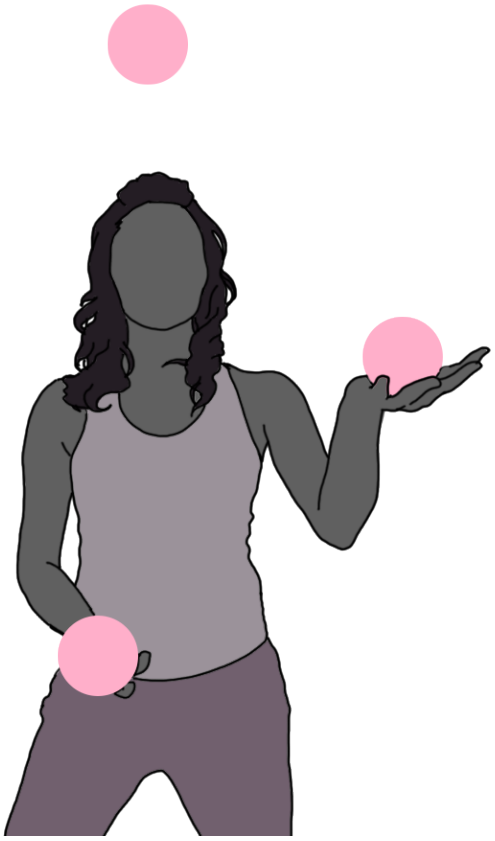
The second point which was discussed after my presentation was how important it is to provide people with an excuse to do things which might seem odd to a spectator. This can be crucial in encouraging people to partake in activities of movement, in surroundings where there will inevitably be other people. To avoid a sedentary lifestyle, it is important to factor in where the sedentary behavior most likely takes place and while a large chunk may take place at home or in isolation, it is very likely that for many a large amount will take place at work or in a public setting. As an example, when observing a stranger talking to themselves in public they come across as odd, however if they are visibly holding a smartphone, then many would assume they are just talking to someone, and everything is normal. This type of situation is what I would like to address with my toolkit and why a physical representation makes sense to me. A physical

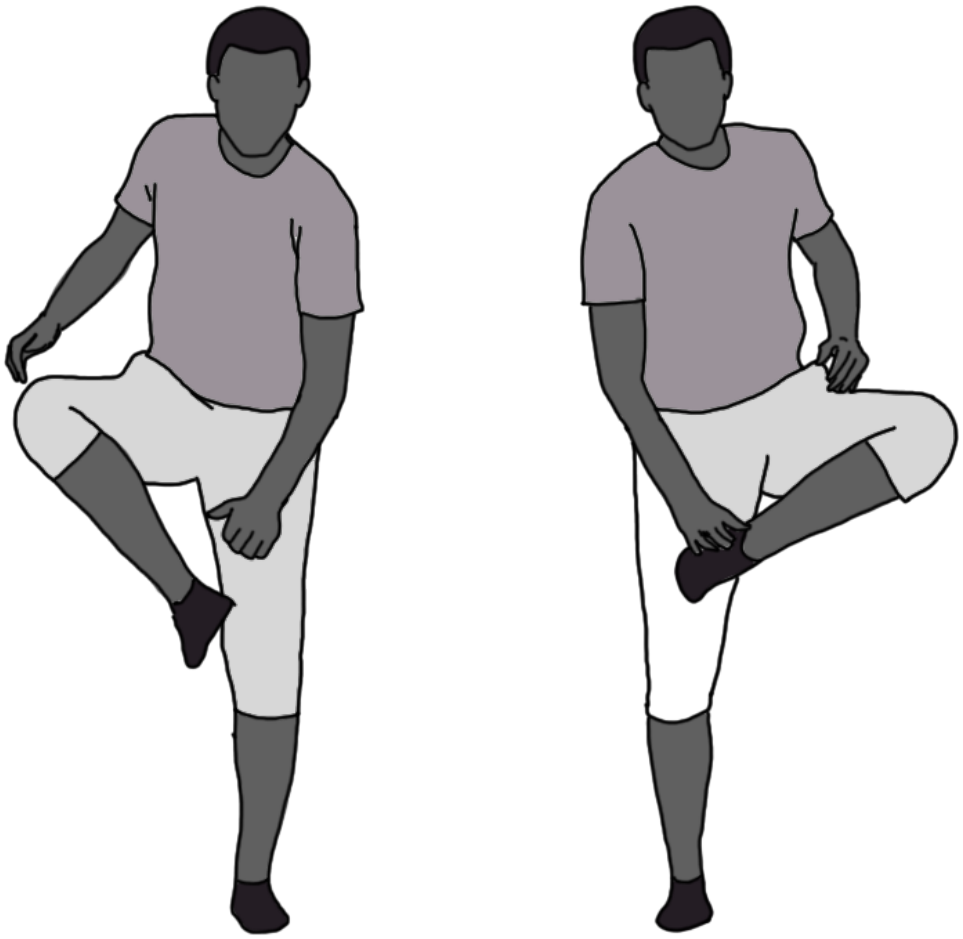
interaction with using physical object is inevitable and signals an explanation for certain behavior and movements.

