DESIGNING SUSA

AN INTERACTIVE ARTWORK THAT STIMULATES SUSTAINABLE BEHAVIOUR THROUGH POSITIVE FEEDBACK

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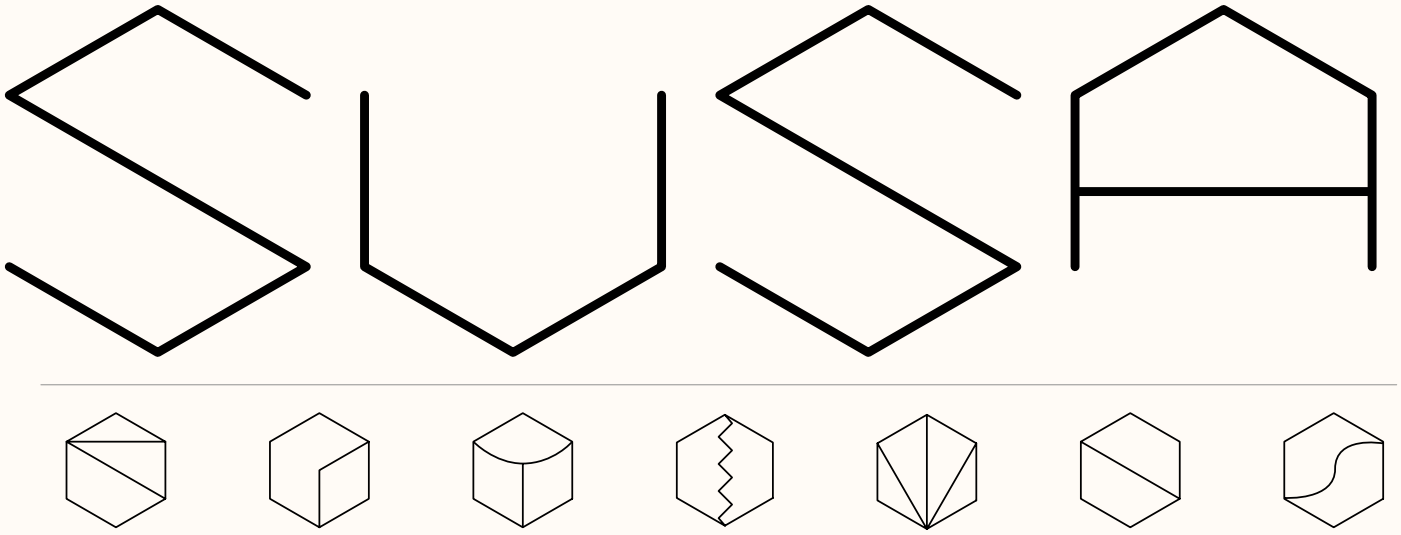

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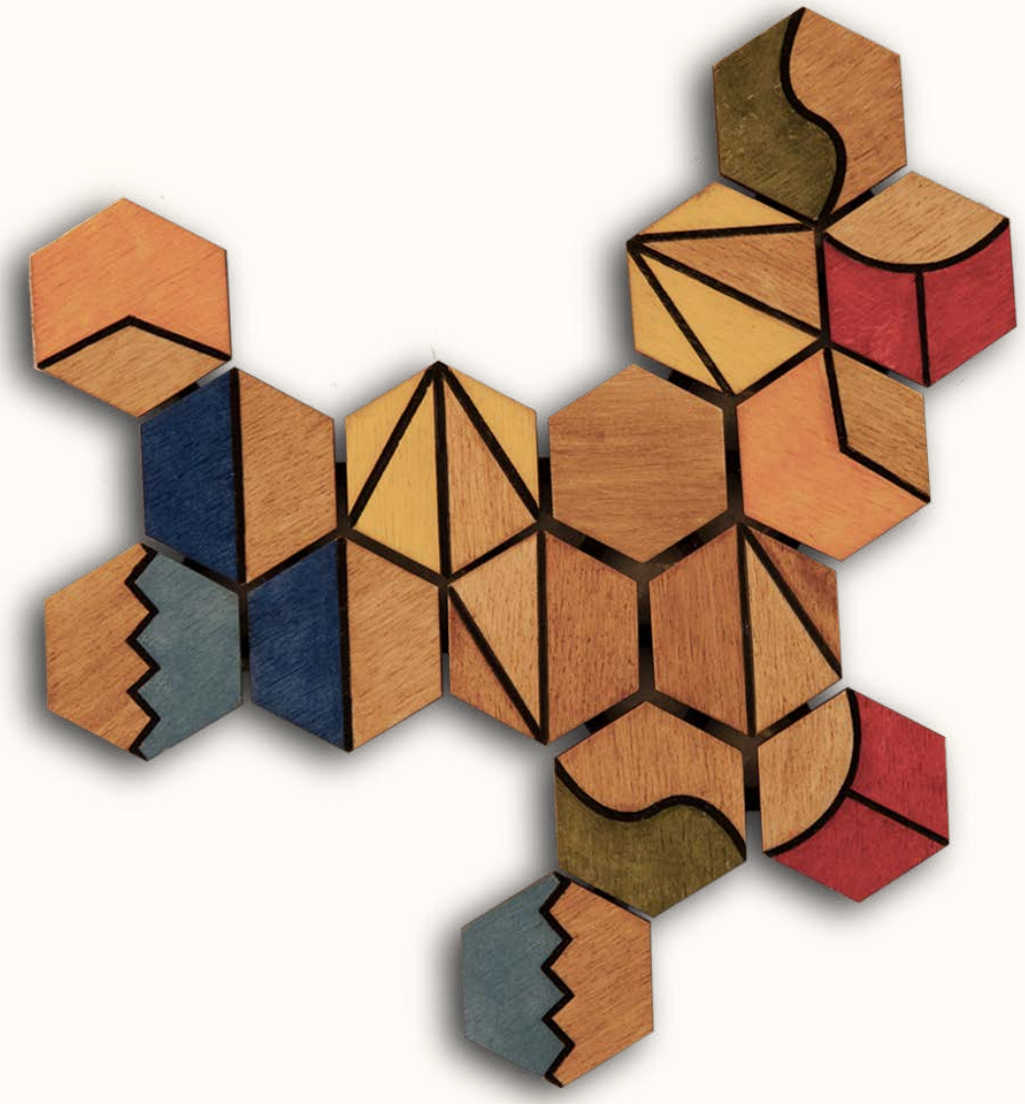

ABSTRACT

The consequences of climate change are becoming visible more and more, also in The Netherlands. Most people consider the environment to be important and want to act sustainable, but they find it hard to really take action. “Where should I start?” “What is actually sustainable and what not?” “What can I do within my budget?” are questions that arise. As a designer, I became aware of the overflow of products that are meant to make our lives better but at the same time harm the environment, which motivated me towards this graduation project. Research shows that stuff scores the highest in the impact top 10 of the average Dutch consumer (Porcelijn, 2017). Therefore, the initial goal of this project was to make consumers aware of the impact their purchases have on the environment and stimulate them to buy less. Literature research is done towards our shopping behaviour and what can be done to motivate sustainable behaviour related to the purchase of product.

This research revealed that, in the long term, activating intrinsic motivation is more successful than providing extrinsic motivation in the form of rewards for example. One way to stimulate intrinsic motivation of consumers to act more environmental friendly is to give them positive feedback about the sustainable behaviour already performed. This enlarges their environmental self-identity, which is defined as: the extend to which one sees him/her self as a sustainable person. (van der Werff, 2016). Since the effect of the positive feedback is bigger when feedback is given on multiple categories of sustainable behaviour (such as waste, energy usage, transportation etc.) instead of one category, a shift in this project is made from products alone towards more sustainable behaviour in general. Thereafter, existing initiatives to stimulate sustainable behaviour are evaluated by comparing them to the findings in the literature research and interviews are held to get a more clear image of consumer experiences. Based on this research, three possible design directions are being presented and the direction of positive feedback is chosen.
The final goal of this project is defined as motivating consumers to act more sustainable by enlarging the environmental self-identity with positive feedback on sustainable behaviour from the past.

The second phase is the ideation phase where in which brainstorms are done for possible solutions towards the chosen direction. A generative session is organised to involve the target group in the design process. With the results and insights of the brainstorm and this session, three concepts are formed which are formed and tested by the use of Google forms. The results are evaluated and the concept of sustainable art is chosen, whereby the user tracks his/her sustainable behaviour by creating an artwork on the wall.

In the third phase, iterations are made to the concept and two more tests are executed, whereby the concept developed into the final design: SusA. SusA is designed to make the user more conscious about their sustainable behaviour, and provide positive feedback for all the sustainable actions by creating an artwork on the wall. It stimulates interaction between the user and house mates and/or guests, and makes users aware of how much of a sustainable person they already are.
The product comes with an smart phone application, where pictures and tips can be shared with friends, statistics of one’s sustainable behaviour can be found and inspiration for sustainable actions in the different categories is available.
To conclude, suggestions are given to introduce SusA to the market, the concept is evaluated and recommendations are made for further research and development.

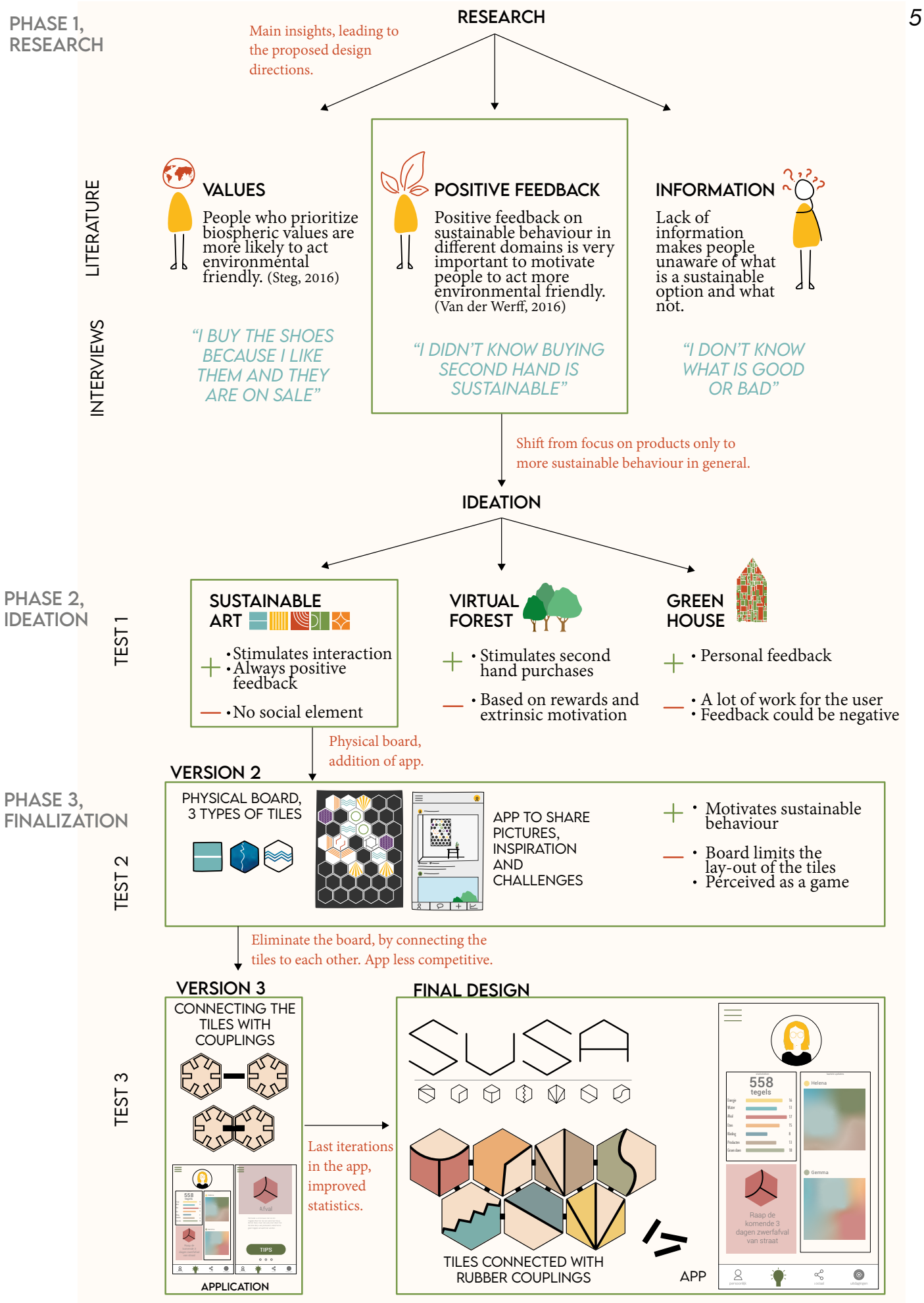

Figure 1. Structure of report visualised.

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1. INTRODUCTION

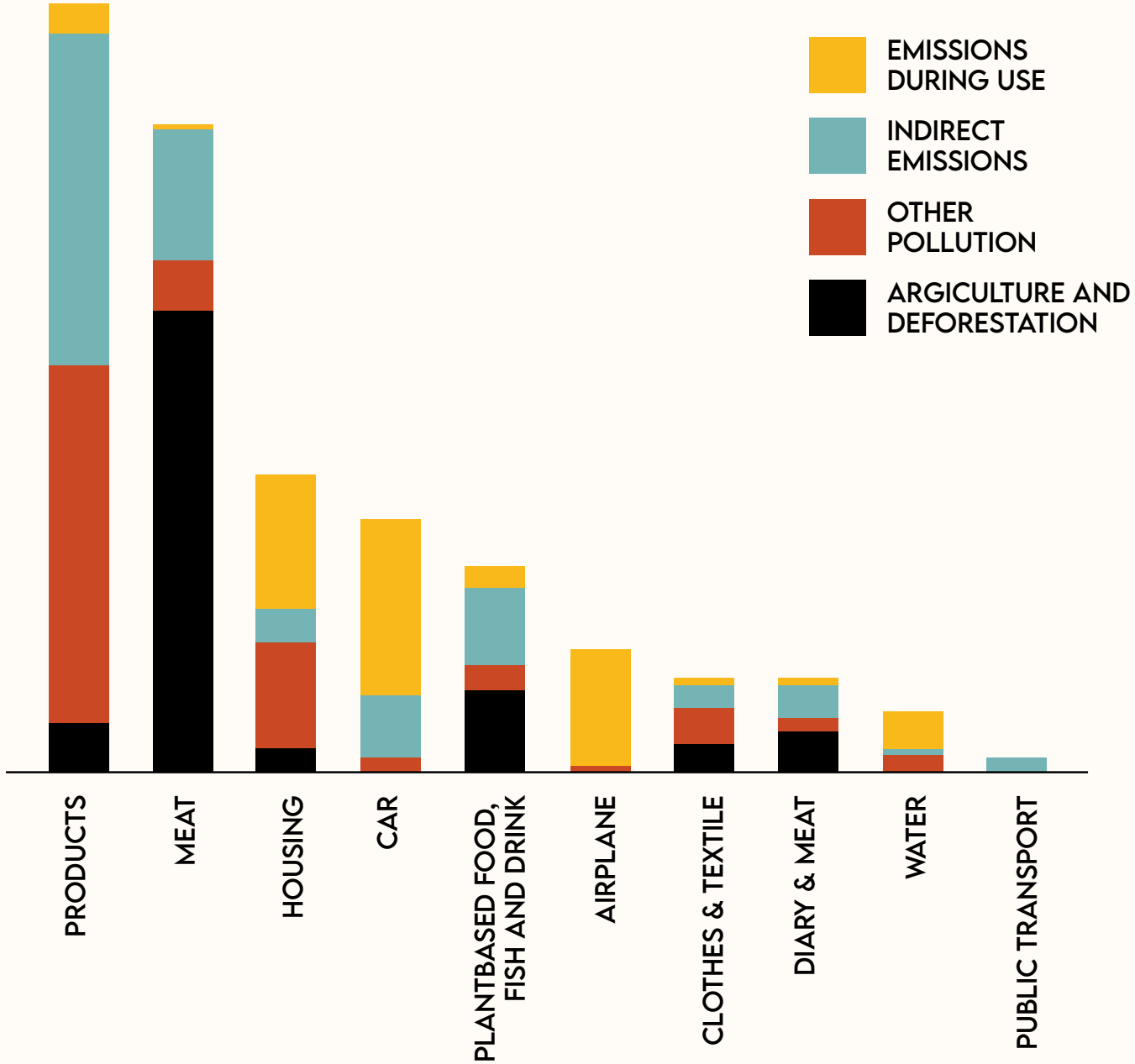
Last months, during the Corona crisis, a lot of people took the time to clean out their houses, and get rid of the stuff that is not used anymore. This caused overflowing charity shops, who couldn't handle the amount of donated goods.
It is not the first time charity shops are having a difficult time keeping up with the donations, also in 2019, when the Netflix series: 'Tidying up with Marie Kondo' was a hit, charity shops were filled to the roof with boxes that had to be sorted. (van Montfoort, 2019)

Apparently, people have more stuff (furniture, home decoration, kids toys, tableware, hobby items, etc.) than necessary, and this is an ongoing problem, because a year later there is new stuff to be donated. This also shows in the numbers: Charity shops collect yearly around 130 million of kilos of stuff, from which 43% is sold in the shop, 40% ends up in landfill (Wiesman, 2020)

Consumerism is from all times, when in 1400 world explorers started to colonize new lands, new materials were found and transported to Europe. There, products were made which then could be sold all over the world. Ages later, during the industrial revolution, machines enabled to mass produce products, and sell them for a cheaper price. More jobs were created, and more people started to earn money, which boosted the consumerism. (Historycrunch, n.d.)
Since 1950, marketing became more effective, with advertisements transferring a sense of identity in products, which led to the interrelation of social status with the consumption of products. Social status is still an often named reason for consumerism. (Verhaeghe, 2019; Paverelli 2019; Yarrow, 2019)
When from 1980 production was outsourced to low income countries, products became even cheaper and available for a bigger audience. (Historycrunch, n.d.)
Consumerism continues to intensify caused by cheap and ongoing supply of materials, outsourcing and influential marketing campaigns. Which leads to economic growth, but at the same time to environmental problems.
Stuff is even the most polluting category of the average human (CE Delft, 2017), as can be seen in figure 3.
Porcelijn did research towards the environmental impact of human

Figure 2 Caven family with all their posessions in t

their backyard.(Material world, Peter Menzel 1994)



Fiure 3. Impact top 10 average Dutch consumer

behaviour and together with CE Delft, composed an impact top 10. The impact of the categories is divided in CO2 emissions during use, indirect hidden CO2 emissions which arise during production, the diverse environmental pollution and agriculture and deforestation.
Since the last three categories occur during the production, this impact of the products we buy is not visible for the consumer and therefore called 'hidden impact'.
While people think they are saving the environment by not using plastic sandwich bags or unplugging the power cords, this has not as much impact as deconsuming would have (Porcelijn, 2017). This unawareness of the share on the environmental problems of consumerism is an interesting direction to design for, since not much is done yet. Most initiatives to minimize climate change focus on saving energy within the house, driving the car less or eating less meat (Dienst Publiek en Communicatie, 2019) which are all good ways to lower the environmental impact, but consumerism should not be forgotten in this journey towards a green future.

MAIN TAKEAWAYS

CONSUMERISM IS FROM ALL TIMES, IT HAS DEVELOPED TOGETHER WITH THE TECHNOLOGIES ENABLING MASS PRODUCTION AND OUTSOURCING PRODUCTION FOR CHEAP(ER) PRODUCTS. IT SNEAKED IN OUR SOCIETY, AND SINCE MARKETING MAKES USE OF PSYCHOLOGICAL INSIGHTS, PEOPLE STARTED TO ASSOCIATE THEIR SOCIAL STATUS WITH THEIR CONSUMPTION. DUE TO THE GROWTH OF CONSUMPTION, STUFF IS BEING THE MOST POLLUTING CATEGORY IN THE TOP TEN OF HUMAN IMPACT ON THE ENVIRONMENT NOWADAYS.

WITHIN THIS PROJECT

THESE INSIGHTS SHOW THE IMPORTANCE OF ATTENTION TOWARDS THE PROBLEM OF CONSUMERISM. TO GAIN A BETTER UNDERSTANDING OF HOW TO SOLVE THIS PROBLEM, RESEARCH WILL HAVE TO BE DONE TOWARDS PSYCHOLOGICAL PROCESSES REGARDING SHOPPING AND USING PRODUCTS. BUT FIRST, A TARGET GROUP HAS TO BE CHOSEN TO KEEP FOCUS.

1.2 TARGET GROUP

Fiure 4. Persona women

The initial target group is defined as people around 30 years old, willing to act environmental friendly, but don't want to change their entire lives accordingly.
The age of 30 is chosen because after the student life, around the age of 30, people start to earn more money, might move into a new house, sometimes together with a partner, and slowly start to replace the cheap products bought during their time as a student with better or more appealing products. As values can change when a big life event like moving houses or having a baby occurs (Steg, 2016) the age of around 30 is a good moment to make people aware of their responsibility towards the environment. Thereby, behavioural change created in this age can be performed for a long period of time, and values can possibly be passed on to children.
The target group is chosen to be willing to act sustainable, they for example eat flexitarian or sometimes buy from a fair trade brand. They are conscious about the problems existing around the environment but are a bit overwhelmed by all the negative messages and don't know how to be more sustainable without compromising their comfortable lives. This group is a big part of the Dutch population, research from Motivication (2019) commissioned by Milieucentraal shows that about a quarter of the Dutch would like to shower more often for less than 5 minutes (27%), or eat vegetarian (24%). Thereby, in general, younger consumers buy cheaper products and use them for a shorter period of time than elderly consumers (Hennies & Stamminger, 2016).
Persona's were made to make it easier to consider the target group during the research, ideation and conceptualisation phase, see figure 4 and 5.

DANIEL VERHOEF

A BIT ABOUT DANIEL
DANIËL IS A SPORTIVE, SOCIAL GUY. HE IS MARRIED AND HAS 2 KIDS, THEREFORE HE WORKS 4 DAYS A WEEK. HE IS INTERESTED IN THE ENVIRONMENT AND TRIES TO ADJUST HIS LIFESTYLE TOWARDS A MORE SUSTAINABLE ONE, BUT FINDS HIMSELF LOST IN THE OPTIONS TOWARDS SUSTAINABILITY. HE WANTS TO BUILD A BETTER WORLD FOR HIS CHILDREN. HE EATS FLEXITARIAN, AND SEPERATES HIS PAPER, GLASS AND PLASTIC WASTE. HE DOES GROCERIES AT THE AH AROUND THE CORNER, AND TRAVELS TO WORK BY BIKE.

"I WANT TO CREATE A BETTER WORLD FOR MY KIDS TO LIVE IN."

AGE
32

CITY
AMSTERDAM

LIVES WITH
WIFE AND SONS (3&5)

EDUCATION
UNIVERSITY OF AMSTERDAM

JOB
ACCOUNTANT

HOBBIES

PLAYING SOCCER | PLAYING THE SAXOPHONE | RIDING HIS BICYCLE | DRINKING BEERS WITH FRIENDS

BRANDS

GOALS

- ENJOYING LIFE
- GETTING A JOB PROMOTION
- RAISING HIS SONS IN A LOVING WAY
- LIVING MORE ENVIRONMENTAL FRIENDLY

FRUSTRATIONS

- HAVING TO WALK FURTHER WITH HIS PLASTIC WASTE THAN NORMAL WASTE.
- TRAFFIC JAMS IN THE CITY CENTRE.

Fiure 5. Persona men

MAIN TAKEAWAYS

SOMEONE FITS THE TARGET GROUP WHEN HE/SHE:

- *IS AROUND THE AGE OF 30, AND NOT LIVING IN A STUDENT ACCOMMODATION ANYMORE;*
- *HAS THE MONEY TO BUY NEW PRODUCTS, AND IS IN THE PHASE OF LIFE WHERE THE OLD WORN OUT STUFF FROM STUDENT LIFE IS REPLACED BY NEW ITEMS;*
- *IS AWARE OF THE ENVIRONMENT, BUT NOT WILLING TO DEDICATE THEIR ENTIRE LIFE TO IT;*
- *WANTS TO BE MORE SUSTAINABLE BUT DOES NOT REALLY KNOW WHERE TO START.*

WITHIN THIS PROJECT

THIS CAN BE USED TO EMPATHISE WITH THE TARGET GROUP WHEN A DECISION HAS TO BE MADE, AND WHEN SELECTING PARTICIPANTS FOR MY TESTS.

2. WHY WE BUY

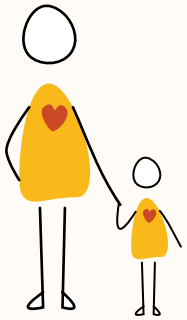
TO CLARIFY WHAT LEADS US TO BUYING MORE THAN WE NEED, LITERATURE RESEARCH IS DONE TOWARDS PSYCHOLOGICAL PROCESSES IN RELATION TO CONSUMPTION. WHY DO PEOPLE BUY PRODUCTS, HOW ARE THEY GUIDED BY MARKETING, AND WHAT HAPPENS IN THE BRAIN DURING BUYING? HAVING A BETTER UNDERSTANDING OF THE WORKING OF THE BRAIN CAN HELP TO SEE THE UNDERLYING PROBLEM OF CONSUMERISM AND FIND A DESIGN DIRECTION IN WHICH A VALUABLE CHANGE CAN BE MADE.

Picture: Sunyu Kim

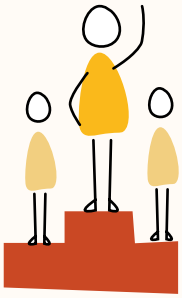
2.1 UNSUSTAINABLE BEHAVIOUR

A way to understand our unsustainable behavior is to look at it from the perspective of the evolutionary psychology. In the book mismatch (Giphart & van Vught, 2016) the dissonance between our primitive brain, formed in the prehistory, and the current society we live in is discussed and the effects are explained. Five heuristics of our brain that make decisions easier but lead to environmental problems are listed.

The first one is that we are focused on our own well-being, or at least that of our children. We are egoistic and self-centered, we care more about ourselves than our family, more about our family than our friends, and more about our friends than our colleagues. What happens to strangers is not that important to us. Every individual makes decisions based on their own profit, while the negative consequences are shared by the group. This is also known as the tragedy of the commons. Already in 1833, the mathematical William Forster Lloyd described this phenomenon. A common is a field where several farmers jointly let their cows or sheep graze. Every farmer has their own animals and lives from the proceeds of the field. The field has a defined size and the amount of grass is limited, so if a farmer adds an animal to his cattle this is profitable for him (more animals means more meat or wool), but unfavorable for the other farmers (less grass will be left for the other animals). If every farmer expands their cattle, the field will be overgrazed and the land will be exhausted, which is unfavorable for all farmers. So individual profit for one farmer, can result in a tragic demise for all farmers. This can be seen nowadays in the empty seas and polluted living environments.

