

# Tangible Representation Tool of Perceived Risks using Personal Data in a Co-design UPPSS Process

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## ABSTRACT

Within the co-design process for ultra-personalized products or services, personal data is constantly collected and used throughout the process. Former research focused on the relationship between data and final product, however, perceived risk in this context has not been considered. This paper proposes a tangible representation of perceived risk and explores its effect on participants in regard to using personal data in a co-design process for ultra-personalization. The findings present that the tangible tool increases awareness for the participants on possible risks and clarifies the most important ones. Consequently, participants willingness to share data decreased unless their conditions are met.

This research might provide insights for researchers and designers focusing on co-design, (ultra)-personalization and perceived risks in the field of design.

This paper first explains the theoretical background & related work, then will go through the design process and explain the final design, the methodology of the research, the findings and discussion will be presented and finished with limitations of the research, future work, and the conclusion.

## Author Keywords

Perceived risks; Co-design; Personal data; UPPSS.

## INTRODUCTION

As user experience has been playing a more and more essential role in the design field, designers have been more connected with their potential users [13]. The co-design process has been applied as one of the methods to boost this connection. Co-design describes a process in which a group of designers, manufacturers, consumers, and other stakeholders exchange ideas and develop a product, service or system together [10]. In this case, the borders between the roles of designer, researcher, and user are blurred [13].

The active engagement of users in a co-design process contributes to the development of personalized products, which are getting more common and find their way to the

market, for example, eyeglasses, fit lingerie and shoes [3,16,17,18]. Often in the process of designing personalized products, personal data is collected and used throughout the design process.

Within the scope of the European General Data Protection Regulation (GDPR), personal data is defined as “any information that relates to an identified or identifiable living individual” [19]. However, in the ultra-personalization design process, personal data is used as evident design material in generating the design of the product and has different meanings matching to various design topics [7].

A leading example is the Ultra Personalized Product and Service System (UPPSS) model as presented by Nachtigall et al. [12]. It describes a design process in which data for the ultra-personalized product is gathered before the design process and during product usage. This process allows the use of data of the individual user based on everyday usage to further improve the wearable.

Within the UPPSS model, the research focused on the relationship between data and the final product. However, perceived risks were not considered. An ethical viewpoint needs to be taken into account for the further development of the UPPSS model.

In the business field, some research demonstrates serious concerns about personal data and its sharing [9]. People tend to be more concerned about their privacy and possible risks due to the increasing security threats and examples of major security breaches [15]. Yet in the co-design context, there is a blank space for recognizing the perception of risks.

New tools and techniques regarding perceived risks lack research in the co-design landscape for ultra-personalized products [13]. Therefore, this project proposes a tangible representation of perceived risks, which can be used in the UPPSS process before co-design sessions. The objective of the research project is to explore its effect on participants in

regard to using personal data in a co-design process for ultra-personalization.

This research was conducted using the Field methodology [8]. We focused on the target group of cooks in the context of co-designing protective workwear. This research might provide insights for researchers and designers focusing on co-design, (ultra)-personalization and perceived risks in the design field.

## RELATED WORK

### Co-design

Co-design, as a design method, has been applied outside of the design domain [10]. For example, a field research project by Kim et al. explored the utilization of a participatory design workshop in the development of policy [6]. In this research, a tangible representation of the current policy was designed and implemented in the field context of a workshop session. This research aimed at providing insights into designing a participatory workshop in the policy context. In our research, we implement the tangible representation of the perceived risks and aim at connecting perceived risks with a co-design session.

Most of the tools for co-design are related to the generation of ideas and iteration of final results, such as Mindmap, Issue cards, Concept Walkthrough [14]. However, tools for representing perceived risks and bringing the concept to the co-design session are not present in common co-design toolkits.

### Perceived risk

The first concept of perceived risk was suggested by R. A. Bauer [2]. In his opinion, perceived risk is a concept in which users' actions will have outcomes that they can not estimate with high confidence and some of which are likely to be unpleasant. Depending on the situation, perception of risk is subjective and usually does not reflect reality, people tend to overestimate or underestimate the risks and possible outcomes [4] influencing the choices that they make.

### Perceived risk in co-design

Kaveh et al. conducted research on the perceived individual risks in co-innovation in the business domain [1]. The researchers realized that in the co-innovation session, not only the risk assessment on the company's level is important, but the individual level as well. George et al. developed a typology of personal data based on perceived risks from consuming industry in order to raise awareness of policy and regulation problems [11]. However, within the design domain, there is a gap between co-design and perceived risks. This research was used to provide a basic line for the development of perceived risk lists in a co-design process while using personal data.

## DESIGN PROCESS

### Pre-interview

The methodology applied in this project is a Field constructive design research methodology [8]. A proper

condition, where the prototype is used in a natural setting, should be created following the four guidelines from Kurvin [8]. A pre-interview with an experienced cook was conducted, aiming at 1) defining the design goal for the co-design process and 2) generating the perceived risks list within this certain process.

A participant with 8 years of experience of working as a professional cook participated in the pre-interview. The interview was divided into two parts. Firstly, the participant answered questions (Appendix 1. Pre-interview questions) about his work and expressed his opinion about personal data. Secondly, the participant read three scenarios and got interviewed after reading each scenario (Appendix 2. Pre-interview Scenarios). The three scenarios described different stages of working: applying for a job, in a job and quitting a job. The scenarios gave some limitations for helping participants imagine themselves under specific conditions. After each scenario, the participant was invited to present his attitude sharing personal data for an ultra-personal product that detects personal information related to health and work.

Each part took 10 minutes. In the interview, one team member was conducting the interview, and another team member was responsible for observing and recording the answers.

### Evaluation

The participant put forward two main problems related to his work: limited working space and back pain caused by long-time working posture. Therefore, the goal of the co-design process was decided to design a garment that detects their health.

Additionally, the participant mentioned several possibilities for using personal data. He explained why sharing some of his personal data such as medical history is risky. *"...regarding medical history, mental health data, these kinds of things, it would just, like, to be spread out, and every company could find it."*

Based on the results of the pre-interview, the perceived risks list, which was generated from George et al.'s research [11], was analyzed and customized to this certain co-design process - ultra-personalization wearable design with data collection for cooks (Table 1. Conceptualized Perceived Risk) [11].

