

DESIGN FOR BEHAVIORAL CHANGE

Reducing the stigma on repaired clothing

DDM110: Design for Behavioral Change

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1. Introduction

In today's rapidly changing environment, sustainability is a significant concern. Historically, humans have engaged in exploitative practices, resulting in global imbalances and natural disasters. The urgency to transition towards sustainability is recognized by the United Nations through its 17 Sustainable Development Goals (SDGs).

In the course "Design for Behavior Change", we focused on how design can help achieve these goals. Our team of five resonated with five specific SDGs and summarized them using the Triple Bottom Line model: 1) People: No Poverty, 2) Planet: Climate Action, and 3) Profit: Responsible Consumption & Production (Elkington, 1999) (Appendix A1). Using a Venn diagram, we derived our main aim: fostering Economic, Industrial, and Natural Resilience. Specifically, we sought to counteract societal and natural exploitation manifested in fast consumerism, some examples of what we aim to address are modern slavery, pollution, and finite resource exploitation (Appendix A2).

To combat unsustainable consumerism, we embraced the 'Circular Economy' concept. Potting, Hekkert, and Worrell's (2017) created a framework to measure innovation in the product chain. This framework comprises three primary strategies: (1) Useful application of materials, (2) Extend lifespan of products and their parts, and (3) Smarter product use and manufacturing. Across these three sections, they defined ten strategies (Appendix A3). From these, we selected the 'repair'- strategy since this is the first strategy occurring in the ladder that has no negative impact and is feasible within the scope of this project. Moreover, repairing extends product life, reduces pollution, and can bolster local economies.

To address the issue of repairability, we identified problem behaviors. After brainstorming, we distilled three potential solutions:

1. [SELF] A broken product is repaired by its owner.
2. [OUTSOURCE] A broken product brought to a repair shop by the owner.
3. [PREMEDITATE] A customer invests in more durable products when buying.

These potential target behaviors were then graded based on their potential impact, change likelihood, spillover, and ease of measurement. Following these criteria, the SELF concept was selected, its impact and positive spillover effect would be greater than the OUTSOURCE concept, and measurement would be easier than the PREMEDITATE concept (Appendix A4).

Exploring further, we identified the fast fashion industry as a significant area of concern. Data indicated a sizable percentage of clothing was discarded (20%) due to wear and tear, though many respondents expressed a willingness to repair it if feasible (Laitala & Klepp, 2011). Emotional connections to clothing were identified as a potent motivator for repairs (Laitala & Boks, 2012). When reparation adds additional emotional value due to customization, it results in clothing being kept for longer (Niinimäki & Hassi, 2011). Thus, we hypothesized that "repairability in fast fashion" targeting wear-and-tear issues while promoting sustainability, would be impactful, feasible, viable, and desirable.

In specifying our target audience, two groups stood out: fashion designers and parents. Given the commercial pressures on designers, we opted to focus on parents, particularly fathers. Research indicated that while women are historically more inclined towards clothing and mending them (McQueen et al., 2023), there was a significant opportunity to engage men, especially given their equivalent environmental concerns (Laitala & Klepp, 2011).

A primary challenge identified was the social stigma attached to wearing repaired clothing (Connor-Crabb & Rigby, 2019; Fletcher's, 2014). However, this perception seems to be changing, as there's a growing appreciation for sustainability (McLaren & McLauchlan's, 2015). To address this, our goal was not only to encourage fathers to repair clothing but also to wear repaired items publicly, shifting societal norms.

In summary, our objective transitioned from the traditional behavior of fathers discarding and replacing worn clothing to encouraging them to repair and proudly wear mended items, championing sustainability. We therefore framed the target behavior as follows:

'Fathers repairing clothing which are worn and torn and wearing them in public'

2. Design process and Concept description

Design process

Using the Triple-Diamond model (Appendix A5), we first applied the Behavioral Change Wheel framework (Michie et al., 2011) to identify the target behavior by combining relevant theories and intervention functions to formulate the design concept, detailed in sections three and four. Finally, prototypes and the questionnaire were made to collect user feedback.

Inspired by the UN goals and the 9R's framework, we address the problem of fast and cheap consumerism through brainstorming behaviors, target groups (Appendix A4). We evaluated them using a grading system and decided to promote fathers wearing repaired clothes.

Using the COM-B analysis (Michie et al., 2014), we identified three changes: improving sewing skills, addressing the stigma associated with repaired clothes, and encouraging the repairing habit. Subsequently, we selected intervention methods from behavioral change theories, proposing a design concept based on the Transtheoretical Model (TTM) (Prochaska et al., 2008).



Figure 1. Patch-It campaign



Figure 2. Thick thread toolkit

Concept description

In relation to the target behavior, we proposed the design concept of "Patch-It" to raise fathers' awareness of wearing repaired clothes. The design includes two intervention approaches: 1) the Patch-It campaign (Figure 1), a collaboration with a supermarket chain promoting change through propagation and role models, and 2) the Thick Thread toolkit (Figure 2), a kit supplied to supermarket

customers to encourage clothing repair. The kit is targeting kids, since they are more likely to start exploring it, which can draw in their parents, involving the whole family. To support the concept, several scenarios, storyboards, as well as a toolkit prototype were developed.

The supermarket campaign aims to reduce the stigma by changing the subjective norm of wearing repaired clothes concerning the perception of professionalism and enjoyment of wearing. It leverages the influence of male role models in the community with window advertisements to capture fathers' attention. This subtly shifts attitudes towards wearing patched clothes.

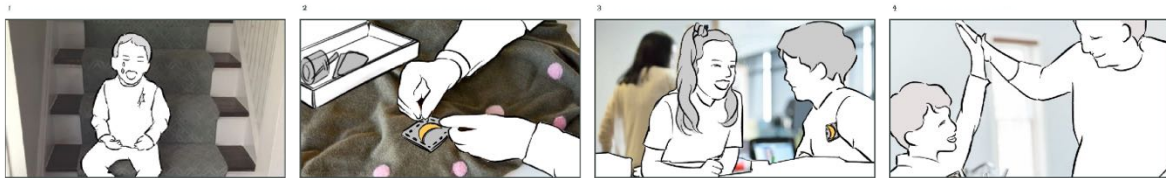


Figure 3. Possible scenarios to which the Patch-It campaign can lead to.

The Thick Thread toolkit, priced at €15 for one of the collectibles, bridges the gap between children and parents through a hands-on experience in mending clothes. The collectibles include colorful patches, child-friendly needles, threads, and a 'tips & tricks' card deck. The toolkit promotes sustainable clothing practices for children and encourages parent participation. As shown in Figure 3, the toolkit can be used to stitch and then patch the clothing when a child's clothes are worn or torn. With possible compliments from classmates, the child will be motivated to repeat this behavior and share their experience with parents. This can foster positive feelings in fathers as well, potentially leading to a change in their behavior.

3. Implementation Design Rationale

Following the behavior change wheel framework, we performed a COM-B analysis (Michie et al., 2014) to identify effective intervention functions. The COM-B analysis helps to define "What needs to happen for the target behavior to occur?" and "Is there a need for change?" in six components. In this analysis, we identified opportunities for design in three components. For psychological capability, we identified the opportunity to teach skills in repairing clothing. A social opportunity that we noted was to reduce the stigma of wearing repaired clothing (Fletcher, 2014). Lastly, for automatic motivation we identified an opportunity to create a habit of repairing clothing instead of throwing it away. From these areas, we decided to focus on social opportunity because we believe the stigma towards wearing repaired clothing is a key factor that opposes the repairment of clothing. When this stigma is lifted, it will create room for further appropriation of repaired clothing.