### 4.5.2 Description

My toolkit ended up taking the final form of a simple and portable small box of prompts, engraved with the title “Movement of the body” and subtitle “You owe it to yourself” on one side of the box. The other side of the box has an incorporated hourglass, so that you can turn the box to keep track of time during your exercises and movements. The thought process behind this was firstly to have a physical embodiment representing the activity which the visitor is partaking in. Secondly, to eliminate the need for a watch or smartphone, thus also removing the distractions of mobile usage such as notifications and lack of sense of time in case the mobile is positioned in an unideal angle in which it is hard to see the timer from while moving. This should also function as a short break from screens, to enable the visitor to switch off while they rediscover movement during the age of digitalization.
The goal is for the visitor to intensely perform a set of 1- or 2-minute exercises, movements, or tasks, timed by the hourglass, to reincorporate physical activity into their daily in a way which is sustainable and not overwhelming. By having the visitor perform a set of small, bite-sized tasks, the timeframe remains flexible and manageable and not too overwhelming to regularly interrupt sedentary behavior. These various 1-minute exercise-prompts can be found within a deck of cards, inside of the toolkit. The cards are organized according to types of activity. There are options for if the visitor is alone or has people joining in and there are different categories of exercise-prompts depending on what the visitor would like to train. It includes prompts to train balance, flexibility, posture, reaction time and a variety of anaerobic exercise. The focus on the prompts is on working with the visitor’s surroundings. What is the architecture or nature surrounding the visitor like? What is lying around? What surrounding objects may be, is not important, the characteristics of these objects are deciding. To make the idea more tangible, picture the following example of an exercise-prompt. A card for training reaction time, for 2+ people, would instruct the visitors to find something, which is small enough to fit into a hand and light enough that it wouldn’t cause significant pain if it landed on someone. The visitors may see a desk nearby, with a pen lying around. Once they have the pen, the next section would explain that one visitor is supposed to lie on the floor and the other is supposed to wait for a few seconds, to drop the pen onto

the other visitor without warning. The other visitor is supposed to roll to the side, attempting to dodge the pen. Later they switch places. This may also function well as an ice breaker. Aside from the timer, the distinctive difference between this project and exercise card games which already exist, is the focus on repurposing one's surroundings. The box of prompts could also optionally contain a ping pong ball, a rope or a small add on, yet it should function perfectly without any. Lastly, there are also cards with simple exercise instructions for which there is no equipment necessary just in case there are no objects around whatsoever. Without the need for any prior knowledge and these functions, this small, portable, and minimalistic toolkit, should encourage the visitor to take the necessary steps to help themselves stay healthy.





