Connecting product attributes to user experiences

- Development of methodology through a case with medical injection devices -

Master's thesis

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STUDENT REPORT

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Abstract:

Including users in design processes has become more and more popular, but may provide a risk factors, as users might not know what makes a product influences their experience. To investigate how a product impacts the user's experience without having the user evaluate the product, this research will focus on creating a framework and methods for connecting the design world to the experience world, while keeping them separate in studies. The problem is explored by developing methods for deriving relevant product attributes and user experience aspects and through these, relate the products to the user experience. The comparison is made through a multivariate analysis.

Danish summary

Rapporten omhandler en undersøgelse af brugercentreret design, med fokus at inddrage brugeren bedst muligt i produktdesign. Undersøgelsen baseres på hypotesen at sammenhængen mellem oplevelsen ved brug af et produkt (user experience) og produktets attributter er for kompleks til at brugere kan beskrive denne sammenhæng i et klassisk brugerstudie. I stedet foreslås et framework, hvor produkt og oplevelse holdes adskilt i evalueringen. Brugeren evaluerer oplevelsen med produktet og eksperter i produktets design evaluerer produktet. Herefter sammenlignes resultater igennem en multidimensionel analyse for at skabe sammenhænge imellem produktet og oplevelsen.

Til undersøgelsen tages udgangspunkt i en case om produktkategorien injektionsenheder og brugere af disse, i samarbejde med Novo Nordisk A/S. Novo Nordisk har udviklet denne type produkter i mange år, og arbejder stadig på at videreudvikle inden for produktkategorien.

Sammenligning af oplevelser og produkter kræver en udledning af produktets attributter samt udledning af aspekter af en brugeroplevelse. Hertil udvikles, som en del af undersøgelsen, metoder til udledning af produkters attributter og aspekter af brugeroplevelser. For udledning af produkters attributter udvikles en workshop (Word Elicitation Workshop) med det formål at skabe en udtømmende liste af produkt attributter som definerer produktet på et rent beskrivende, ikke-evaluerende plan. Dette gøres gennem en sammensætning af anerkendte metoder, heriblandt fokusgruppeinterviews og *semantic differentiation*. Slutteligt kondenseres listen.

Interviews med eksperter inden for brugeradfærd i den gældende produktkategori sammenlignes med adfærdspsykologi i form af behovsopfyldelse for udledning af en række oplevelsesaspekter, som beskriver de behov og mål som brugere ønsker opfyldt for at opnå en positiv oplevelse. Her fokuseres på hvordan brugere af det specifikke produkt oplever verdenen, for at kunne udlede aspekter af brugeroplevelsen, som beskriver de behov som den faktiske bruger har. Både produktattributter og brugeroplevelsesaspekter evalueres igennem tests, hvor et antal produkter evalueres af henholdsvis produkt eksperter og brugere.

Sammenligning af resultaterne foretages igennem en multidimensionel analyse, hvor produktattributter og brugeroplevelsesaspekter samt evalueringer af oplevelsens kvalitet sammenlignes igennem en *Principal Component Analysis*, hvorved sammenhænge mellem produktattributter og oplevelsesaspekter kan udledes. Slutteligt kan *preference mapping* anvendes på det udledte data, til at pin-pointe brugernes præference i det *principal component*-rum, som er udviklet igennem *principal component analysis*.

Metodologien udviklet i denne undersøgelse bærer lovende tendenser i forhold til at skabe meningsfulde sammenhænge mellem produkter og oplevelser, imens brugeren afholdes fra at evaluere produkterne. Dog kræves validering, eksempelvis igennem anvendelse i en sammenligningstest eller et større studie, idet studiet udført i denne undersøgelse, foretaget for at evaluere metoden, ikke giver den nødvendige evidens for at konkludere hvorvidt metoden skaber et bedre resultat end eksempelvis et mere klassisk brugerstudie med efterfølgende interview.

Contents

Preface

This project is written by Engineering Psychology group 17gr1082 as a master's thesis for Engineering Psychology in the department of Electronic Systems, Aalborg University. The project is written in the period January to June 2017. References are done according to the Harvard-method and figures, tables, and appendixes are presented in the end of the report in the order they are used.
In order to protect Novo Nordisk A/S' competitiveness and individual employees, names of people and products are replaced with aliases. Names of actual products may occur in cases where no replacement is deemed necessary.