The results from the COM-B analysis were then used to identify intervention functions using a table of known effective intervention functions based on the COM-B component (Michie et al., 2014). From the intervention functions to tackle *social opportunity* we selected *modelling* and *environmental restructuring* as the basis for our concept. Within these intervention functions we selected the behavior change techniques of *demonstration of behavior* and *adding objects to the environment*. These and the other selected potential BCT's can be found in Appendix A6. With these techniques, we developed a concept consisting of two parts to promote repairment of clothing to fathers.

The design of our intervention has been based on the idea of a self-reinforcing loop. Via the Patch-It supermarket campaign, which targets kids, we first add collectible objects (which support mending

and customizing clothing) to the environment of fathers. As children explore the tools, threads, and patches from the Thick Thread Toolkit, parents are likely to become involved in supporting them. The results of using the Thick Thread Toolkit are likely going to result in visual customizations in clothing and bags that are worn to school. This demonstration of behavior can result in a shift in the norm towards repaired clothing.

It is essential that this campaign is properly framed and marketed, to ensure it becomes socially accepted by other children and parents. With these reinforcing behavioral change techniques, we hope to see a positive shift in the behavior of fathers, repairing their own clothing.

4. Theoretical Rationalization for design concept

Self Determination Theory (SDT)

Using the Self Determination Theory (SDT) of Hagger et al. (2020), we evaluated our intervention functions and BCTs, we identified an increasing desire for autonomy (sustainable solutions and self-sufficiency). Other factors such as fashion and style criteria hinder the acceptance of repaired clothing (Fletcher, 2014). This stigma affects our need to socially relate, prompting negative feelings towards mended clothes. We believe that demonstrating acceptance in one's environment can reverse this, making repaired clothing socially acceptable.

Introjected ->	Identified ->	Integrated
I disapprove with people who wear repaired clothing, it is not acceptable	I respect others that wear repaired clothing, it fits with my values	I wear repaired clothing; I want to do it and I fit in with others

Introducing the Thick Thread Toolkit to fathers addresses the need for competence in mending. Initially, societal norms may deter fathers from embracing this skill, resulting in reluctant behavior. By engaging children with the kit, not only do they learn to repair, but they also involve fathers in the learning process, emphasizing that mending is achievable for all.

Introjected ->	Identified ->	Integrated
I dislike repairing clothing, I don't know how, and I do not want to know	I want to be able to repair my clothing, I believe I can learn	I can repair my own clothing and am proud of it

Transtheoretical Model (TTM)

Many fathers are likely in the pre-contemplation phase regarding our target behavior, with societal stigma being the primary barrier. We emphasized transitioning from pre-contemplation to preparation, adopting four TTM strategies to foster this change (Prochaska et al., 2008). Our intervention design, depicted in Figure 44, centralizes the target behavior with surrounding TTM stages and our chosen strategies. Our target behavior can be split into two parts, (I can wear it) Perceived Norm and (I can repair it) Personal Agency which are positioned in the outer circle and relate to the Integrated Behavior change Model (IBM) (Montano & Kasprzyk, 2015). The furthest circles detail the selected determinants for evaluating the intervention impact. The spiraled line showcases the intervention's self-reinforcing nature, with four key transitional points guiding behavior change from Pre-contemplation to Action.

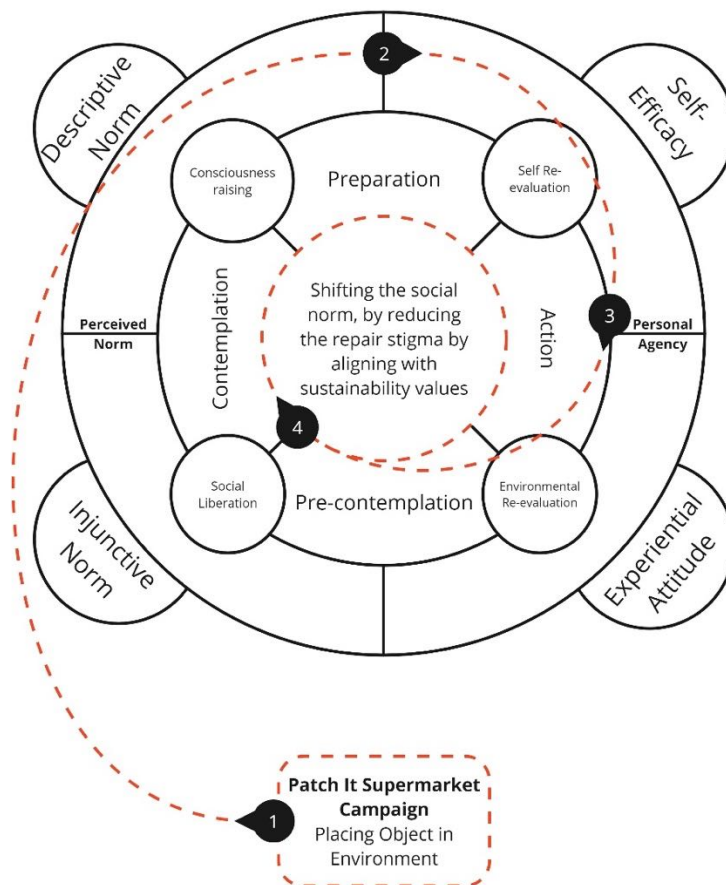


Figure 4. Combining the TTM & IBM Model to frame intervention design

1. Patch-It Supermarket Campaign

Launching the Patch-It Supermarket Campaign, we raise consciousness through advertisement, targeting the descriptive norm, suggesting that mending clothing is common. This reaches customers in pre-contemplation. The customers whose injunctive norm aligns more strongly, valuing sustainability or handcrafting are likely to be the first adopters, as they're closer to stages like preparation or action.

2. Collecting the Thick Thread Toolkit & the kid's effect.

When shopping, supermarket customers gradually gather pieces of the Thick Thread Toolkit. Each acquisition gently nudges their awareness of the toolkit's growing utility, aiding their shift from contemplation to preparation. However, lacking personal agency might hinder some from progressing to action. To address this, explainer cards are added, offering bite-sized knowledge increments. Yet, mere information might not sway fathers to act.

Children, often drawn to supermarket collectibles, are inclined to complete the toolkit (e.g. soccer stickers, wuppies, flower seeds). By focusing on children instead of fathers, we prompt dads to self-assess their ability to aid their kids in mending (Self-Re-Evaluation). This shared learning can instill a belief: if my child can, so can I, impacting their control belief and self-efficacy.

3. Causing Demonstration of behavior

Early adopters showcasing repaired clothing become role models that demonstrate the target behavior. The Thick Thread Toolkit makes mends prominent, and when kids make repairs, they likely wear them proudly. The social acceptance of this behavior is essential for the intervention's success. Positive acceptance can prompt environmental re-evaluation, moving sceptics from pre-contemplation to contemplation. Conversely, if mended clothing faces rejection, it could amplify existing stigmas, jeopardizing the intervention. Aligning the campaign with sustainability values, especially prominent among the youth, can counteract potential stigma. Emphasizing the fun element of the campaign and toolkit for children can enhance social acceptance. Rigorous testing with kids is crucial before a nationwide rollout.