### PROTOTYPE

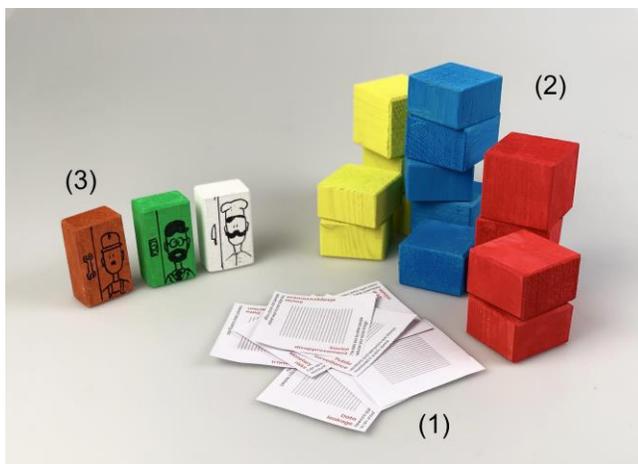
The prototype is a tool used before co-designing ultra-personalized products (Figure 1). The role of the prototype is to clarify the perceived risks for the participants by visually mapping them and raising discussion between the participants and designers.

The tool consists of three parts - the perceived risk cards (Figure 1. (1)), the blocks representing the importance level of each perceived risk (Figure 1. (2)) and the role blocks for participants to think about the other stakeholders (Figure 1. (3)).

	Perceived Risks	Description
1	Public surveillance	Locations and behaviors are always monitored in public space
2	Online surveillance	Online behaviors and opinions are always monitored
3	Data leakage	Relevant data is unwillingly leaked to an unauthorized party
4	Data transaction	Relevant data is being sold
5	Data misuse	Relevant data is misinterpreted, used with bad intentions.
6	Social disapproval	The data saw by other people reduces your social image.
7	Monetary risks	Can be used to hack the bank account etc.

**Table 1. Conceptualized Perceived Risks**

Perceived risks are written on seven cards with short descriptions, and additional or more concrete aspects can be written on the blank cards (Figure 1. (1)) (Appendix 3. Perceived risks list).



**Figure 1. Tangible tool to represent perceived risks: (1) perceived risks cards (2) blocks (3) role blocks.**

Each user gets five blocks to oblige participants to choose which risks are more important to them (Figure 1. (2)). Four of the blocks are the same height, while one is 1.5 times higher. It is done to reduce the opportunity to divide all

blocks evenly and force the user to choose which risk is most relevant to him.

The role blocks consisted of different stakeholders: manufacturer, chef (manager) and businessman (client) (Figure 1. (2)), which help the users to think about other stakeholders. Role blocks should be changed depending on which kind of context the tool is going to be used in.

#### How to use

While using the tool, designers play the role of facilitators. The tool can be used in several rounds. In the first round, the participants are introduced to the perceived risk cards and select the most relevant ones. Then, the blocks are provided. The participants are requested to think for one minute and then distribute the blocks on the perceived risk cards at the same time. The limitation of the thinking time and simultaneous distribution is done to reduce the influence among the participants. Afterward, participants are asked to explain the reasons behind the decisions and have a discussion with other participants and designers. Additional aspects should be written down by the designers on the blank cards. When everything is discussed, the blocks are returned to the participants and a new round of the block distribution begins. After the assigning of blocks and a new discussion, the designers and participants can decide together if more rounds are needed to complete clarifying the perceived risks.

#### PILOT TEST

A pilot test was conducted to analyze the feasibility of the user test protocol and improve the setup (Appendix 4. Protocol I). The data from the pilot test was not used for the final analysis.

#### Setup

One cook participated in the pilot test. Two team members were involved in the pilot test as designers. The other three observed via Livestream video in a separated room. The pilot test lasted for 45 minutes.

The participant walked into the room with an empty table. After signing in the consent form (Appendix 5. Consent Form II), designers gave the participant a short introduction of the co-design process and this user test.

To start, the designers conducted the first interview, the interview questions can be found in the appendix 4 I. Then, the participant was informed that a personalized wearable would be designed to reduce the back pain problems for cooks and thus some personal data will be collected. Afterward, perceived risk cards were introduced, from which the participant was asked to select the relevant ones. After the blocks were introduced, the participant was guided to use the tool for the first round, placing the blocks and explaining the reasons to place the block in this way. There were some new insights during the first round which were written on the blank perceived risk cards. Hereafter followed the second round.

In the end, the designers conducted another interview to gain insight into how the tool affected the participant. The questions can be found in Appendix 4 I.

**Evaluation**

The process was reflected upon and the gained insights were used to adjust the user test.

Firstly, one participant might lack natural social factors while using the tool. In the user test, at least two participants will be involved.

Secondly, the participant mentioned the value of the final product three times, which has a major influence on his perception of the risks “*if I see the value in sharing the data, then I think it’s no problem*” (Appendix 6. Video transcripts I). In order to avoid the focus on the value of the final product, a more open-ended design case will be presented in the user test.

Furthermore, the interview questions during the pilot test were based on intuition rather than research. The interview questions were improved by adding more in-depth questions about the participants' motivations (Appendix 4. Protocol II).

Lastly, in order to trigger the participants to actively consider the usage of personal data while selecting the perceived risks, a print-out of personal data was presented during the user test with the following personal data on it:

- Medical history
- Body measurements
- Posture
- Working times
- Location
- Work environment
- Work and leisure time-related habits
- Heart rate

These relevant personal data were selected based on the pre-interview feedback and by checking through the full personal data list, which was generated from George et al.’s research [Information Sensitivity Typology]. (Appendix 3. Personal Data List )

**USER TEST**

**Setup**

Based on the evaluation of the pilot test, the user test was adjusted and conducted (Appendix 4. Protocols II). The user test lasted for 60 minutes, with two designers involved in the user test, two observers observing via Livestream (after their consent) and two participants at the same time. One of the participants works full time as a chef and the other one is a part-time cook. The interviews before and after using the tool were conducted in different rooms.

**Data Collection**

The user test results were collected, consisting of 1) perceived risk mapping, 2) discussion transcripts, 3)

interview notes and 4) observation notes. The full data collection can be found in the Appendix 6,7,8.

*Perceived Risks Mapping*

The chosen perceived risks were Data leakage, Misuse of data, Social disapproval and Data transaction. The results of putting down the blocks are summarized in Table 2 and Table 3.

Risk	User 1	User 2	Total
Data leakage	3	0	3
Misuse of Data	1 big	2	<b>2 + 1big</b>
Social Disapproval	0	2	2
Data Transaction	1	1 big	1 + 1big

**Table 2. Results of Round 1**

Risk	User 1	User 2	Total
Data leakage	3	2	5
Misuse of Data	1	1 big	1 + 1big
Social Disapproval	0	1	1
Data Transaction	1big	1	1 + 1big

**Table 3. Results of Round 2**

*Discussion Transcripts*

The video recording of the user test was transcribed for analyzing (Appendix 6. Video Transcripts II). The discussion between the participants and with the designer after the first round motivated the participants to make individual decisions.

*Interview Notes*

The interviews before and after using the tool are summarized as interview notes (Appendix. 7 Interview notes).

*Recordings & Observation notes*

An integrated observation note was made based on critically watching the video recording of the user test, and combining it with input from both designers and observers (Table 4. Observation note).