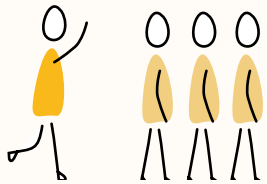


The second heuristic is that we are focused on the here and now. We want direct satisfaction to our desires, and lack self-control. This is clearly illustrated by the Marshmallow test of psychologist Walter Mischel from 1972. Kids were offered a marshmallow, which they could eat immediately or wait 15 minutes after which they would get a second one. A lot of kids behaved impulsively and ate the marshmallow immediately. Follow up research showed that the children who were able to refrain themselves, were socially more successful in later age.



The third is that we are very sensitive to status, this is rooted in our brain in the prehistories, when men obtained status by hunting the best meat, telling the best stories etc. These men with the highest status got to have the best food and the most sex. Nowadays status relative to others is still very important to us, for example when having the choice between earning 50.000 dollars in a year, when the average is 60.000 dollars, or earning 40.000 dollars when the average is 30.000 dollars, most people choose the second option. eventhough the first option would result in more money, having more and being better compared to the people around them is considered to be more important.

The fourth is that we focus on others. This used to be useful in the prehistory, since it would be dangerous not to follow the group, but this nowadays results in following others when they perform unsustainable behaviour. We want to be part of the group so badly that even though we know the group is wrong, we will still follow them.



The last heuristic is that our primitive brain mainly has attention toward direct sensory experiences. We neglect information that is not directly felt. We know there is climate change but we don't feel it. And we don't experience the loss of materials, so we keep consuming to stay up to date in the status competition.

MAIN TAKEAWAYS

THERE ARE SOME 'MISTAKES' IN OUR BRAIN, THAT GUIDES US INTO CONSUMPTION AND OTHER UNSUSTAINABLE BEHAVIOUR. THESE MISTAKES ARE GRACEFULLY USED BY MARKETING TO SEDUCE US TO BUY MORE AND MORE.

WITHIN THIS PROJECT

UDERSTANDING HOW THE BRAIN WORKS GIVES INSIGHT IN THE UNDERLYING THOUGHTS AND CONSIDERATIONS OF CONSUMERS, WHICH THEY WOULD NOT SEE AS A REASON FOR THEIR BEHAVIOUR THEMSELVES, AND THUS WOULD NOT COME OUT OF INTERVIEWS. THESE MISTAKES CAN BE USED IN A POSITIVE WAY IN THIS PROJECT, FOR EXAMPLE BY FINDING WAYS TO MAKE THE SUSTAINABLE BEHAVIOUR MORE COMMON AND STATUS ENHANCING, SO THAT TO BELONG TO A GROUP, ONE HAS TO ACT SUSTAINABLE.

Eventhough nobody would admit they buy something because it makes them feel they are better than others, status is more often mentioned as reason for overconsumption. This would suggest it is something that leads us unconsciously and hints to the underlying problem of overconsumption and is therefore interesting to do some further research on.

Status is a more often called big influencer of shopping behaviour (Verhaeghe, 2019; Paverelli 2019; Yarrow, 2019).
Our identity is formed by the impressions we get from family and surroundings. In the past decades this was very stable, because everything was local, but now under influence of television, travelling and education, we are subject to much more impressions. This gives a lot of freedom, but on the other side also enlarges stress, fear and the feeling of being make-able. Often this freedom is translated into the strive for material and professional success, independence and individualism (Verhaeghe, 2019). As Pekelharing says: "We don't only buy stuff, we also buy the idea of a good life." (Paverelli, 2019).
Contradicting to this belief, according to the Easterlin paradox (figure 6), after a certain level more money doesn't lead to more happiness (Easterlin, 1974).
Buy why is social status so important to us? It indicates how good we are as partners, and thus is of big importance to survive and procreate. (Stratum, 2020) According to Stratum (2020) there are 6 characteristics that objectively make us a good partner: general intelligence, openness, conscientiousness, agree-ability, stability, extraversion.
When we are aware of our less attractive characteristics, we try to compensate for it with buying goods and services. Brands anticipate to this very well in their advertisements, by spreading the idea that a perfect life can be reached when buying their products.
Even though people can judge others in a face-to-face conversation very well, we still try to mislead them by giving signals of us being the perfect partner through owning goods and services, since we think that others do care about this in others. (Stratum, 2020).

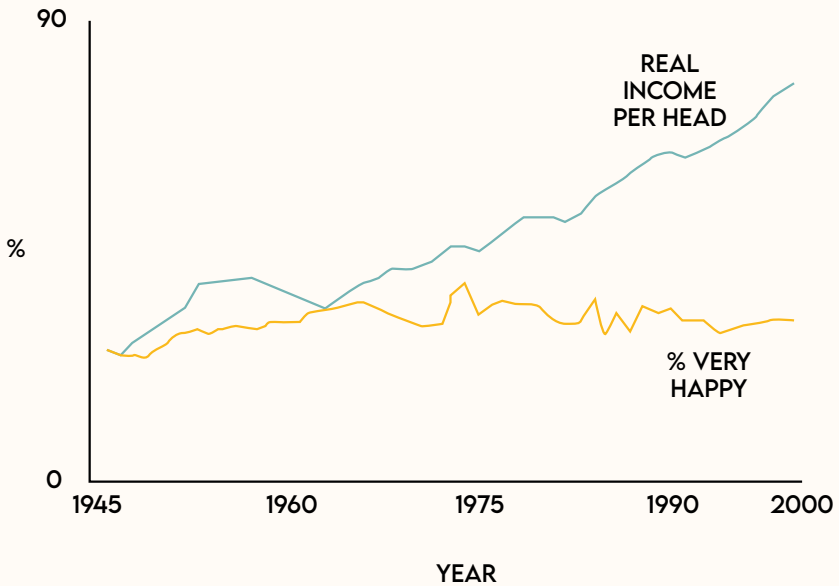


Figure 6. Graph Easterlin paradox, measured in the USA

2.3 PRODUCT VALUES

Products are seen as status symbols, but they have more values than status enhancing only. To better understand our relation with products, some research is done towards product values and our replacement behaviour.

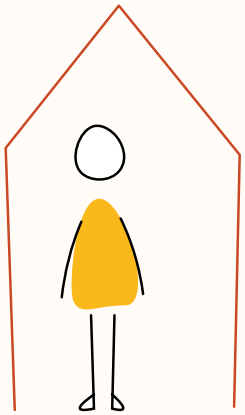
The strive for status through products also effects replacement behaviour. Since having the newest and best products is regarded as a status symbol, products are replaced before they are broken beyond repair (Rau & Oberhuber, 2016). Obsolescence can be absolute, when the product is broken beyond repair, or relative, when the product is physically still functioning but it is evaluated to be less worthy in comparison to new products by the consumer (Van den Derge et al., 2020). The decision to replace a product is always a trade off between the advantages of the current owned product and the new one (Van Nes and Cramer, 2005). In some cases the user accepts the function loss within a product, while in other situations, the function loss is seen as a reason to replace the product, the latter being the less environmental friendly option. For a complete analysis of replacement behaviour, see appendix A. Apart from function, there are 4 other values influencing the consumers decision to buy or replace a product, as can be seen in figure 7 on the next page. These different values make the relation we have with products complicated especially when they are conflicting, for example when a newer version of a product is released, which enables the user new social interaction with others and belong to the group, but the old product still functions and has emotional values. How the user deals with these conflicting values is very personal. From an environmental perspective, using a product longer, repairing it when broken, postponing replacement and only buying what you need is the most optimal choice. Rationally seen these are easy decisions, but since products evoke emotions and have other values as well, this is often more complicated.

FUNCTIONAL VALUE

A products perceived utility and functional performance.

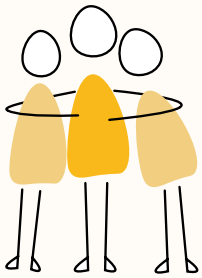
EPISTEMIC VALUE

The product creating curiosity, newness or the need for variation.



CONDITIONAL VALUE

The influence of circumstances or specific situations on the consumer.



SOCIAL VALUE

How the product is linked to belonging to a group.

EMOTIONAL VALUE

How much the product arouses emotions and affections.

Figure 7. Product values influencing our relation with the product.

MAIN TAKEAWAYS

IN TODAY'S SOCIETY, THE FEELING OF BEING MAKEABLE, AND HAVING CONTROL OVER HOW PERFECT YOU ARE AS A PERSON LEADS TO OVER CONSUMPTION. NEXT TO STATUS, PRODUCTS HAVE OTHER VALUES THAT CAN LEAD TO UNSUSTAINABLE BEHAVIOUR.

WITHIN THIS PROJECT

PRODUCTS HAVE ALL KINDS OF VALUES FOR THE USER, AND THESE VALUES ARE TAKEN INTO ACCOUNT WHEN A DECISION HAS TO BE MADE WETHER TO BUY/ REPLACE A PRODUCT OR NOT. NEXT TO THESE PERSONAL VALUES, MY AIM FOR THIS PROJECT IS TO LET PEOPLE CONSIDER THE ENVIRONMENTAL IMPACT OF A PRODUCT AS WELL. SINCE THE VALUES ARE SO DIFFERENT PER PERSON, THIS SHOULD BE TAKEN INTO ACCOUNT BY DESIGING A SOLUTION THAT IS PERSONAL AS WELL.

TO CONCLUDE

THERE ARE SEVERAL REASONS WHY CONSUMERS BUY (NEW) PRODUCTS. FIRST OF ALL, PROSPERITY IS GROWING, AND PRICES OF PRODUCTS GET LOWER DUE TO OUTSOURCING AND MASS PRODUCTION. THIS RESULTS IN A BIGGER PART OF SOCIETY THAT IS ABLE TO SPEND MORE MONEY. TOGETHER WITH THE IDEA OF PRODUCTS MAKING US HAPPY, OR HELP US TO HAVE A BETTER LIFE AND ENLARGING OUR STATUS, THE MONEY EARNED IS SPENT ON PRODUCTS. THEREBY, PEOPLE GIVE VALUE TO PRODUCTS, WHICH SOMETIMES LEAD TO UNSUSTAINABLE BEHAVIOUR, FOR EXAMPLE WHEN A PRODUCT IS REPLACED EARLY BECAUSE OF SOCIAL VALUES, OR A PRODUCT IS KEPT WHILE IT IS NOT BEING USED ANYMORE BECAUSE OF EMOTIONAL VALUES.

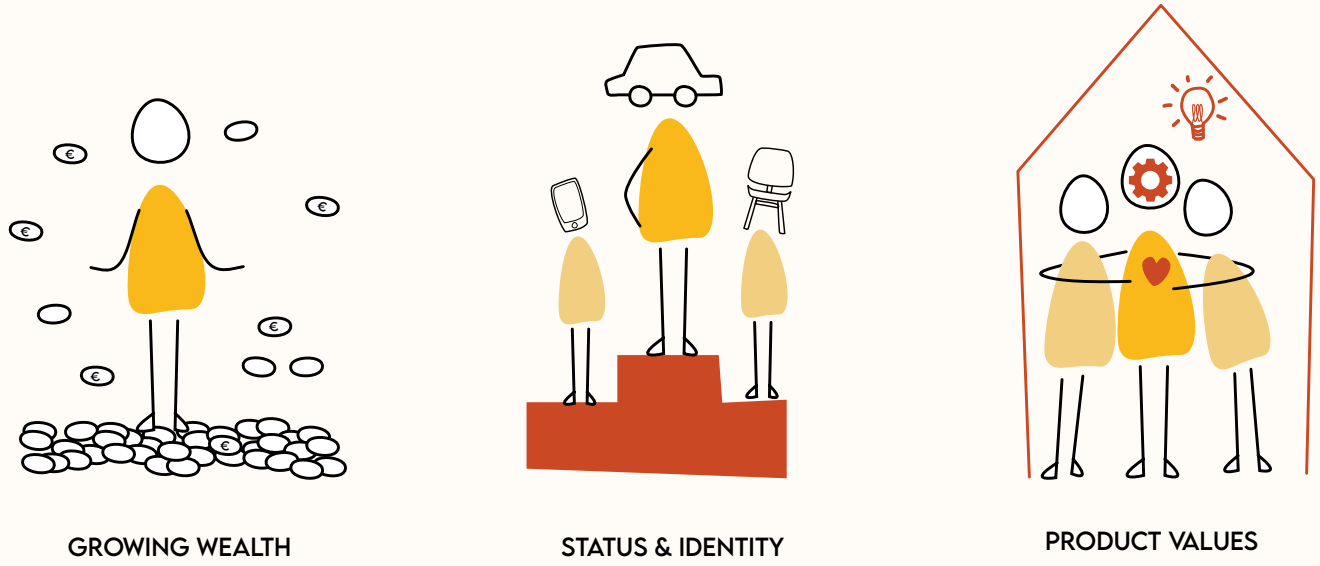


Figure 8. Reasons to buy

3. MOTIVATING TOWARDS SUSTAINABLE BEHAVIOUR

SO PEOPLE BUY BECAUSE OF STATUS, THE BELIEVE IT MAKES THEM HAPPY OR WANTING TO BELONG TO THE GROUP. THESE PRODUCTS ARE HARMING THE ENVIRONMENT WHEN BOUGHT NEW AND NOT USED FOR THEIR FULL POTENTIAL. THERE ARE POSSIBILITIES TO LOWER THE ENVIRONMENTAL IMPACT WITHIN REACH, SUCH AS BUYING SECOND HAND, SHARE OR BUY FROM SUSTAINABLE BRANDS.
HOW CAN CONSUMERS BE MOTIVATED TO BEHAVE MORE SUSTAINABLE REGARDING PRODUCTS? HOW CAN ONE BE MOTIVATED TO MAKE USE OF THE POSSIBILITIES OFFERED? IN THIS CHAPTER, RESEARCH IS DONE TOWARDS MOTIVATORS FOR SUSTAINABLE BEHAVIOUR.

Picture: Brandon Montrone

3.1 MOTIVATORS FOR SUSTAINABLE BEHAVIOUR

A way to find methods to motivate sustainable behaviour is by looking at it from the perspective of conservation psychology, which studies the mutual relation between humans and the natural environment.

People act the way they do mainly because they link positive outcomes with their acting (Lehman and Geller, 2004). Fischhof (2020) listed ways to motivate people towards more green behaviour, based on general psychological principles from the conservation psychology. These are illustrated in the image below. As can be seen, rewards are a way to extrinsically motivate people for sustainable behaviour, this can undermine the intrinsic motivation (Cherry, 2019). People behave in a certain way because of rewards or social acceptance, this works as long as the reward is present, but once the reward stops, the behaviour drops of as well. The other methods are all ways to support intrinsically motivated sustainable behaviour, and link to the self determination theory as described in the next chapter. All of these methods can be used as inspiration in the development of the design, and serve as example for the pillars of intrinsic motivation.

PROVIDE INFORMATION

Why an action is important, and how to do it.

HELP PROCESSING

Repeat a message multiple times to make it stick.

LEVERAGE LEADERS

People are likely to follow others.

FUN

Make sustainable behaviour more fun, for example by positive messages or group activities.

ALLOW PARTICIPATION

People want to have the opportunity to contribute with their ideas

ONE STEP AT THE TIME

Let people get familiar with one behaviour before moving on to the next

PAUSE REWARDS

Rewards work as long as they continue, but the behaviour drops off as soon as they stop.

Figure 9. Methods to motivate sustainable behaviour

3.2 INTRINSIC MOTIVATION

Rewards and their temporarily effect because of being an external motivator introduces the difference between intrinsic and extrinsic motivation. As intrinsic motivation tends to be more effective in the long term, it is interesting to do more research towards the theory of intrinsic motivation and how it can be used in a positive way.

The main difference between intrinsic and extrinsic motivation is what makes us feel good. With intrinsic motivation, the behaviour is shown because the act of the behaviour itself makes us feel good whereas with extrinsic motivation the result of the behaviour makes us feel good. (Geurtsen, 2018)
To make the behaviour more desirable, the behaviour has to match the desires from the target group. According to the self determination theory of Deci and Ryan (Ackerman, 2020) three universal desires that stimulate the intrinsic motivation are competence, autonomy and social involvement. Competence gives the feeling one is able to show the desired behaviour, autonomy gives the feeling the person makes his/her own decisions and social involvement gives the feeling of belonging to a group and being in a social safe environment, the latter linking back to the heuristic in our brain of following others (chapter 2.1) Intrinsic motivation can be activated by these three factors, but can't be forced. Someone has to have a bit of intrinsic motivation already to make these factors effective.

Figure 10. Feelings that stimulate intrinsic motivation

MAIN TAKEAWAYS

INTRINSIC MOTIVATION CAN BE ACTIVATED, NOT MADE. THE FEELINGS OF AUTONOMY, COMPETENCE AND SOCIAL INVOLVEMENT ACTIVATE INTRINSIC MOTIVATION.

WITHIN THIS PROJECT

THE FEELINGS OF COMPETENCE, AUTONOMY AND SOCIAL INVOLVEMENT SHOULD BE ADOPTED IN THE DESIGN SO THAT USERS WILL EXPERIENCE THESE FEELINGS AND THEIR INTRINSIC MOTIVATION WILL BE ACTIVATED. THESE ARE INCLUDED IN THE CRITERIA FOR DESIGN AS DESCRIBED IN CHAPTER 7.2.

3.3 VALUES AND SUSTAINABLE BEHAVIOUR

Activating the intrinsic motivation gives an interesting point of view for further research on sustainable behaviour. Professor Linda Steg showes that when it comes to the environment, people are less guided by facts, arguments and cost-benefit analysis and more by feelings, norms and values. This shows that intrinsic motivation is also important in the area of motivating environmental friendly behaviour.

Steg (2016) has done extensive research towards what motivates people to act green. She found that sustainability gives people a good feeling, because we feel like we contribute to the big picture, a common necessity.
She also found that the considered importance of behavioural consequences depends on which values ("desirable goals that transcend situations and serve as guiding principles in peoples life in general", Steg (2016)) people prioritize. There are 4 types of values that are important considering environmental behaviour:

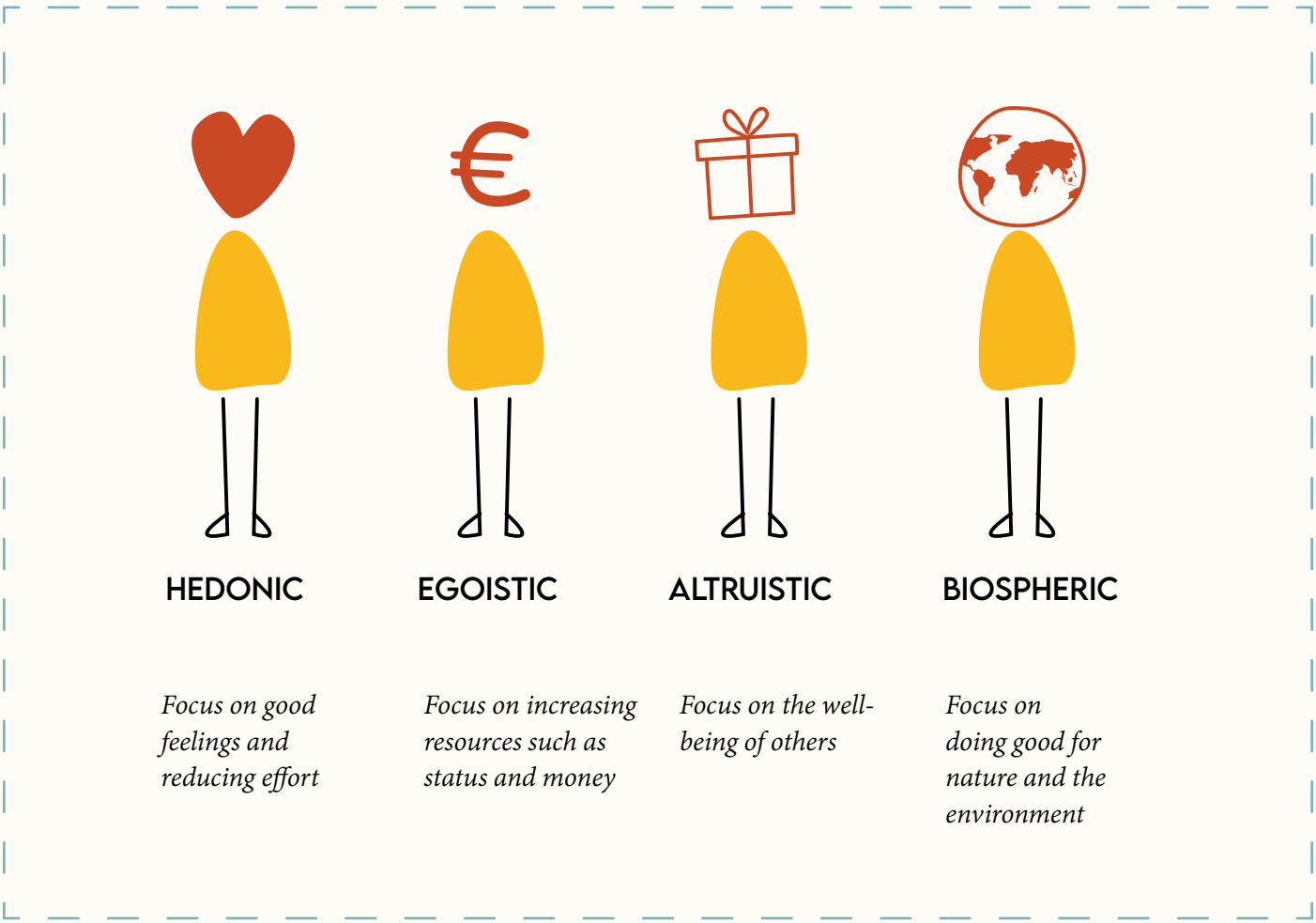


Figure 11. Values

People are more likely to favour and choose options that are in line with the values they prioritize. All people carry egoistic, biospheric and altruistic values with them tin a certain degree. (De Groot & Steg, 2009). These values are formed during childhood and more or less stable over time. Frequently, acting towards altruistic and biospheric values leads to sustainable behaviour. While the less pro-environmental behaviour is often related to egoistic values.
Therefore, the effect of interventions to promote sustainable behaviour will last longer when biospheric and altruistic values are considered. (De Groot & Steg, 2009)

Sometimes, people don't act in harmony with their values, for example when the sustainable behaviour causes high financial costs, effort or inconvenience. This creates a conflict between biospheric and egoistic values. Another moment of not following values is when people temporary prioritize other goals, for example when someone is in a hurry. Or when cognitive resources are overloaded.

People are more likely to act on their values when these are activated in the context where choices are made (Steg, 2016). This links back to the heuristics in our brain as described in chapter 2.1, since we live in the here and now, and are focussed on direct sensory experiences, our brain can be easily deceived by presenting one of the following symbols. Altruistic values are activated by religious symbols (churches) symbols of justice. Biospheric values are activated by natural symbols (trees, animals). Hedonistic values with hedonistic symbols (chocolate, bikini models, nice smell) and status or financial symbols activate egoistic values.
Circumstances indicating the to what extent others acted on particular values influences the likelihood of pro-environmental actions as well.

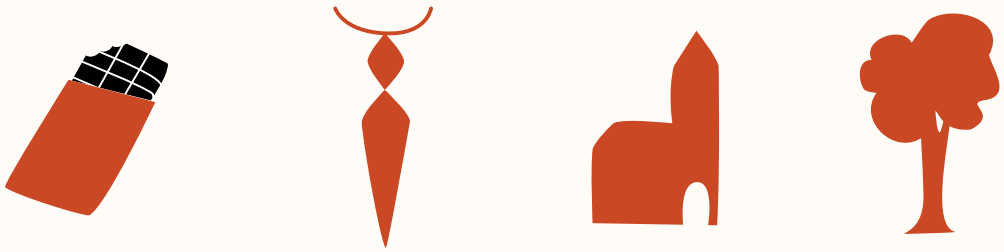


Figure 12. Activators for values

These insights can be used in different ways to encourage pro-environmental behaviour, as Linda Steg proposes:
- Use strategies that empower and motivate people to act on their biospheric values, such as changing the (perception of) costs and benefits of acting sustainably, reducing cognitive effort, increasing the awareness of environmental issues, taking advantage of people's desire to be consistent in their behaviour or social influence strategies.
- Strengthen altruistic and biospheric values, the priority of different values of people can change when a life changing event occurs, when the current values form a threat to themselves, or when scientific evidence shows that environmental problems seriously threaten human life and this can be stopped by changing ones behaviour. For more information about these ideas, see appendix B

MAIN TAKEAWAYS

THE VALUES PEOPLE PRIORITISE, AND ESPECIALLY THE BIOSPHERIC VALUES TELLING HOW IMPORTANT ONE CONSIDERS THE ENVIRONMENT HAVE A BIG INFLUENCE ON ENVIRONMENTAL FRIENDLY BEHAVIOUR. ENLARGING ONES BIOSPHERIC VALUES WOULD THUS LEAD TO A MORE SUSTAINABLE PERSON. THEREBY, BIOSPHERIC VALUES CAN BE MADE MORE SALIENT IN SPECIFIC SITUATIONS WITH DIFFERENT STRATEGIES.

WITHIN THIS PROJECT

THESE INSIGHTS GIVE A POSSIBLE DIRECTION TO DESIGN FOR. BY DESIGNING SOMETHING THAT ENLARGES ONES BIOSPHERIC VALUES, SUSTAINABILITY WOULD BE CONSIDERED TO BE MORE IMPORTANT AND MORE SUSTAINABLE DECISIONS WOULD BE MADE. TO BE ABLE TO DESIGN FOR THE ENLARGEMENT OF BIOSPHERIC VALUES, MORE RESEARCH IS NEEDED ON HOW TO INFLUENCE THE FORMATION OF THESE VALUES. THEREBY, I QUESTION IF VALUES ARE THE ONLY WAY TO INSTRINSICALLY MOTIVATE TOWARDS SUSTAINABILITY.

3.4 ENVIRONMENTAL SELF-IDENTITY

Biospherical values seem to be a compelling way to enhance consumers' consideration of the environment, but research towards ways to enlarge the biospherical values reveal another factor: the environmental self-identity.

Van der Werff (2016) adds to the research of Linda Steg with insights in the environmental self-identity of people. Environmental self-identity is defined as: "The extent to which someone sees his-/herself as a environmental friendly person". This environmental self-identity guides people in their sustainable behaviour, such as separating waste or saving energy.