4. Effect of Demonstration of behavior

As children showcase their Thick Thread Toolkit creations at school, the shift in social norms favoring clothing repair results in Environmental Re-evaluation which might lead to Social Liberation, especially among conservative families. Ideally, this self-reinforcing trend leads more adults to adopt the toolkit, making visibly mended clothing a widespread style and sparking conversations in various circles. The campaign strategically targets fathers, aiming to establish them as societal role models. We theorize, that since the male population is less concerned about fashion and style, and more about functional clothing, they might be more likely to challenge the norm by wearing visually mended clothing in public. The toolkit's name reflects this aim, appealing to men's preference for less intricate tasks. The marketing campaign should spotlight male ambassadors to reinforce this message.

5. Ethics Analysis of design concept

To identify the ethical implications of our main concept "Patch-It", we conducted a value and stakeholder analysis. Firstly, we identified all relevant stakeholders, as shown in the Onion diagram in Figure 5 and identified gains and losses for each, details can be viewed in Appendix A7.

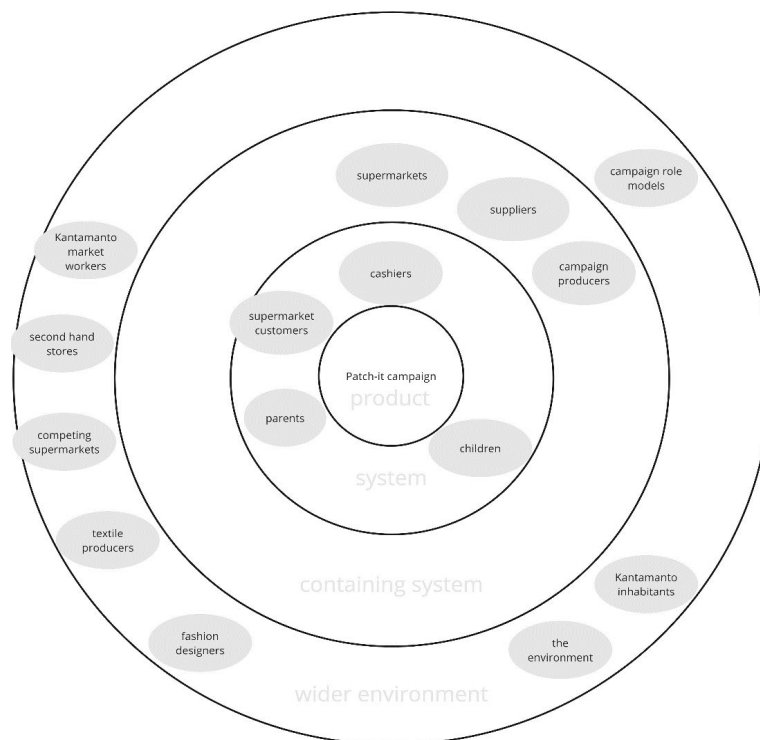


Figure 5. Stakeholder Onion Diagram of Patch it

The concept primarily benefits parents, children, and supermarkets through autonomy, connectedness, and sustainability. In contrast, fashion designers and textile producers might face reduced profits but can pivot towards sustainability and high-quality repairs. Competing second-hand stores and Ghana's Kantamanto market, where thrown-away textiles are resold, already struggle with item quality (Manieson & Ferrero-Regis, 2023). They could benefit from improved clothing quality and less pollution.

Environmental sustainability	Autonomy	Connectedness
Accessibility	Equality	Safety

We reflected on stakeholder analysis to pinpoint key moral values, detailed in Appendix A8. Environmental sustainability emerged as a core value underpinning our design. Accessibility and equality are crucial to avoid exclusion risks related to poverty and profit. We also emphasize autonomy, especially for children, ensuring our design avoids exploitation and allows free choice, implemented via a non-coercive supermarket distribution strategy. Connectedness is vital, addressing stigma for early adopters and potential reduced demand among competitors like fashion designers and textile producers. Lastly, we prioritize safety, especially for children, guiding our design towards an ethical and unharmed concept.

Value conflicts

Some value conflicts may arise from our design, described below.

Environmental Sustainability vs Accessibility

Fewer clothes in recycling may contribute to the SDGs, however, might reduce Kantamanto market's supply, possibly increasing worker poverty. However, future proof initiatives are arising like "Kantamanto Social Club (Innovate, 2023)", who help workers upcycle textiles, creating new earning opportunities.

Equality vs Accessibility

While the Patch-It's usage is dependent on supermarket spending, we aim for universal and equal access by offering items for free for those who need by partnering with the Dutch Voedselbank.

Environmental sustainability conflicts

In the development of our concept, we require additional resources to bring our design to life, possibly boosting (over-)consumption. While this might impair environmental sustainability, our design aims to mitigate the problem of waste pollution in Africa and extend clothing's lifespans. We believe it's positive outweighs the production-related impacts.

Autonomy vs Safety

Influencing parents via children might raise concerns about exploitation and manipulation. Research by Thyne et al. (2019) showed how advertising affects children, indicating that their vulnerability goes beyond their understanding of advertising intent. However, it's important to highlight that in our campaign we prioritize children's autonomy, avoiding promoting unhealthy behavior.

Scenario of value conflict in everyday use

Our design concept, available to all supermarket shoppers, may raise concerns about equality and accessibility when collecting Patch-It items. Our design ties Patch-It item collection to supermarket

spending, potentially causing equality issues. For example, someone spending €20 thrice gets 3 items, while another spending €60 once gets 4 for the same total expenditure.

Reflection

We think our concept's long-term benefits outweigh the short-term losses, considering the significant ethical issues above. As designers, we aim for long-term solutions ensuring accessibility, equality and autonomy. Therefore, we have important ethical guidelines to stick with to make our concept align with our vision.

1. *Stimulate local entrepreneurship*

With more repairs potentially reducing new fashion demand, we should encourage local entrepreneurship, enabling those passionate about clothing to work in high-quality fashion creation or clothing repair on a local scale.

2. *Honoring sustainable competitors*

We won't seek to convince existing markets to repurpose second-hand clothing, as we believe that the current level of pollution remains unacceptably high, we aim to foster new markets. We recognize the value of second-hand clothing in developing countries, even in our concept introduces short-term challenges and therefore support new initiatives that support those competitors.

3. *Preserve equality and accessibility*

Creating accessibility through a supermarket campaign might still create some tension when it comes to poverty equality, as can be seen in the scenario. Therefore, we aim to donate and all surplus products to the Dutch Voedselbank. This collaboration aims to support accessibility and contribute to environmental sustainability by reducing waste.

6. Evaluation Plan

From our theoretical analysis as seen in section 4, four determinants of behavior change from the IBM model (Montano & Kasprzyk, 2015) were found. To evaluate our intervention, we needed to measure these four determinants for the different stages of the intervention. Thus, evaluating the change in the Subjective norm, Descriptive norm, Self-efficacy and Experiential attitude would give us a clear view of the influence of the intervention.