Researchers focus on the stage of putting blocks because the users were asked not to talk at that time. The table shows two kinds of data: 1) the duration between two key points. The first duration is from start thinking how to put the blocks to touch the blocks, and the second duration is from start putting blocks to finish putting the blocks down. 2) users’ behavior, especially when they put the blocks.

		Round 1		Round 2	
		User 1	User 2	User 1	User 2
Thinking how to put the wood blocks	Time	50 seconds for thinking without touching the blocks	58 seconds for thinking without touching the blocks	Held blocks in hand, 15 seconds for thinking without moving the blocks	31 seconds for thinking without touching the blocks
	Behavior	Then he separated three wood blocks and held them, ready to put.	Then he held all the wood blocks.	Then he separated three wood blocks and held them, ready to put.	He took out a block and put it aside firmly
Putting blocks	Time	10 seconds for putting all the blocks	9 seconds for putting all the blocks	15 seconds for putting all the blocks.	17 seconds for putting all the blocks
	Behavior	He quickly put down 3 blocks (which is the most) on a plate. Hesitating for a while, he placed the remaining two blocks on different risk plates.	He quickly put down 2 blocks (which is the most) on a plate. Hesitating for a while, he placed the remaining two blocks on different risk plates.	Participant 1 put down 3 blocks (which is the most) on a plate. Participant 2 stacked 2 blocks (which is the most) on the 3 blocks that participant 1 placed. Hesitating for a while, participant 1 changed a block. Participant 2 put block on a plate, and participant 1 put a block on the same plate. They had some words and saw each other's behavior. They both looked at one plate for a while. Participant 1 hesitated, and participant 2 put a block, then participant 1 put a block. It seems participant 1 is waiting for participant 2 to put first. Participant 2 put the left block quickly.	

Table 4. Observation notes

### Analysis

The perceived risk mapping is analyzed with a comparison graphic (Figure 2). Meanwhile, the comparison results are actively linked with the analysis of qualitative data, which results in a deeper understanding of the reasons behind certain behaviors.



Figure 2. Comparison of Perceived Risks Mapping Round 1 & 2

The full transcripts and interview notes can be found in Appendix 6 Video Transcripts II.

The discussion transcripts and interview notes are analyzed by the content analysis method [5]. Through reading the written sentences actively, meaningful characteristics of the participants' comments can be spotted [5]. The discussion transcripts are color-coded for categorizing (Appendix 8.

Content analysis and color-coding). Six big themes emerged - Important personal data, Concerns about the data, Data misuse, Data leakage, Consequences of the data misuse/leakage and Others. The content analysis provided a basis to interpret the interviews and the extracted sentences are used to reason our insights in Finding & Discussion part.

### FINDINGS & DISCUSSION

In this section, the findings and interpretations are discussed per topic. Several topics are discussed - Increase awareness within the context, clarifying the most important perceived risks, willingness to share personal data, social impact during a discussion and projected stakeholder blocks.

#### Increase Awareness within the Context

The participant's awareness of perceived risks increased in this situated context of the co-design process. This conclusion can be drawn by comparing the interviews conducted before and after the user test. The participants actively expressed to have more awareness regarding why the data is being collected, what they define as personal data, what data was important for them, where it could be used and how this use can affect them.

*"After talking about the costs and stuff, and losing the job. It (sharing personal data) could have a bigger impact than I thought before"* Participant 1

Since the participants were situated in a context of co-design using personal data, and the tool introduced the participants

to perceive the risks of sharing personal data as a highly relevant issue. Additionally, it should be emphasized that their awareness only increased regarding this certain topic.

This increase could also be suggested by observation while placing the blocks. A difference in thinking time was observed (Table 4. Observation Notes). Participant 1 spent 10 seconds putting blocks in the first round and 15 seconds in the second round. It took 9 seconds for Participant 2 putting blocks in the first round and 17 seconds in the second round. Both of them spent more time to put blocks in the second round. The video observation shows that they had more hesitation while putting down the blocks in the second round. In the second round, they looked at the definition of the risks they chose and the records of previous discussions. In this setup, their awareness of perceived risks in the co-design context could be increased while considering and judging different risks, and the connections between them.

#### Clarifying the most important perceived risks

The discussions, which emerge due to the use of the tool, helped to inform the participants about the range of risks and clarify how they perceive them. The tangibility of the tool provides the option to cluster the perceived risks make them more understandable.

Participants 1 has placed the most blocks on one risk in round one, which is data leakage. *“A lot of me in one second to a lot of people”*. Participants 2 has not placed one block on this risk but did so in the second round (Figure 2). As a reason, participant 2 stated that since the discussion of the first round the risk of data being leaked is influencing other risks.

Though both participants agreed that data leakage is the most important perceived risks after the discussion, they mentioned a tight connection between data leakage and data misuse. One participant said: *“I don’t like it if it is leaked and I don’t like it if it is misused. In one way it is a bit the same. When it is leaked then it is already misused, I believe.”* and the other participant nodded at the statement. *“Maybe a combination between these two.”*

#### Willingness to share personal data

The analysis of the video revealed that the participants first rank personal data based on their importance and take that into account before they determine which risk deserves more attention. In this case, the tool helped designers to get a clearer understanding of the conditions under which a user would be willing to share data.

Table 5 shows the personal data mentioned in the discussion after the first round placing the blocks. Participants highlighted that the most important personal data for them is medical data *“When you have all that information of me and you leak it, especially the medical history and my heart rate.”* This data is relevant to participant 2 because it can lead to

social disapproval - *“If my data about my body measurements are leaked or about my medical history and it is misused then this could lead to social disapproval and we are all social beings”*. This user motivated his statement based on his education in social sciences. Further, he stated that leaked medical data could lead to job loss *“I think the medical stuff (data), which could cost a cook his job.”* After usage of the tool participants did not change the understanding of personal data, it remained the same. From this, designers can assume that medical data is more important for participants to keep safe than other data, hence they expressed through the tool under what condition they would be willing to share this data.

Rank	Category	Count	Personal data from quotes	Count
1	Medical data	7	Medical data	2
			Heart rate	2
			Medical history	2
			Diabetics	1
2	Location & time data	4	Location	2
			Working/leisure related time	2
3	Personal preference	1	Habits	1
3	Physical data	1	Body measurement	1

**Table 5. Important personal data ranking.**

After the second round, the participants stressed the fact that data, mostly the medical data, should not leak at all and that there is no selling of information to third parties, such as insurance companies, then they are more willing to share the data. In this case, the tool could help designers to get a clearer understanding of the motivations why a user is less willing to share data.