The environmental self-identity is partly stable: it depends on the values someone prioritizes, and especially on the biospheric values, linking back to the research of Steg (2016). But part of it can be influenced by being reminded of one's environmental friendly behaviour in the past. For example, in the research done by Steg, Keizer and Van der Werff (Van der Werff et al., 2014) participants were asked about common environmental friendly behaviour such as separating glass waste, or turning of the lights. Participants who could answer these questions with "Yes I do this regularly", realized they acted environmental friendly on a regular basis, which made them see themselves as a more environmental friendly person, which in turn gives them a good feeling. This effect was only present when participants were asked about environmental friendly behaviour in various domains, so not all questions related to one category of sustainable behaviour, but divided over various categories.

Further research showed that difficult and unique behaviour has more impact than simple and everyday behaviours. So either feedback on easy behaviour on various domains, or feedback on one particular hard to do and more unique behaviour (such as switching to an electrical car) enlarges the environmental self-identity. This positive feedback activates the intrinsic motivation as described in chapter 3.2, by giving the feelings of autonomy (I make my own decisions and act in line with how I see myself) and competence (I am able to perform sustainable behaviour) (Cherry, 2019). The higher the environmental self-identity is, the more people are likely to act sustainable, since people want to act in line with how they see themselves.

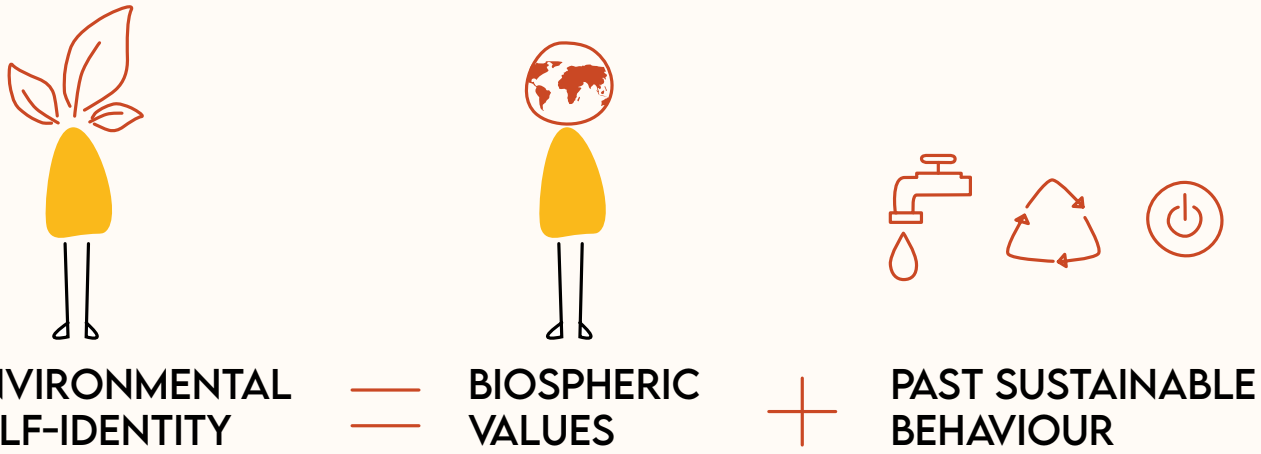


Figure 12.Environmental self-identity

MAIN TAKEAWAYS

POSITIVE FEEDBACK IS VERY IMPORTANT FOR THE CONSUMER TO KEEP BEING SUSTAINABLE. AS PEOPLE WANT TO ACT IN LINE WITH HOW THEY SEE THEMSELVES, TELLING SOMEONE HOW SUSTAINABLE HE/SHE IS WILL MAKE THEM FEEL LIKE A SUSTAINABLE PERSON, AND THEY WILL BE LIKELY TO ACT LIKE THAT IN THE FUTURE. HEREBY IT IS IMPORTANT TO GIVE FEEDBACK ON VARIOUS CATEGORIES OF SUSTAINABLE BEHAVIOUR.

WITHIN THIS PROJECT

THE POSITIVE APPROACH OF GIVING FEEDBACK ON PAST SUSTAINABLE BEHAVIOUR IS VERY INTERESTING, AND COULD BE AN OPTION FOR A DESIGN DIRECTION. IT COULD GIVE SUSTAINABILITY A POSITIVE TWIST, INSTEAD OF THE MORALITY AND FEELING OF GUILT THAT ARE NOW ASSOCIATED WITH IT. SINCE FEEDBACK IS NEEDED ON DIFFERENT AREAS OF SUSTAINABILITY, A SHIFT FROM PRODUCTS ONLY TOWARDS SUSTAINABLE BEHAVIOUR IN GENERAL WOULD BE NEEDED WHEN THIS DIRECTION IS CHOSEN.

3.5 POSITIVE PSYCHOLOGY OF SUSTAINABILITY

Getting positive feedback on past sustainable behaviour and seeing yourself as a sustainable person seems to give people a good feeling. This provides an other way to look at sustainable behaviour, from perspective of the field of positive psychology in combination with sustainability.

According to Corral-Verdugo (2013), people who practise sustainable behaviour experience significant psychological benefits, such as satisfaction, competence, motivation and happiness.
Linking it more to consumerism, Myers and Diener (1995) reviewed happiness research and concluded that happiness does not require consumption based or environmental damaging activities, since the most important sources of life satisfaction are non material in nature. Research from Brown and Kasser (2005) even showed that happiness is related to decreased consumption, and to pro-ecological behaviours.
On the other hand, products can also contribute to one's subjective well-being through symbolic meaning. (Casais et al., 2018). Symbolic meaning can be obtained when people associate the product with a meaningful experience, person, place or idea. Subjective well-being is defined in the field of positive psychology as "a phenomenon with both cognitive and subjective components: a positive appreciation of one's life, a sense that one's life is good, meaningful and worthwhile, combined with the experience of joy, happiness and contentment." (Casais et al., 2018).
Some every day consumer products contain symbolic meanings that can contribute to subjective well-being, those are: symbolic meanings that represent and signify positive relations, personal growth, purpose in life, environmental mastery, autonomy and/or self-acceptance. Autonomy is a symbolic meaning that directly corresponds to the pillar 'autonomy' of intrinsic motivation as described in chapter 3.2.
The others relate to intrinsic motivation in terms of being motivated to keep growing and gaining fulfilment, this is essential to develop self-esteem (Deci & Ryan, 2010). Casais et al. (2018) listed directions that can help the designer to design products that foster the symbolic meaning, see table 1. Within this project, the symbolic meanings of personal growth, purpose in life and self-acceptance are the most relevant, since these are related to changing ones behaviour towards a more sustainable one. These are included in the design criteria as described in chapter 7.2. The design directions that go with them are used as inspiration for the generation of ideas that contribute to subjective well-being of the users.

SYMBOLIC MEANING	DESIGN DIRECTION	DESCRIPTION
POSITIVE RELATION WITH OTHERS	SUPPORT MEANINGFUL AFFILIATIONS	BY FACILITATING THE PRACTICE OF GROUP/COMMUNITY ACTIVITIES
	EMBODY CHARACTERISTICS OF A GROUP	BY USING UNIQUE CHARACTERISTICS OF THE GROUPS THE USER BELONGS TO
PERSONAL GROWTH	SUPPORT ACTIVE PERSONAL DEVELOPMENT	BY PROVIDING A PLATFORM FOR ACTIVE REFLECTION ON LESSONS LEARNED AND FUTURE EXPECTATIONS
	EMBODY PERSONAL GROWTH	BY FOCUSING ON ADAPTABILITY TO ACCOMMODATE PHYSICAL AND OR PSYCHOLOGICAL CHANGE
	SUPPORT ACCEPTANCE AND GROWTH FROM PAST EXPERIENCES	BY PROVIDING A TANGIBLE REPRESENTATION OF THE PASSAGE OF TIME
	ENHANCE MEMORIES	BY OFFERING A POSITIVE CONTEXT OR ACTIVITY TO REFLECT ON MEMORIES OF LOVED ONES
PURPOSE IN LIFE	ENCOURAGE POSITIVE CHANGE	BY PROVIDING AN EXTERNAL TRIGGER THAT SUGGESTS BENEFICIAL ACTIVITIES OR BEHAVIOURS
	PROVIDE A SENSE OF CONTROL	BY ALLOWING THE USER TO MANAGE PERSONALLY SIGNIFICANT GOALS, OR TO ELIMINATE OBSTACLES IN THEIR FULFILMENT
	KEEP TRACK OF PROGRESS	BY PROVIDING VISUAL FEEDBACK ON PROGRESS TOWARDS PERSONALLY SIGNIFICANT GOALS
ENVIRONMENTAL MASTERY	SUPPORT MULTI-SENSORIAL COMMUNICATION	BY TRANSLATING MESSAGES INTO A SENSORIAL EXPERIENCE
	PROVIDE A CONTEXT FOR MEANINGFUL INTERACTION	BY MAKING USE OF THE CONTEXT OR LIMITATIONS AS AN ADVANTAGE
AUTONOMY	DESTIGMATISE	BY ENHANCING THE AESTHETIC QUALITIES OF PHYSICALLY ENABLING PRODUCTS
	DESIGN FOR MINDFULNESS	BY SLOWING DOWN PROCESSES OR DISCLOSING MECHANISMS BEHIND PRODUCTS TO PROMOTE MINDFUL LIVING
	REDIRECT THE USER'S ATTENTION	BY DESIGNING AN INTERVENTION THAT REQUIRES ATTENTION FROM THE USER TO DISTRACT FROM NEGATIVE SITUATIONS
SELF-ACCEPTANCE	ALLOW SHARED TRANSFORMATION	BY PROVIDING TOOLS FOR USER INPUT AT AN AESTHETIC AND/OR FUNCTIONAL LEVEL
	ALLOW SELF-EXPRESSION	BY PROVIDING A TANGIBLE PLATFORM TO WEAR, SHARE OR DISPLAY PERSONALLY SIGNIFICANT IDEAS

Table 1. Design directions to forster symbolic meanings, retrieved from: Casais et at. 2018

The Canadian researcher O'Brien developed the term sustainable happiness: " Happiness that contributes to individual, community or global well-being and does not exploit other people, the environment, or future generations".
In her research, students were asked to answer questions about what makes them happy in life, and how this could also contribute to lower the environmental impact. Being conscious of how ones actions can benefit the environment, results in more sustainable behaviour (O'Brien, 2008). This also lowers the misconception that to be sustainable, one has to sacrifice in one way or another. It gives opportunities to be happy and contribute to social and global well-being.

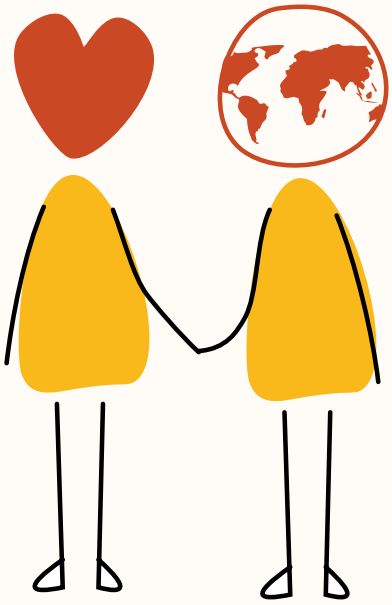


Figure 13. Social and global well-being combined for sustainable happiness

MAIN TAKEAWAYS

HAPPINESS MAKES PEOPLE LESS MATERIALISTIC AND MORE SUSTAINABLE. AND IN PRINCIPLE, HAPPINESS IS NOT CONSUMPTION BASED. SUSTAINABLE HAPPINESS LINKS HAPPINESS WITH THE SOCIAL AND GLOBAL WELL-BEING, WHICH LOWERS THE MISCONCEPTION THAT SUSTAINABILITY IS BORING OR LOWERS LIFE SATISFACTION.

WITHIN THIS PROJECT

THIS GIVES OPPORTUNITIES TO DESIGN SOMETHING POSITIVE, AND ENABLE HAPPINESS WHILST ENCOURAGING SUSTAINABLE BEHAVIOUR. THE LIST OF DESIGN DIRECTIONS OF CASAIS CAN FUNCTION AS INSPIRATION TO DESIGN A PRODUCT THAT SUPPORTS WELL-BEING THROUGH THE SYMBOLIC MEANING OF THAT PRODUCT.

TO CONCLUDE

THE DIFFERENT FINDINGS OF WAYS TO MOTIVATE SUSTAINABLE BEHAVIOUR ARE CONNECTED WITH EACH OTHER, MAINLY BY THE FACT THAT THEY ARE FOCUSSED ON INTRINSIC MOTIVATION. THESE MOTIVATORS SUCH AS BIOSPHERIC VALUES, ENVIRONMENTAL SELF-IDENTITY AND HAPPINESS HAVE A LONGER POSITIVE IMPACT COMPARED TO EXTRINSIC MOTIVATION LIKE REWARDS. TO ACTIVATE THE INTRINSIC MOTIVATION, THE FEELINGS OF COMPETENCE, AUTONOMY AND SOCIAL INVOLVEMENT HAVE TO BE STIRRED UP.

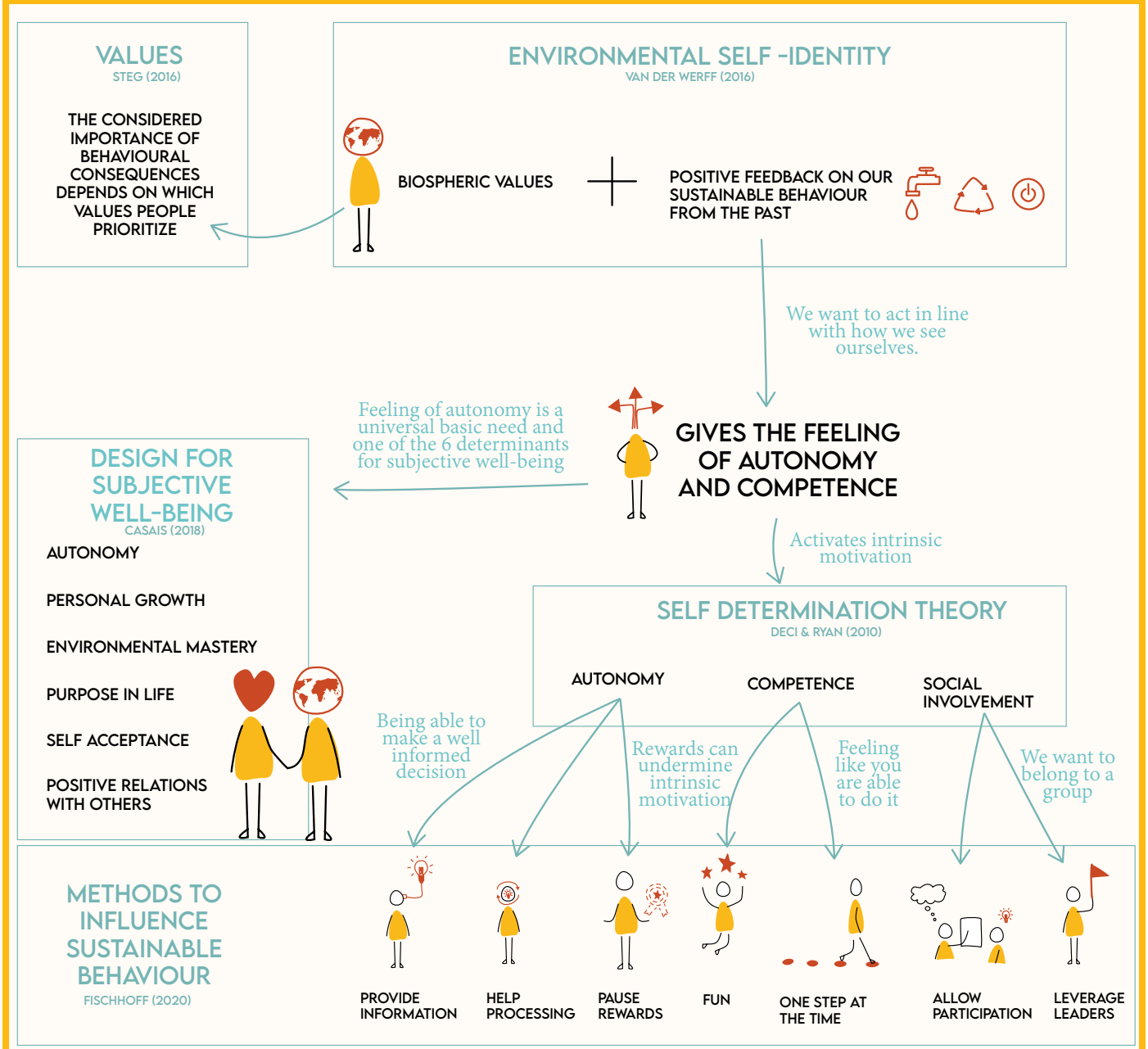


Figure 14. Overview of how the different findings in literature research are connected.

4. EXISTING INITIATIVES TO STIMULATE SUSTAINABLE BEHAVIOUR

WITH THE GAINED KNOWLEDGE ABOUT HOW TO MOTIVATE SUSTAINABLE BEHAVIOUR, CURRENT INTERVENTIONS TO HELP PEOPLE MAKE MORE SUSTAINABLE DECISIONS CAN BE REVIEWED. WHAT IS ALREADY BEING DONE, HOW DOES THIS IMPACT CONSUMERS AND DO THESE INTERVENTIONS MAKE USE OF THE THEORIES OF VALUES, POSITIVE FEEDBACK AND SUSTAINABLE HAPPINESS?
IN THIS CHAPTER, CAMPAIGNS, LABELS AND QUALITY MARKS AND TOOLS TO CALCULATE ONES FOOTPRINT ARE ANALYSED.

Picture: Wendy Wei

4.1 CAMPAIGNS

Campaigns are a way to reach a lot of people at once, the three governmental campaigns about sustainability are evaluated in this chapted to get a better view on their effects.

Campaigns are a widespread tool used to raise consumer awareness on various subjects. One of those subjects is sustainability. The Dutch government launched 19 campaigns with a TV spot in 2019, of which 3 were focussed on sustainability; '*iedereen doet wat*', '*energie besparen doe je nu*' and '*band op spanning*' (Rijksoverheid, 2019).
The resulting effect of a campaign on our behaviour is not measurable. Experiments to measure the behavioural change have shown that the effect is very small, but campaigns can put a theme on the agenda, create support for future laws and grow new norms. (Vermeulen, 2018). Looking at the positivity of these campaigns, the campaign *'iedereen doet wat'* seems the most positive. This campaign focusses on small contributions towards the environment, and how everybody can do something within his/her limits. It provides options to choose from and the feeling of doing it together and thereby the feeling of autonomy and social involvement for the target group. The campaign *'band op spanning'* focusses on both environmental and personal financial benefits, whereas the campaign called *'energie besparen doe je nu'* focusses mainly on financial benefits, activating the egoïstic values of the target group. Evaluation of the campaigns shows that the campaigns '*iedereen doet wat*' and '*band op spanning*' are scoring above the benchmark (7.3) with an appreciation score of 7.6 and 7.8 respectively (Dienst Publiek en Communicatie, 2020). Showing that a positive messages directed at the benefits for the environment are appreciated more in a campaign than messages activating egoïstic values, eventhough the target group might not be aware of the underlying values activated with the campaigns, and this preference is unconsiuosly formed.
Campaigns about the environment have more often a negative message. For example the campaign '*Korter douchen, daar zit muziek in*' is telling us that on average people shower too long and wi th that, waste water and energy (Milieucentraal, n.d.) The Earth Hour campaign tells us that we use a lot of energy with our lights and leave our lights on too often (Van der Werff, 2016).
According to the research of Van der Werff about the environmental self-identity, spreading positive messages could be more effective.

Figure 15. Campaign Dutch government, 'iedereen doet wat'.

MAIN TAKEAWAYS

CAMPAIGNS CAN BE USEFUL TO PUT A THEME ON THE AGENDA, BUT THE EFFECT ON BEHAVIOUR IS VERY SMALL. CAMPAIGNS OFTEN FOCUS ON OUR UNSUSTAINABLE BEHAVIOUR, WHICH COULD BE AGAINST THE PURPOSE OF THE CAMPAIGN.

WITHIN THIS PORJECT

DESIGNING A CAMPAIGN ON ITS OWN IS NOT IDEAL SINCE THE BEHAVIOURAL CHANGE IT CAUSES IS NEGLIGIBLE. EVALUATION OF THE CAMPAIGNS SHOWS THAT POSITIVITY IS VERY IMPORTANT, BUT NOT USED ENOUGH YET.

4.2 LABELS AND QUALITY MARKS

A way to inform people about the quality of a product is by putting it on the packaging, for example with a label or quality mark, which is seen at the moment of the purchase decision. Research is done towards how consumers are informed about the sustainability during the purchase of their durable products.

There are about 106 labels and quality marks for products and services on the Dutch market. Most of these are made for the food industry, and can be found in the supermarket. Quality marks give in principle positive feedback, since they show certain standards are reached, but because not every label or quality mark is officially registered, not al of them are reliable. The enormous amount and the varying reliability is very confusing for consumers. For a label or quality mark to be successful, it has to be advertised very well, so it gets better known and is trusted by the consumer (keurmerkinstituut, n.d.).
Research towards the side effects of sustainability labelling in consumer society shows that consumers are gradually getting less satisfied with the buying of a common product when they are frequently exposed to a similar product with a quality mark. These effects add to the awareness of consumers and could possibly change the behaviour of consumers in long term. (Ingenbleek et al., 2009)

Big companies seem to react to the attention towards products with a fair trade/biological quality mark in supermarkets by formulating their own sustainability criteria to their suppliers. Thus, quality marks can function as inspiration. (Ingenbleek et al., 2009

A little can be found about quality marks in the household goods industry: of course there is the energy label at electrical appliances, but this tells something about the energy usage during use, and nothing about the environmental impact of the product during production. Other quality marks that can be found on products are the FCS or PEFC quality marks on wooden products when the wood is produced in a sustainable way.

About 65% of Dutch consumers take notice of sustainability when buying groceries. Half of them uses quality marks as a guideline. But a lot of consumers think there are too many different quality marks (70%). The demand for one overarching quality mark is high (72%) (Ingenbleek et al., 2009).

Figure 16. Quality marks

MAIN TAKEAWAYS

QUALITY MARKS ARE MADE TO INFORM CONSUMERS ABOUT THE SUSTAINABLE OR ETHICAL PRODUCTION OF A PRODUCT. THEY CAN HELP THE CONSUMER MAKE A DELIBERATE DECISION, BUT ALSO INSPIRE COMPANIES TO FORMULATE CRITERIA FOR PRODUCTION. QUALITY MARKS ARE MAINLY PRESENT IN FOOD INDUSTRY; MAYBE, THE LACK OF QUALITY MARKS IN OTHER INDUSTRIES GIVES CONSUMERS THE IDEA THAT SUSTAINABILITY IS NOT IMPORTANT WHEN BUYING PRODUCTS

WITHIN THIS PROJECT

THE LACK OF INFORMATION ABOUT THE SUSTAINABILITY OF PRODUCTS GIVES A POSSIBLE DESIGN DIRECTION. LACK OF INFORMATION CAN MAKE IT HARDER TO MAKE A SUSTAINABLE DECISION. DESIGNING A WAY TO PROVIDE INFORMATION COULD SOLVE THIS PROBLEM, WHEREBY THE SPRAWL OF DIFFERENT SOURCES OF (UNRELIABLE) INFORMATION SHOULD BE AVOIDED BY THE INITIAL DESIGN.

To be able to lower once environmental impact, they first have to know how sustainable they are, and where improvement could be made. In this section, research is done towards current tools and incentives that give insight in consimers impact on the environment.

CO2 calculation tools

Various websites offer a tool to calculate ones footprint (wwf, n.d.; duurzaamheidinactie, n.d.; milieucentraal, n.d.). Questions are asked about travelling (by car, public transport and plain), electricity and gas usage in house, meat and dairy consumption and sometimes shopping behaviour (clothing, furniture). If shopping behaviour is considered at all, this contribution towards the outcome of the footprint of the consumer is very small. Milieu centraal states it is very hard to calculate the CO2 emissions from the stuff we buy, but they provide an image showing which products causes which amount of CO2 emissions (during production and waste processing) (Milieu Centraal, n.d.), see figure 17. Although the numbers of CO2 emissions are pretty low in comparison to for example car usage, products still have a big impact on the environment, as research from Porcelein (2017) showed (see introduction). This can be explained by the fact that people on average own 10.000 items (Van Houten, 2020), adding up the small numbers of CO2 emissions results in a high number in total. Thereby, as can be seen in figure 3 in the introduction, CO2 is not the only emissions products cause. An equal amount of other emmissions, such as water pollution, cause the impact of products on the environment. In general, anwering the questions of a CO2 footprint tool is pretty hard, sometimes

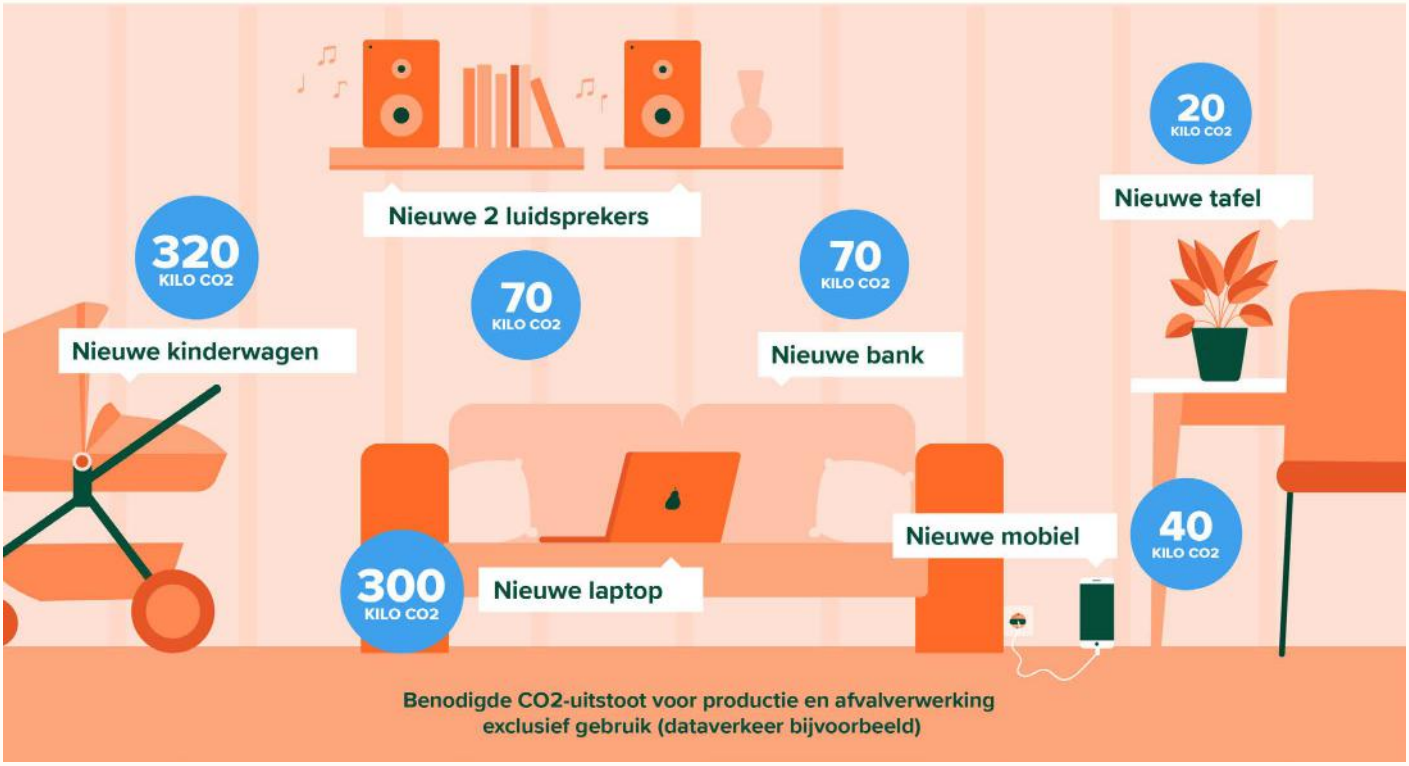


Figure 17. Environmental impact per product

numbers of energy usage have to be given, or kilometres travelled in a month have to be filled in. These numbers are not always at hand, making it harder to fill in the tool accurately. Results of these kind of tests are measured in kilograms CO2 emissions or in amount of space needed for your life style (in earths or global hectare). Because it is hard to fill in the questions accurately, it is easy to explain away results when they turn out worse than expected. "Oh I must have made mistakes when answering this question" or "Well, these results are based on averages" are thoughts that can occur. The results can often be compared to the average Dutch consumer and tips can be found to lower your impact. These tips are often general, and not specifically based on the answers given. In other words, the possibility to calculate your CO2 footprint is there, which can be a good eye opener for some people. On the other side, it is hard to get an accurate view on your actual footprint. Results are easily explained away, and tips given are general.