As for the interaction level, the measurements that are interesting to test are (1) whether the parents get involved with their children to help repair clothing and (2) if children like to collect the cards/patches. These two aspects are vital for parents to adopt the intended behavior change through the intervention of the Patch-It campaign.

Due to limited time in the course, the evaluation can sadly not be performed with a complete prototype. Therefore, we opted to focus on the evaluation of the four identified determinants of behavior change through the presentation of scenarios.

Procedure

Participants were asked to fill in an online survey containing 3 different scenarios describing the interaction of our design concept. Before the first scenario and after each one the participants were asked to fill in a questionnaire (see Appendix A10) containing personalized scales to measure 4 aspects of the IBM model (Montano & Kasprzyk, 2015). These aspects are the subjective norm, descriptive norm, self-efficacy, and experiential attitude. The scales for the first three aspects were bipolar disagree-agree scales, scored from -3 to +3. The experiential attitude was measured with semantic

differential scales, with variables such as "motivating-discouraging" and "tacky-stylish" scored from -3 to +3.

Participants

Participants were recruited through convenience and snowball sampling. Participants were selected based on the criteria for being a parent of a child aged 6-10 years old. Data was collected from 11 participants.

Evaluation

Data from the questionnaire was stored on OneDrive. The data was further processed and analyzed in R and Jamovi. The expectation is that each aspect of the IBM model would increase after all scenarios are shown. This hypothesis was tested with a repeated measures ANOVA.

7. Prototype and empirical evaluation

To explore the gathered data, a stacked bar chart was created of each determinant to look for changes in each determinant (see Appendix A9). From these stacked bar charts, we observed some slight increases in the determinants of subjective norm and self-efficacy. For the various semantic scales in the experiential attitude an increase is less noticeable, although it looks as if some variables do see a positive shift over the scenarios as well.

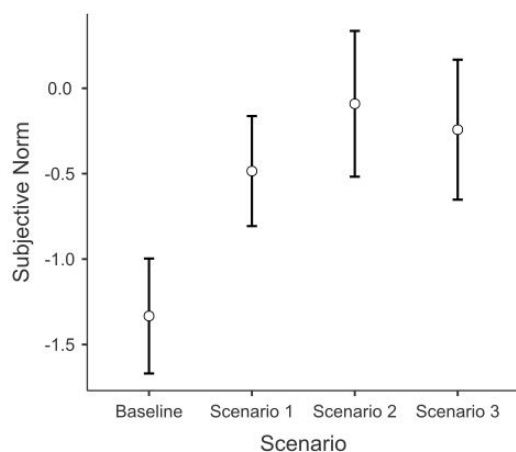


Figure 6. Subjective Norm after each scenario.

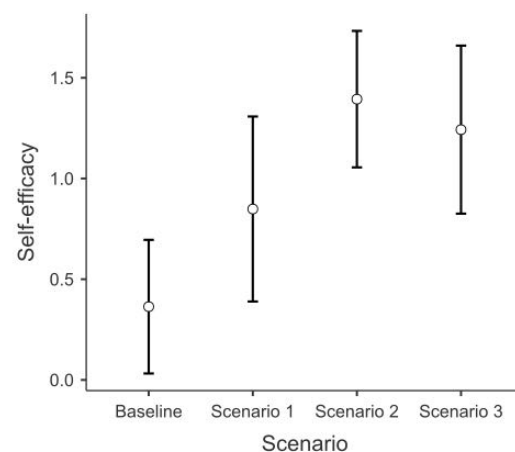


Figure 7. Self-efficacy after each scenario.

To test the significance of the observed changes, a one-way repeated measures ANOVA was conducted on 11 participants to examine the effect that each scenario had on the different determinants of the IBM model (Montano & Kasprzyk, 2015). Results showed that the shown scenarios lead to statistically significant differences in the determinants of Subjective Norm ($F(3, 118)=10.31, p<0.001$) and Self-efficacy ($F(3, 118)=7.185, p<0.001$) (see Figure 6 and Figure 7) as well as three of the seven semantic scales making up the Experiential Attitude, namely Discouraging-Motivating ($F(3, 30)=3.672, p=0.023$), Unenjoyable-Enjoyable ($F(3, 30)=4.07, p=0.015$) and Unprofessional-Professional ($F(3, 30)=3.729, p=0.022$) (see Figure 8, Figure 9 and Figure 10). However, the subjective norm is still only observed to be getting closer to zero instead of turning positive. As for self-efficacy, we see a growth in confidence that slowly built up after each scenario with a small dip back down after scenario 3. The other determinants of Descriptive Norm and the scales Tacky-Stylish, Unacceptable-Acceptable, Undesired-Desired and Bad-Good of Experiential Attitude turned out not to have statistically significant differences. However, most of these scales seem to show an increase in their mean after each scenario (see Figure 11 on the next page).

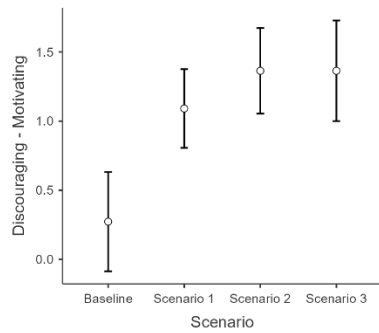


Figure 8. Discouraging-Motivating scale after each scenario.

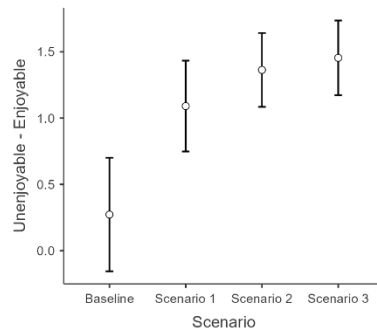


Figure 9. Unenjoyable-Enjoyable scale after each scenario.

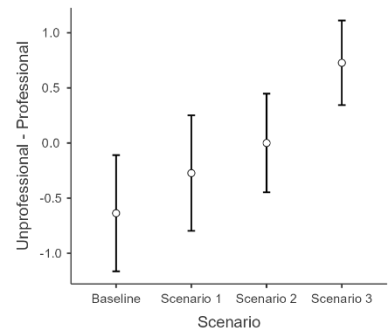


Figure 10. Unprofessional-Professional scale after each scenario

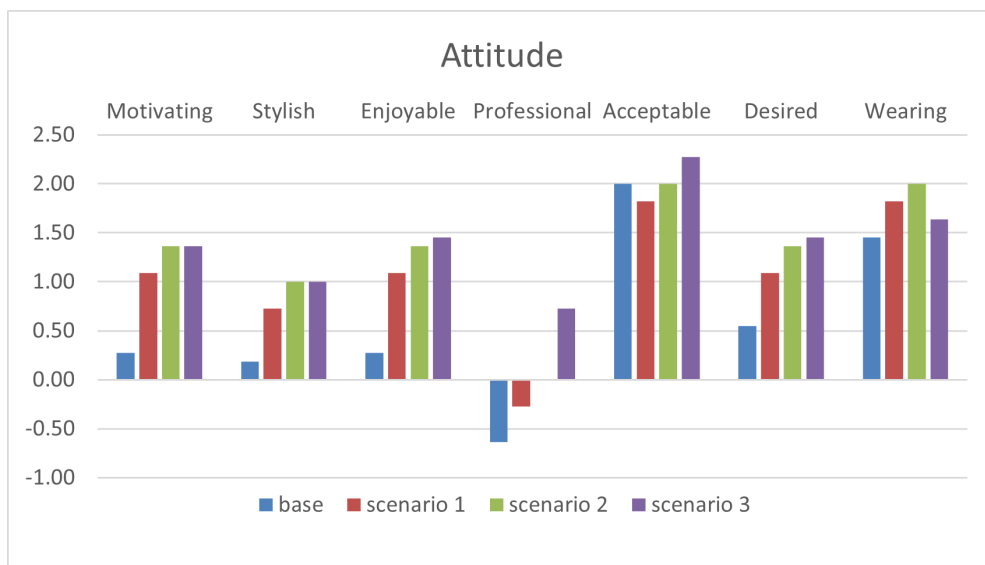


Figure 11. Mean of Experiential Attitude scales after each scenario.