# 5. Conclusion

# 5.1 Conclusion and contribution

To answer the research question, which I posed in the beginning of my thesis “How would it make most sense to build movement into people’s daily lives?” I would say it would have to be in a way which is convenient, motivating, and memorable. Just like spending 5 minutes a day learning a language, positive habits are more easily formed when there is a convenient way to the change the behavior and the task doesn’t seem too demanding. Accordingly, to prevent the dangers of a sedentary lifestyle, by making small changes in one’s daily routine, it makes sense to offer a solution, which is simple to use, requires no prior knowledge and flexible allowing for shorter or longer sessions depending on the person and their goals. The possibility to rediscover movement from a new perspective by adapting to and playing with any type of location or surroundings is part of my projects charm. There are infinite possibilities and ways to creatively repurpose existing objects as exercise tools, or to be fair as anything, and this is a central focus of the box of prompts. Not only does this project help people to help themselves in a way that allows them to work on their fitness and health, but also in a way that opens their eyes and spreads awareness of possibilities. This is where the distinction from other exercise card games lies. Many action films have the protagonists thinking on their toes, working with their immediate surroundings to use objects in their near vicinity as shields, weapons, or other makeshift equipment, utilizing creativity to play with their surroundings. In real life, due to lack of urgency, there seems to be a larger expectation of using objects to be used for a specific purpose. With my project I aim to help people break this habit and train the mind to see possibilities and opportunities, while training the body to enhance its performance.

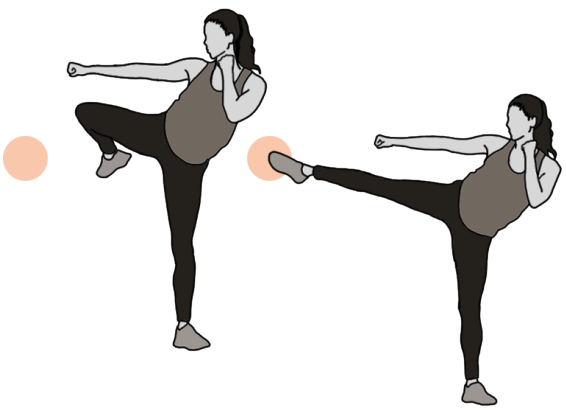
In conclusion, my contribution is research and work towards offering a solution which nudges people towards taking the necessary steps to help themselves be a much healthier version of themselves. This may take different forms. Firstly, the form of combatting the sedentary lifestyle and improving their physical health directly by training their balance, flexibility, posture, reaction time or general fitness through anaerobic exercises. Therefore, indirectly helping to prevent injuries, illnesses, to keep the mind functioning with better sleep, memory, and coordination,

slowing the aging process as well as extending life span. Secondly, by helping people be more mentally relaxed through a connection of body and mind, as well as enhancing openness by practicing seeing objects in a way other than their original intended purpose. Lastly, encouraging the discussion of this current topic is very important, as health is extremely valuable and should be taken care of accordingly, no matter who you are.