Comparing countries

The website from Global Footprint Network (Global Footprint Network, nd.) compares countries in their sustainability. (See figure 18) The amount of biocapacity is compared to the emissions. This should be at the same level, to be environmental neutral in a country. Two different measurements can be taken to reach it: Creating more nature, or decreasing emissions.

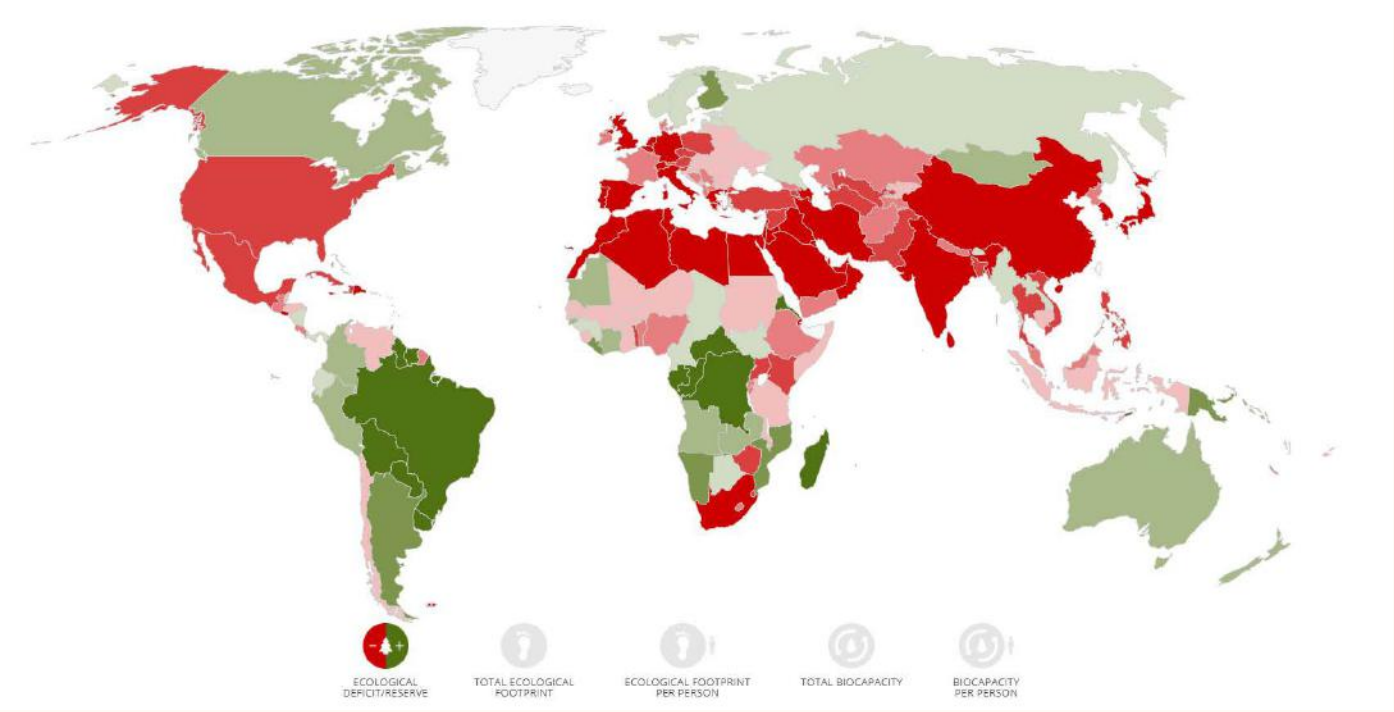


Figure 18. amount of biocapacity compared to emissions per country.

On packaging

Oatly (an Oat milk brand) takes the initiative to note the CO2 emissions on their packaging, whereby the cultivation, production, packaging and transport is taken into account (Oatly, n.d.). Since Oatly is the only brand providing this information, it is hard for the consumer to compare these numbers to other products, for example regular milks. For Oatly it is relatively safe to note these numbers on the packaging, since this can be used as an advertisement for their products, whereas with regular milk, the CO2 emissions would be much higher, so a milk brand would not be willing to put these numbers on the packaging voluntary.

Figure 19. CO2 emissions on Oatly packaging

MAIN TAKEAWAYS

CONSUMERS CAN LOOK UP THEIR ENVIRONMENTAL IMPACT, BY FILLING IN A QUESTIONNAIRE. THE RESULTS ARE INDICATIVE AND BASED ON AVERAGES, AND RESULTS CAN EASILY BE QUESTIONED BY THE CONSUMER. OFTENTIMES, CO2 EMISSIONS ARE THE ONLY KIND OF ENVIRONMENTAL IMPACT NOTICED, WHILE OTHER THINGS SUCH AS DEFORESTATION AND WATER POLLUTION ALSO HAVE A BIG IMPACT ON THE ENVIRONMENT.

WITHIN THIS PROJECT

INSIGHT IN ONES ENVIRONMENTAL IMPACT IS OFTEN NOT VERY PERSONAL, WHICH COULD BE IMPROVED BY A DESIGN WITHIN THE DIRECTION OF INFORMATION OR POSITIVE FEEDBACK.

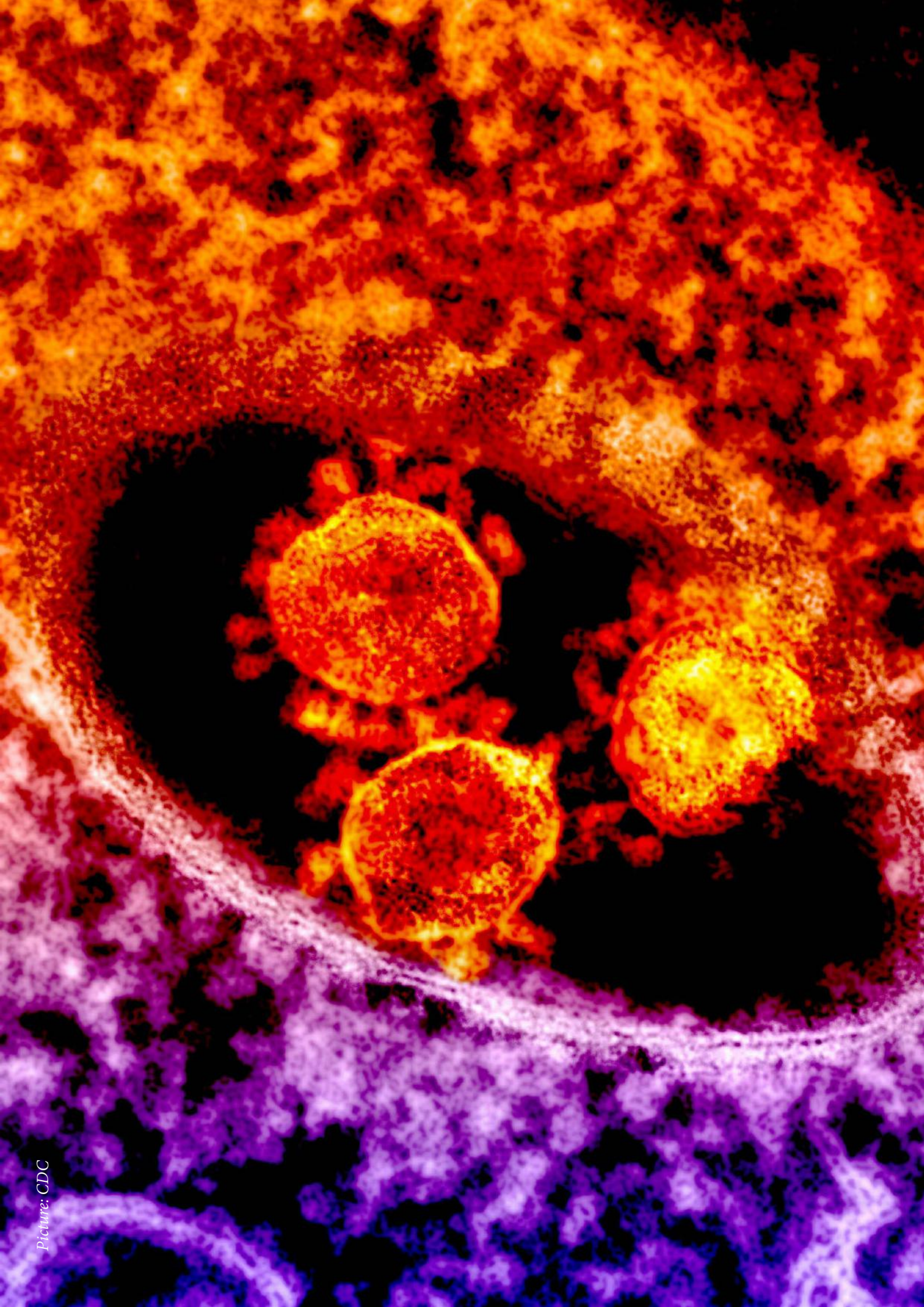
TO CONCLUDE

CONSUMER AWARENESS ABOUT THE ENVIRONMENTAL IMPACT IS RAISED BY CAMPAIGNS, QUALITY MARKS AND TOOLS TO CALCULATE ONES FOOTPRINT. POSITIVITY IN CAMPAIGNS IS OFTEN MISSING. QUALITY MARKS ARE MOSTLY PRESENT IN THE FOOD INDUSTRY, BUT NOT VERY COMMON ON USER PRODUCTS. TOOLS CAN BE FILLED IN WHICH ESTIMATES THE CO2 FOOTPRINT FOR A PERSON. RESULTS CAN BE EFFECTIVE WHEN THE CONSUMER IS SHOCKED ABOUT THEIR NUMBERS, BUT SINCE IT IS HARD TO GIVE ACCURATE ANSWERS THE RESULTS ARE NOT EXACT AND BASED ON AVERAGES, THEY CAN EASILY BE QUESTIONED BY THE CONSUMER. GIVING PERSONAL AND POSITIVE FEEDBACK WOULD BE MORE EFFECTIVE.

Figure 20. Campaigns, confused consumers by quality marks and footprint calculation.

5. INTERVIEWS

THE LITERATURE RESEARCH PROVIDED KNOWLEDGE ON THE THEORIES ABOUT WHY PEOPLE BUY AND HOW TO MOTIVATE THEM TOWARDS BUYING MORE SUSTAINABLE. TO CONNECT THESE THEORIES WITH EXPERIENCES FROM REAL PEOPLE, SMALL EXPLORATIVE INTERVIEWS WERE DONE. THE ENTRY POINT FOR THESE INTERVIEWS WAS THE MOMENT OF BUYING, SINCE THIS IS A MOMENT WHERE PEOPLE REALLY MAKE THE DECISION TO ACT SUSTAINABLE OR NOT. IN THIS WAY, THE REAL SUSTAINABLE BEHAVIOUR COULD BE REVEILED, AND PARTICIPANTS WERE LESS SEDUCED TO GIVE SOCIALLY ACCEPTED ANSWERS.
IN THIS CHAPTER, THE INTERVIEW RESULTS ARE DISCUSSED.



Picture: CDC

5.1 SET-UP OF THE INTERVIEWS

For these interviews, participants were contacted by telephone and asked questions about the last product(s) they have bought, why they bought this, and whether they did consider buying 2nd hand or repairing the old product. Thereafter, some questions about the last item they disposed; how they disposed it and why. Participants were not informed about the purpose of this project, to ensure unbiased answers. For the full list of questions asked, see appendix C. The interviews lasted for about 15-30 minutes.

Participants were selected on age, being non-student and estimated to fit the mindset of the target group (willing to be more sustainable, but not adjusting the whole lifestyle to it). The first interview was done to test the questions and the flow of the conversation. This interview was done with a person who does not match the target group in age, but does fit in lifestyle. An overview of the participants, what they have bought and disposed with reasons why can be found in table 2

Overall, people had to think hard to remember their last purchase, but it was even harder to remember the last thing that was disposed. This might be because people dispose items less often, or because it is done not really conscious. The evaluation of the results are categorised into 3 categories: information, willingness to do right, comfort and ease. which links to the possible design directions found in the literature study.

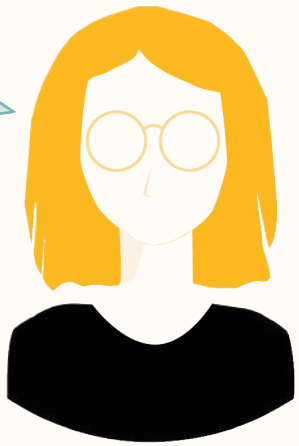
#	Name	gender	age	item bought	main reason	item disposed	main reason
1	Pia	F	61	Carafe	It looked good	Plastic container	Dirty
2	Rik	M	28	Furniture	Replacing the old	Old furniture	Fed up with it
3	Melanie	F	24	Reusable baking paper	Sustainability	Tea cups	Broken/Dirty
4	Sterre	F	25	Tent + camping furniture	Did not have it yet	Old school stuff	Broken or not usable anymore
5	Zizzy	F	25	Photoframes with art	Did not have it yet	Desk	Does not fit the new house
6	Annechien	F	34	Clothes	It was on sale	Clothes	Did not wear it anymore
7	Helena	F	33	Side table	It looked good	Bed	Does not fit the new house
8	Christian	M	32	Fishing magnet	Lost the anchor of the boat	Flipflop	It was incomplete

Table 2, overview of participants, purchases, disposals and reasons why

Comfort and ease

When buying new products, ease is a big influencer of the buying decision. Even though people have the right intentions, they get seduced sometimes by a less sustainable option (see quotes of Sterre and Annechien below).
For example when being in a hurry, Melanie (24): "I try to concentrate more on the environment when buying something new, but sometimes when I am in a hurry, I just pick the first I can find." Or when a new product can be bought really cheap, for example Christian (32): "For some products, I know I will only use it once or twice. In that case I don't need a product of high quality, so I can buy it cheap online from China". These examples show how values are conflicting when making a buying decision. The biospheric values are placed in the background when egoistic values are more salient.

Sterre (25): *"I considered buying my tent second hand, and I searched Marktplaats for it, but I couldn't find the type and quality I was looking for. So we went to the decathlon to buy a tent, and there we also bought the rest of the camping stuff we needed, because it is easier to buy everything at once, so we don't have to go from pillar to post to buy everything."*

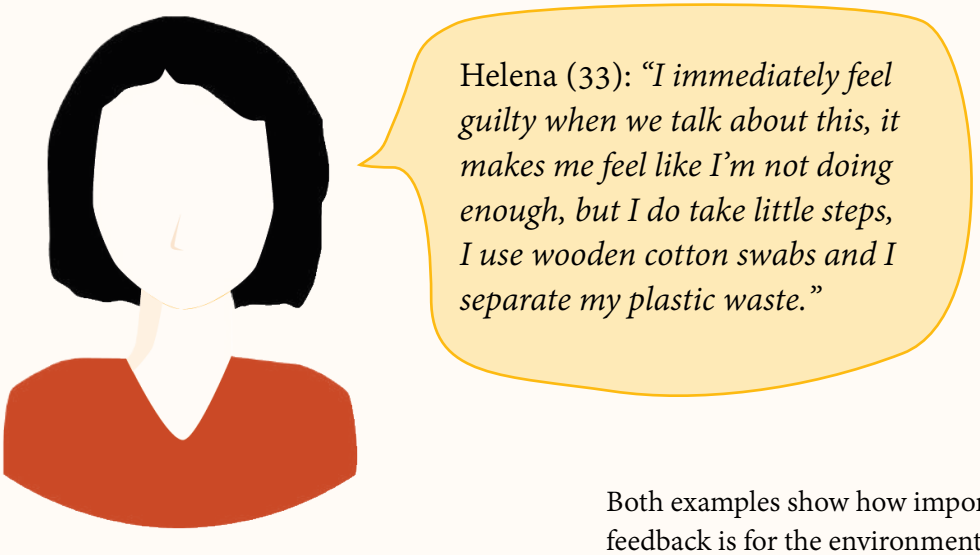


Annechien(34) : *"I read about sustainable clothes, and I only want to buy in shops where I know where it comes from, but I also often trust the brand in taking their responsibility. For example when I buy shoes from Ecco, I think that should be okay right? But I am not really going to do research before I buy those shoes. I buy them because I like them and they are on sale. "*

Willingness to do good

All the participants mentioned they consider sustainability to be important. Even though, not all of them make conscious sustainable decisions when buying something, and not in all product categories. But most participants mentioned they are aware of the environmental problems and willing to do something good for the environment. Buying 2nd hand is a common thing to do, but mostly, saving money is a bigger motivator to buy 2nd hand than the environment is. Some people are not even aware of how sustainable their decision to buy 2nd hand is, for example Christian, after telling him buying second hand is very good for the environment:

Talking about the buying behaviour and sustainability sometimes leads to feelings of guilt, and the feeling that someone is not a sustainable person, even though they are willing to take effort in favour of the environment. Like when talking to Helena:



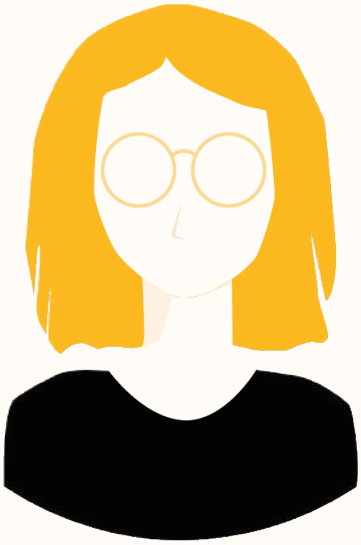
Both examples show how important the positive feedback is for the environmental self- identity.

Lack of information

When buying products, participants are mostly not aware of their environmental impact, they want to buy sustainable, but information is not always at hand. Mostly, when buying sustainable, products have to be bought online. This frustrates some participants. It is not always clear what aspects can be considered when one wants to buy sustainable, as Helena (34) says: "I would really like to know more about where my products come from, what is bad and what is good." And "I recently bought a magic bullet, and a Ring Fit for the Nintendo Switch, whereby I didn't think about the environment, or where it is made at all. I think there should be more attention to it."

The willingness to buy sustainable is there, and the interest in what are sustainable options. But the information should be available at the moment of buying, as Zizzy mentioned:

Zizzy (24): *"I don't know how sustainable a wooden desk is, it is not stated on it either. It would be nice if this information would be on it, so I could make a deliberate decision. I would be willing to pay 10 euros more for a more sustainable desk."*



MAIN TAKEAWAYS

MOST PEOPLE ARE WILLING TO ACT SUSTAINABLE, BUT GET SEDUCED SOMETIMES FOR THE CHEAPER, EASIER OR MORE ATTRACTIVE OPTION. ALSO LACK OF INFORMATION, OR NOT KNOWING WHEN A SUSTAINABLE OPTION IS CHOSEN MAKES IT HARD TO MAKE ENVIRONMENTAL FRIENDLY DECISIONS. TALKING ABOUT SUSTAINABILITY OFTEN TIMES NOURISHES FEELINGS OF GUILT AND SHAME.

WITHIN THIS PROJECT

THE RESULTS OF THE INTERVIEWS ARE RELATED TO THE RESULTS OF THE LITERATURE RESEARCH. THE IMPORTANCE OF THE ENVIRONMENT IS NOT ALWAYS STRONG ENOUGH TO MAKE SUSTAINABLE DECISIONS, LINKING BACK TO THE DIRECTION OF VALUES. THEREBY, TO LOWER THE FEELINGS OF GUILT AND SHAME POSITIVE FEEDBACK SEEMS TO BE VERY IMPORTANT. LACK OF INFORMATION IS SOMETHING THAT FRUSTRATES CONSUMERS, SINCE THEY DON'T KNOW WHAT A SUSTAINABLE OPTION IS. THESE COMBINATIONS OF LITERATURE AND INTERVIEW RESEARCH CAN BE COMBINED TO FORM DESIGN DIRECTIONS.

6. THREE DIRECTIONS

FROM THE LITERATURE RESEARCH, COMBINED WITH THE INSIGHTS FROM THE INTERVIEWS, THREE POSSIBLE DIRECTIONS ARE FORMULATED. THESE DIRECTIONS PROVIDE MORE GUIDANCE INTO POSSIBLE DESIGN SOLUTIONS TO CREATE AWARENESS ON THE ENVIRONMENTAL IMPACT OF PRODUCTS AND MOTIVATE CONSUMERS TO BEHAVE MORE ENVIRONMENTAL FRIENDLY. WITH THE DIRECTION OF POSITIVE FEEDBACK, A SHIFT WOULD BE MADE FROM THE FOCUS ON PRODUCTS ONLY, TOWARDS MORE SUSTAINABLE BEHAVIOUR IN GENERAL. IN THIS CHAPTER, THE DIRECTIONS WILL BE EXPLAINED FURTHER, AND ONE DIRECTION WILL BE CHOSEN TO CONTINUE WORKING ON.

Picture: Swapnil Sharma

6.1 THE THREE DIRECTIONS

In figure 21, an overview is shown of the results of the literature research and interviews and how three design directions follow out of this research.

Values

The first direction is based on insights of the causes of consumerism and the fact that values determine what we consider to be important, whereby enlarging biospheric values would result in bigger appreciation of the environment, and more sustainable choices.

Positive feedback

The second direction is based on the fact that the environmental self-identity (how much one sees him/herself as a sustainable person), is enlarged by positive feedback on past performed sustainable behaviour. Since people want to act in line with how they see themselves, the bigger environmental self-identity results in more sustainable choices.

Information

The last direction is based on the lack of information about the sustainability of products that is available. Although consumers are willing to make an environmental friendly decision, it is really hard to do so, since there is not enough information available on what is sustainable, and what not.

For more detailed information about the directions, see appendix D

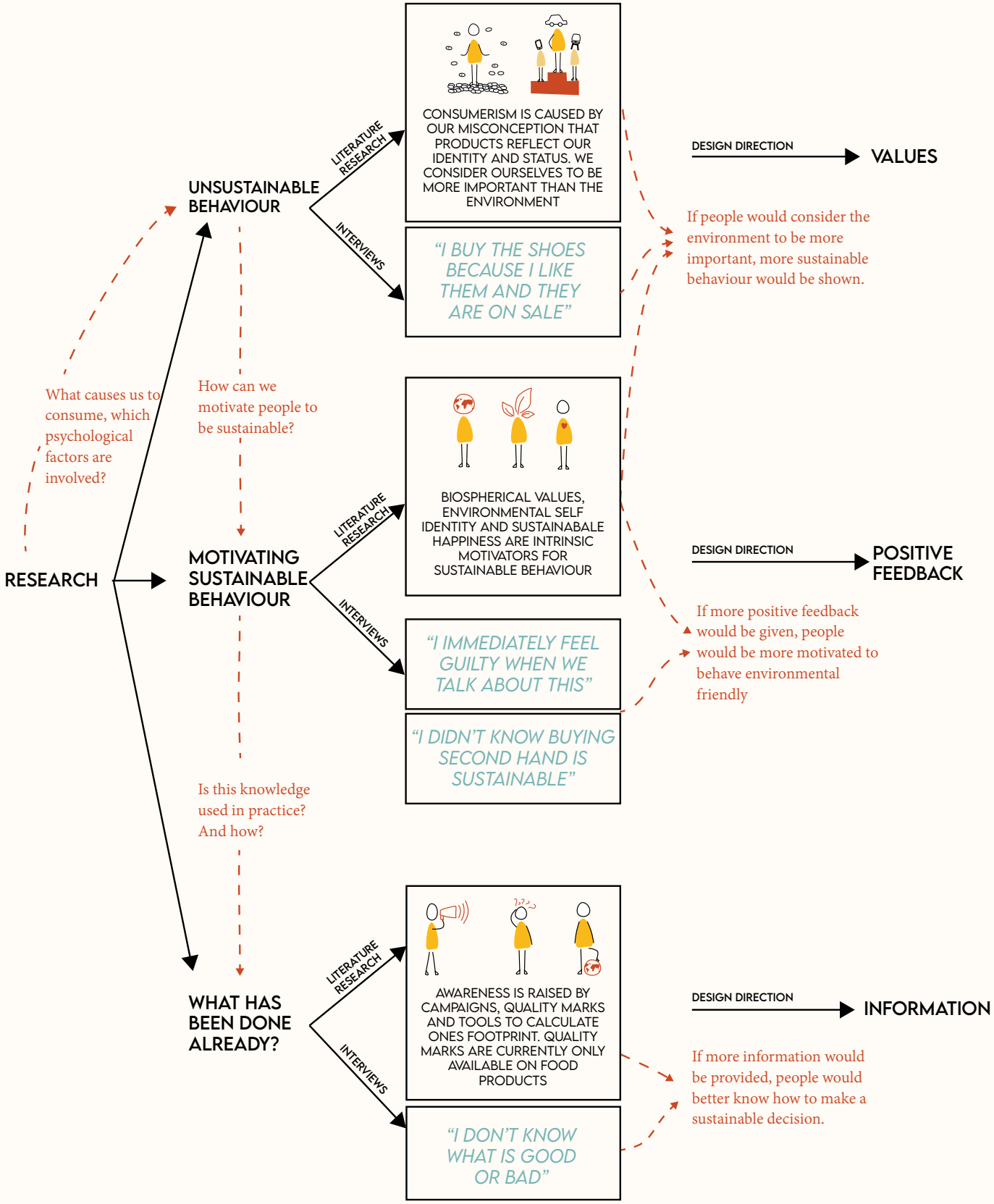


Figure 21. Summary of research and following design directions. With report structure in black, and thoughts in red.