Aalborg University, June 7, 2017

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Chapter 1

Products, their users, and the study of them

Asking users to evaluate the use of a product can force them to connect their experiences and the product, to evaluate how the product affected their experience. But can we trust users to be able to relate an experience with the relevant elements of the product, enabling the developers to improve the design? Do users know which elements of the product that produced value in use? And if so, can they verbalise such a relation in a way so that designers can design from it?

1.1 User evaluation of product design

Research suggests that users do not evaluate a product's value or quality solely on it's instrumental or utilitarian qualities, but also on emotional or hedonic qualities [Hassenzahl et al., 2000]. This notion has gained support and focus through the evolution of the field of User Experience (UX) and Experience Design (for description and discussion on the field of UX, see appendix A). These fields of research and design focus on products in context "*putting experience before functionality*" [Hassenzahl, 2010, page vi], or in other words to evaluate a user's full experience when using a product rather than just the instrumentals of the product. The rationale behind experience design is that users do not find value in product attributes as such, but rather in the experience that the the product hopefully aids in making more pleasurable [Roto et al., 2011].

But how do we then provide user feedback to products when focusing on the experience, as designers' only touch point with a user's experience is through the product? [Crilly et al., 2004]. One way to do it is to make the user explain the connection. However, this can cause problems, as the user may experience latent needs, that is needs which the user is not aware of or know exist [Kraft, 2012, p.30-31]. Thus, users will react on needs they are not aware of, and thus cannot explain, while they may try, if asked: An example of such unsuccessful attempt of explaining experience with product attributes can be seen in the use of injection devices for treating diabetes, where users relate their fear to the needle which goes into the body and delivers the medicine [Nordisk, 2017]. But research suggest that the needle is not responsible for the fear, which actually stems from very different sources, such as fear of the the disease, sense of helplessness or lack of understanding [Peyrot et al., 2013; Osterberg and Blaschke, 2005]. However, all of this is placed on the needle, which delivers the medicine, as this is the physical manifestation of the very abstract paradigm of living with diabetes [Nordisk, 2017]. So, even though users say that the emotion is related to the needle, would the bad feeling go away if the needle was removed? Probably not [Nordisk, 2017]. How an experience could be better or worse, and thus, how an experience could be improved cannot be explained by the user directly by asking them.
Conclusively, having users describe and evaluate products directly by analysing the product and project their emotional experience onto the product is not a perfect way of evaluating the product, nor provide input for innovating it.
The other way of getting valuable information from the users is to ask them about or observe their experience without relating it to the product, as is the methods used by e.g. antrhopologists. Then it is up to the researcher to analyse the result to answer how this might influence the design-solutions. As suggested *"What is, thus, needed is design-oriented knowledge of the relationships between interaction attributes and experiences."* [Lenz et al., 2014], or in other

words: the link between products and the following experience is where the value lies for designers of products.
If the connection to how product attributes, not only related to the interaction but also visual expression, influence the experience can be mapped, designers would be able to evaluate the product's value to the user, and therefore provide better conditions for proactively and reactively understand design decisions' effect on experience, while allowing users to evaluate an experience without having to make a design analysis of the product in hand.

1.2 Problem definition

This leads to the following focus questions, which this research will try to answer:

Is it possible to create a method that connects product attributes to user experiences, without having users do the connection?

This question poses several sub-questions:

- What is product attributes, how is a product's attributes derived, and what are a specific product's attributes?
- What is user experience, what are the aspects of a user experience relevant to the experience of a specific product, and how are these derived?
- Are there any relation between product attributes and the user experience? If so, how can this relation be explained without asking the users to do so?

This research will focus on developing and evaluating methods for extracting product attributes and explore user experience. To connect product attributes and user experience, a method is developed, with the goal of explaining such connection. The methods will be developed through examination of relevant theory and applied methodology, to create a reliable framework.

To exemplify the approach, injection devices used for treating various diseases with injected medicine is used as a case in collaboration with Novo Nordisk A/S. First, however, an analysis is made of the research done on explaining the connection between attributes and experiences, to use is as base for the research.