8. Discussion

The results of the evaluations show that the intervention designed could be promising. Starting with the baseline, some of our hypothesis around our target group were confirmed; the motivation and enjoyability around repairing is low ($\bar{x}=9\%$) and repaired cloths are barely seen as stylish ($\bar{x}=6\%$), while not at all professional ($\bar{x}=-21.3\%$). After the introduction of scenario 1, the “Patch-It” supermarket campaign, it seems to have a lot of influence. All attitudes except of the acceptability of wearing repaired clothing are improved ($d\bar{x}$ ranges from 12 to 27.3%). Scenario 2 has less significant change of attitudes of users, nevertheless the introduction of it still leads to positive change in all dimensions of the evaluated attitudes. Lastly, we saw that from scenario 2 to 3, the external influence does not seem to have too big of an effect. Some attitudes stay the same or have a slight improvement of less than 10%. For the attitude towards wearing, we even see a decrease ($\bar{x}=12\%$). Nevertheless, we see that at the same time, the mean of perceived professionalism increased from 0 to $\bar{x}=0.73/3= 24.24\%$. We believe these results confirm that our intervention (if properly executed) can help our target group move towards adopting the target behavior.

During the evaluation, it seemed like there was miscommunication with the participants. They perceived each of the four scenarios as different ones instead of a stage of the same process. Thus,

they all follow up on the baseline, instead of each other. This could have been avoided by offering more explanation and explicitly mentioning this.

To strengthen the claims made, we would have to do a more elaborate evaluation of the intervention. This could be achieved by making a more realistic scenario, where participants can experience the design concept and extend the evaluation to a longer duration. By building and handing out the toolkit and setting up the campaign in public, it really becomes part of the participant’s life which they can experience fully.

Limitations

Additionally, a more in-depth evaluation of the acceptance from children is required. The evidence from this evaluation rests on the assumption that the Thick Thread Toolkit is positively adopted by kids.

9. Individual contributions

All team members equally contributed to the design project and presentations. We distributed the work equally but divided the final report sections into individual responsibilities. There are no main inequalities in contribution to this project.

The writing of the report was divided within the group. This is how it was distributed:

Main contributors to report sections	Joris	Annet	Zihan	Jitze	Isidoros
1. Introduction/Definition of Design Brief	x				
2. Design process and Concept description			x		x
3. Implementation Design Rationale	x			x	
4. Theoretical rationalization for design concept	x				
5. Ethics Analysis of design concept	x	x			
6. Evaluation Plan		x		x	
7. Prototype and empirical evaluation				x	
8. Discussion					x
9. Individual contributions:	x	x	x	x	x
References & review		x	x		

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This research was coached by lecture professors Harm van Essen and Panos Markopoulos, who provided both theories and guidance for this project. Large Language Models (LLM's) like GPT-4, Notion AI were utilized during this project, it was deployed with care, and specifically used to formulate suggestions for condensing the text. No new information was generated by the LLM, and all text was edited and reviewed before implementation.

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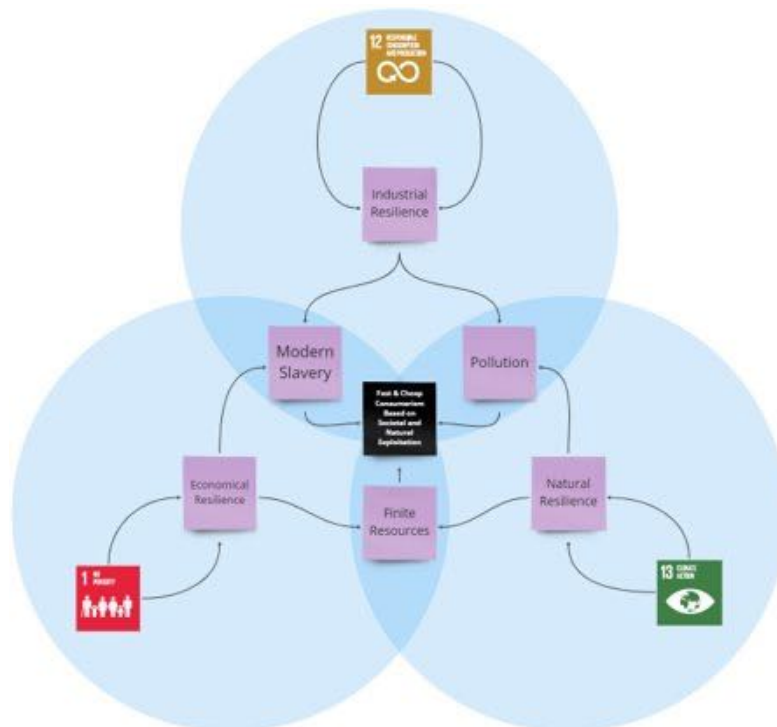
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Appendix

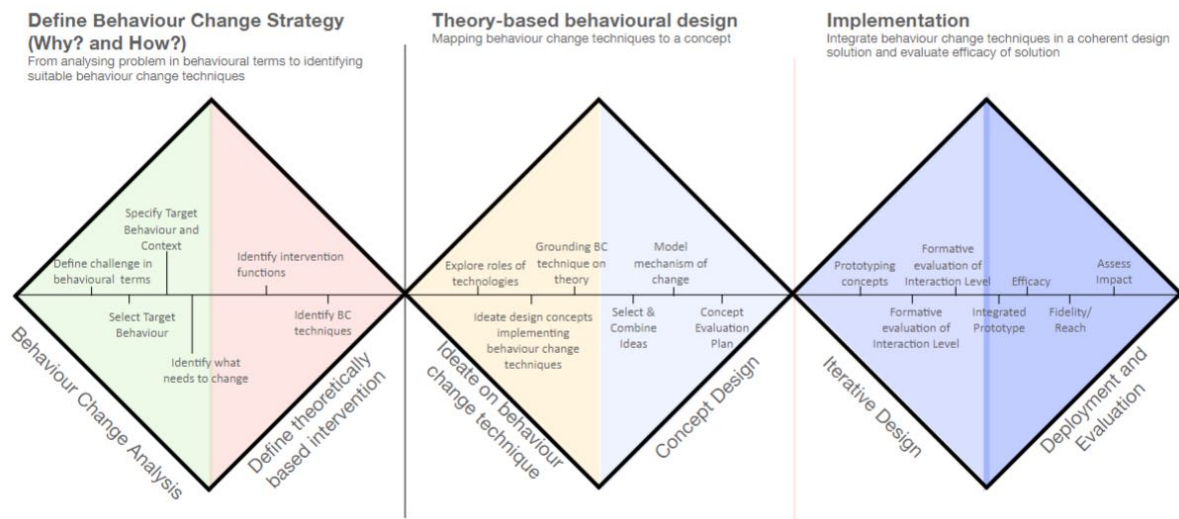
A1. Selection of the 17 Sustainable Development Goals (SDGs).