To be able to make a decision between the three directions, ideas will be generated for each of the directions, where after a list of criteria is made and a direction will be chosen with the use of a Harris Profile. The following figure shows an overview of the used methods.

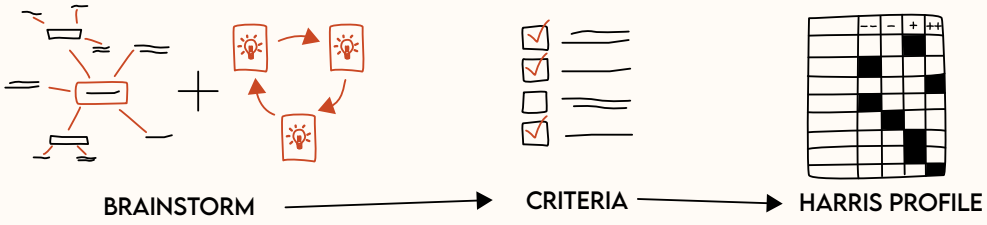


Figure 22. Used methods to choose a design direction.

Idea generation

The ideas were generated by means of the methods *mind mapping* and *brain writing*. Mind mapping was done two times, once alone, whereby the paper of Casais et al (2018) (see chapter 3.5) was used for inspiration. The second time the mind map was made together with a graduate. After these mind maps a brain writing session was organised with 2 other graduating students. The directions were explained and provided with 2 questions per direction. In this way, 6 questions were brainstormed on, after 4 minutes the brain writing paper was passed on to the next person, which could elaborate on and complement the ideas for that question. Ideas were clustered per direction. The clusters of each direction are shown in figure 23, for a full overview of the brainstorm results, see appendix E.

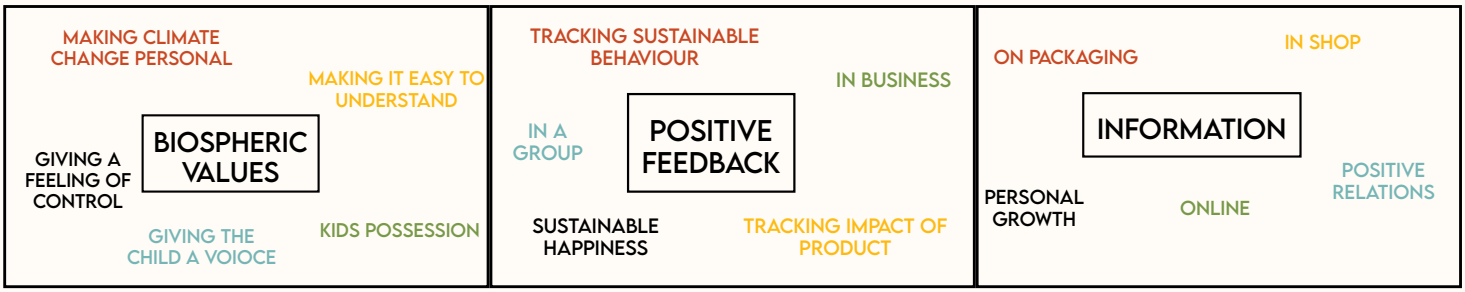


Figure 23. Clusters of ideas per direction

MAIN TAKEAWAYS

INFORMATION AS A DIRECTION IS RATHER BORING ON ITS OWN, BUT IT CAN BE INTEGRATED INTO A DESIGN. BIOSPHERIC VALUES ARE STILL A BIT VAGUE, IT IS NOT REALLY CLEAR HOW TO AMPLIFY THIS, MAKING IT HARD TO COME UP WITH IDEAS. POSITIVE FEEDBACK CAN BE PROVIDED IN LOTS OF DIFFERENT MOMENTS AND WAYS.

WITHIN THIS PROJECT

I GET ENTHUSIASTIC FROM A POSITIVE VIEW ON SUSTAINABILITY, SPREADING THE FEELING THAT SOMETHING CAN BE DONE, AND ONES ACTIONS MAKE A DIFFERENCE. OTHER CRITERIA HAVE TO BE SET UP, TO MAKE A DELIBERATE DIRECTION CHOICE.

Criteria for direction

Based on the brainstorm results and insights from previous literature research and interviews, criteria are formulated to make a deliberate decision about the directions. The first six criteria are about what kind of design solutions could derive from the direction. The last criteria is focussed on myself, whether the direction is clear and defined, so that I know how to design a solution for this direction. After setting up these criteria, the three directions have been assesed on them and a direction is chosen.

1. FITTING THE TARGET GROUP, AS DESCRIBED IN CHAPTER 1.2
2. ACTIVATES INTRINSIC MOTIVATION
3. BEING DIVERSE; THERE ARE DIFFERENT DESIGNS POSSIBLE TO TACKLE THIS DIRECTION
4. BEING NEW; NOT MUCH IS DONE YET IN THIS DIRECTION
5. HELPING CONSUMERS TO MAKE SUSTAINABLE DECISIONS.
6. BEING CLEAR AND PROVIDING GUIDANCE; I KNOW HOW THIS DIRECTION CAN BE TACKLED.

Choosing a direction

The first direction, information, does not provide a lot of different possibilities to tackle this direction. A label or an information website/app would be the most logical solutions, and these are not very new or innovative. The direction of biospheric values is the least clear. How biospheric values are formed and how to influence this is not found in literature research. Thereby this direction does not fit the target group the best, since values are formed in the childhood, it would be logical to focus on children when choosing this direction.
The direction of positive feedback scores the best on the criteria. It fits the target group, since feedback is provided for those who are already having some sustainable behaviours, activating their intrinsic motivation to do more for the environment. It is new compared to what is done now in an attempt to make people more sustainable, such as campaigns, which often are based on the negative messages, and tools that are confusing and not personal. This direction would be a welcome positive way of creating awareness and action around sustainability. In appendix F, the Harris Profiles of each direction are shown.

MAIN TAKEAWAYS

THE DIRECTION OF POSITIVE FEEDBACK IS CHOSEN AS A FOCUS FOR THE REST OF THIS PROJECT. THEREBY, THE FOCUS SHIFTS FROM PRODUCTS ONLY TOWARDS SUSTAINABLE BEHAVIOUR IN GENERAL, AS EXPLAINED IN CHAPTER 3.4.

7. IDEATION

AFTER CHOOSING A DIRECTION, THE GOAL OF THE DESIGN IS FORMULATED AND CRITERIA ARE SET UP, ON WHICH THE CONCEPTS CAN BE TESTED. QUESTIONS AND SUB-QUESTIONS ARE FORMULATED WHICH INITIATE THE IDEATION PROCESS. BY MEANS OF VARIOUS BRAINSTORM METHODS, IDEAS ARE GENERATED TO FIND A SOLUTION TO THE PROBLEM. FROM THESE IDEAS, THREE CONCEPTS ARE MADE.

Picture: Eberhard Grossgasteiger

7.1 GOAL OF THE DESIGN

To be able to keep the focus in the right direction while designing, the goal of the project has to be formulated, and criteria will be set up on which the concepts can be tested.

The goal of this project is to motivate consumers to act more sustainable by enlarging the environmental self-identity with positive feedback on sustainable behaviour from the past. This creates a loop wherein the consumer is reminded of their environmental self-identity, which leads to a sustainable choice, and adds to the environmental self-identity, so that it has more environmental friendly decisions to be reminded of, and the choice to be sustainable gets easier.

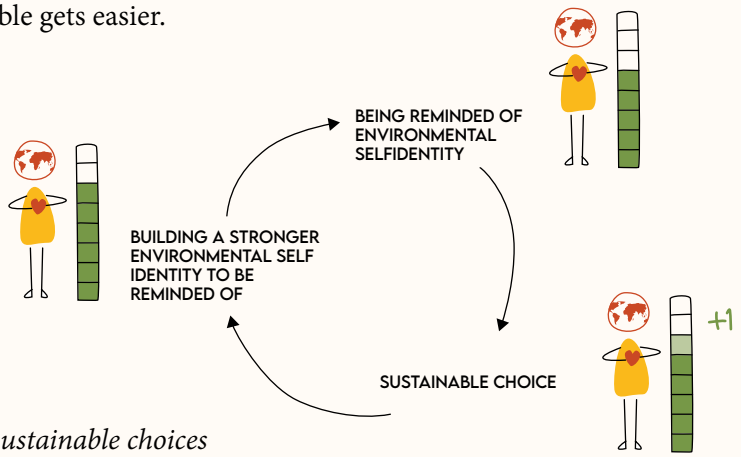


figure 25, creating a loop of sustainable choices

7.2 CRITERIA

Five criteria are formulated, to which the design must definitely abide by, which are derived from the findings of literature research. Five wishes are formulated which make the concept more favourable if the concept abides by them.

CRITERIA

CRITERIA FOR ENLARGING SUSTAINABLE SELF-IDENTITY

A1. THE DESIGN REMINDS USERS ABOUT THEIR SUSTAINABLE BEHAVIOUR FROM THE PAST.

A2. THE DESIGN PROVIDES A POSITIVE VIEW ON THE USERS' CONTRIBUTION TOWARDS SUSTAINABILITY.

A3. THE DESIGN MOTIVATES TO ACT MORE SUSTAINABLE.

CRITERIA FOR ACTIVATING INTRINSIC MOTIVATION

A4. THE DESIGN GIVES USERS THE FEELING OF COMPETENCE

A5. THE DESIGN GIVES USERS THE FEELING OF AUTONOMY

A6. THE DESIGN GIVES USERS THE FEELING OF SOCIAL INVOLVEMENT.

CRITERIA FOR DESIGN FOR SUBJECTIVE WELL-BEING

A5. THE DESIGN SHOULD PROVIDE THE FEELING OF PURPOSE IN LIFE, PERSONAL GROWTH AND/OR SELF-ACCEPTANCE

A6. THE DESIGN SHOULD HAVE A LONG TERM EFFECT.

WISHES

B1. THE DESIGN IS APPEALING TO THE USERS.

B2. THE DESIGN IS FEASIBLE.

B3. THE DESIGN IS EASY TO UNDERSTAND FOR THE USERS.

B4. THE DESIGN REQUIRES LITTLE EFFORT FOR THE USERS.

B5. THE DESIGN HAS GRAPHICAL ELEMENTS.

7.3 INSPIRATIONAL QUESTIONS

While generating ideas, multiple options to tackle the problem came across, which are formulated in questions in this section, so they can be used as inspiration during the design process.

1. WILL AN INDIVIDUAL OR COLLECTIVE DESIGN BE MORE EFFECTIVE?
2. HOW TO GIVE FEEDBACK WITHOUT GETTING ANNOYING?
3. HOW TO KEEP GETTING ATTENTION WITH THE FEEDBACK PROVIDED?
4. ON WHICH MOMENT WILL THE FEEDBACK BE THE MOST EFFECTIVE?
5. SHOULD IT BE ENTIRELY FOCUSSED ON PRODUCTS, OR ALSO ON OTHER SUSTAINABLE BEHAVIOUR?
6. WHERE SHOULD THE FEEDBACK COME FROM? A PERSON? A PRODUCT? AN APPLICATION?

The questions above will be researched in a qualitative matter, and have an inspirational purpose, so that new ideas and iterations can arise during the next phase.
To answer these questions, the method of research through design will be used. This method makes use of prototypes that play a role in the process of generating knowledge in two ways (Stappers & Giaccardi, 2005). The first way of gaining knowledge while building the prototype, whereby the designer will have struggled with opportunities and constraints, and limitations from the real world, giving insights in new or improved ways to design the product/service. The second way of gaining knowledge through the prototype is by presenting it to the user, where it can generate discussions and where the user-product interaction can become observable.

7.4 RESEARCH QUESTIONS

Research questions are formulated, which define the goal of the final product that is made.

1. HOW CAN ONE BE REMINDED OF THE ENVIRONMENTAL SELF-IDENTITY ON THE MOMENT OF BUYING?
2. HOW CAN SOMEONE OBTAIN A GOOD FEELING FROM ACTING SUSTAINABLE WITH THE HELP OF POSITIVE FEEDBACK AND HOW CAN THIS FEELING BE RETAINED?

7.5 SUB QUESTIONS FOR IDEATION

Sub questions are formulated in a how can you...? question, and serve as inspiration for the ideation of concepts.

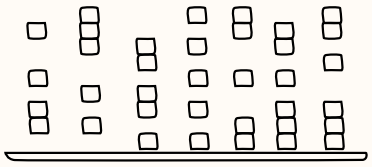
HOW CAN YOU EXPERIENCE GOOD FEELING?
HOW CAN YOU RETAIN A GOOD FEELING?
HOW CAN YOU GIVE POSITIVE FEEDBACK?
HOW CAN YOU BE REMINDED?

7.6 FIRST IDEAS

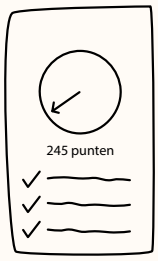
After formulating the research and subquestions, the ideation started. To come up with ideas, mindmaps are made for every subquestion.

The core of these ideas are around tracking ones behaviour, gamification, reminders for what really matters and raising awareness on the impact of products, compared to your own happiness. Even though not all concepts are feasible, I think the principles they build up on are strong, such as gamification, which could make sustainable behaviour addicting, and tracking progress refers back to research of Casais (2018), where she stated that a product with which one can track progress can improve the subjective well-being of the user. Including the target group in the design process could help to see how they are thinking about this problem, give new inspiration and confirm whether I am thinking in the right direction or not.

Card in wallet which shows what makes you happy. This could also be the print of your bank card.



Tracking your sustainable behaviour every week, which makes a nice graphical print.
It is something you can use over and over again

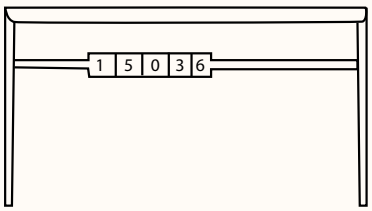


App with collecting points, it is connected to the bank app, so you get a notification when something is bought.
You score points by not buying anything, reparing, buying second hand. With this app you can track how sustainable your house is.

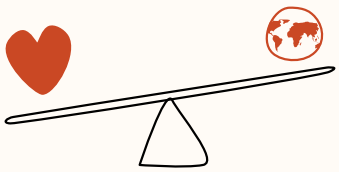
Growing a plant with your sustainable behaviour. You have to get something out of it to be able to buy something. It could be connected to a bank app, it visualises your sustainable behaviour.

A picture of your happy moment you can colour it in when you did something sustainable. Could also be an artwork instead of a picture. It could be either on print or online.

A kind of illustration generator from your sustainable behaviour. You can fill in what you did, when and where and a picasso like picture is coming out.
Or you can fill in what gave you a good feeling.



Counting how often you use something on the product. On the internet you can see how you positively impacted the environment by using it so often.



Comparing your happiness with the harm to the world with your behaviour. You want it to be in balance or more happiness than harm to the earth. Measure whether your happiness is worth the harm to the earth.

Figure 26. First ideas

MAIN TAKEAWAYS

THE FIRST IDEAS ARE FORMED. A GENERATIVE SESSION WITH THE TARGET GROUP COULD HELP TO FIND NEW INSPIRATION.

7.7 GENERATIVE SESSION

Involving the user as an expert into the forming of concepts gives insight in what the user considers to be important, what motivates them and what they think is fun or makes them feel good. These insights can be used as inspiration for my concepts, and to check whether the ideas I have so far would match the users. to involve the user, a co-creation session is organised.

Set-up of the session

As a preparation for the co-creation session, a small booklet was distributed among the participants. This booklet had the purpose of sensitizing the participants, and get them into the right mindset, including questions about their most valuable and least valuable belongings and questions about what makes them feel good, in general, in relation to stuff and in relation to the environment. I have tried to be as positive as possible and without judgement. It is important to not activate moral feelings and feelings of guilt, since this can lead to social accepted answers, where I want the participants to feel free to be honest. The booklets were sent back to me, because it is interesting to see what makes a product valuable, and what gives a good feeling. The answers won't be used to derive hard data, but as inspiration for the concepts.
A pilot session of the co-creation was done with 2 participants, mainly to check whether the estimated time was doable and the tasks were not too difficult.
The co-creation was done online, making use of Zoom and Miro. The session consisted of an introduction of the project, a small round of getting to know each other, brainstorming, selecting interesting ideas and forming concepts in 2 teams of 2. In figure 27 the empty Miro sheet can be seen. For the full set-up of the session, see appendix G

Participants

Four participants were invited for the session, they were selected on age (around the 30), having a job (or being able to spend money) and my estimation of them in relation to their involvement in the environment. I especially did not want participants who are fully engaged in all the environmental initiatives and dedicate their lives to it. The small number of participants was chosen to enable the conversation between participants whilst doing the session online, which is in my experience harder when more than four participants are joining. Unfortunately one of the participants cancelled her attendance an hour before the session, therefore I helped one of the participants with the formation of the concept. This made it impossible for me to switch between the breakout rooms, and look how the concept of the other team was formed. On the positive side, I gained a lot of insight from the conversation and forming of the concept, I also could direct a little bit towards what I thought was most interesting, and in the end I think a very interesting concept came out.

1. BRAINSTORMING

2. SELECTING PROMISING IDEAS

3. CREATING CONCEPTS

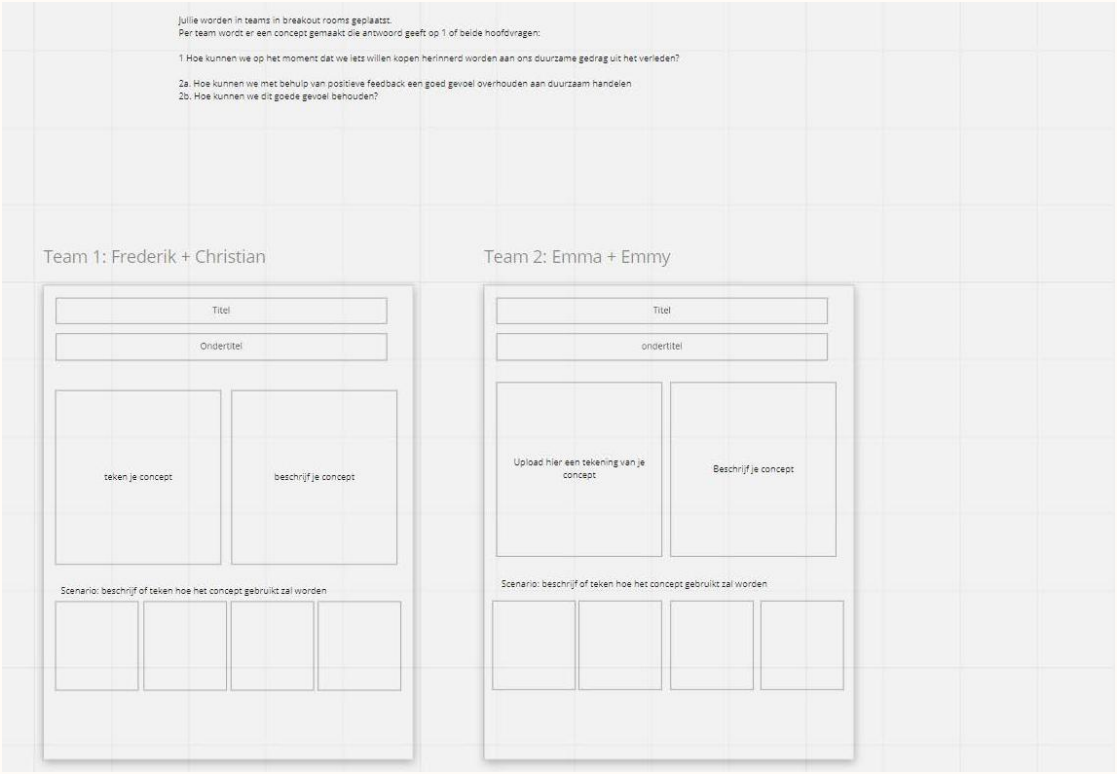


figure 27. Empty Miro sheet

7.8 RESULTS SESSION

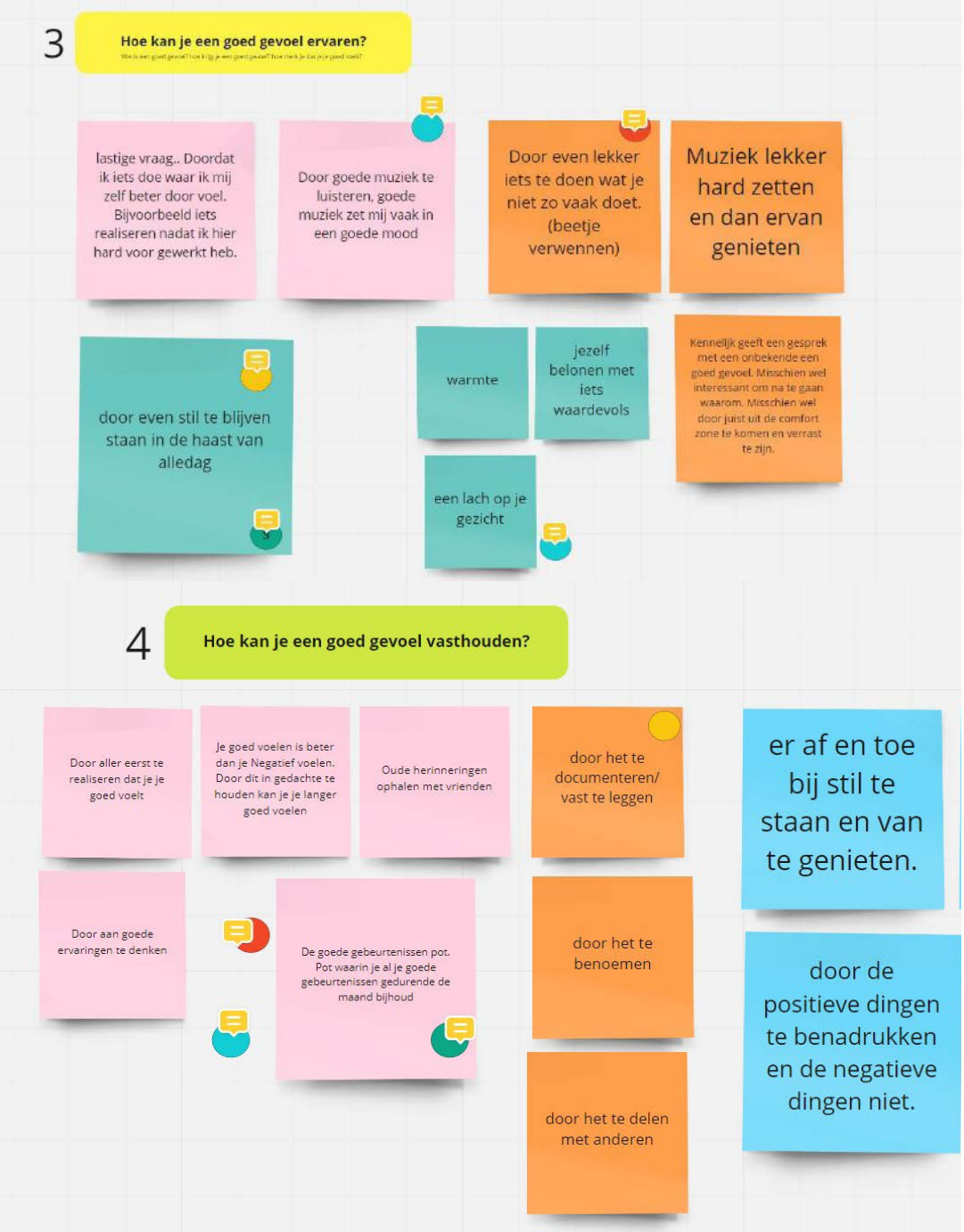
Although the generative session was for inspiration purposes rather than forming usable concepts, a usable and feasible concept came out. Next to the concepts, the brainstorm phase and the booklets gave some insights as well, which will be discussed in this section.

From the booklets I noticed that people felt quite proud about the amount of products they owned second hand. Participants answered the question "What feels good with regarding to buying?" with answers related to buying second hand. Scoring a good deal gave a good feeling, and for the more sustainable oriented people, doing good for the environment was an extra factor. Furthermore, what feels good and makes happy, is often not related to products, being outside, doing sports, discovering new places, being with family were the most frequently mentioned answers.

From the brainstorm session, I saw there were some overlapping ideas with the ones I formed previously, which gave me the confirmation I was thinking in the right direction. The question how to experience a good feeling was answered with listening to music, warmth, rewarding yourself with something valuable, or something that is not done regularly and 'by reflecting on the rush of everyday life. This shows that feeling good is related to living in the moment, a concept could respond to this.
Also the question of how to retain a good feeling was answered with ideas related to awareness and living in the moment, 'by occasionally reflecting on it and enjoying it' or 'by documenting/record it'. The idea of a 'good memories jar' was proposed, where good memories are tracked during a month. This idea was received enthusiastically, balancing good and bad behaviour or a yearly overview were follow up thoughts that were noted with it. Furthermore, what became clear is that a social aspect is very important to make and keep a concept fun. Participants noted they are motivated by a competitive element.

Some interesting concepts and ideas were formed, which I could definitely work further on. Brainstorm results and concepts made during the session and the pilot of the session can be seen in appendix H.

Figure 28. What feels good.