Chapter 2

Relationship between product attributes and user behaviour

To understand the relation between experience and product attributes, previous frameworks are reviewed and discussed. Here, the framework proposed by Crilly et al. [2004] will used as a reference point, as this theory includes the entire span from product to experience. A discussion is made by comparing other theories and frameworks, to enable an evaluation of the theory applicable in the current research.

2.1 Products, experiences and behaviour - an integrated conceptual framework

Based on a literature review, Crilly et al. [2004] suggests a semiotic way of looking at product design, as a channel for designers to communicate to consumers. From this perspective, Crilly et al. [2004] continues to form a framework, suggesting which product aspects and physiological and psychological elements to take into account, to make functional and pleasing designs.
For the description of the framework, Crilly et al. [2004] is used as reference, also when the framework cites other authors. In the following discussion of the framework, the relevant theory will be applied to the topics of the framework.
The framework, visualised in figure 2.1, takes base in the four fundamental parts of communication that is *source* (design team), *transmitter* (product), *receiver* (perception through senses), and *destination* (response, divided into cognition, affect and behaviour) . The *channel* through which the communication is done is in this framework seen as the environment in which the product is perceived [Crilly et al., 2004]. While focusing solely on the visual element of design, Crilly et al. [2004] suggests that the framework should fit on other senses as well.

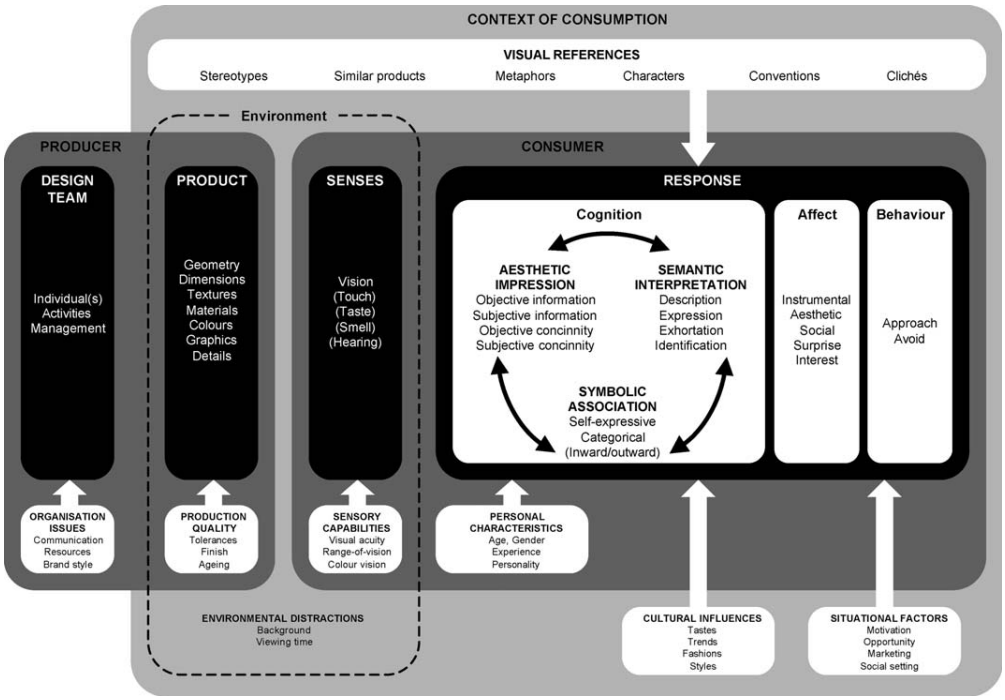


Figure 2.1: A framework presenting the connection between products users and reactions. Figure adapted from Crilly et al. [2004]

The framework opens up for the four parts of communication by reviewing research done on the specific subjects. With the scope of linking product features with experiences, only the relevant parts of the framework will be discussed. Therefore, the design team will for now not be a focus point, as this lies before (or after) the connection of products and experiences. (The following is all based on the framework presented in Crilly et al. [2004], and thus, citations will not be made throughout the description).

Product: 7 visual categories are enlisted, which should include any objective physical aspect of a product from a visual perspective. These are geometry, dimensions, textures, materials, colours, graphics and detailing. Additional to this is production quality related elements such as tolerances, ageing, and finish, which can be said to be included by the aforementioned seven categories, but are categorised by itself as they are deviations to *the product as intended by the designer*.