## 5.2 Reflection and learnings

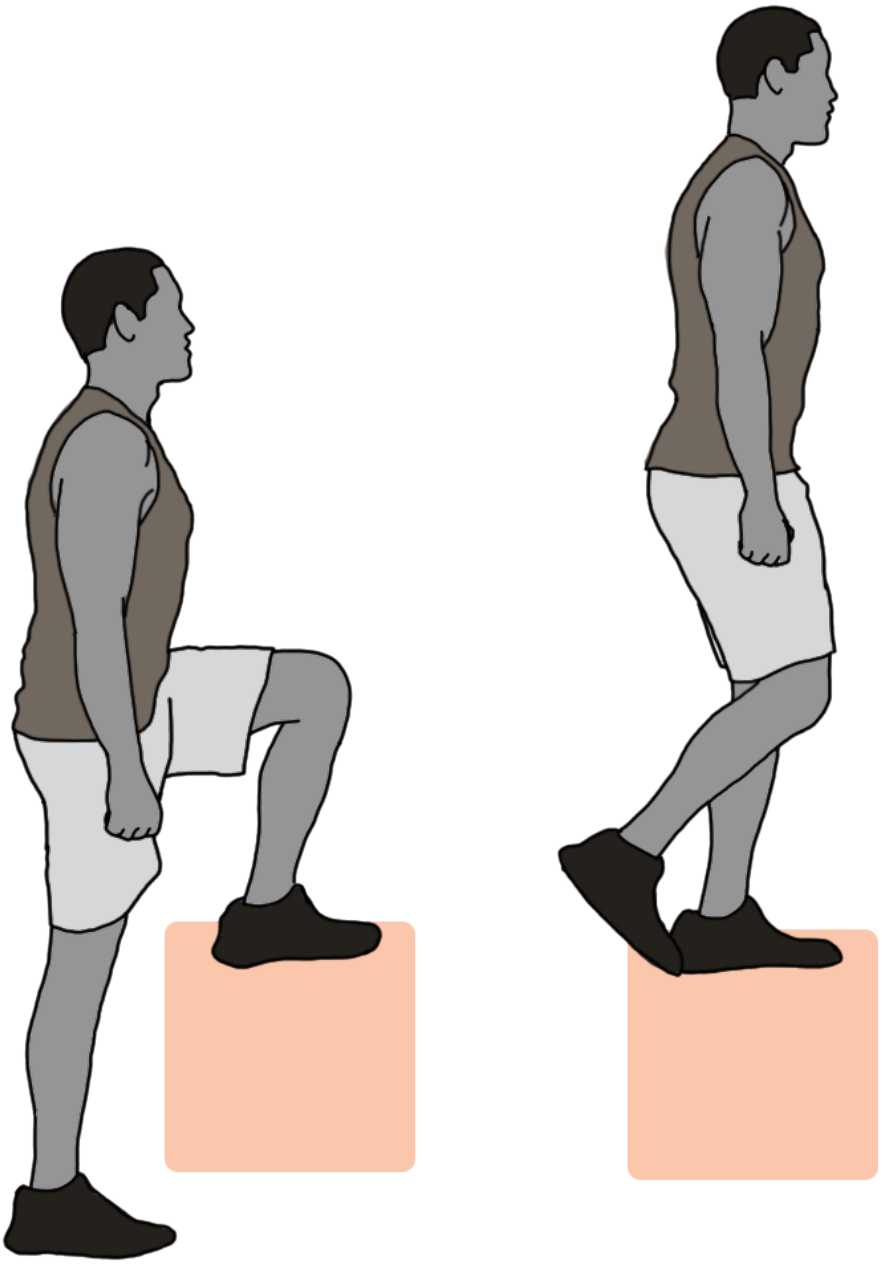
When I look back, I almost can't believe how fast the time flew by. I remember being under illusion that we had all the time in the world and that it would be very relaxed with 4 whole months available to work on this project and thesis. Yet in hindsight, even though I did make to do lists, a time plan and kept the weekly tasks and mentorings in mind, I neglected my tendency to strongly procrastinate, particularly when I was in a negative state of mind due to influences outside of my course and I always found myself with a sleep deficit the night before there was any kind of deliverable. What I believe added to this, was that I changed the direction and vision of my end-product far too often and despite making many prototypes, they were often prototypes of me trying out different ideas, rather than iterating an improving on existing ones. This was mentioned in the mentorings; however, the damage had already been done. On a positive note, what I really enjoyed about this experience was the flexibility and freedom that came with it and learning to learn from your own observations without being steered in a certain direction or subconsciously influenced by peers or people in your group. I also got a better feeling for what aspects of a process I enjoy and which ones I feel neutral about or less inclined to want to deal with. Even though, we've had 5 semesters of projects, none have given me the time and flexibility to get a feel for the different aspects as much as this one has. I really liked the research phase, both the desk research where I let curiosity guide me and got to learn countless new things while I pondered about why things are the way they are and the field research where I had the opportunity to listen to people talk about their struggles and experiences, some of which had issues with their weight and really try to foster a deep understanding of how and why they feel

what they feel. I also really enjoyed the situating and marketing aspect, as it really influenced even my own perception of my end-product and how it can make it or break it. It could easily be reduced to some cards in a box with a timer stuck onto it or it could be so much more. I think it's fascinating how little tweaks can completely change how something comes across and how small additions and functions can flip is its purpose upside down. Another thought which I was having, was that I have mixed feelings about the topic I chose. On one hand I think it is an incredibly important topic and improving one's health can benefit everyone immensely, so I feel like it helped me add value to a and bring awareness to a problem, which is common and neglected. However, at some points in the past few weeks I did feel the lack of passion for it. I wondered if I would have felt more motivated if I had a stronger personal connection to it and it kept me up at night, yet at the same time having less of a personal connection enables you to observe something from a more neutral position and to deal with a topic without any strong personal biases. Furthermore, this project reminded me of a lesson I have learned many times but keep losing touch with. Even though there are many things that could have gone worse and even when I was behind on something I pushed through and never quit, especially now during this stage of reflecting on my process and learnings, I can't help but to feel like I should have used my time better, I could have done X and Y differently, I should have put in more effort or gone the extra mile, but ruminating about problems is not going to fix them. You can't change the past, but you can change the future. This reminder to move forward, deal with the present and look to the future leads me to my last section of future steps.