A2. Venn Diagram of the triple bottom line model



A5. Three-Diamond model from the lecture



(Markopoulos, 2023)

A6. COM-B identified Intervention functions

	Education	Persuasion	Incentivisation	Coercion	Training	Restriction	Environment restructuring	Modelling	Enablement
Change need: sewing skills need to be acquired					Practice TPB, SCT <ul style="list-style-type: none"> • Demonstration of the behavior • Instruction on how to perform a behavior • Behavioral practice/ rehearsal 				
Change need: stigma on repaired clothing is existing							Modify Surroundings TPB, ELM, HT <ul style="list-style-type: none"> • Restructuring the physical environment 	Instance TPB, TTM <ul style="list-style-type: none"> • Demonstration of the behavior 	Accessibility TTM <ul style="list-style-type: none"> • Practical social support • Adding objects to the environment • Restructuring the physical environment • Increase means and reduce barriers for behavior
Change need: habit of repair instead of throwing away		New Identity/ Role Model TPB, SDT, TTM <ul style="list-style-type: none"> • Identity associated with changed behavior • Set an example 	Observe Behavior/ Outcome TPB, TTM <ul style="list-style-type: none"> • Monitoring (outcomes) of behavior by others without feedback 		Habit HT <ul style="list-style-type: none"> • Habit formation 		Exposure TTM <ul style="list-style-type: none"> • Exposed to the facts, statistics, social resources, etc. 		

A7. Stakeholder analysis: gains and losses

Stakeholder	Gains	Losses
Parents & other supermarket customers	Benefits in terms of self-efficacy (autonomy) by feeling more capable of repairing clothes themselves belonging to a group and connecting with others and receiving recognition : since it is a starting movement. The fathers might experience being an exception to the norm self-expression : experiencing more freedom in physical expression by being able to customize your clothing	achieving goals & feeling impactful on alignment with sustainable intentions, autonomy by experiencing more self-efficacy and having a lot of choices in the design self-expression : experiencing more freedom in physical expression by being able to customize your clothing autonomy loss : by replacing the focus on the children and fathers, mothers might have less influence in the repair
Children	Benefits in terms of autonomy by feeling more capable of repairing clothes themselves	Might initially lose the feeling of connectedness due to a chance of being one of the early adopters of the concept, and then it is very context/location related whether early adopters get positive acknowledgement for wearing repaired clothing or not. Next to that, safety can be critical when it comes to using the campaign's product
Supermarkets	Contributing to the society on sustainable levels Next to that, a collection campaign facilitates encouraging repetitive consumer behavior at your shop	Risks of failing campaigning might damage the image of the store .
Cashiers & role models	Feeling of connectedness due to contributing to environmental sustainability and sharing that to others	Risks of failing campaigning might damage their image & therefore feeling of connectedness .
Fashion designers	Motivation to design for a new market focused on longevity instead of trends, finding new opportunities for tailoring clothes instead of designing new clothes.	The more people will be able to repair clothes and feel comfortable wearing repaired clothes, the less new fashion needs to be designed, and therefore they might lose the feeling of success .
Tailors	Feeling of connectedness due to decreased stigma on wearing repaired clothing, increase in customers.	Due to more people being able to repair themselves, it may also result in a decrease in feeling of relatedness by a decrease customers.
Campaign creators	Feeling of ownership and accessibility might increase by being accountable for this good-cause campaign	The risks of failing campaigning might damage their image.

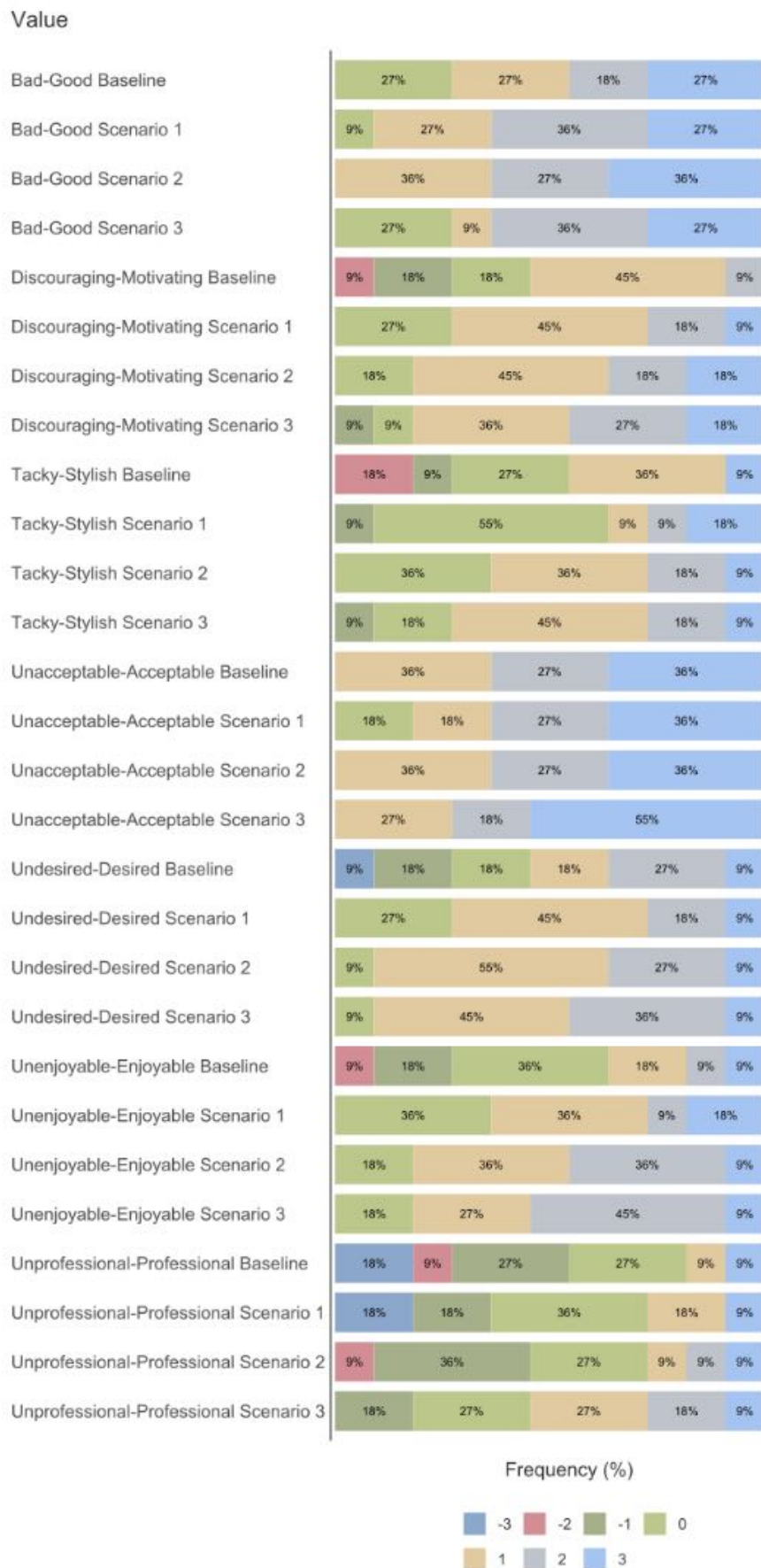
Textile producers	Motivation for segment of properly designed and high-quality textiles in the long term	If the campaign is a success it might lead to less clothing buying and therefore a lower demand for textiles in the short term
Second hand stores	Less pollution and low-quality import clothing aligns with their environmental sustainability contribution	Might have less clothing to sell and therefore loses value in terms of money/accessibility/success/autonomy? In the short term
Kantamanto second hand clothing market workers (Ghana)	Less pollution and low quality imported clothing: environmental sustainability	Workers there might lose in terms of accessibility in terms of money and resources due to less clothing ending up in this market due to fewer thrown away clothes,
Environment	Environmental sustainability & health: If less clothing gets thrown away due to more repairing instead of throwing away, less pollution might happen in places like the clothing garbage piles at Second hand market in Kantamanto, Ghana. Moreover less resource usage might occur due to less textile production.	Producing the products requires resources and therefore, in the beginning, somewhat loses value in terms of environmental sustainability , especially if it turns out the campaign isn't a success