MAIN TAKEAWAYS

HAPPINESS IS OFTEN NOT RELATED TO PRODUCTS, MOST PARTICIPANTS THOUGHT ABOUT ACTIVITIES, PEOPLE AND NATURE WHEN THINKING ABOUT WHAT MAKES THEM FEEL GOOD. RELATED TO SHOPPING, SCORING A GOOD DEAL AND DOING GOOD FOR THE ENVIRONMENT GIVES THE GOOD FEELING WHEN BUYING SECOND HAND AND CAUSES A PROUD FEELING CONNECTED TO SECOND HAND PURCHASES. THIS PROUD FEELING CAN BE USED IN THE DESIGN FOR EXAMPLE IN THE CONCEPT OF THE VIRTUAL FOREST, WHERE THE AMOUNT OF SECOND HAND PURCHASES BECOMES VISIBLE FOR ONESELF AND OTHERS.
A SOCIAL ASPECT WITHIN THE DESIGN IS CONSIDERED AS IMPORTANT, BESIDES HAVING A COMPETITIVE ELEMENT, IT ALSO MOTIVATES AND IT COULD CREATE THE FEELING OF SOCIAL BELONGING, BY NOT BEING THE ONLY ONE WHO CARES FOR THE ENVIRONMENT.

7.9 THREE CONCEPTS

After the brainstorm session, the previously made product ideas are improved, and some new ideas are formed. The most promising ideas are made into concepts, and will be presented in this section.

CONCEPT: VIRTUAL FOREST

DESCRIPTION

This concept is a smartphone application, which is linked to common used second hand sales platforms such as *Marktplaats* or *Vinted*. When buying a product 2nd hand, the user gets a tree, which is added to his/her virtual forest. Collecting more trees unlocks special trees, such as an old oak tree, or an apple tree. The amount of trees in the forest can be compared to those of friends within the app.

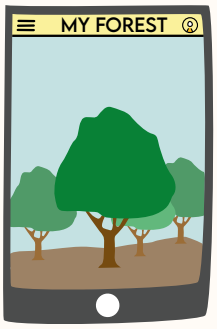
GOAL

- To stimulate buying second hand products in stead of new.
- Enlarge the realisation that buying second hand is good for the environment.

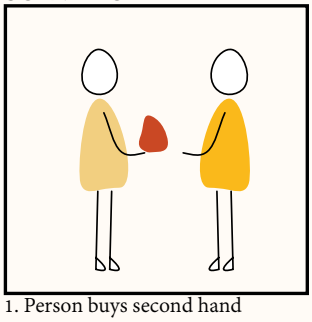
POSSIBLE ADJUSTMENT

With every tenth virtual tree, a real tree is planted in The Netherlands.

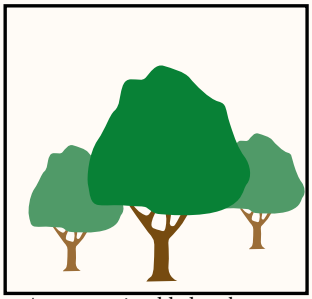
DRAWING



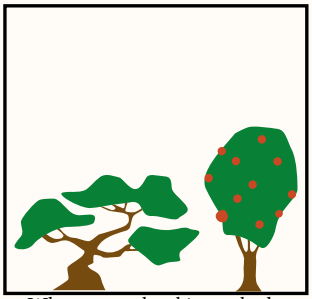
SCENARIO



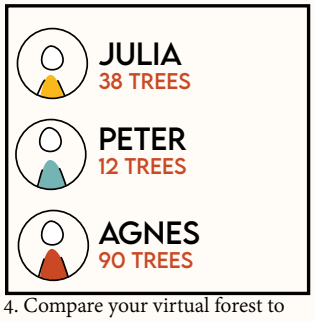
1. Person buys second hand from someone.



2. A new tree is added to the virtual forest.



3. When a next level is reached, special trees will be unlocked.



4. Compare your virtual forest to those of friends.

What's good about this idea?

- Provides positive feedback when buying second hand.
- It reaches a lot of people, since it is connected to the accounts of existing second hand sales platforms.
- It could also make people who don't buy second hand for sustainability reasons aware of the environmental benefits of buying second hand.
- It is focussed on the moment of buying.
- When sharing your score, there is a social aspect to it.

What could be negative about this idea?

- It might stimulate to buy more, since it rewards every second hand purchase.
- It is based on external motivation, with rewards. Does this still work when the reward disappears or gets less attractive?

MAIN TAKEAWAYS

CREATING A VIRTUAL FOREST COULD BE A FUN WAY TO HIGHLIGHT THE ENVIRONMENTAL BENEFITS OF BUYING SECOND HAND. QUESTIONS THAT WILL HAVE TO BE EXPLORED IN THE USER TEST ARE: DOES EARNING TREES MOTIVATE TO BUY MORE SECOND HAND? DOES IT ENCOURAGE USERS TO BUY MORE?

CONCEPT: MY GREEN HOUSE

DESCRIPTION

This concept is an application for smartphones which registers the stuff that is in the house, and gives it a 'green-score'. Purchases are registered (by scanning a customer card or manually), which influences the house coloring more green or red.
Buying second hand, repairing, having less, and having stuff longer makes the house greener. When something new is bought, additional questions are aked: Did you really need this and did you consider the quality? Depending on the answers the house colors more or less red.

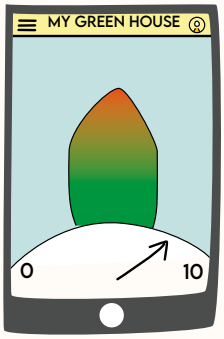
GOAL

- To stimulate buying second hand, reparing and using products longer.
- Making people aware that buying sustaineble doesn't have to be difficult (buying second hand, and making deliberate descisions is enough).

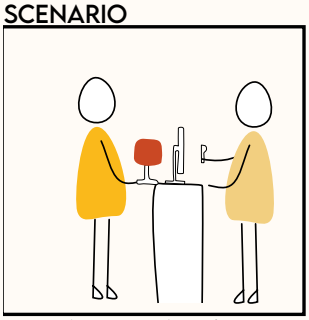
POSSIBLE ADJUSTMENTS

The image of the house could be adjusted to anything else.

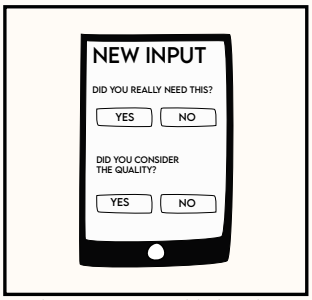
DRAWING



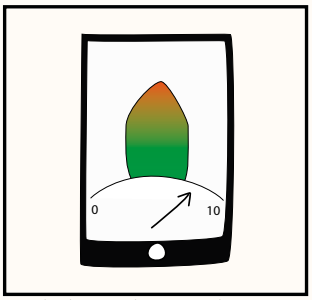
SCENARIO



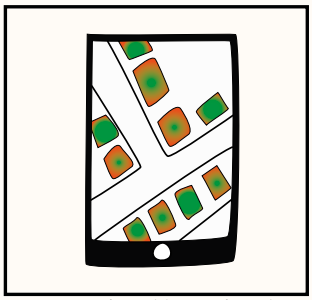
1. User buys something for in the house.



2. The new item is added in the app, when it is a new product, additional questions are asked.



3. The house changes color towards more green or red.



4. Houses of neighbours/friends can be compared to your own score.

What's good about this idea?

- It provides visual insight in the impact of the products in the house
- It stimulates to buy second hand
- It is present on the moment of buying.

What could be negative about this idea?

- It could be to generative, every second hand product is good, and every new product is bad, whilst some products have way more impact than others
- It is a lot of work to register every purchase

MAIN TAKEAWAYS

THE IMAGE OF A GREEN HOUSE COULD MAKE PEOPLE MORE PROUD ON THEIR SECOND HAND PRODUCTS BY HIGHLIGHTING THE SUSTAINABILITY OF IT. USER TESTS HAS TO SHOW HOW THIS IDEA IS PERCEIVED BY THE USER AND IF IT MOTIVATES TO BUY MORE SECOND HAND.

CONCEPT: SUSTAINABLE BEHAVIOUR ART

DESCRIPTION

This concept is a board/poster that can be put on the wall. The user tracks his/her sustainable behaviour by adding tiles. The tiles are categorised in different sustainable behaviours, each category matches a color.
By tracking in which categories sustainable behaviour is performed each day, an artwork is created that provides insight in how sustainable the user is and in which categories the user could improve him/herself.

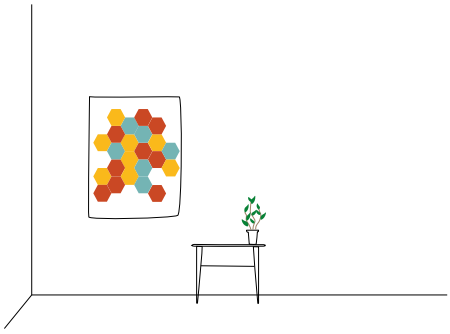
GOAL

- Providing insight in the sustainable behaviour of users.
- Starting the conversation about sustainable behaviour between family members or when guests are coming over.

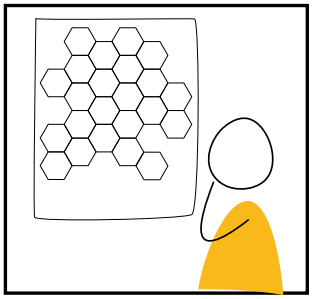
POSSIBLE ADJUSTMENTS

Instead of tracking sustainable behaviour, tracking what makes someone feel good. Also with categories, this makes it more a mindfulness tool.

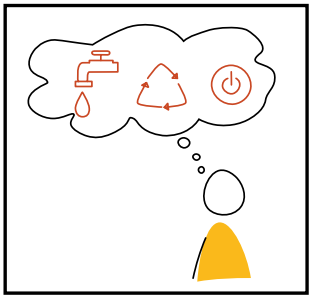
DRAWING



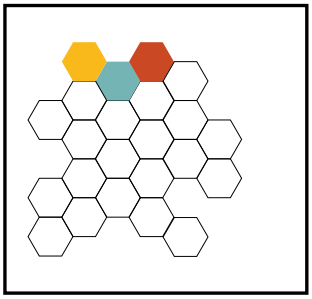
SCENARIO



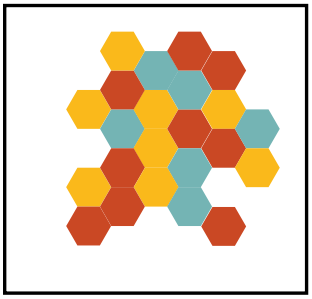
1. Person looks at poster.



2. Person thinks about sustainable behaviour of that day.



3. The corresponding categories are added to the board.



4. An artwork is made with your sustainable behaviour.

What's good about this idea?

- It provides positive feedback, everybody does something sustainable everyday.
- It is physically present in the house, which reminds people about it when passing by.
- It stimulates interaction between intimates and can work as conversation starter.

What could be negative about this idea?

- It is not really focussed on shopping behaviour, which was the initial target of my project.
- It is another thing that should be bought for in the house, which is not desirable. It should be made sustainable and last very very long.

MAIN TAKEAWAYS

CREATING AN ARTWORK ON THE WALL BASED ON SUSTAINABLE BEHAVIOUR PROVIDES POSITIVE FEEDBACK AND STIMULATES INTERACTION BETWEEN HOUSE MATES. USER TEST HAS TO SHOW HOW THIS CONCEPT INFLUENCES THE ENVIRONMENTAL SELF-IDENTITY AND HOW THIS CONCEPT COULD FOCUS MORE ON PRODUCTS AND BUYING BEHAVIOUR.

TO CONCLUDE

THREE CONCEPTS ARE FORMED. THE FOCUS OF THE DIFFERENT CONCEPTS VARIED. THE VIRTUAL FOREST FOCUSSES ON SECOND HAND PURCHASES AND REWARDS THESE WITH THE ADDITION OF A TREE TO ONES PERSONAL VIRTUAL FOREST. THE FOCUS OF THE SUSTAINABLE BEHAVIOUR ART IS ON DIFFERENT ASPECTS OF SUSTAINABILITY, NOT ONLY ON PRODUCTS. AN ARTWORK IS CREATED BY TRACKING ONE'S SUSTAINABLE BEHAVIOUR. THE FOCUS OF THE LAST CONCEPT, MY GREEN HOUSE, IS ON THE PURCHASE OF SECOND HAND PRODUCTS AND USING PRODUCTS LONGER. BY TRACKING THE PURCHASE AND DISPOSAL OF THE PRODUCTS IN THE HOUSE, AN IMAGE OF THE HOUSE COLOURS MORE GREEN OR RED, GIVING PERSONAL FEEDBACK ON THE ENVIRONMENTAL IMPACT OF THE PRODUCTS IN THE HOUSE. TO FIND OUT HOW THE TARGET GROUP RESPONDS TO THESE CONCEPTS, USER TESTS WILL BE DONE.

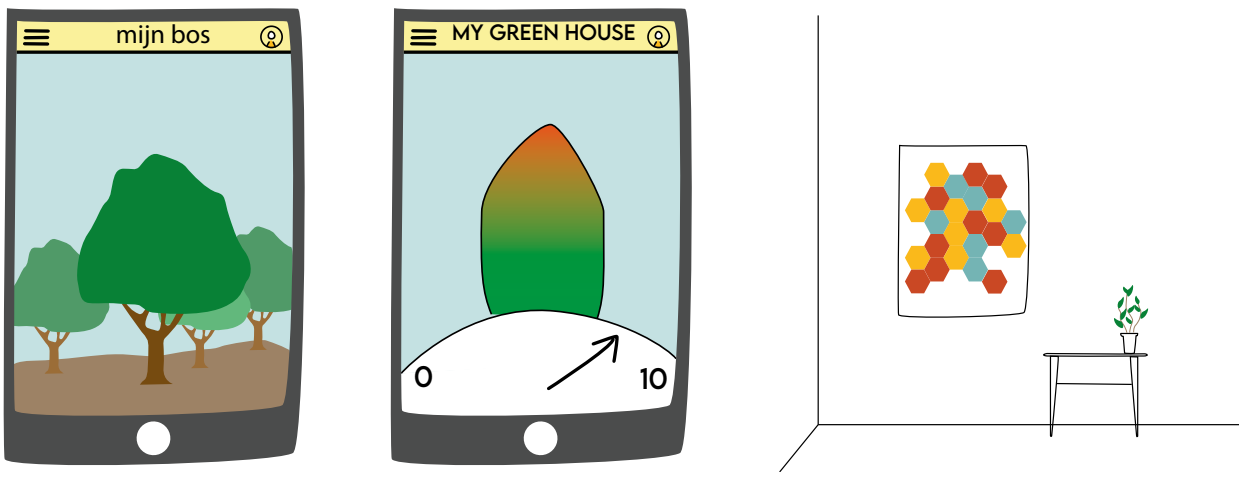


Figure 30. Three concepts

8. FIRST TESTS

TO BE ABLE TO TAKE THE THOUGHTS AND CONSIDERATIONS OF THE TARGET GROUP IN TO ACCOUNT WHEN SELECTING IDEAS TO WORK FURTHER ON, USER TESTS WILL BE DONE. BASED ON THE RESULTS OF THE TEST, IN COMBINATION WITH THE EVALUATION OF THE CONCEPTS BASED ON THE PREVIOUS LITERATURE RESEARCH, OWN CONSIDERATIONS AND THE CRITERIA AS FORMULATED IN CHAPTER 7.2 ONE OF THE CONCEPTS WILL BE CHOSEN TO CONTINUE WORKING ON.

Picture: Scott Webb

8.1 SET-UP FIRST TEST

The first tests are done in an explorative way, with the goal to gain insight in what the target group thinks of the concepts. Whether they think it is fun to use, if they would be willing to use it for a longer period of time, if it stimulates sustainable behaviour and last but not least, if the use of the concept enlarges their environmental self-identity.

In order to generate a quick test set up, Google forms is used as a prototype. To be able to test the concepts through Google forms, simplifications had to be made (see table 3). In order to get feedback on the entire concept, and not only on the test as it was now, the concept was explained to the participants as in the images in the previous chapter.
For each concept questions are set up in Google forms, based on the answers given, the participants see an image (a tree added to their forest, a house getting greener, a tile being added to their sequence). Everyday a new form is send with similar or the same questions, building upon the previous days. The test lasted for 5 days. For the full set-up of the test, see appendix I. Afterwards, an interview was held to evaluate the test, the concepts and their performance on the criteria and find answers to the questions formulated above. To evaluate whether the concepts influence the environmental self-identity, the questions 'do you consider yourself a sustainable person?' and 'did this change compared to before the test?' were asked. This question is derived from the meaning of environmental self-identity: 'How much one sees him/herself as a sustainable person'. Nine participants participated in this test, three per concept. Participants were selected on their age, working status (not being a student, having money to spend), and estimated interest in the environment.

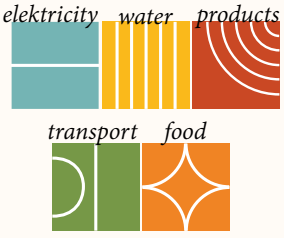
Concept	*Simplilfications*	*Questions*	*Categories*	*Example of Images*
Virtual Forest	• Based on previous purchases if nothing second hand is bought that day. • No sharing	1. Did you buy something second hand today? 2. If no: Do you have something second hand in [productcategory]?	• Furniture • Elektronics • Kitchen appliances • Decoration • Hobby items	 *1 tree* *5 trees*
Green House	• Current percentage of second hand products in house. • 0, 25, 50, 75 or 100% as options	1. How much [productcategory] do you have? 2. What percentage of this is 2nd hand?		 *0%* *50%* *100%*
Sustainable Art	• One sustainable action per day. • Tiles are placed horizontally next to each other.	1. Did you do something sustainable today? 2. In which category does it belong?	• Water • Energy • Products • Transport • Food	 *elektricity* *water* *products* *transport* *food*

Table 3. Overview of adjustments and questions in test 1

8.2 RESULTS FIRST TEST

In this chapter, the results of the first tests will be discussed based on the interviews with the participants (for full interviews with participants, see appendix J).

Virtual Forest

Participants evaluated the virtual forest as a fun way to reward second hand purchases. It can be motivating to buy second hand, and it raises awareness on the environmental benefits of buying second hand.

> *"I DID NOT BUY 2ND HAND OUT OF SUSTAINABILITY REASONS, BUT THIS CONCEPT MAKES CLEAR BUYING SECOND HAND IS ALSO BETTER FOR THE ENVIRONMENT, WHICH IS FUN." - RIK*

The participants who did not buy products second hand for sustainability reasons, mentioned that they did not consider themselves as a more sustainable person with this knowledge. This could mean that an action has to be taken for sustainability reasons in order to increase the environmental self-identity.
Participants confirmed getting a tree does not motivate to buy more in general, but it does motivate to buy more second hand.
In general, participants were willing to use this for a longer period of time, but there was some doubt about how long it would stay interesting. Some more interaction with friends within the app, collecting trees together or levels would be necessary to keep it fun.

Green House

This concept was received enthusiastically, counting the amount of products and how much of those were bought 2nd hand was perceived as fun to do, creating awareness and providing insight in where improvement could be made. It motivated to buy more second hand.

> *"I CONSIDER BUYING EVERYTHING SECOND HAND FROM NOW ON" - FREDERIK*

The house getting more green or red was a good reward for having a lot of second hand goods. However, due to the simplifications made to be able to test this concept through google forms, the results sometimes felt not representative, which was demotivating. To use this app for a longer period of time, a lot of improvements would have to be made. For example, making the registration of products easy/automatically, seeing results faster, also taking into account for how long a product is used and how often it is used. Not all new bought products are bad, and thereby, some products have more impact than others.

Participants would like to get information on what to consider when they want to make a sustainable decision. The concept adds awareness of sustainable behaviour, however, it was considered to be frustrating that not all aspects of sustainability were taken into account, one of the participants scored relatively low, even though she considers herself as a sustainable person.

"I WAS BOTHERED BY THE FACT THAT ONLY STUFF WAS TAKEN INTO ACCOUNT. IT LOOKED LIKE I AM NOT SUSTAINABLE AT ALL, EVEN THOUGH I DO SEPARATE MY WASTE AND BUY MY CLOTHING SECOND HAND. SO IT FEELS LIKE THE IMAGE IS NOT COMPLETE" - EMMY

Sustainable art

Participants were quite enthusiastic about this concept. They enjoyed tracking their sustainable behaviour, and said it worked very well in raising awareness about how much they already do for the environment. The different categories motivated them to be sustainable in different areas. It would be even more motivating if multiple actions could be filled in, so multiple tiles could be added in one day. Sometimes it was hard to come up with something else to do, so providing tips/inspiration per category would be appreciated. The participants would like to use this for a longer period of time, on a daily basis. Tracking your sustainable behaviour increases the environmental self-identity.

"BY DOING THIS TEST, I REALIZED I AM KIND OF SUSTAINABLE ALREADY, THAT MAKES ME PROUD OF THE GOOD THINGS I DO ALREADY, AND GIVES MOTIVATION TO KEEP DOING IT" - ANNECHIEN

Sustainable behaviour that has become a habit, is often forgotten to be sustainable, whereby the good feeling retrieved from it disappears as well. This concept reminds people about the positive impact people have with their ingrained behaviour.

"I AM MORE SUSTAINABLE THAN I THOUGHT, THIS CONCEPT WAS A GOOD WAY TO GET THE GOOD FEELING OF THE SUSTAINABLE THINGS I DO DAILY BACK" - NYNKE

MAIN TAKEAWAYS

NOT ALL TESTS GAVE AN EQUALLY GOOD IMPRESSION OF THE CONCEPT. HOWEVER, THE MAIN POINTS OF IMPROVEMENT PER CONCEPT CAME OUT PRETTY WELL. FURTHER EVALUATION OF THE CONCEPTS IS NEEDED TO MAKE A DELIBERATE DECISION, INCLUDING MY OWN OPINION, CRITERIA AS FORMULATED IN CHAPTER 7.2 AND THE POINTS OF IMPROVEMENT.

Concepts will be evaluated based on the considerations formulated in the test set-up, feedback of the participants, criteria as set up in chapter 7.2 and linked back to previous literature study. Points of improvement are given.

Virtual forest

Based on literature

- Rewards tend to be successful while they continue, but the desired behaviour can drop off when the rewards disappears or get less attractive (Fischhoff, 2020)
- A way to motivate sustainable behaviour is to make it more fun (Fischhoff, 2020)
- Biospherical values are activated by images of nature, by seeing the forest when buying something, the biospherical values will be activated and users will be more likely to perform sustainable behaviour. (Steg, 2016)
- This concept adds triggers and motivation, while the ability is already there (Fogg, n.d.)

Based on test

Getting a tree is a fun reward for buying second hand, and it makes people who don't buy out of sustainability reasons more aware of the environmental benefits of buying second hand. Although the effect on environmental self-identity might be small, it does motivate to buy more second hand, but not to buy more in general.
More interaction with others within the app, planting real trees or levels would make it even more fun, and would be necessary to keep it interesting for a longer period of time.

"IT IS SUPER NICE TO GET A TREE WHEN I BUY SOMETHING SECOND HAND!" - GEMMA

Based on criteria

For full analysis of this concept based on the criteria as formulated in chapter 7.2 see appendix K1. The virtual forest scores high on the criteria of providing a positive view on sustainability (A2), by visualising how the purchase of second hand products leads to a greener word. The straightforward design makes this concept easy to understand for the user (criteria B3).
The app scores lower on long term effect (A6), since there is some doubt about how interesting this will be in the long term, or when the rewards drops off or gets less interesting.

Points of improvement

- Sharing your forest with friends, saving together, having levels or planting trees for every 10 trees that are saved would be even more motivating.
- If adding purchases would be low effort or automated, it would last longer.
- Information about the impact made could be added.

Green house

Based on literature

- Gives direct and personal feedback, something which goes wrong with tools to calculate footprint (chapter 4.3)
- Social influence strategies can stimulate sustainable behaviour (Steg, 2016)

Based on test

Participants thought counting the amount of products and how much of those were bought second hand was perceived as fun to do, created awareness and providing insight in where improvement could be made. It motivated to buy more second hand. But on the other hand, the complexity of this concept became clear, since not every new bought product is equally bad for the environment, some products have more impact on the environment than others, and how often a product is used has influence on the impact as well. Thereby, the image shown was considered to be demotivating when the participants had the idea it was not a good representation of their sustainable behaviour, since behaviour in different areas(waste, clothing, energy) are not taken into account.

"I IMMEDIATELY FEEL LIKE GETTING THAT HOUSE GREEN!" - EMMY

Based on criteria

For full analysis of this concept based on the criteria as formulated in chapter 7.2 see appendix K2. The green house scores high on reminding users about their sustainable behaviour from the past (A1), since the colour of the house is based on all the purchases that are done. This concept scores lower on motivating to act more sustainable (A3), since the feedback could also be negative when a lot of new products are being bought, and is not likely to change quickly because one product does not make a big difference on the total image.
Thereby, the concept can get really complicated when all aspects of what makes a product sustainable are taken into account, making it score low on criteria B2, feasibility. Registering all products requires effort and motivation from the user, making it score low on criteria B4 (little effort).

Points of improvement

- Automatically register products, so it takes less effort.
- Adding information: What makes a purchase a good one?
- Adding levels to keep it interesting

Sustainable art

Based on literature

- This concept clearly builds upon the idea that the environmental self-identity can be improved by reminding people of their sustainable behaviour from the past (van der Werff, 2016) . Making use of the fact that the effect is bigger when behaviour in different categories are mentioned, this concept is not fully focussed on products, but on multiple aspects of sustainable behaviour.
- Corresponding to research of Casais (2018), this concept enables users to keep track of their progress, which is an example of the symbolic meaning of personal growth, and contributes to their well-being.
- This concept enables users to improve their sustainable behaviour in their own pace (Fischhoff, 2020)

Based on test

Keeping track of their sustainable behaviour reminds participants about how sustainable they already are, and enlarges their environmental self-identity. Categorising the behaviour motivates to improve sustainable behaviour in different areas as well, but inspiration for what could be done would be appreciated.

"TOMORROW I WILL DO SOMETHING ELSE, I WANT TO SEE THE OTHER COLOURS!" - ZIZZY

Based on criteria

For full analysis of this concept based on the criteria as formulated in chapter 7.2 see appendix K3. Overall, this concept scores quite good. It provides a positive view on sustainability (A2) by rewarding the sustainable behaviour without punishing the less environmental friendly behaviour. As users are forming their own artwork while being sustainable, the product makes sustainable behaviour fun to do, and gives the feeling of competence (A4). Since the artwork made is ever changing and personal, it will be appealing for everyone (B1). As the product is present in the house, it can stimulate interaction between house mates, which gives it a social aspect (A5). However, the social aspect of interaction between users of the product misses, e.g. when the user lives alone. The concept does not fully focus on the purchase of products, but it has the potential to make people more aware of their sustainable behaviour, and whilst having the category of stuff in it, it also motivates users to be more sustainable with their products.