## 5.3 Future steps

Moving forward, I will be focusing on seeing my project take its envisioned form and then soon direct my attention onto the project video, which should visually embody the feelings which I would like to bring out in people, with my box of prompts. I am glad that the change in the toolkit didn't result in the need for a completely new idea for the storyboard, as I am still drawn to the most recent storyline for the video. After completing my project, video and after the exhibition, I hope that my box of exercise prompts has some sort of knock-on effect or serves as an inspiration to help encourage innovation, new ideas and ways of observing the world around you or that it serves as a reminder to pay attention to physical activity and to take the necessary steps to avoid living a sedentary lifestyle to the highest degree possible. I will probably gift the end-product to my parents, but I could see some of the people I interviewed using it. I also believe there could be a digital version, where the focus still lies on repurposing objects from your surroundings into exercise tools, yet uses the alarm of the phone and displays the cards on an app. I think the notion of using prompts or a game to encourage repurposing of surroundings could also be adapted to different areas of life, not just physical health. A few of my peer's projects deal with aspects of the topic of expressing and labeling emotions to enable better introspection, therefore an example of using these prompts could be for introspection. What feeling a camera gives you? If you feel caught off guard, judged or observed, or if you feel seen and important.
Whether a closed door represents security, closure, a loss of opportunity or a barrier in your eyes and why? There could be many ways to look at surrounding objects. As a general feeling, I hope that in the future the topic of health remains prominent, even after the world slowly recovers from the shock of the pandemic and that people focus on taking the necessary steps to enable themselves to live a happier and healthy life.



# 6. Bibliography

# 6.1 References

## 6.1.1 Book

Sexton, Patrick & Chambers, Jeffrey. (2006). The Importance of Flexibility for Functional Range of Motion. Athletic Therapy Today. 11. 13-17. 10.1123/att.11.3.13. (https://www.researchgate.net/publication/288633539_The_Importance_of_Flexibility_for_Functional_Range_of_Motion

## 6.1.2 Journal article

Aman, J. E., Elangovan, N., Yeh, I. L., & Konczak, J. (2015). The effectiveness of proprioceptive training for improving motor function: a systematic review. Frontiers in human neuroscience, 8, 1075. Retrieved May 9, 2022 from https://doi.org/10.3389/fnhum.2014.01075

Arsenis, N. C., You, T., Ogawa, E. F., Tinsley, G. M., & Zuo, L. (2017). Physical activity and telomere length: Impact of aging and potential mechanisms of action. Oncotarget, 8(27), 45008–45019. Retrieved May 9, 2022 from https://doi.org/10.18632/oncotarget.16726

University of Pennsylvania School of Medicine. (2011, April 20). Ends of chromosomes protected by stacked, coiled DNA caps. ScienceDaily. Retrieved May 9, 2022 from www.sciencedaily.com/releases/2011/04/110420125500.htm

Gorka, S. M., Teppen, T., Radoman, M., Phan, K. L., & Pandey, S. C. (2020). Human Plasma BDNF Is Associated With Amygdala-Prefrontal Cortex Functional Connectivity and Problem Drinking Behaviors. The international journal of neuropsychopharmacology, 23(1), 1–11. https://doi.org/10.1093/ijnp/pyz057

Bekinschtein, P., Cammarota, M., Katche, C., Slipczuk, L., Rossato, J. I., Goldin, A., Izquierdo, I., & Medina, J. H. (2008). BDNF is essential to promote persistence of long-term memory storage. Proceedings of the National Academy of Sciences of the United States of America, 105(7), 2711–2716. https://doi.org/10.1073/pnas.0711863105

Kowiański, P., Lietzau, G., Czuba, E., Waśkow, M., Steliga, A., & Moryś, J. (2018). BDNF: A Key Factor with Multipotent Impact on Brain Signaling and Synaptic Plasticity. Cellular and molecular neurobiology, 38(3), 579–593. https://doi.org/10.1007/s10571-017-0510-4