#### Social impact during discussion

During the session, the tool raises discussion among participants and designers. The participants exchanged ideas, often agreed on each other and build upon each other’s thoughts in the discussion. For example, participant 1 stated *“I think as well for the insurance companies. Now in the future time, people see: Oh, now you are a cook, you have a lot of stress. You know what? You have to pay more per month”*, participant 2 added, *“Yes, you have a bigger risk for*

a heart attack". They both nodded at each other's statements and showed mutual agreement. In the second round of placing blocks, they stacked the most blocks together on the *data leakage* card, while they put them on different cards in the first round. The participants showed more agreements in the second round (Figure 2). Moreover, they put the blocks down with more hesitation than in the first round, one participant seemed to wait for the other one, to place the blocks on the same risk card.

Even though they did not place the blocks in exactly the same way, the perceived risk mapping still shows the influence on each other (Figure 2). In Figure 2, the small blocks are defined as height 2 and big blocks as height 3. Comparing the difference in height between the two participants in both rounds, the difference between the first and second round decrease from 12 to 6. Their perception of risk is converging after using the tool.

### **Projected stakeholders**

Although stakeholder blocks are included in the tool, the other stakeholders were not taken into account by participants throughout the user test. The participants noted that all statements and decisions made from their own perspective "*I did not think about them*", "*Me neither. Not that much at least. That was totally from my own perspective*". Therefore, further discussion of the necessity of the stakeholder blocks is needed.

### **Limitations**

In this section, the limitations of the research are discussed, which could be used to define the relevance of this research but also as a basis for research into future directions.

Firstly, the research does not include enough target users in the pre-interview and the user test. Only one participant was involved in the pre-interview and two in the user test. Only one or two participants could not be concluded as the optimal scenario for using the tool.

Secondly, the other stakeholders, such as manufacturers or managers, were not involved in the research. Thus we can only speculate about their influence on this process.

Furthermore, the time span of this research is insufficient to some extent. Field methodology requires enough time span in a social context in order to analyze the data [13] and the general co-design process has a much longer time span, while in this research only the early stage in the co-design process was taken into consideration [13]. No further test was conducted regarding the long-term influence of the tool on the participants and the implementation in other stages within UPPSS loops.

Another limitation could be the influence of feeling safe in the environment of the university gives. The designers were quite vague about the goal of the research and to whom the data would go, nevertheless, the participants did not question the nature of the research for a second. We assume that during a co-design session outside of this educational context

the willingness to cooperate, share data and give opinions will be different and less.

### **Future Work**

This paper presented research on the possibilities of using a tangible representation to bring the concept of perceived risks into the co-design process. This research can be used as a stepping stone for further research in the re-consideration of perceived risks in the co-design process.

Within the UPPSS frame, the tool can be implemented in other stages. More research could be done on the impact on participants in further UPPSS process.

Additionally, the research could be a pilot for developing principles regarding using personal data in the co-design process. The clarification of their subjective perceived risks of share personal data might be a good example of users contribute to the co-design process, other than to provide functional data.

A method to connect members of a stakeholder group with one another and give them a possibility of the spectrum of perspectives they can take into account when thinking about the proposed design. Vice versa we see potential when this is explored to connect the various stakeholder groups with one another and enable a discussion of informed groups.

### **CONCLUSION**

In this research, the objective was to explore the possible effects by using a tool to represent the perceived risks in the UPPSS co-design context.

The findings show that the tangible representation tool has effects on the participants by clarifying the perceived risks and personal data. The awareness of personal data usage in the co-design process increased, though the participants tend to focus on their own perspectives and opinions instead of taking consideration of other stakeholders. The willingness to sharing personal data might decrease, nevertheless, under which conditions they are willing to share personal data seems clearer for the participants.

The prototype can be developed to assist designers and researchers to better collect and use personal data from users. Within the UPPSS frame, it also provides some insights of mapping personal data and perceived risks based on a different design concept.

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## APPENDICES

Appendix 1. Pre-interview questions

Appendix 2. Pre-interview scenarios

Appendix 3. Perceived risks list

Appendix 4. Protocols

- I. Pilot test
- II. User test

Appendix 5. Consent forms

- I. Pre-interview
- II. Pilot test and User test

Appendix 6. Transcripts

- I. Pilot test
- II. User test

Appendix 7. Interview notes user test

Appendix 8. Content analysis and color coding

## APPENDIX 1. PRE-INTERVIEW QUESTIONS

- 1) For how long you are working as a cook?
- 2) Describe your daily work, routine, responsibilities, activities.
- 3) How often and how long you work in one day?
- 4) What kind of safety tools do you use? (Gloves, gas alarms and etc.)
- 5) What kind of problems do you encounter during your work? How would you improve it/them?
- 6) How do you feel after work? How you would describe the tiredness? (0-10)
- 7) Do you think that by giving some personal data (e.g. health rate, sugar levels in the blood) to the manager can improve the working experience? Why?
- 8) If you would want to solve the problem that you selected, what kind of personal data you would be willing to contribute in order to solve it? Why?
- 9) What kind of data you perceive as too personal to share?

## APPENDIX 2. PRE-INTERVIEW SCENARIOS

- 1) When applying for a job  
You apply for a prestigious job, your dream job. It fits all your criteria you were looking for during your job hunt. During the interview it gets clear that you would fit the position and at the end you are getting an offer. You have an alternative offer which is not as optimal, but would satisfy your baseline requirements.  
The owner wants you to wear a shirt, which monitors your heart rate and location during your working hours.
  - a) What do you think about that?
  - b) How you imagine the data will be used?
  - c) Do you need to know how the data will be used?
  - d) Would you take the job?Gather health related data in order to make sure that you're maintaining a productive state and remain healthy over time.
  - e) How does the explanation of the data usage makes you feel?
- 2) When in a job  
You are working in the same place as you do now. Your supervisor says that the company will bring a new safety product to work with. They want to make personalized safety gloves. Gloves company comes and do 3D scans of your hands and also ask about your personal medical data as medical history data, mental health status and other data that for you does not look really relevant.
  - a) Is it important to you to know where your data is going to be used?
  - b) Do you feel concerned that your data will be used by other company rather than the one you are working it?
- 3) Scenario (what would you make you quit)  
You are working at a prestigious restaurant, the workload is high, almost every day you have to work overtime. In order to reduce the workload, your boss wants to do some research on the work floor. At first, it starts with measuring when the stoves and other kitchen appliances are on. But after a while, your boss wants to measure the location of every person in the kitchen using cameras, he wants access to your medical history, he wants to measure heart rate, blood sugar and hydration levels. He asks you to hand in your phone during work time.
  - a) How do you feel in this scenario?
  - b) Now what is your opinion on personal data and sharing?