Points of improvement

- Push more towards sustainable behaviour regarding products, for example by creating challenges, which can be focussed on products.
- Add inspiration for what sustainable actions can be taken within the different categories
- Connecting it with an app, to increase the social element for users who live alone or users who want to see what other users do.

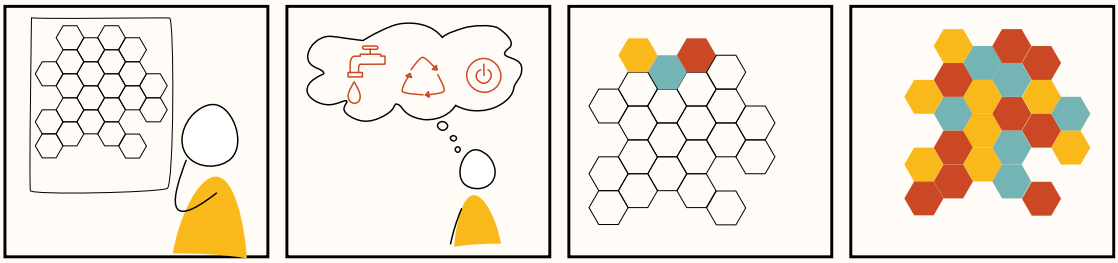
TO CONCLUDE

THE CONCEPT SUSTAINABLE ART IS EVALUATED AS THE MOST PROMISING CONCEPT. AS CAN BE SEEN IN THE TABLE BELOW, THIS CONCEPT HAS THE MOST POSITIVE POINTS AND EASY TO SOLVE NEGATIVE POINTS.
BASED ON THIS EVALUATION, THE CONCEPT WILL BE IMPROVED WHEREBY POSITIVE POINTS OF THE OTHER CONCEPTS WILL BE TAKEN INTO ACCOUNT, SUCH AS IMAGES OF NATURE TO ACTIVATE THE BIOSPHERICAL VALUES, AND PERSONAL FEEDBACK. A SOCIAL ELEMENT WILL BE ADDED TO INCREASE MOTIVATION AND FOCUS ON PRODUCTS WILL BE IMPROVED

	+	−
Virtual forest	• Stimulates second hand purchases • Images of nature activate the biospherical values	• Based on rewards. What happens if the reward drops off, or gets less interesting? • Extrinsic motivation
Green house	• Personal feedback on sustainability of products in house	• Effort to register every product • Feedback can be negative • Gets complicated if every aspect of sustainability is added
Sustainable art	• Boosts environmental self-identity by reflecting on multiple aspects of sustainability • Easy to understand and takes little effort relative to the amount of awareness • Adds to subjective well-being by providing a tool to track progress • Stimulating interaction between housemates (and guests)	• Less focussed on products • No social element

Table 4. Main positive and negative points per concept.

An adaptation is made to improve the chosen concept. The principle of the concept stays the same, the user adds tiles to a board when something sustainable is done, creating an artwork during the month based on his/her sustainable behaviour.



1. Person looks at poster.
2. Person thinks about sustainable behaviour of that day.
3. The matching categories are added to the board.
4. An artwork is made with the sustainable behaviour.

New variations of the tiles are designed and categories are added and reorganised. The first tiles are the same as the first test, with retro colours and lines. The lines enable the user to connect tiles and might stimulate an action in a particular category, because a direction of the lines is needed. The new designed tiles have a hexagonal shape, which enables a more playful and diverse creation of the artwork. Design two have more natural prints and colours, meant to activate the biospherical values, as mentioned in chapter 3.3. The third version are tiles with a white background and graphical shapes, to better fit into different interiors and enable the user to make shapes and patterns.

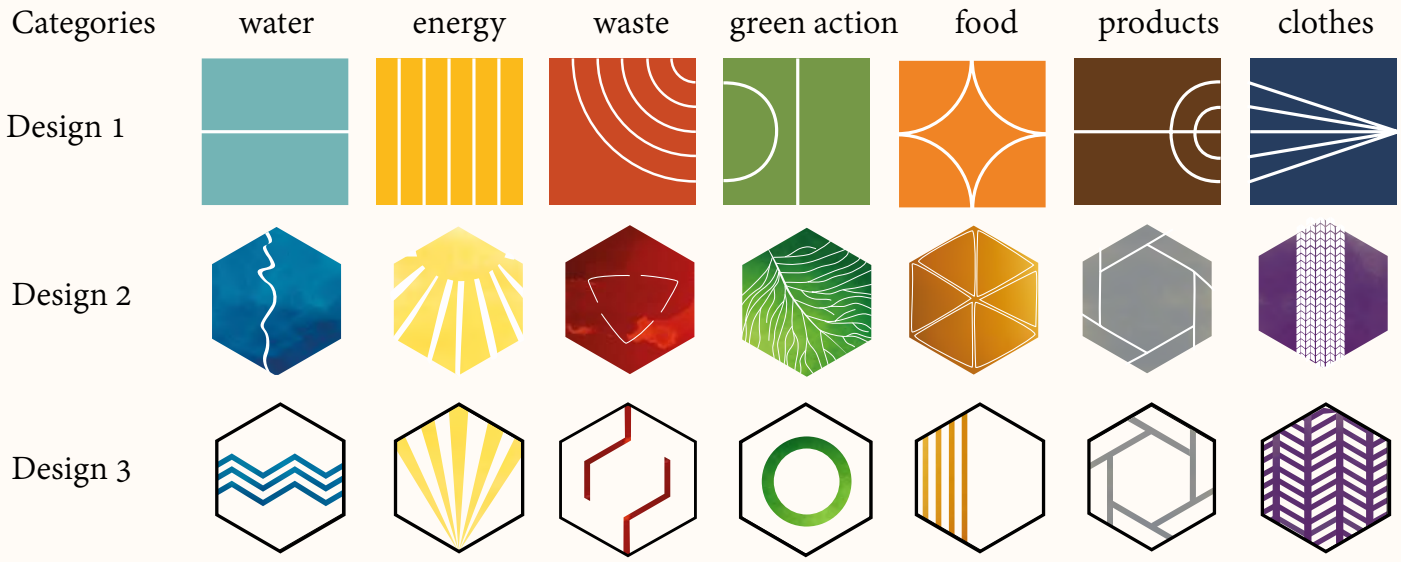


Figure 31. Variation of tiles

The app

To add a social aspect, an app is included in the concept, for screen shots, see figure 32. The app has 4 main functions:

- With statistics, the user is able to analyse his/her sustainable behaviour over several months. By uploading a picture of the board at the end of the month, statistics will be generated through artificial intelligence which recognizes the colours of the tiles. The statistics will show in percentages how often a certain tile is placed (and thus an action is done in that category). Users will be able to see statistics per month, but also per year, giving a complete overview of which categories of sustainable actions are done most often and where improvement could be made.
- Inspiration for sustainable actions per category are provided, as requested during the first test.
- As an extra stimulant to perform sustainable behaviour, challenges are added. These focus either on a particular action, for example 'bring all your old electronic devices to a recycling point', or on sequences of actions such as 'eat vegetarian for three days'. These challenges don't give an extra reward, but result in adding more tiles to the board.
- A social part is added to the application, where pictures and notes can be uploaded. These could be either pictures of the actions performed or the boards that are created, or notifications of challenges that will be done by the users. In this way, users of the product can share inspiration and as participants of the generative session already mentioned, a social part motivates and gives extra satisfaction

In this scedule, all aspect of the concept are visualised:

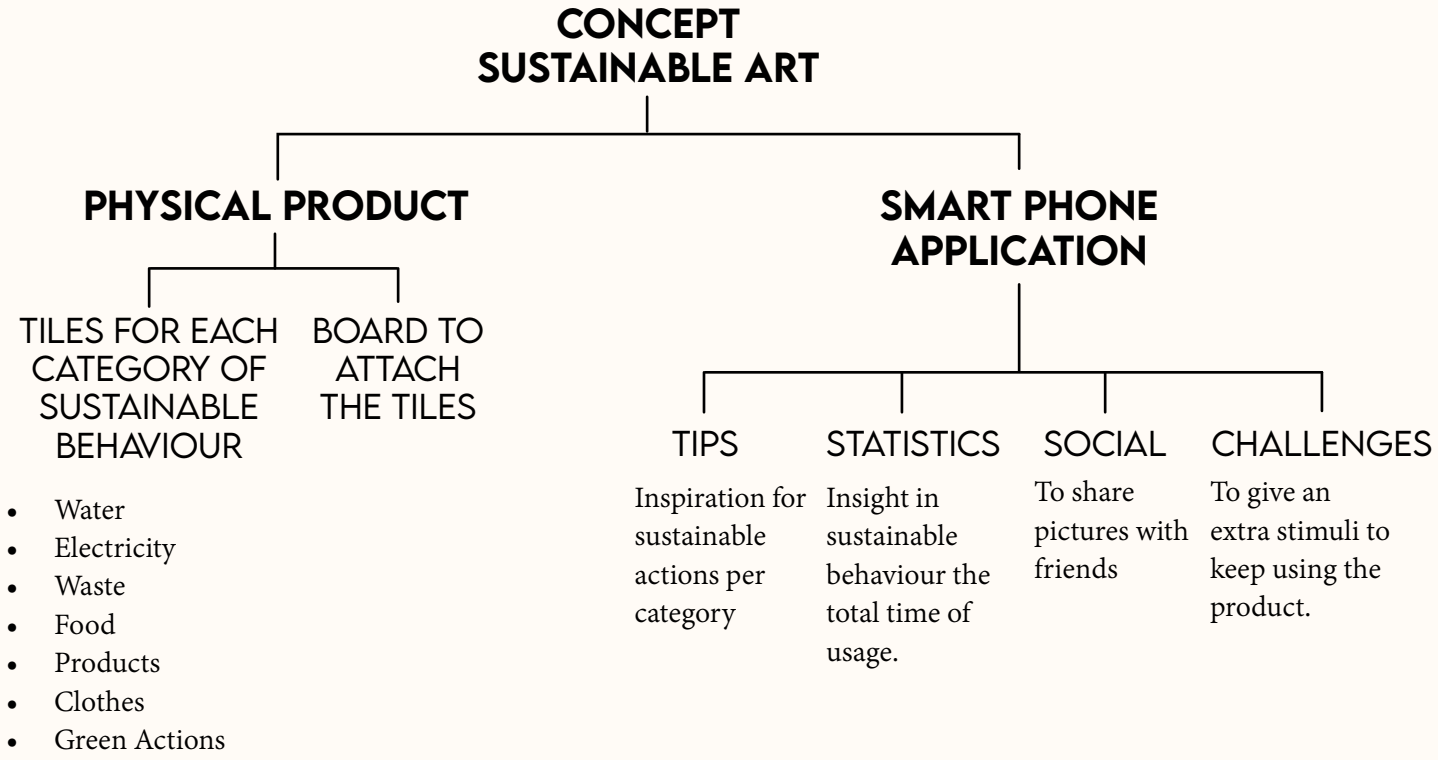


Figure 32. Main screens of app prototype.

9. SECOND TEST

TO TEST THE IMPROVED CONCEPT, A MORE ELABORATED USER TEST IS PERFORMED. PROTOTYPES OF THE BOARD AND TILES ARE MADE AND ALSO AN EXAMPLE OF WHAT THE APP WOULD LOOK LIKE. THE CONCEPT WILL BE EVALUATED ON THE APPRECIATION OF THE TILES AND THE BOARD, AND WHETHER THE DIFFERENT DESIGNS REACH THE GOAL OF MOTIVATING TOWARDS MORE SUSTAINABLE BEHAVIOUR. FURTHER EVALUATIONS WILL BE DONE ON THE COMBINATION OF THE BOARD WITH AN APP, HOW IT MOTIVATES SUSTAINABLE BEHAVIOUR, AND HOW IT AFFECTS THE ENVIRONMENTAL SELF-IDENTITY. THE SET-UP OF THE TEST, EVALUATION OF THE CONCEPT AND RESULTING ITERATIONS WILL BE DISCUSSED IN THIS CHAPTER.

Picture: Pixabay

To find points of improvement and see how the new concept is being received, a new test is done. Within this test, special interest lies in how the combination of the physical board and an application is appreciated, and which tile design is preferred.

Some rules of when and how to place a tile on the board are intentionally left open for interpretation. For example for behaviour that is done daily, such as separating waste or eating vegetarian, a waste respectively food tile could be added every day, or once in the beginning and afterwards only when something else or special is done. In the evaluation interview after the test period will be asked towards the approach of the participants.

Particitpants

After the previous test, participants were asked whether they would like to participate in another test, 7 out of the 9 participants were willing to participate again and did the second test as well. The participants who tested the concept of sustainable art in the first test are testing the new designed tiles in this test, so there is a clear distinction between the first and the second test.

Method

Prototypes of the boards and tiles were made out of cardboard. A rope was attached so the participants have the option to hang the board somewhere in the house. The tiles have a double sided tape on the backside, to attach the tile on the board. At first, the plan was to use magnetic tape so the prototype would be reusable, but this turned out to be not strong enough and to heavy. A booklet was provided with information and some questions to fill in before, at day 4 and after the test period. To test how the concept influenced the environmental self-identity, the question 'on a scale from 1 to 10, how much of a sustainable person do you consider yourself?' was asked before and after the test period. In this way, the answers could be compared to each other, and see if there was an increase in the environmental self-identity. This was estimated to give a better estimation of the influence of the concept on the environmental self-identity than the approach as was used in the first test, by only asking it afterwards. Participants will be asked to evaluate the test more elaborately in a one on one conversation after the test is done. For a list of questions see appendix L. The prototype was sent by post to the participants.
A prototype of the application was made by the use of Adobe XD and send digitally towards the participants, for screen shots of the prototype see figure 32 (page 81).
The application was not fully functional but gave an idea of how the prototype would look like. Based on the feedback from last user test, a list of inspiration was added in the app, thereby a social page was visible. Since it was not possible for the participants to post pictures in the prototype, the option was given to send me a picture with caption via whatsapp, so I could update the app.

On day 4, all participants were asked to send a picture of their board at that day, so all the boards would be shown in the app. The different tile designs were communicated beforehand, to avoid confusion. On day 4 the participants were also asked whether they would want to join a challenge, which would also be made visible in the app.
On the last day, participants were asked to send a picture of the final result of the board, and whether or not they accomplished the challenge, which would be the last update in the app. In this way, it was possible to test a little bit of how the social part of the application could work.

Figure 33. Prototype of the board, square tiles with booklet left, tile design 2 upper right, tile design 3 lower right.

9.2 RESULTS SECOND TEST

In this chapter, the results of the test will be discussed on the points as discussed previously, the board and the app, the tile design, de interpretation of the rules, how it motivates sustainable behaviour, how it affects the environmental self-identity and other improvements. For full interview results per participant see appendix M, and overview of the results see appendix N.

Participants were enthusiastic about the prototype and the test. I received a lot of pictures from the participants, and how they deserved their tiles. This was communicated to all participants through the app. Since most (6 out of 7) participants were family members of me and each other, they were interested in each others actions and the pictures that were shared. Especially those who fit my target group better in terms of wanting to be more sustainable, but don't really know how to start, were enthusiastically about the concept. One participant was less interested in the environment, and forgot about it easily. One participant was already a bit further in sustainability and noticed that she did most of the things already, her board was full at the end of the week.

The board

Although some participants were sceptical about a board and said beforehand they would prefer an app, the board was very much appreciated. Also those who were sceptical took back their words and said it added value. Having a physical board hanging in your house is a good reminder and the reward in the form of a physical tile is perceived as more satisfying than an online tile. The board functioned as a conversation starter between house mates and children really liked to participate by doing action to earn a tile and placing this on the board afterwards.

Emmy: "My sons don't want to eat meat for three days already, beacause that yields a tile!"

The app

The app played a big role in the fun of this concept. Photo's of the boards and the actions itself were actively shared and regarded as motivating and inspiring. Also the list of inspiration per category was used extensively by the participants. The idea to enable users to propose sustainable actions was imposed, whereby the proposed idea could be added to the app when it is approved to be a real sustainable action.

GEMMA: "I ESPECIALLY LIKED THE INSPIRATIONAL PICTURES. THOSE ARE THING WHICH MAKE YOU THINK: 'OH YES, I COULD DO THAT AS WELL SOMETIMES'"

Helena:"An hour of picking litter from the streets during my lunch break!"

Annechien: "Tonight I'll watch the documentary of David Attenbrough for a green tile!"

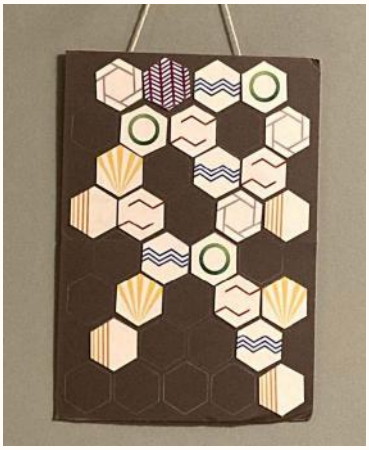
Motivates sustainable behaviour

Participants were motivated to act sustainably and earn tiles, to fill the board. New habits were formed easily, like turning of the lights when you leave the room. The test also made people who had thought about something sustainable they could do actually do it, for example buying reusable pouches for fruit and vegetables and use them. The tile was exactly the small extra motivation that was needed to really set one to action. Thereby, the friendly, accessible way of motivating towards sustainable behaviour was appreciated:

"MOST OFTEN, CONVERSATIONS ABOUT SUSTAINABILITY HAVE A COMPELLING TONE, BUT YOUR WRITING STYLE IS WAY MORE MOTIVATING AND ACCESSIBLE, IT'S JUST TIPS WHAT YOU COULD DO, VERY PLAYFUL AND WELL THOUGHT THROUGH."
- ANNECHIEN

Tile design

Although everybody thought the print they made looked good, and they were proud of their composition, most participants considered the graphical hexagon tile to be the most interesting. With the square tiles, it was possible to attach the lines to each other, which was appreciated and also fun for children. Nevertheless, the results were often a bit messy. The hexagon tiles have a more interesting shape on its own, and the graphical print enables to make patterns, even though the lines are not continuing entirely.
The size of the board gave some restrictions to the placement of the tiles, this could be solved by attaching the tiles directly on the wall or to each other instead of to a board.



The hexagon tiles with graphical print were liked the most.

Stimulates environmental self-identity

Some participants thought they were more sustainable after the test than before, for others this stayed the same. The participants who stated they felt more like a sustainable person argued that they were doing more for the environment now, which made them a more sustainable person and gave them a good feeling.
One participant who did not see any improvement questioned her motivation to be sustainable:

"I WANT TO EARN A LOT OF TILES AND 'WIN' THE GAME, DOES THAT MAKE ME A MORE SUSTAINABLE PERSON? RIGHT AFTER IT SHE MENTIONED SHE DID GET MORE AWARE, AND WHENEVER SHE LEFT THE ROOM WITH THE LIGHTS ON, SHE THOUGHT: OH, LET ME TURN OF THE LIGHTS FIRST FOR EXAMPLE."

This might suggest that the concept is seen as a game, which was not the intention. Gamification can make things more fun and addictive, but these effects are often temporarily. It leads to over-engagement in the beginning and loss of interest after a while, unless techniques are used to keep the game interesting.

The fact that the concept was interpreted as a game can be due to the test set-up. All participants started tracking their behaviour at the same time, and an interim score of their boards was shared on day 4, and afterwards creating the feeling of competition, and wanting to be 'better' (having more tiles) than others. The action of adding a tile itself could be interpreted as a reward (like in a game), but is meant as a tool for tracking behaviour (like tracking your running distance in a running-app), and motivates the user to improve him-/herself.
So there are some aspects which can be seen as game-elements, which is not necessarily a bad thing, since game elements don't work against intrinsic motivation (Mekler et al., 2017), and can be very motivating as well.
Looking back at the elements that activate intrinsic motivation as described in chapter 3.2, a lot of those elements are present in this concept. The feeling of competence, feeling like you are able to do something, is activated by offering sustainability in small steps. The actions that a user performs to earn the tiles, can be selected on the difficulty that feels achievable. In this way, the behaviour can be done on ones own pace, as Fischhoff mentioned as a motivator for sustainable behaviour as well.
The second feeling that has to be activated in order to activate the intrinsic motivation is the feeling of autonomy. This is done by providing multiple options and categories to perform a sustainable action in, and letting the user decide him/herself what he/she wants to do that day or moment. Also the feeling of social involvement is activated by this concept, especially by the sharing function, so users see they are not fighting the environmental change by themselves, but are part of a small community. However, this sharing function is meant to be inspirational, this function could make the concept more competitive and thus game like.
Concluding, the concept is meant to be more of a tracking tool than a game. Game elements like challenges and sharing inspiration are added to keep it fun and interesting. To avoid turning the concept into a game too much, some game elements that have to be avoided in the next iteration are: ranking lists, clear limits on actions, challenging others, progress bars and unlocking levels.

Interpretation of the rules

The rules for placing a tile were left open for interpretation, either for every sustainable thing you do, only when something new is done or when something is done consciously. Most of the participants chose to only place tiles when something new was done, or really conscious with the environment in mind. Although it does not really matter how the rules are interpreted, since the concept is really focussed on the users individual motivation for sustainable behaviour, it was considered to be a bit confusing when to place tile and when not, so for the final product, suggestions can be made. Since clear rules and limits on actions makes it more into a game, this will be avoided.

Big differences between the amount of tiles placed.

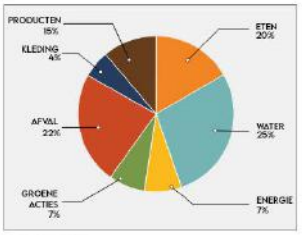
Emotions experienced during the test

the emotions experienced during the test were mainly described as content, proud, enthusiast, motivated, inspired. Those represent the first 7 images. One participant felt ashamed for not earning product or green action tiles (last image), another participant felt modest since she thought she was doing good, but there was room for improvement.

Other insights

The design of the app could use some improvement, not all participants could find the pages where they could see boards of other participants or the challenges.

The statistics over a couple of months would be interesting. A circle diagram gives a clear indication about what is being done the most, and what the least. But it could also lead to doing something less, so that the other category gets bigger respectively. It would be good to visualise it in such a way that it motivates doing more of every category.



The challenges were considered to be fun, and all participants chose another challenge for the last three days, which indicates the difficulty of the challenges was on the right level and equal amongst the challenges. For the final app, it could be interesting to classify the challenge on level of difficulty. This ensures that the challenges will be always on the right level, and users are motivated to unlock new challenges.

Five out of the seven participants wanted to keep tracking their behaviour, and keep using the board even though the test is finished. Which indicates they really liked it.

MAIN TAKEAWAYS

THE CONCEPT IS A GOOD WAY TO MOTIVATE SUSTAINABLE BEHAVIOUR AND IS CONSIDERED TO BE FUN, WHICH RESULTS FROM THE FACT THAT FIVE PARTICIPANTS WILL KEEP USING IT. IMPROVEMENTS COULD BE MADE IN APPEARANCE OF THE TILES AND THE APP AND BETTER NAVIGATION THROUGH THE APP. THEREBY, TO AVOID THE CONCEPT TURNING INTO A GAME, SOME ELEMENTS SUCH AS RANKING LISTS AND CHALLENGING OTHERS HAVE TO BE AVOIDED.

Based on the evaluation of the second test, some iterations will be made to come to the final design. In this chapter, the various options that are considered will be discussed, the final iterations will be made after the green light meeting.

Tiles

The hexagon shaped tiles allow users to get more creative with the layout of the tiles, since there are six directions in which the tile can be placed instead of four. Thereby, it is a more interesting shape on its own and all participants indicated to prefer the hexagonal tiles. Therefore the tile of the final design will be hexagonal.
From the test it was found that a link of the print on the tile with the corresponding category was not necessary, although some participants like that. This of course is very subjective, as well as the preferred design of the tiles. Lines were considered to be a fun way to make patterns and shapes, thereby the lines can stimulate the user to show a behaviour in a certain category, if a certain line is needed. Therefore, the tiles of the final design will have line (see figure 34). If the product were to be sold, different versions of the tiles could be produced, as well as limited editions as a Van Gogh design for example (see figure 35).

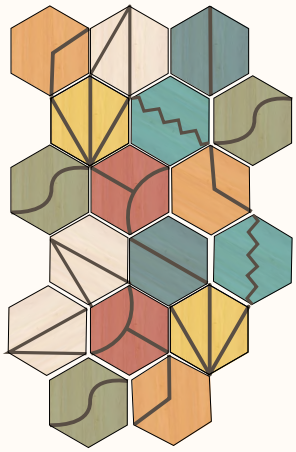


Figure 34, final tile design

Figure 35, Van Gogh edition

Board

The prototype made use of double sided tape to attach the tiles to the board. The final product has to be reusable, therefore different ways of attaching and releasing the tiles to the board are explored. The first option is to add a second, smaller, hexagonal shape on the back of the tile, which can be placed in a hexagonal hole in the board. The second option is to make the attachment on the back of the tile round, so the tiles can be placed in a board with round holes. The principle of both solutions are similar, but having a board with round holes and sticks might be aesthetically more pleasing.

Since participants of the test said they were limited by the size and shape of the board by placing their tiles, the possibility to attach the tiles to each other, in stead of to a board is explored. This would reduce the use of material as well.

App

The design of the app needs to be improved by matching it more with the design of the tiles and smoothing the navigation of the app.
To keep the product a reflection tool, rather than a competitive game, the option to share a picture of your board will be there in the social page, but results of the boards will not be automatically visible for friends or other users of the app. There will be no ranking on the amount of tiles collected in a month, or the amount of challenges done.
The challenges will be ranked on difficulty level, but will not have to be unlocked by completing other challenges.

Rules

As mentioned in the previous chapter, no strict rules will be made for when placing a tile. However, to create more clarity, some suggestions for often used 'rules' will be given:
- Only place a tile when you do something deliberately, even though you might do it more often
- Place a tile for the things you do more often once every month/week, for example for separating waste or having the heater on a low temperature
- Place a tile for everything you do, even if you do it everyday

Because the pictures of the board will not be automatically shared in the app, the different interpretations of the rules will not lead to unfair comparison of the boards.

Sustainability

Since this project is completely focussed on sustainability, the final product should be produced as sustainable as possible. Knowledge on the most sustainable materials and production methods is limited, and optimizing the sustainability would be recommended for further research.
With the knowledge that is in hand guidelines that apply will be:

- using reusable materials,
- keeping the amount of different materials low,
- making connections between different materials detachable
- have as little rest material as possible

10. FINAL DESIGN

A LAST TEST IS DONE WITH A PROTOTYPE OF THE IMPROVED VERSION OF THE PRODUCT WITH NEW PARTICIPANTS, IN ORDER TO MORE CRITICALLY EVALUATE THE CONCEPT, AND FIND THE LAST IMPROVEMENTS THAT LEAD TO THE FINAL DESIGN. ON THE BASIS OF THESE FINDINGS, THE FINAL DESIGN IS PRESENTED AND A PROPOSED BUSINESS MODEL IS PRESENTED.