Numakawa, T., Odaka, H., & Adachi, N. (2017). Actions of Brain-Derived Neurotrophic Factor and Glucocorticoid Stress in Neurogenesis. International journal of molecular sciences, 18(11), 2312. https://doi.org/10.3390/ijms18112312

Jurkowski MP, Bettio L, Woo EK, Patten A, Yau S-Y and Gil-Mohapel J (2020) Beyond the Hippocampus and the SVZ: Adult Neurogenesis Throughout the Brain. Front. Cell. Neurosci. 14:576444. doi: 10.3389/fncel.2020.576444 Retrieved May 9, 2022 from https://www.frontiersin.org/article/10.3389/fncel.2020.576444

Liu Patrick Z., Nusslock Robin. (2018). Exercise-Mediated Neurogenesis in the Hippocampus via BDNF. Frontiers in Neuroscience. Retrieved May 9, 2022 from https://www.frontiersin.org/article/10.3389/fnins.2018.00052

Sleiman, S. F., Henry, J., Al-Haddad, R., El Hayek, L., Abou Haidar, E., Stringer, T., Ulja, D., Karuppagounder, S. S., Holson, E. B., Ratan, R. R., Ninan, I., & Chao, M. V. (2016). Exercise promotes the expression of brain derived neurotrophic factor (BDNF) through the action of the ketone body β-hydroxybutyrate. eLife, 5, e15092. https://doi.org/10.7554/eLife.15092

Bing Hu, Angeliki Maria Nikolakopoulou, Susana Cohen-Cory. (2005, October 1). BDNF stabilizes synapses and maintains the structural complexity of optic axons in vivo. The Company of Biologists. Retrieved May 9, 2022 from https://journals.biologists.com/dev/article/132/19/4285/42966/BDNF-stabilizes-synapses-and-maintains-the

### 6.1.3 Web article

Brigham Young University. (2017, May 10). High levels of exercise linked to nine years of less aging at the cellular level: New research shows a major advantage for those who are highly active. ScienceDaily. Retrieved May 9, 2022 from www.sciencedaily.com/releases/2017/05/170510115211.htm

Gretchen Reynolds. (2011, March 2). Can Exercise Keep You Young?. The New York Times. Retrieved May 9, 2022 from https://well.blogs.nytimes.com/2011/03/02/can-exercise-keep-you-young/

Elizabeth A. Weaver II Hilary H. Doyle. (2019, August 8). Cells of the Brain. Dana Foundation. Retrieved May 9, 2022 from https://www.dana.org/article/cells-of-the-brain/

Dr Alan Woodruff. (2019, August 13) What is a neuron?. The University of Queensland. Retrieved May 9, 2022 from https://qbi.uq.edu.au/brain/brain-anatomy/what-neuron

TIFFANY LAMBERT. (2021, March 25). Arakawa (1936-2010) and Gins (1941-2014). The Architectural Review Magazine. Retrieved May 9, 2022 from https://www.architectural-review.com/essays/reputations/arakawa-1936-2010-and-gins-1941-2014

Arlene Semeco, MS, RD. (2021, December 14). The Top 10 Benefits of Regular Exercise. Healthline Media. Retrieved May 9, 2022 from https://www.healthline.com/nutrition/10-benefits-of-exercise#TOC_TITLE_HDR_12

Sharon Reynolds. (2019, March 19) Getting active later in life brings benefits. National Institutes of Health. Retrieved May 9, 2022 from https://www.nih.gov/news-events/nih-research-matters/getting-active-later-life-brings-benefits

Alice G. Walton. (2017, May 23). 6 Science-Backed Ways Exercise Benefits The Body And Brain. Forbes Magazine. Retrieved May 9, 2022 from https://www.forbes.com/sites/alicegwalton/2017/05/23/6-ways-exercise-benefits-the-body-and-brain/?sh=662d46152503

Alexa Lardieri. (2018, November 27). Endurance and High-Intensity Exercise Have Anti-Aging Effects, U.S. News & World Report. Retrieved May 9, 2022 from https://www.usnews.com/news/health-care-news/articles/2018-11-27/study-finds-some-exercises-are-better-for-anti-aging