**APPENDIX 3. PERCEIVED RISKS LIST**

	<b>Perceived Risks</b>	<b>Description</b>	<b>Relevant data</b>
1	Public surveillance	Locations and behaviors are always monitored in public space	Biometric data, demographic data
2	Online surveillance	Online behaviors and opinions are always monitored	Community Interaction, Contact Info., Personal Preferences
3	Data leakage	Relevant data is unwillingly leaked to an unauthorized party	all
4	Data transaction	Relevant data is being sold	Biometric data, demographic data, financial info, Contact Info.
5	Data misuse	Relevant data is misinterpreted, used with bad intentions.	Biometric data, demographic data
6	Social Disapproval	The data saw by other people reduces your social image.	Biometric data, demographic data, personal preferences, community interaction
7	Monetary risks	Can be used for hack the bank account etc.	Biometric data, financial info., Secure Identifier

Personal Data List

Biometric Info.	Height, Weight, Fingerprint, Voiceprint, Facial info, Gender, Race, Eye color, Body measurements, DNA profile
Basic Demographics	Place of birth, Birthdate, Hometown, Country of citizenship, Income level, Number of children, Marital status, Job title, GPS location
Personal Preferences	Hobby, Shopping behavior, Sexual preference, Religion, Political affiliation
Contact Info.	IP address, Email address, Work address, Home address, Zip-code, Phone number, Work contact information
Social Interaction	Law enforcement files, family/friends contact information, Social network profile, Medical history
Financial Info.	Credit card number, Financial account, Vehicle registration number
Secure Identifier	Social security number, Health insurance number, Passport number, Digital signature, Handwriting sample

## APPENDIX 4. PROTOCOLS

### I. Pilot Test

User Test Protocol - 10.10.2019

Time: 45min

- 9:00-9:45

Participants:

- 2 cooks
- 2 designers (Haoyu and Tomas), participating in the game. Designer 1 is the leading facilitator communicating with the cooks, designer2 takes notes
- 3 researchers (Maik, Huizhong and Sanne), observing by live camera from another room and record the videos, taking notes
- 1 media person (Maik): taking pics and videos

Field set:

- Clear room, empty table, seats for participants, live camera
- Tool:
  - Role card blocks (Manufacturer, restaurant manager, project manager)
  - Bricks
  - Risks plates: 7 written + 7 blank

Process:

Step1:

- Welcome cooks, introduce yourselves: We are a design team, a company reach us to design a wearable for the cooks
- Cooks sign consent form
- Designers conduct interview-1 (including context explanation) to cooks
- 1st interview:
  - What is personal data for you?
    - What's your opinion of sharing data?
  - What kind of data you perceive too personal to share?
  - What's your opinion of giving personal data to your employer?
  - What is your opinion of products that gather data?
    - What is your opinion of personalized products?
  - How do you feel now?
    - Positive or negative?

Step2:

- The first part of the co-design session, we ask your opinion about the process
- Data need to be collected: medical history, measurements, posture, working time, location, habits, heart rate,
- Remind them the presence of stakeholders and they would have cooks data

Step 3:

- Introduce perceived risks
- Choose the relevant risks for you without explaining why
- The participants are invited to write more concrete aspects

Step 4:

- Introduce bricks
- Explain: The height of bricks indicates the attention that should be given to this perceived risk.
- Think for 1 minute, where you want to place them

Step 5:

- In order to reduce the influence of other players, the participants (cooks) put the blocks around the perceived risks plates at the same time

Step 6:

- The participants discuss the reasons why they put this amount of blocks on specific risks.
- Nudge them to talk about the concrete aspects they see in the perceived risks.
- Designer2 writes down the and place on the table next to the relevant risk
- (Researcher taking notes and pics)

Step 7:

- Adjust: clear all the blocks

Step 8:

- Based on the new risks and concrete aspects, the participants have one minute to think and then play round 2.

- (The test will be conducted at least 2 rounds, keep open to 3rd round)

Step 9:

- Designers conduct Separate interviews 2 in different rooms
- 2nd interview:
  - What is personal data for you?
  - What's your opinion of sharing data?
  - What's your opinion of giving personal data to your employer?
  - What is your opinion of products that gather data?
  - What's your opinion about the session?

## II. User Test

User Test Protocol - 14.10.2019

Time: 60min

- 14:40-15:40

Participants:

- 2 cooks
- 2 designers (Maik and Sanne), participating in the game. Designer 1 is the leading facilitator communicating with the cooks, designer2 takes notes
- 2 researcher (Huizhong and Haoyu), observing by live camera from another room and record the videos, taking notes
- 1 media person (Haoyu): taking pics and videos

Field set:

- Clear room, empty table, seats for participants, live camera
- Designers and cooks sit at the corner of the table
- Tool:
  - Role card blocks (Manufacturer, restaurant manager, project manager)
  - Bricks
  - Risks plates: 7 written + 7 blank

Process:

Step1:

- Welcome cooks, introduce yourselves: We are a design team, a company reached out to us to design a wearable for cook
  - Hello dear participants, we are part of a student design group, which is working in our current project with a company together. We are working on and designing a wearable device for cooks. For this process you are invited to be part of the first interviews in this project. We are interested in what you as a cook have to say about some considerations we have.

This meeting is protected under the ethics code of the university. If you decide to participate please read and sign the form in front of you. If you have any questions beforehand you can ask them now.

- Cooks sign consent form
- Designers conduct interview-1 (including context explanation) to cooks
- 1st interview:
  - Have you ever participated in any co-design before?
    - Now, you will participate in a session within a co-design process, to design a personalized garment for you (cooks).
  - Imagine, if your personal data will be collected and used for the co-design process,
    - In this case (this co-design process), how would you describe your awareness of the personal data usage? (awareness that means: do you aware who/why/how/where...) (if they don't know it is fine)
  - In your opinion, what is personal data for you? Do you perceive any risks of using these personal data?
    - Could you describe How you feel about the co-design process using these personal data?
    - How is your willingness to share your data? why?
    - How is your willingness to cooperate/participate in the co-design process? Why?
  - Ok, now let's start to the co-design session!

Step2:

- Data need to be collected: medical history, measurements, posture, working time, location, habits, heart rate,
- Remind them the presence of stakeholders and they would have cooks data

Step 3:

- Introduce perceived risks
- Choose the relevant risks for you without explaining why
- The participants are invited to write more concrete aspects

Step 4:

- Introduce bricks
- Explain: The height of bricks indicates the attention that should be given to this perceived risk.
- Think for 1 minute, where you want to place them

Step 5:

- In order to reduce the influence of other players, the participants (cooks) put the blocks around the perceived risks plates at the same time

Step 6:

- The participants discuss the reasons why they put this amount of blocks on specific risks.
- Nudge them to talk about the concrete aspects they see in the perceived risks.
- Designer2 write down and place on the table next to the relevant risk
- (Researcher taking notes and pics)

Step 7:

- Adjust: clear all the blocks

Step 8:

- Based on the new risks and concrete aspects, the participants have one minute to think and then play round 2.
- (The test will be conducted at least 2 rounds, keep open to 3rd round)

Step 9:

- Designers conduct Separate interviews 2 in different room
- 2nd interview:
  - You have finished a session within a co-design process.
  - How would you describe your awareness of the personal data usage now? (awareness that means: do you aware who/why/how/where...)
  - In your opinion, what is personal data for you? Do you perceive any risks of using these personal data?
  - Could you describe How you feel about the co-design process using these personal data?
  - How is your willingness to share your data? why?
  - How is your willingness to cooperate/participate in the co-design process? Why?
  - What's your opinion about this session?