Senses: For the senses, vision is the main interest, but touch, taste, smell and hearing are listed as well. Crilly et al. [2004] retain from discussing perceptual theory, and lists only the conventional five senses. Sensual disabilities are added as individual differences for each user. For vision, these are visual acuity, range of vision and colour vision. However, each sense have different ways to be compromised.

Cognition response: The cognition response, meaning the processing of the stimuli, is split into three aspects:

Aesthetic impression is the attractiveness of the product based on purely artistic (or beauty) attributes. The aesthetic impression can be seen as creating a perfect balance between opposing factors, some subjective and others objective. Based on literature, a further separation into information and concinnity can be made. Information in this context relates to all the elements that arouse the user, like contrasts and novelty. Concinnity relates to the connection and completeness of the presented information. In total, this provides four elements of aesthetic.

- *objective information* can be seen as contrasts, which creates perceptual cues. Contrasts can be both to the environmental background or to the product itself.
- *subjective information* can be seen as how much the product deviates from the known and expected.
- *objective concinnity* can, based on cognitive theories such as gestalt psychology, be seen as how well the order is perceived in the product (e.g. symmetry).

- *subjective concinnity* is what makes sense in a product, not related to the product or human capabilities, but to the users expectation and knowledge.

The concinnity and information should weight each other up in the end to make aesthetically pleasing products. If concinnity is higher than information, products are seen as dull, while if information is higher, product are seen as confusing and ugly. In well designed products, the aesthetics make products engaging, comprehensible and attractive at once [Crilly et al., 2004].

Semantic interpretation is what the product says about it's functionality. Perception of functionality and utility stems from the semantic interpretation of the product. Four categories of semantic product qualities are listed:

- *Description* presents the product's purpose, modes and usages. The descriptive part of semantic interpretation can be seen as the product's signifiers for actions. These description semantics can further be seen through constraints towards what is possible, meaningful and acceptable to do [Norman, 2013, page 125–130].
- *Expression* presents the properties of the product itself, like whether it is fragile, dense or robust.
- *Exhortation* presents specific action requests from the product to make users act upon.
- *Identification* presents what the product is made of and where it comes from, like e.g. brands or metallic surfaces.

Symbolic association is what the product says about the one who uses it. Opposed to semantics, which can be seen as the denotation, symbolic associations are related to connotations or what is implied in the product. Both inwards and outwards association occurs, as products imposes identity on the users, as well as products project the identity on others. Two types of symbolic associations are *self-expressive* and *categorical*:

- *self-expressive* symbolic association is related to differentiate from other people, by highlighting specific values or attributes.
- *categorical* symbolic association is related to integrating with other people in groups or social positions.

Affective response: The affective response, or the emotional response, is split into five categories:

- *Instrumental* emotions is related to the evaluation of how the product will aid you in achieving goals (e.g. dissapointment and satisfaction)
- *Aesthetic* emotions is related to the pleasantness of the stimulation in itself (e.g. disgust and attraction)
- *Social* emotions is related to whether the product is seen as complying to socially accepted standards (e.g. indignation and admiration)
- *Surprise* emotions is related to novelty (e.g. amazement).
- *Interest* emotions is related to a sense of challenge and promise (e.g. boredom and fascination) [Crilly et al., 2004]

Behavioural response: The behavioural response, or how the users will act towards the product, is seen as one-dimensional: Approach or avoid. This relates to whether a product will be e.g. used, investigated, bought (approached) or ignored, abused, or hidden (avoid).

Context of consumption: To further explore the interaction, Crilly et al. [2004] describes how elements not present in the current environment still influence the interaction. Here, three focus points are visual references, cultural influences and situational factors. From within the consumer, personal characteristics will influence as well.

Visual references: People use references to understand products, like alike products or known shapes. Visual references assists users in the cognitive part of the response, by relating the perceived product to previous experiences and learning. Six types of visual references are noted as *stereotypes, similar products, metaphors, characters, conventions* and *cliches*.

- *Stereotypes* are the mental image of how a product class looks. If a product looks like the prototype mental image, users will have a better visual reference, and therefore easier recognise the product as being in this product class, and thereby get expectations towards e.g. functionality.
- *Similar products* are aiding users, if a product is recognised as similar to other specific products (not stereotypes) either recent or iconic ones, recognisable for the user, from which the product class is recognised.
- *Metaphors* is references to *other things*, not related to the product or product classes. This can be used to create analogies to familiar settings, suggesting similar action patterns or possibilities.
- *Character* of a product is related to "who" the product is, by giving characteristics that makes users relate it to something emotional or meaningful like living things.