A8. Identified moral values

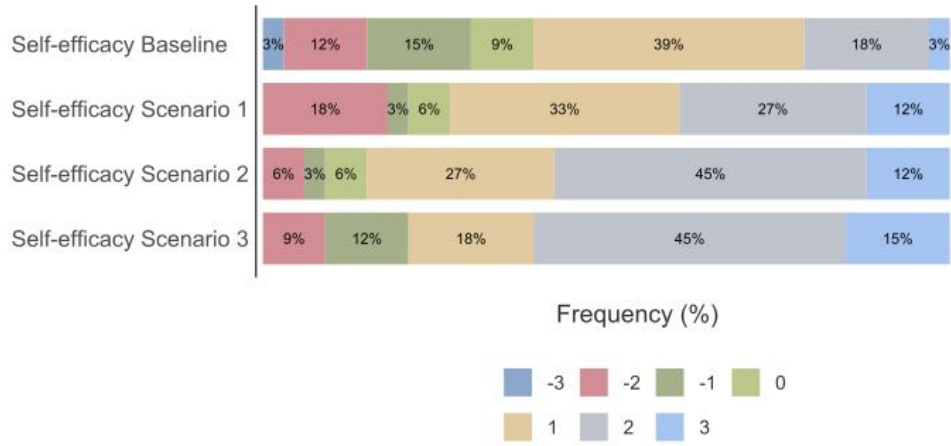
Value	meaning	relevance
Environmental sustainability	A healthy balance in terms of the earth's resources ecosystems and services by not exceeding the planet's capacity for both current and future generations of society	This is the starting point where our design concept comes from. To know whether our concept is successful, it is crucial to identify whether environmental sustainability is in the plus. For the supermarkets and producers of the concept this value might boost their image and motivate them to contribute even more to this value.
Accessibility	The amount of created opportunity in which a person can participate in a certain activity and mental and psychical wellbeing of this person	The accessibility of the concept has been increased by making the threshold to use as low as possible by giving it away for free at a supermarket.
Autonomy	The need for independence and agency over the behavior	Our design is for behavior change, and we do not want to force people to make certain choices, since this is unethical. Therefore, it is crucial to leave room for autonomy in the behavior of the user. With our design, we do not obligate the user to any action.
Equality	The amount of same treatment and opportunities for people	Since our concept is introduced at a supermarket depending on the amount of expenses, we increase equality compared to

		buying at the store, but still some inequality might arise depending on the amount of money you can spend as customer.
Connectedness	The active involvement with another person, object, group, or environment, and having a close relationship to someone	The campaign might increase the connectedness for some stakeholders, while also decrease for other stakeholders. Users might feel more connected due to interaction with others, seeing others wearing the same clothing. On the other hand, competitors like the second-hand stores might feel less connected to their customers and environment due to a reduction caused by our concept.
Safety	The amount of danger and risk that could lead to negative outcomes	The campaign and supermarket are at risk when a child gets injured due to elements in the toolkit.

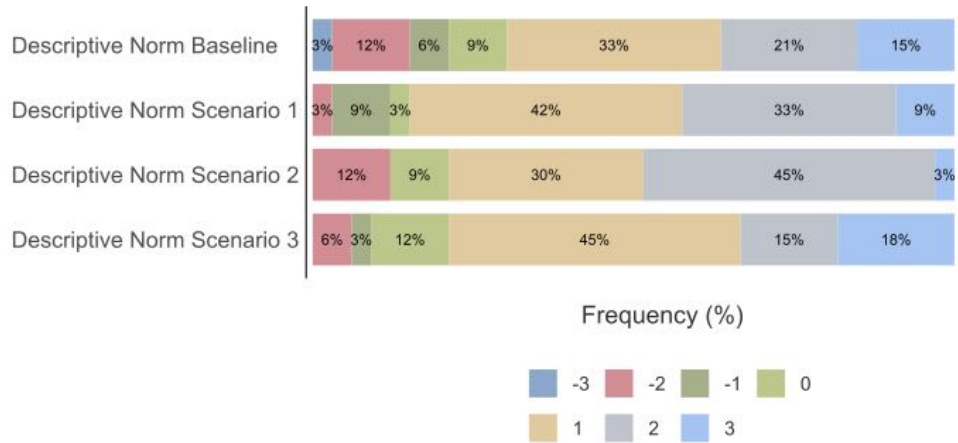
A9. Data analysis



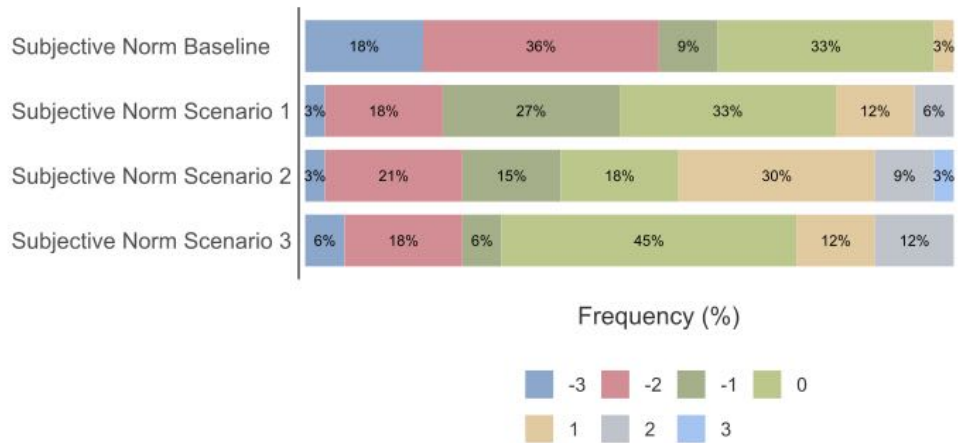
Value



Value



Value



A10. Consent form and questionnaire

Evaluation of "Thick Thread Toolkit"

* Required

Consent Form

1

Introduction

You have been invited to take part in the research project Thick Thread Toolkit because you responded to our message or were asked personally by one of our researchers.