Picture: Jonathan Borba

To find improvements and see how the product is evaluated on the game aspects with the latest iterations, another test is done. This test is executed with new participants, to get a fresh look at the product

The goal of this test is to get feedback on the new system of attaching the tiles to each other instead of to a board, find further improvements and to see if the improvements in the app make the concept less competitive and more focused on intrinsic motivation and reflection. To better evaluate the influence of the concept on the environmental self-identity and to get to know the participants a bit better, more questions were added to the booklet about their view on the environment, the role of the environment and nature in their lives, how they look at their contribution towards a more sustainable world. These will be answered in the booklet before the test, and the participants will be asked to reflect on these questions afterwards. To gain insight in how the concept activates the intrinsic motivation, questions will be asked about what motivated them to keep using the product, and whether this concept activated the feelings of competence, autonomy and social involvement.

Participants

A final test will be done with 3 participants within a group of friends, fitting to the target group in terms of age and general interest in the environment. One of the participants (Annechien) from the last test asked 2 friends to participate in this test, which are not related to me. This allows the participants to be more critical, since they don't know me and don't have the urge to please me. Ideally, all participants would be new to the concept and unrelated to me, since this would give more critical and unprejudiced results. However this was not achievable within the scope of this project, so the fact that one of the participants was already familiar with the concept will be taken into account while analysing the results. On the other hand, Annechien continued using the product afterwards and is now using the improved version, which makes her testing period seven weeks, this could result in more interesting insights in terms of long(er) use of the product.

Method

The test set-up was similar to the test set-up of the second test. Participants received a prototype of the concept, containing tiles, connection pieces and an online prototype of the application. For development of the tiles, see appendix O. A booklet was added with information about the test, and questions to be filled in before and after the test. Afterwards, the participants were contacted by phone to evaluate the concept in more detail, for questions of the evaluation see appendix P1.
This test lasted for 2 weeks. Ideally, it would be able to test the concept for a longer period of time (at least 1 month), but this was not possible within the given time of this project. To make the game less competitive compared to the previous test, participants weren't asked to share their interim results, pictures of their boards and the challenges they did. Just like in the second test, participants were able to share their actions and tips in the app by sending a picture to me with a description, so I could update the app.

To evaluate the latest version of the concept, results of the second test will be evaluated on the basis of the interviews with the participants. The concept will be evaluated on it's influence on the environmental self-identity, on how the connection of the tiles to each other is liked and whether the product is still perceived as a game. For a transcript of the interviews see appendix P2

Also in this test, the prototype was evaluated positively, participants thought it was fun to keep track of their sustainable behaviour and it created awareness about their sustainable behaviour which gave them a good feeling. The longer the product was used, the more options for sustainable behaviour and more variation was discovered and the more different categories are chosen to create a varied artwork. The new participants noted that two weeks of testing felt too short to fully discover the potential of this product, and expected to do more new actions to earn a tile is they would have had more time. Annechien had been testing the concept for seven weeks and confirmed this, she kept selecting new actions to do and continued performing her newly formed behaviour.

"I MAINLY BECAME MORE AWARE OF THE SUSTAINABLE THINGS I ALREADY DID, IF I WOULD HAVE HAD MORE TIME TO TEST, I WOULD HAVE BEEN ABLE TO FORCE MYSELF TO DO NEW THINGS." - FENNA

The App

The main function of the application in the tests was to share pictures and inspiration through the social section. This was due to the fact that the application was not fully functioning, placing reactions to the pictures was not possible, statistics were showed for a fictional user and the inspiration was also provided in the instructions booklet. Therefore the necessity of having an app with the product was questioned, sharing pictures could also be done using existing social media such as Whats-app or Instagram. However, some participants mentioned they did prefer to keep things separate and decide for yourself when to check the app, rather than being spammed in a Whatsapp group. The app would play a bigger role when it would be fully functioning, but could also be improved with more interesting statistics, whereby inspiration could be retrieved from a Fitbit motion tracker or the yearly overview of ones streams on Spotify.
Another improvement for the app that was mentioned was that participants kept track of the actions that they had done in the booklet, or on a piece of paper. To see which particular actions they had performed added value to them. This could be integrated in the tips section of the app, in the form of check boxes. The data generated could be used to create a more detailed statistics overview.
Some participants are very harsh on themselves, and do think they are not doing good enough, while in fact they don't under perform compared to other participants who are positive about their results. Since this product is meant to work as positive feedback, retrieving a good feeling about ones performance is important and should be facilitated. This could be done by giving the option to compare ones results with the average Dutch consumer for example, this could be included in the statistics section of the application.

The tiles

The design of the tiles allowed participants to form their own artwork, connect the lines and make a figure, the wooden and handmade look were appreciated. Connecting the tiles to each other made felt more like creating an artwork than playing a game and allowed the participants to freely explore the shapes that could be created. The couplings of the prototype were not always functioning very well, some were too small and some too big, making it a bit of a hassle to attach the tiles. This should be improved in order to keep the use fun and low effort. Since the tiles are connected to each other instead of to a board, it is not possible to change the position of the tiles afterwards, this was not seen as annoying by the participants, rather motivating to give it another try the next month and improve the design.

Final result Fenna

Intrinsic motivation

As mentioned before, connecting the tiles to each other rather than on a board felt more like making an artwork, and made it less game like. This was an unexpected outcome of the change from the board to tile only, but is very positive.
Furthermore, the evaluation on how this version of the product activated the intrinsic motivation was positive, all participants thought the three aspects for intrinsic motivation (competence, autonomy and social belonging) were present. The social belonging was least present, this was partly due to the app not fully functioning and not being able to react on the uploaded pictures. However, talking about the product and the new sustainable behaviour with friends and family and noticing your impact on others also creates the feeling of social belonging.

"MY BROTHER MADE A VEGAN SOUP AND DESSERT FOR CHRISTMAS, BECAUSE I AM BECOMING VEGAN. THAT GAVE ME THE FEELING I DON'T HAVE TO DO IT ON MY OWN." - ANNECHIEN

Not sharing the pictures of the board, and not asking for interim results seemed to work on making it less competitive and less like a game. However, the participants did not share a lot of pictures overall, so this could be of influence as well.

Environmental self-identity

The evaluation of the environmental self-identity was done a bit more elaborated compared to the previous test, including questions about the attitude towards sustainability and participants' contribution towards a more sustainable world.
Overall, the participants mentioned their view on their own sustainability changed positively, however due to the short period of testing for the new participants, this was still a bit hard to say. The product sparked a more positive feeling about the environment and their own contribution towards a more sustainable world. Also they believe the environment is quite important and this increased through the use of the product.

"BY USING THIS PRODUCT, YOU CAN CREATE A MINDSET BY WHICH THE SUSTAINABLE BEHAVIOUR IS AUTOMATICALLY INTERTWINED INTO YOUR LIFE" - ANNECHIEN

Based on the results of the third test, some iterations are made with the goal to keep the product fun to use for at least one year. Most improvements are made within the application, for the improvement of the tiles and coupling pieces, recommendations are written.

The option to track the actions performed will be added in the inspiration section. This information will be added to the statistics overview, with more elaborated information about what actions are done most, within the different categories.
The statistics overview will be further improved with more detailed information and the addition of records, such as the most tiles in a month, or the category with the most tiles. This will keep the product fun for a longer period of time, since it activates the feeling of competence and the desire to improve oneself. Thereby, national statistics will be shown, which states how many sustainable actions are done in total, which enlarges the feeling of social involvement.
Another intervention to stimulate usage for a longer period of time is the addition of levels, which are only visible for the user itself. These levels are based on the amount of tiles that are earned by using the product. There are five levels, after earning 200 tiles, a new level is reached. No rewards are added to earning a new level, since rewards can undermine intrinsic motivation.

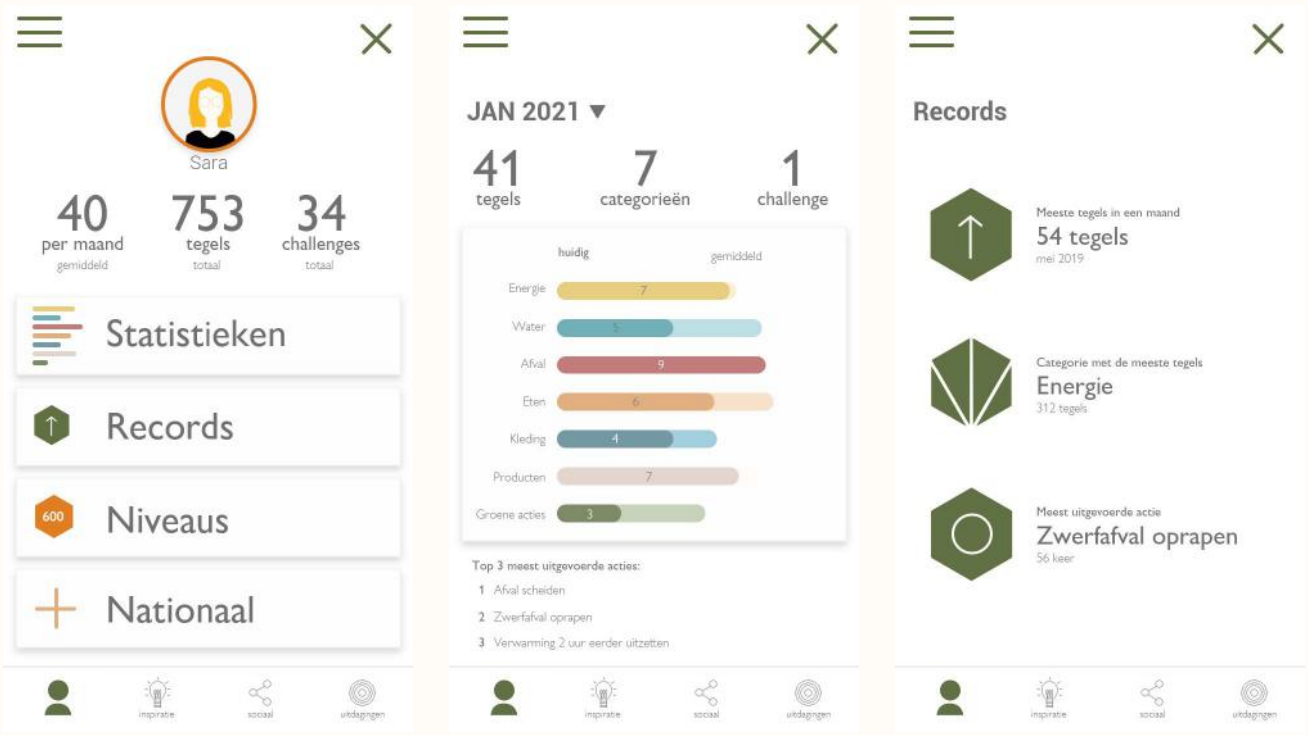


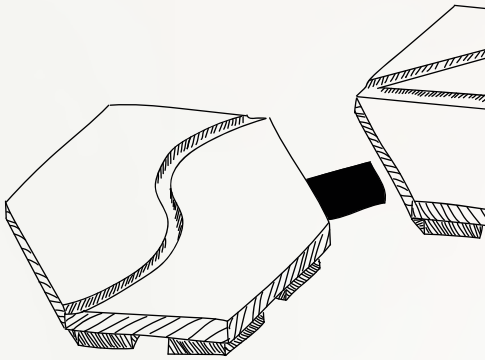
figure 36 Screenshots of improved statistics part of the application

To give an clear image of the final product, the final design of the product and the application are presented in this section. For the flowchart of the app, see appendix Q

SUSA

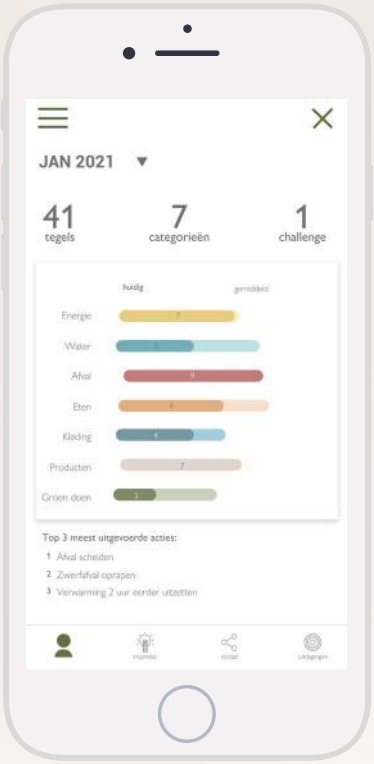
An interactive artwork that stimulates sustainabale behaviour

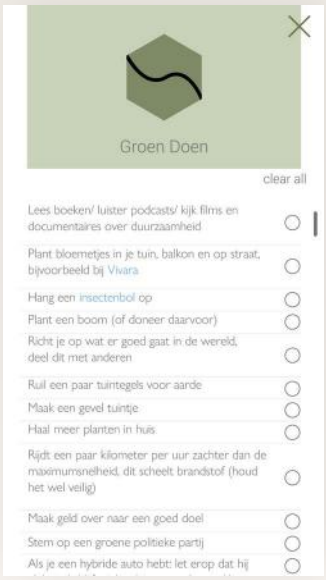
Fnd inspiration, get insight in your statistics and share pictures with friends in the app

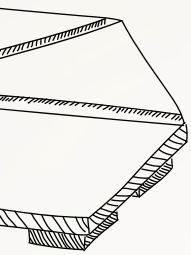


Each tile has it's own category

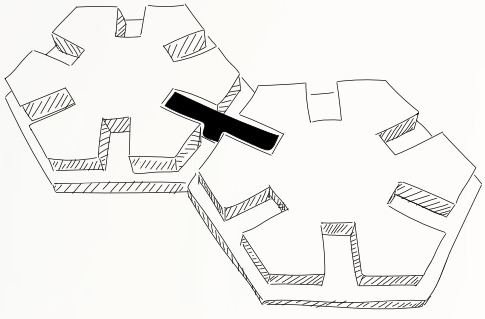
water electricity waste products food clothes green actions

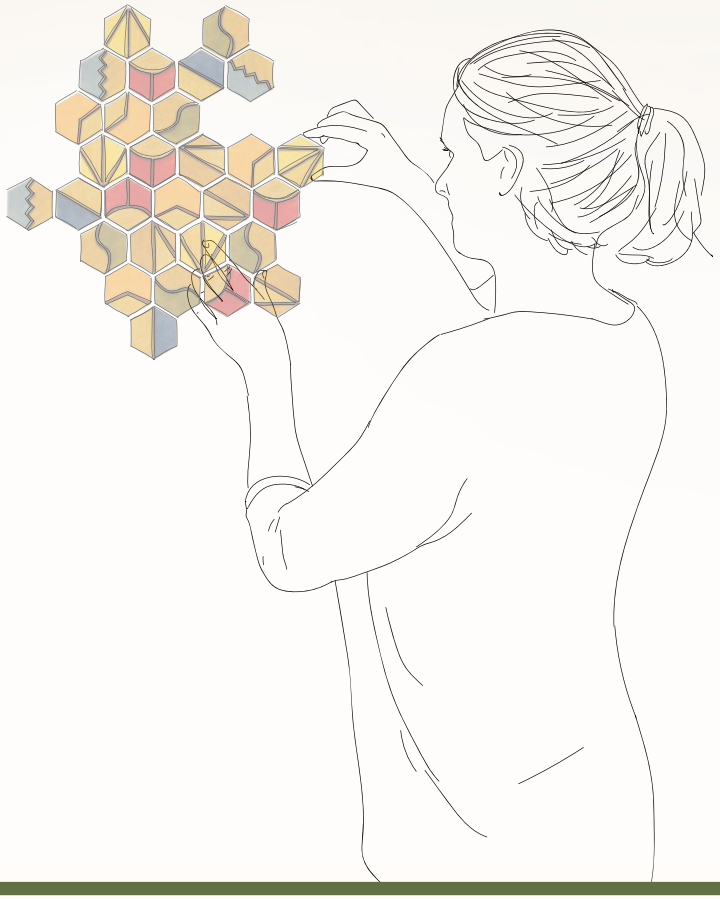






Connect the tiles
with rubber couplings





For SusA to become successful in the public domain, it is important to have a vision about how this product could enter the market. In this section, thoughts are shared about pricing, retail strategies and sustainability.

Sales

One option to bring SusA to the market is to establish a start-up to further develop, produce and sell the product. The product could be sold in the web shop of the start-ups' own website, and/or in stores with a focus on sustainability such as the chain stores *WAAR* or *Hutspot* or a local shop like *Loco Lama* in Delft or *Het Faire Oosten* in Amsterdam, which sell local/sustainable products. Investors will have to be found to financially support the development and production of SusA and the advertisement campaigns to bring SusA under attention. A possibility for acquiring this financial support and attention is to start off with a reward based crowdfunding, whereby products are pre-ordered and the investors will get a product in return for their investment once the product is launched. For further details about the option of forming a start-up, a sustainable business model canvas is filled in and can be seen in appendix R.

An alternative would be to search for established companies, pitch the product and develop the concept in co-creation with that company. Companies that could be thought of are *Milieu-Centraal* (which brings sustainability under attention and gives tips for sustainability) or *Hema* (which is a well known brand and works on a more sustainable product range). It might be necessary to adjust the appearance of the product and the app to the house style of these companies, but the concept could stay the same.

Price

The main costs involved will be those for the further development and production of the product, development and hosting of the application and website. The main revenue stream will be the sales of the product (tiles, connection parts and mounting piece) and for a fixed price of around €30. Later on, the extension set could be sold as well, for a fixed price of around €7 (see recommendations in chapter 11.1) A code will be provided with the product, to download the app for free. To lower the price of the product, affiliate marketing could be used, with a cost per click structure. Advertisements could be implemented in the form of links towards websites within the tips section. This would avoid annoyance by the users, but still brings revenues for the advertisers. An image of what this would look like can be seen in figure 37.
Since some people really like to share their experiences and inspiration and get motivated by this, it is more fun for them to use this product if friends are using it as well, therefore, package deals can be made like second half price, or buy 2 get 1 for free.

Figure 37. Example of the tips page with links to websites of advertisers in blue.

Sustainability

Since this product is focussed on sustainability, the production process and sales must be sustainable as well. The products will be made out of certified wood, which means it is harvested in a sustainable way, whereby the surrounding environment is also taken into account. Furthermore, different materials will be made detachable, so they can be recycled after disposal. To guarantee this recycling, the users will be asked to return the product (with free shipping) back to the company after use. When products are still good to use, they can be sold second hand, or as spare pieces.

Other settings to use SusA

Since the families with children in the second test mentioned the kids really liked to help earning and placing the tiles as well, a version for children could be developed, taking the safety requirements for children into account. This version could be used in school classes, in combination with education about the environment.
Another option is to offer SusA on websites with promotional gifts, so a company can give SusA to all it's co-workers for Christmas or an anniversary for example. In this way, the colleagues can form a group within the app right away to share inspiration and tips.

10.6 CONCLUSION

SusA is a tracking and reflection tool that stimulates sustainable behaviour. The product consists of hexagonal tiles with prints for different categories of sustainable behaviour, one for water, one for electricity, one for waste etc. The use is simple: attach a tile to the artwork for every sustainable action that is done. By making the artwork bigger and bigger, the users give themselves positive feedback for their sustainable behaviour and users become aware of how sustainable they already are. According to research of Van der Werff (2016) this positive feedback enlarges the environmental self-identity, and leads to more sustainable behaviour, since people have the tendency to act in line with how they see themselves.
The product comes with an app, where pictures and tips can be shared with friends, statistics of ones sustainable behaviour can be found and inspiration for sustainable actions in the different categories is available. Challenges keep the use of the product fun by offering a stimulation to do something different than the user is used to.
To bring SusA to the market, a start-up can be established. The product could be sold in (gift) shops which have a focus on sustainability or local design. Investors will have to be found to financially support the development and production of the product, this could be done by reward based crowdfunding, whereby products are pre-ordered and the investors will get a product in return for their investment once the product is launched.
By selling SusA, sustainable behaviour is sold.
SusA, let's keep it positive.

11. EVALUATION

TO COMPLETE THIS REPORT, THE FINAL DESIGN WILL BE EVALUATED ON THE BASIS OF THE CRITERIA AS SET UP PREVIOUSLY, THEREBY RECOMMENDATIONS WILL BE GIVEN AND A PERSONAL REFLECTION IS WRITTEN.

Picture: Gustavo Cruz

It is important to critically evaluate the outcome of this project, in order to see if the proposed product really is a valuable solution for the initial goal of this project. The final design will be evaluated based on the influence on the environmental self-identity, functionality, desirability and the criteria as set up in chapter 7.2. Thereby, recommendations will be given for further research and development.

Environmental self-identity

The main goal of the product is to stimulate the users' sustainable self-identity, by giving them positive feedback on their sustainable behaviour. This principle is based on research of Van der Werff (2016). In this research, the influence of positive feedback on sustainable behaviour on the environmental self-identity has been studied with the use of a questionnaire. The participants answered questions about their sustainable behaviour, and right afterwards reflected on their environmental self-identity. No information is provided about the long term impact of this questionnaire.

In my tests with the prototypes of the product, I see that a change in the environmental self-identity of the participants is reached after a longer period of time, as they indicated that testing for 2 weeks was not long enough to see a difference. This might be due to the fact that the feedback is not given at once. The product has to be used for a couple of days to see the feedback developing. Every time the user sees the art work and at the end of a cycle of use (this could be a month, or the moment the user decides to start a new artwork) the user has a moment of reflection on his/her sustainable behaviour. The time needed to influence the sustainable self-identity varies from person to person, some people are more strict to themselves than others and need more positive feedback to accept it.

Another result from the test was that the longer people use the product, the more new and challenging actions they perform to earn the tiles. According to the research of Van der Werff (2016), more challenging and more unique behaviour has more impact on the sustainable self-identity. Therefore, it is desirable that the product would be used for a longer period of time, so that the point of performing more unique and challenging behaviour is reached. The point where this happens varies per person as well, and further research should show how long it takes to make a shift in the identity of a person so that positive feedback is no longer needed to see oneself as a sustainable person.

Functionality of the product

The last prototype that was made and tested functioned as desired, the tiles could be attached to each other with the rubber couplings, but since these were cut by hand, not all couplings did fit perfectly. Therefore, before the product can enter the market, these need some further development in terms of materials and connection method. I expect that if the rubber coupling pieces would be produced in the right size and stiffness, instead of cutting it by hand, connecting the tiles would be much easier. Other options that can be considered are the use of magnets or click fingers, for this, it might be necessary to change the material of the tiles. Of course, the sustainability of the product has to be taken into account in this further development of the tiles.

Desirability

In terms of necessity of stimulating more sustainable behaviour, I think SusA is very welcome. Enlarging the perceived importance of the environment for consumers can be the start of a bigger shift towards a more sustainable world. Even though sustainable behaviour is stimulated though the use of the product, it still is another product that requires resources and energy for production. Therefore, if the product is taken into production, attention should be given to the return of the product and recycling of materials. Preferably, the product would be made from scrap materials in the first place. Thereby, the participants of the tests were very enthusiastic about the product and motivated to use it, but the question is how much the fact that they tested the product for me influenced their experience. A longer test with independent participants could give more critical results about the fun and the desirability of this product.
The real impact of the sustainable behaviour by the use of this product is hard to measure, since the actions variate in impact a lot and the same tile can be earned with an action with big impact and small impact. However, according to the theory that people have the desire to be consistent in their behaviour, also the small actions will eventually lead to more sustainable choices with more impact. If the product is sold well, producing and extension could be considered, for example a set of new special tiles, which form an eight category of bigger sustainable actions such as buying solar panels, insulating the house etc. In this way, sustainable actions with a bigger impact are stimulated as well.

Criteria

The test results show that the final design meets every requirement as formulated in chapter 7.2. Using the product motivated the participants of the tests to act more sustainable, it made them aware of the sustainable things they already did and where improvements could be made. The participants mentioned that their view on their contribution to a more sustainable world changed positively, by actually doing more for the environment and becoming more aware of their sustainable habits.
The design activates the intrinsic motivation in terms of competence and autonomy very well, by providing tips and inspiration on various levels of difficulty and giving the users the option to choose their own action. The social involvement was less present during the tests, this was due to the fact that the prototype of the app was not fully functioning, and the amount of participants was limited.
The design increases the subjective well-being by providing a tool for personal growth in the area of sustainability, self acceptance is present in the form of self expression, and the artwork can be used as a statement towards friends and family to show how important one considers the environment. The user should be motivated to improve his/ her sustainability before starting to use the product, as it only then can be a representation of his/ her purpose in life. Finally, the long term effect was hard to test within the given time for this project. However, the use of the product can stimulate the creation of new habits, which cause sustainable behaviour for a longer period of time, even after the usage of the product. But to keep getting positive feedback on this behaviour, the product should continue to being used. Whether the positive feeling about ones sustainable behaviour will stay present without getting positive feedback must be verified by further research as mentioned before.

11.3 PERSONAL REFLECTION

First of all, I want to say that I am proud about the result of this project. At the beginning of this project I had no idea of what kind of product I would be designing, which made me excited to work further and see where it would lead me to.
One thing that I struggled with was making choices, especially in the beginning my supervisors told me to make choices early in the process, because it would make it easier to keep the focus. Nevertheless, I was still hesitating to do so, because making choices also eliminates possibilities and I didn't want to miss a good change. I think in the end, the strategy of keeping the direction a bit vague in the beginning helps me to come to unexpected and valuable insights, which eventually leads to more valuable designs.

I really enjoyed working on this project, especially making prototypes, testing and evaluating the concept gave me energy. I like to work with my hands and also I need some positive feedback to keep me motivated. I have searched for test participants within my own circle of contacts, which might have influenced the results of the tests, in terms of positive reviews of the concepts. However, I think that I managed to stay critically about myself and the concepts and ideas generated, and pay attention to the negative comments that were mentioned, which finally led to a well considered design.
What I discovered during this project is that writing is not my strongest point (I knew that already) but making structuring the report and visualizing the text is something that I enjoy doing. Even though I have to think very deeply about it sometimes, it gives me a satisfied feeling when it works out.

I gained more confidence in my qualities as a designer and in my research and planning skills. Even though I was stressed sometimes, I kept track of my planning, and managed to finish the deliverables a few days before the deadlines.
I am happy that the COVID-19 crisis did not influence my project too much, and that I was able to work at the faculty for some days of the week despite the measurements.

I want to thank my supervisors, my boyfriend, my parents and all the participants of the tests for thinking along and supporting me throughout the project.

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