Queensland Brain Institute (2018, April 17) What is synaptic plasticity?. The University of Queensland. Retrieved May 9, 2022 from https://qbi.uq.edu.au/brain-basics/brain/brain-physiology/what-synaptic-plasticity

Mandy Oaklander. (2016, September 12). The New Science of Exercise. Time Magazine. Retrieved May 9, 2022 from https://time.com/4475628/the-new-science-of-exercise/

CTV.ca News Staff. (2011, February 21). Simple exercise can actually delay aging, study finds. CTV News. Retrieved May 9, 2022 from https://www.ctvnews.ca/simple-exercise-can-actually-delay-aging-study-finds-1.610321

ANDY GREENBERG. (2019, November 29). Hacker Lexicon: What Is a Dead Drop?. WIRED Magazine. Retrieved May 9, 2022 from https://www.wired.com/story/what-is-dead-drop/

Core Physical Therapy. (2018, February 7). 5 Benefits of Improved Balance. Coreptiowa. Retrieved May 9, 2022 from http://www.coreptiowa.com/blog/post/5-benefits-of-improved-balance/

Harvard Health Publishing. (2019, June 21). Exercise and your arteries. Retrieved May 9, 2022 from https://www.health.harvard.edu/heart-health/exercise-and-your-arteries

National Institutes of Health. (2016, May 24). Physical activity associated with lower risk of many cancers. Retrieved May 9, 2022 from https://www.nih.gov/news-events/nih-research-matters/physical-activity-associated-lower-risk-many-cancers

The American Psychological Association. (2020, March 4). Working out boosts brain health. Retrieved May 9, 2022 from https://www.apa.org/topics/exercise-fitness/stress

Cleveland Clinic. (2021, June 21). Coronary Artery Disease. Retrieved May 9, 2022 from https://my.clevelandclinic.org/health/diseases/16898-coronary-artery-disease

Healthdirect Australia. (2021, May). How to reduce visceral body fat (hidden fat). Retrieved May 9, 2022 from https://www.healthdirect.gov.au/how-to-reduce-visceral-body-fat-hidden-fat

NHS. ( 2021, August 4). Benefits of exercise.Retrieved May 9, 2022 from https://www.nhs.uk/live-well/exercise/exercise-health-benefits/

WebMD. (2021, August 26). What Is Visceral Fat?. Retrieved May 9, 2022 from https://www.webmd.com/diet/what-is-visceral-fat

WebMD (2021, June 23). Insulin Resistance. Retrieved May 9, 2022 from https://www.webmd.com/diabetes/insulin-resistance-syndrome

WebMD. (2000, March 6). Get Smart: Brain Cells Do Regrow, Study Confirms. Retrieved May 9, 2022 from https://www.webmd.com/brain/news/20000306/get-smart-brain-cells-do-regrow-study-confirms

CDC. (2021, July 19). Coronary Artery Disease (CAD). Retrieved May 9, 2022 from https://www.cdc.gov/heartdisease/coronary_ad.htm

CDC. (2022, April 27). Benefits of Physical Activity. Retrieved May 9, 2022 from https://www.cdc.gov/physicalactivity/basics/pa-health/index.htm

Mayo Clinic Staff. (2020, November 10). HDL cholesterol: How to boost your 'good' cholesterol. Mayo Clinic. Retrieved May 9, 2022 from https://www.mayoclinic.org/diseases-conditions/high-blood-cholesterol/in-depth/hdl-cholesterol/art-20046388

Mayo Clinic Staff. (2021, October 08). Exercise: 7 benefits of regular physical activity. Mayo Clinic. Retrieved May 9, 2022 from https://www.mayoclinic.org/healthy-lifestyle/fitness/in-depth/exercise/art-20048389

Mayo Clinic Staff. (2021, March 12). Belly fat in women: Taking — and keeping — it off. Mayo Clinic. Retrieved May 9, 2022 from https://www.mayoclinic.org/healthy-lifestyle/womens-health/in-depth/belly-fat/art-20045809

Niantic. (2022, 28 April). How to play Pikmin Bloom. Retrieved May 9, 2022 from https://niantic.helpshift.com/hc/en/23-pikmin-bloom/faq/2854-how-to-play-pikmin-bloom/