## APPENDIX 6. VIDEO TRANSCRIPTS

### I. Pilot Test

H: Hi, this will be a one part of the whole co-design session. We will ask you some questions first. Then tool. Then . then ask the questions again

H: What is personal data for you?

P: Personal data is data that describes a person, or that can lead back to a person

T: Maybe give some examples?

P: Your name, phone number, everything you can fill in on facebook is personal data

H: What is your opinion of sharing those data?

P: I think everyone own their own responsibility. Especially nowadays with internet and stuff. What you put out there is your own business.

H: Is there any data you think is too personal to share? For example?

P: Medical records

H: Come back to work, because you are a cook right? How do you think about giving the data to your employer/ boss?

P: Something is necessary, but they do not need to know everything.

T: Why they do not need to know everything?

P: Oh, this is hard... they need to know you..... That you are not crazy. But the rest, no

H: When the employer hiring you, they have this kind of test to see your personality

H: In this project, we will design a wearable that may collect your data, how do you feel about that?

P: What kind of data? Personal data, it depends how much they share on those data.

H: Yea, in the co-design session the data will be shared with other stakeholders.

P: Oh. Oki.

T: The data can be heart rate, location, similar data. What is your opinion about these kind of products?

P: I think if the product is useful enough, then it's not a problem. It depends on if you really want to use the product.

H: Lead to another question. This kind of product, because it's collecting your data, it is kinda personalized product for you. What do you think about that?

P: It is good. Personal direction to do a product, it will be more useful.

H: Next questions is about emotions. How do you feel now?

P: Tired, already.

H: That's the interview before the session

(Explain co-design and the gourment what we are co-designing).

(Explain the tool)

(Let the participant to put the blocks on most important perceived risks cards)

Okay. So now we will discuss together why you chose these options. So let's start from most important to you - Online surveillance.

Can you explain why?

P: Can you show the cards that I discarded? Because my decisions are based on that. Because I think company never wants to have a bad reputations if something would come out, so selling data option is stupid. Data leaked and hacked is also a problem that can occur, it is not in their hands. So that's why I didn't picked these.

Online surveillance, I think that we are always checked where you are and stuff.

H: Maybe you can tell what kind of data is relevant to this one (?) ? Because not all the data can be used for online surveillance.

P: Maybe if you are looking for a job and your employer can see that. If you buy a product that they are making and you don't know how it works and if you would look up the risks, people might know that you are looking at the risks already.

H: And about other two?

P: Data misuse. If data is not well interpreted, it can become less useful to you. You want to have a product working as best at your ability.

P: I think that a location is always checked, because you always have your phone with you. So if there is a product that you need to carry with you and your location is always monitored is always a bad thing. In some cases no, because if it checks what kind of stores you visit and than checks what kind of discount it has, than I think it's a good thing.

T: So if you share a data, and you get some values out of it, than there is no problem for you?

P: No, if I see the value in sharing the data, then I think it's no problem. I think that sharing a data, improves products and services

T: And for example in your cooking place, do you think that sharing your location is important?

P: Not really.

T: But if our product would do that, how would you think its used?

P: To check things when you are not at work. Ech. Now I see why this is not necessary for work. So only product that has enough value is worth sharing the data.

T: And for example in that public surveillance card. What if they put cameras and your manager would surveillance you while you are working. How does it make you feel?

P: I think it's part of my job. And he wouldn't had enough time to always surveil us. There is no cameras at the moment, but managers job is to monitor us.

H: Based on your understanding, because the public surveillance is kinda broad, maybe you and to refine them based on your understanding?

P: When it's used outside the work. I think my work does not have anything to do with my personal life or anything else.  
20min mark

H: It's interesting that you didn't put anything here (maybe online surveillance?)

T: So why you didn't put anything there?

P: It doesn't matter what kind of product you are making, no matter what your behaviour online can be always seen (can't understand)

H: And what about these two?

P: This is about ultra-personalized product (???? plane) and this one about all concept about surveillance (public surveillance plane)

T: Can you tell me which specific aspects do you mean when you are talking about these concepts?

P: There is not necessary for someone always to monitor where you are. Except if you voluntarily doing it.

T: And then about highest building.

P: I think that if I am willing to share my data, then misinterpret or more like misusing the data is the worst thing that you can do.

H: Then you don't have the control

P: Yeah, like other ones (planes) are like giving your data, yeah like I have my data, but this one is misusing in less of my benefit.

T H: ~Connect the stakeholders with the planes~

P: Much things is not a fault of manufacturer. If they are the part of the product, they will make product that will collect data, but the data will not go to the manufacturer.

T: But if the manufacturer will collect data to make second iteration of the product?

P: Then they (pokes to Manager block) will collect data and give it to the manufacturer and say that's how we want to improve it.

Manufacturer is pretty neutral in that way. The company is responsible for the data.

T: Where you would put the company block on the table?

P: In the middle.

H: What is personal data for you?

P: I think it's completely the same.

H: How is your opinion about sharing?

P: It really depends on how the useful the products is if you willing to share the data.

H: Is there any data you think is too personal to share?

P: I think medical history is the line. Withdraw line.

T: On which side?

P: As again, if you want to share it, that's fine. But if you want to use the product you need to share it.

T: So that is not really comfortable for you

P: No I don't think so. I think it is a product that is made now, and used now \*\*\*\*\*

For example, if the product is going to measure your heart rate, is there any problem with your heart? Then it's like okay question to ask, but not like sharing all the medical history.

H: What is your opinion to giving data to the employer?

P: I don't really have enough to do with them, I don't know.

H: What Is your opinion about the product that gathers data?

P: The same. If I can see the use for me, then it is okay.

H: And about personalized products? How do you feel now?

P: Personal products make more exciting(????), more useful, in general. So it is a good think ,everyone needs to know what kind of risk comes with that.

H: How do you feel now?

P: Still the same

H: What is your opinion about this? Do you think that this clarification about perceived risk helped you understand the co-design or change your opinion somehow?

P: It made me think of things. I think it helps a lot. People first have to think by themselves about what kind of data what kind of risk there are. Because if I need to think about risk by myself first, I would also have chose these risks, probably.

H: So, in general, it helped

P: Yeah.