Participation in this research project is voluntary: the decision to take part is up to you. Before you decide to participate we would like to ask you to read the following information, so that you know what the research project is about, what we expect from you, and how we deal with processing your personal data. Based on this information you can indicate via the consent declaration whether you consent to take part in this research project and the processing of your personal data.

You may of course always contact the researcher via j.c.orij@student.tue.nl, if you have any questions, or you can discuss this information with people you know.

5

Potential risks and inconveniences

Your participation in this research project does not involve any physical, legal, or economic risks. You do not have to answer questions that you do not wish to answer. Your participation is voluntary. This means you may end your participation at any moment you choose by letting the researcher know this. You do not have to explain why you decided to end your participation in the research project.

6

Withdrawing your consent and contact details

Participation in this research project is entirely voluntary. You may end your participation in the research project at any moment, or withdraw your consent to using your data for the research, without specifying any reason. Ending your participation will have no disadvantageous consequences for you.

If you decide to end your participation during the research, the data you already provided up to the moment of withdrawal of your consent will be used.

Do you wish to end the research, or do you have any questions and/or complaints? Then please contact the researcher via j.c.orij@student.tue.nl.

If you have specific questions about the handling of personal data you can direct these to the data protection officer of TU/e by sending a mail to functioarisgegevensbescherming@tue.nl. Furthermore, you have the right to file a complaint with the Dutch data protection authority: the Autoriteit Persoonsgegevens.

Finally, you have the right to request access, rectification, erasure, or adaptation of your data. Submit your request via privacy@tue.nl.

2

Purpose of the research

This research project will be managed by Jitze Orij, Zihan Hu, Isidoros Kotinis, Joris Raaphorst, and Annet Remijnse.

The purpose of this research project is to investigate your intended behavior regarding clothing repair and the influence of our design concept Thick Thread Toolkit on your intended behavior.

3

Controller in the sense of the GDPR

TU/e is responsible for processing your personal data within the scope of the research. The contact details of TU/e are:

Technische Universiteit Eindhoven
De Groene Loper 3
5612 AE Eindhoven

4

What will taking part in the research project involve?

You will be taking part in a research project in which we will gather information by:

- Showing you a scenario 4 times and record your initial responses and questions via audio.
- Asking you to fill in a questionnaire 5 times about behavior towards clothing repair.
- Interviewing you about your answers to the questionnaire and record your answers via audio. Also, we will make a transcript of the interview.

For your participation in this research project, you will not be compensated.

7

Legal ground for processing your personal data

The legal basis upon which we process your data is consent.

8

Confidentiality of data

We will do everything we can to protect your privacy as best as possible. The research results that will be published will not in any way contain confidential information or personal data from or about you through which anyone can recognize you, unless in our consent form you have explicitly given your consent for mentioning your name, for example in a quote.

The personal data that were gathered via audio recordings and other documents within the framework of this research project, will be stored in storage facilities that are supported by the ICT service of TU/e.

The raw and processed research data will be retained for a period of 4 months. Ultimately after the expiration of this time period, the data will be either deleted or anonymized so that it can no longer be connected to an individual person. The research data will, if necessary (e.g. for a check on scientific integrity) and only in an anonymous form be made available to persons outside the research group.

This research project was assessed and approved by the ethical review committee of Eindhoven University of Technology.

I understand and I consent to processing my personal data gathered during the research in the way described in the information sheet. *

Yes

No

Baseline

Please indicate your opinion on the following statements according to your situation. *

	Disagree (-3)	-2	-1	0
My family thinks I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My close friends thinks I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most people who are important to me think I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my family would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my close friends would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think most people who are important to me would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can repair clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can help my kid repair clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can develop my repair skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Motivating (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Professional (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Tacky (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Acceptable (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Unenjoyable (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Undesired (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

	Bad (-3)	-2	-1	0	1
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Encounter the "Thick Thread" Campaign

As you go to Aldi for your usual shopping, you notice a poster for the "Thick Thread" Campaign at the entrance. Taking a quick glance, you learn that it is promoting wearing repaired clothes. Inside the supermarket, you also spot a counter displaying toolkits specifically designed for children to sew and repair their own clothes.



Please indicate your opinion on the following statements according to your situation. *

	Disagree (-3)	-2	-1	0
My family thinks I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My close friends think I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most people who are important to me think I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my family would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my close friends would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think most people who are important to me would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can repair clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can help my kid repair clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can develop my repair skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

	Tacky (-3)	-2	-1	0	1
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

	Unenjoyable (-3)	-2	-1	0	1
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

	Acceptable (-3)	-2	-1	0	1
	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Professional (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Motivating (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

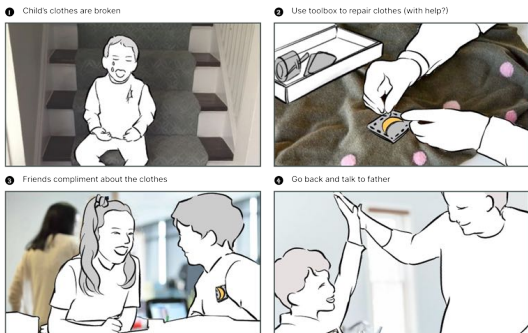
Bad (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Undesired (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Kid Repairing Clothes Using the "Thick Thread" Toolkit

Your child demonstrated a keen interest in the Thick Thread Toolkit. They wished to have the cute patches sewn onto their damaged clothes. After pleading with you to purchase it, they utilized the tools and patches from the toolkit to repair the holes in their garments. They proudly wore the mended clothes to school and received compliments from their classmates, bringing them immense joy. Upon returning home, they happily shared their experience of wearing the mended clothes with you.



Please indicate your opinion on the following statements according to your situation. *

	Disagree (-3)	-2	-1	0
My family thinks I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My close friends thinks I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most people who are important to me think I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my family would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my close friends would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think most people who are important to me would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can repair clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can help my kid repair clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can develop my repair skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

29

What is your attitude regarding wearing repaired clothes? *

Undesired (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

30

What is your attitude regarding wearing repaired clothes? *

Tacky (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

31

What is your attitude regarding wearing repaired clothes? *

Acceptable (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

35

What is your attitude regarding wearing repaired clothes? *

Motivating (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

32

What is your attitude regarding wearing repaired clothes? *

Professional (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

33

What is your attitude regarding wearing repaired clothes? *

Unenjoyable (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

34

What is your attitude regarding wearing repaired clothes? *

Bad (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Seeing Fathers Around Wearing Repaired Clothes

36

In everyday life, you may notice that fathers around you are also wearing patched clothes. Whether it's at school, on the streets, or even in the workplace.



Please indicate your opinion on the following statements according to your situation. *

	Disagree (-3)	-2	-1	0
My family thinks I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
My close friends thinks I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Most people who are important to me think I should wear more repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my family would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think my close friends would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I think most people who are important to me would wear repaired clothes	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can repair clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can help my kid repair clothing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
I would be confident that I can develop my repair skills	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Acceptable (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Professional (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Motivating (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Unenjoyable (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Undesired (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Tacky (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

What is your attitude regarding wearing repaired clothes? *

Bad (-3)	-2	-1	0	1
<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Thank you for participating and answering all the questions!