KidsHealth.org. (2022, February). Why Exercise Is Wise. Retrieved May 9, 2022 from https://kidshealth.org/en/teens/exercise-wise.html

FamilyDoctor.org. (2021, February). Why Exercise?. Retrieved May 9, 2022 from https://familydoctor.org/why-exercise/

Strong Coffee Company. (2020, September 17). Increase BDNF: 10 Ways to Rescue Your Brain. Retrieved May 9, 2022 from https://strongcoffeecompany.com/blogs/strong-words/how-to-increase-bdnf-10-ways-to-rescue-your-brain

Khan Academy. Telomeres and telomerase. Retrieved May 9, 2022 from https://www.khanacademy.org/science/biology/dna-as-the-genetic-material/dna-replication/a/telomeres-telomerase

Khan Academy. Overview of neuron structure and function. Retrieved May 9, 2022 from https://www.khanacademy.org/science/biology/human-biology/neuron-nervous-system/a/overview-of-neuron-structure-and-function

Spyscape. How To Find and Use a Dead Drop. Retrieved May 9, 2022 from https://spyscape.com/article/how-to-find-and-use-a-dead-letter-box

Preventous Collaborative Health. The Importance of Being Balanced. Retrieved May 9, 2022 from https://preventous.com/the-importance-of-being-balanced/

Healio. What are Chromosomes?. Retrieved May 9, 2022 from https://www.healio.com/hematology-oncology/learn-genomics/genomics-primer/what-are-chromosomes

The Arthritis Foundation. Benefits of Exercise for Osteoarthritis. Retrieved May 9, 2022 from https://www.arthritis.org/health-wellness/healthy-living/physical-activity/getting-started/benefits-of-exercise-for-osteoarthritis

MedlinePlus. Retrieved May 9, 2022 from https://medlineplus.gov/genetics/gene/bdnf/#function

Wikipedia. Retrieved May 9, 2022 from https://en.wikipedia.org/wiki/Brain-derived_neurotrophic_factor

Wikipedia. Retrieved May 9, 2022 from https://en.wikipedia.org/wiki/Ingress_(video_game)

Wikipedia. Retrieved May 9, 2022 from https://en.wikipedia.org/wiki/Zombies,_Run

Wikipedia. Retrieved May 9, 2022 from https://en.wikipedia.org/wiki/Dead_drop

Wikipedia. Retrieved May 9, 2022 from https://en.wikipedia.org/wiki/Total_Wipeout

Wikipedia. Retrieved May 9, 2022 from https://en.wikipedia.org/wiki/Takeshi%27s_Castle

### 6.1.4 Website or product

https://ingress.com

https://zombiesrungame.com

https://capti.co

https://writing-prompt-s.tumblr.com

https://www.reddit.com/r/deaddrops/

https://www.orellfuessli.ch/shop/home/artikeldetails/A1057388108?ProvID=10917751&gclid=CjwKCAjwve2TBhByEiwAaktM1E7MgWO5MHkw4IbHW_cuCz8YEU5J1mhhHGm9ee6KatICTdpHPsbBShoCKYsQAvD_BwE

## 6.2 Figures

Workout illustrations - © Nicola Delany

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Fitness Dice - © Lea Genders Fitness, Retrieved May 27, https://www.leagendersfitness.com/news/2017/12/20/roll-the-dice-work-out-a-fitness-dice-giveaway

Pokémon Go - © Niantic. Retrieved May 27, https://pokemon-golive.com

Geocaching - © Pixabay. Retrieved May 27, https://www.noticiasaominuto.com/pais/430953/geocaching-ganha-adep-tos-mas-deve-ser-realizado-com-seguranca

Total Wipeout - © BBC. Retrieved May 27, https://www.mir-ror.co.uk/tv/tv-news/wipeout-contestant-collapses-dies-af-ter-23044924

YouTube Workout Channel - © Pamela Reif. Retrieved May 27, https://www.youtube.com/c/PamelaRf1

Bioscleave house - © Madeline Gins and Arakawa. Retrieved May 27, https://www.6sqft.com/bioscleave-house-uses-architec-ture-to-extend-lifespans-and-stregnthen-immune-systems/

Survey screenshots - © Nicola Delany

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