## II. User Test

D1 = Designer 1 (Maik)

D2 = Designer 2 (Sanne)

R1 = Researcher 1 (Haoyu)

F = Participant 1, Chef-cook

B = Participant 2, part-time cook

D1: For the next part I would like you (Benjamin) to come with me, around the corner, we are going to ask some questions and separate from each other so you don't disturb each other. So just follow me.

Proceed to interview 1

D1: So for this co-design process we are going to require some data, which is going to be your medical data, body measurements, posture, working times, location, work and leisure related habits. So this is the context, now we are not really going to take this data, but for the sake of this test imagine that we are.

D1 puts list with required data on the table

B: Leisure is your private life?

D1: Yes it's the activities you do in your free time

D1: And we have a tool for this...

Introduces stakeholder blocks

D1: During this co-design process there are more stakeholders involved. One of them could be your boss, the chef-kok, well actually that is you right now (points at Frank and puts the chef-kok block with him). Your manager, the business man and the manufacturer of the whole garment.

B: He makes the clothes?

D1: Exactly. If you want to say something about these stakeholders, for example if you have a feeling that he (the manufacturer) would disagree or he could do a certain action with whatever. Then you just say i have this in my mind and project it on these blocks.

---

D1: For the next step we are going to have some papers for you. These are perceived risks. (puts papers with risks on the table) One is leakage of data, the other is data leaked to unauthorized party, we have data transaction, data that is being sold, misuse of data, monetary risk, social risks, data that you don't want to share because it would influence your social status, public surveillance, locations.

R1 walks in to take some pictures.

D1: This is Haoyu she will take some pictures.

D1: So now in this context (points to paper with personal data) which of these areas (the perceived risks) are important for you? What do you think is likely a risk when dealing with this data? Is it more that you don't want to share this data or is it people selling it.

B: Yeah people selling it.

D1: So you pick misuse?

B: Yes, you can always misuse my medical data. Let's say if...

D1: For now just pick the ones you think are important, you don't have to say why, yet.

B: I think everything, everything is important.

B & F think about it for a while

B: I would say misuse.

F: Yes agree.

D1: You can choose all or some, whatever you like.

B: Ah! Okay.

F: Yeah maybe this one (pointing at one of the risks) The leakage of data.

B: Yes data can leak.

They continue to pick 4 risks; Misuse of data, Data leakage, Social risk and ??

D1: The other two we are also going to keep them here, in case you change your mind. And if you want to write down anything else, we have these empty ones which you can use in any part of the process if you want to add something.

---

D1: Now going to the fun part. We have these bricks here. These bricks represent the amount of attention that needs to be paid to something.

D1 gives example of how to put the bricks on the papers

D1: So you will be putting the bricks on the papers, if you think there is something missing, you can still write it down on the empty papers. Or if one of these (the two not chosen risks) is suddenly interesting again, adjust how you like. Now you are invited to think about where you are going to put the bricks for one minute and after that you just place it where you think

B: So each for ourselves?

D1: Yes, so put them where you think the most attention needs to go to. and then just put it there, however you like.

---

After one minute break

D1: The time is up and you can place it for yourself.

Participants are placing the bricks

D1 is stacking the bricks on each other

D1: Now you have to explain why you did that. (facing Frank) You put three bricks alone on data leakage. Why is that?

F: I think that this is the biggest part. You can leak a lot of me in one second to a lot of people. That is why.

D1: What do you think of that could be leaked that concerns you so much?

F: I don't really think about something right now, but I think it is the easiest way. When you have all that information of me and you leak it (points on data paper) especially the medical history and my heart rate. I think there are a lot of companies that can use that information. Maybe my location, and things I do in private life. Mostly about my body and my health.

D1: Okay Misuse of data. Where you (Benjamin) placed more bricks than he did

B: I chose this because data can leak that it is. Misusing that data is even worse. As you said there are a lot of companies that can use your data and misuse it for other things. I mean people can misuse my location so that they can find me and can say bad word again to me. That is why my misuse was a little bit high for me

F: Yeah a little bit the same story as he told and most are already over here it is a little bit of a combination. I don't like if it is leaked and I don't like it if it is misused. In one way it is a bit the same. When it is leaked then it is already misused, I believe. (B is nodding to this statement). Maybe a combination between these two.

D1 makes connected sign between data leakage and misuse. Both participants agree with saying yes and nodding

D: Now let's have a look at social disapproval

B: Yes.

D1: What aspects did you think about when you were putting the blocks there?

B: This has not too much to do with my work. But when I look at these things (points at list with required data) before people know. Let's say I am bigger than I am now. You know people think about you in a certain way, which can lead to social disapproval. If my data about my body measurements is leaked or about my medical history and it is misused then this could lead to social disapproval and we are all social being. I don't think that is something to be liked. Same with my location, leisure related time, habits.

D1: Sounds good. Let's go to this here where you two added to data transaction. What kind of data do you think about being sold?

F: I think the medical stuff, which could cost a cook the job. I think cook is one of the hardest jobs in the world, because in a normal deadline you have a deadline in a month and in a kitchen every order is a deadline. Your whole day is full of deadlines. I really think there will be companies who are looking for that data. Years ago the Chef Cook was always quite big (laughter), so maybe there is a company looking for a reason why that changed. Maybe diabetics, your heart rate, because of the deadlines

B: Stress, a lot of stress. I think as well for the insurance companies. Now in the future time people see: Oh now you are a cook, you have a lot of stress. You know what? You have to pay more per month. (F. agrees) you have more

F: Yes, you have a bigger risk for a heart attack.

B: Yes, you have a bigger risk for some things so you have to pay already. Who knows.

D1: How could you say that (while writing down the aspect just mentioned)

F: Health insurance

D1: Health insurance. Bill increases

B: Yeah, increased bill

F: Maybe even the life insurance

B: Life insurance. Who knows (laughing)

Silence

F: Also a risk is: we are standing the whole day a lot of hours

B: Yes

F: So. With your legs and stuff it is also a risk.

B: Yes.... Or your knees

D1: You would not like to have that data misused at all, like sold to other parties.

B: No, absolutely not. (F agrees to B)

D1: Okay. Now everyone gets their bricks again. Short reap:

For data leakage you are more concerned about the health or medical information, which is tightly connected with the misuse of data.

Because you assume that as soon data is leaked it will be used or misused. (both nod)

Social disapprovalment is more the social judgement based on data. It is not that you will be excluded, but the judgement of it as far I understood (B nods and agrees)

The data transactions they increase ---- so that you don't get a job or even lose your job based on that data.

Do you have more aspects in mind you had in mind since we went through the whole phase. Maybe monetary risk, public surveillance or something else that you were thinking about that was not on here yet? In terms of misuse of data, data leakage. Maybe another concern were you say this is something I find risking which is not in this table

Both thinking

B: Yeah kind of, but this is not such of a big thing for me personally, but about the public surveillance people know when you work then they know when you are not at home and steal things.. I don't know (laughing). That is the only thing

D1 Probably related to data leakage.

B: Yeah. It was just the first thing that came in mind.

D1: Fair. Something like this is also helping already 9 places aspect

Since we talked through everything again you will get one minute again and then you lay the bricks as well based on the aspect you liked about that or the one you find the most interesting. Maybe through the exchange you see that the other one has an aspect where you think : Right, I did not think about that, so we going to do exactly the same, but this time we look at the extra ones.

---

2nd round

D1: This time you put the interest there. After this talk maybe something has changed. If not you can place it the same way as before Time is ticking now.

.....

B: It is kinda hard

D1: Please place now

Okay. A lot has changed

Seems like you two are favoring the data leakage itself

You already had three last time (F) and you didn't have one (to B who put three too)

B: Because what you said about the leakage, that it is all connected. I thought yeah it is knit too tight to each other that it is so important to give it some bricks.

D1: Okay.

What happened here? There is only one of each of you

B: (notes) I had the biggest one. That is important

F: I think that maybe that I had not enough bricks. Maybe I wanted to add here one as well. I had a small one over here I believe. After talking about the costs and stuff. And losing the job. Could have a bigger impact than I thought before. This is still a bit the same story that it is so connected that I almost say you have to connect these and ive it 4 bricks

B: Exactly give together. Yeah, I agree. I think you know. I have done some...my studies were social studies so I always try to look at the social aspect of things, So I have to put at least one brick on it.

D1: Fair

Good

If you are interested, because we would say now it is over, but if you like to play another round with the aspects you have just mentioned.

B: We are done not sure what could change that much

B: I am interested in these two (points at stakeholders)

D1: Right have you considered including them at all in your decisions.

B: Ah that is the final step right?

D1: No that is just a another question.

F: I did not think about them.

B: Me neither. Not that much at least. That was totally form my own perspective

**APPENDIX 7. INTERVIEW NOTES**

Participant I	1st interview	2nd interview
<p>Have you ever participated in any co-design before?</p> <p>&gt; Now, you will participate in a session within a co-design process, to design a personalized garment for you (cooks).</p>	No	
<p>Imagine, if your personal data will be collected and used for the co-design process, In this case (this co-design process), how would you describe your awareness of the personal data usage? (awareness that means: do you aware who/why/how/where...) (if they don't know it is fine)</p>	Not aware	<p>Vague question. Where when how?</p> <p>More aware. Realized that he was a little aware: blocking cookies during online usage</p>
<p>In your opinion, what is personal data for you? Do you perceive any risks of using these personal data?</p>	<p>Personal data: Age, education, location:</p> <p>Formal data</p>	<p>Added through game, habits, formal, pics on Facebook</p> <p>There are risks a lot of security (I hope). There are a certain amount of risks I need social media on a daily basis-</p>
<p>Could you describe how you feel about the co-design process using these personal data?</p>	I am fine with it	<p>Interesting, active thinking, more aware, funny and nice conversations</p>
<p>How is your willingness to share your data? why?</p>	Personal data is fine	<p>For research and ethical purposes. Now I will double think about insurance usage of such</p>
<p>How is your willingness to cooperate/participate in the co-design process? Why?</p>	<p>Got asked to help in a research. Everything that could help our work would be fine</p>	Would. No changes
<p>What's your opinion about this session?</p>		<p>Interesting, vague, what is being researched?</p>

Participant II	1st interview	2nd interview
Have you ever participated in any co-design before? > Now, you will participate in a session within a co-design process, to design a personalized garment for you (cooks).	Yes, this year and a couple of years back.	
Imagine, if your personal data will be collected and used for the co-design process, In this case (this co-design process), how would you describe your awareness of the personal data usage? (awareness that means: do you aware who/why/how/where...) (if they don't know it is fine)	I am okay with that, i have nothing to hide	The same as before, i think i was already quite aware
In your opinion, what is personal data for you? Do you perceive any risks of using these personal data?	age/life/kids/finance/internet No real risks.	Personal data has stayed the same for me
Could you describe how you feel about the co-design process using these personal data?	I am okay with it	I am not afraid, it didn't change from before the interview
How is your willingness to share your data? why?	Depends on the moment/person/websites	The same as before
How is your willingness to cooperate/participate in the co-design process? Why?	100% willing!	still 100% willing!
What's your opinion about this session?		a bit weird, i still don't know exactly what we are doing and what is going to happen

**APPENDIX 8. CONTENT ANALYSIS AND COLOR CODING**

NO	Quotes	Important Personal Data	Bad Consequences	Data Leakage	Data Misuse
1	I think that this is the biggest part. You can <b>leak a lot of me</b> in one second to a lot of people. That is why			leak a lot of me	
2	...especially the <b>medical history</b> and my <b>heart rate</b> .	medical history, heart rate			
3	I think there are a lot of <b>companies that can use that information</b> .			companies that can use that information	
4	<b>Misusing that data</b> is even worse				misusing that data
5	there are a lot of <b>companies that can use you your data</b> and <b>misuse it</b> for other things			companies that can use you your data and misuse it for other things	
6	I mean they(people) can <b>misuse my location</b> so that they can <b>find me and can say bad word to me</b> .	my location	find me and can say bad word to me		misuse my location
7	I don't like if it is <b>leaked</b> and I don't like if it is <b>misused</b> .			if it is leaked	if it is misused
8	When it is <b>leaked then it is already misused</b>			leaked then it is already misused	
9	You know people think about you in a certain way, which can lead to <b>social disapprovalment</b>		social disapprovalment		
10	If my data about my <b>body measurements</b> is leaked or about my <b>medical history</b> and <b>it is misused</b> then this could lead to <b>social disapprovalment</b>	body measurements, medical history	social disapprovalment		it is misused
11	Same with my <b>location, leisure related time, habits</b>	location, leisure related time, habits			
12	I think the <b>medical stuff(data)</b> , which could <b>cost a cook the job</b> .	medical data	cost a cook the job		
13	I really think there will be <b>companies who are looking for that data (medical data)</b>	medical data		companies who are looking for that data	
14	Years ago the Chef Cook was always quite big , so maybe there is <b>a company looking</b> for a reason why that changed			a company looking for	
15	Maybe <b>diabetics</b> , your <b>heart rate</b> , because of the deadlines	diabetics, heart rate			
16	I think as well for the <b>insurance companies</b> . Now in the future time people see: Oh now you are a cook, you have a lot of stress. You know what you have to <b>pay more per month</b> .		pay more per month	insurance companies	
17	You would not like to have that <b>data misused</b> at all, like <b>sold to other parties</b> .				data misused, sold to other parties
18	about the public surveillance <b>people know when you work</b> then <b>they know when you are not at home</b> and <b>steal things</b> ..	when you work	steal things	people know when you work	they know you are not at home