- *Conventions* is references to things that are culturally accepted in general as *the way things are*. If a product reacts as things usually does, it refers to the same meaning.
- *Cliches* are related to using references from other products in a way that suggests lack of novelty, originality and innovation.

Cultural influence: The notion of trends, taste, styles, and fashion gives a cultural bias towards what is seen as pleasing and beautiful, in the present time by present people.

Situational factors: Users' motivation in the situation of experience may alter the response, as well as opportunities for continuous consumption. Financial constraints and whether a product compliments existing possessions in a meaningful an nice way will as well affect the experience.

Environmental distractions Coming from a background, from which the product has low contrast will make the product less clear to perceive. Further, if time available to explore the product is insufficient, some impressions like aesthetic ones will be quicker received than semantic interpretations. Thus, time of exploration will also affect what is perceived and understood.

Personal characteristics are defined as age, gender, previous experiences and personality (self-confidence, social aspiration and ideologies).
Crilly et al. [2004] argue that separations of categories within the different framework elements are artificial, and only relevant in relation of analysis, while users likely will not have this categorisation. Further, designing with focus on single elements of senses or cognitive responses might be worse than designing by intuition and experience [Crilly et al., 2004]. While the framework only briefly touches expectations in the context of aesthetics and the notion of previous experiences, the framework does not touch the dimension of multiple use and changes in experience over time. As suggested by Law et al. [2009], UX can be very different based on when it is assessed. The framework suggests five ways of how a product affects experience, as the interpretation, impression and association of a product, cause affect in the user through an evaluation of instrumental, aesthetic, social, surprise and interest value. However, the framework expresses little about how this evaluation happens.

The visual references, presented by Crilly et al. [2004], are much related to understanding products meaning and the subjective part of aesthetics, and are thus not emotionally loaded, except for cliches, which is the negative appraisal of specific attributes. Based on the presented model, this emotional response should be covered by the affect phase, while the rest of the visual references

can be set to relate directly to the cognition phase of the response.
Input from other senses are, suggestively, also evaluated through comparison with internal references, however maybe fundamentally different [Yost et al., 2008, page 18–19]. From sound source identification comes e.g. the notion of how expectations towards the likelihood of objects to be perceived will frame the references used to recognise objects [Yost et al., 2008, p.18]. Therefore, the framework presented is assumed to be representative for experiences in general, and not just visual experiences.

2.2 Product experiences as affect

Desmet and Hekkert [2007] has made a framework of product experiences, looking at experiences as affect. relating the framework to the work by Crilly et al. [2004], the behavioural element is further explored, by looking at the manifestations of experiences. Experiences manifest in people through

- Subjective feelings (feeling angry or happy),
- Behavioural reactions (Fleeing or fighting),
- Expressive reactions (Smiling or laughing), and
- Physiological reactions (Sweat production) [Desmet and Hekkert, 2007].

This framework focuses solely on exploring the aspects of what they call product experience [Desmet and Hekkert, 2007], and not on the product aspects. It further incorporates all senses, and not just vision, compared to Crilly et al. [2004].
Desmet and Hekkert [2007] categorise product experience into three part:

- *aesthetic experience*, which is how the senses are gratified
- *experience of meaning*, which is what meaning we attach to the product
- *emotional experience*, which is feelings and emotions elicited from the product

Desmet and Hekkert [2007] further create a hierarchy between the three, by suggesting that Aesthetic and meaning experience leads to emotional experience.
Whereas Crilly et al. [2004] sees aesthetics more or less as a synonym with beauty, including meaningfulness and expectations as factors of aesthetics, Desmet and Hekkert [2007] propose two possible hypothesises: One equal to Crilly et al. [2004], and one, where aesthetics are perceived on a visceral level, a process level without any cognition or emotions. Conclusively, one includes

aesthetic evaluation in cognition, and one does not, looking at cognition from a traditional psychology point of view. Further, Desmet and Hekkert [2007] proposes the option of separating appraisal of aesthetics from appraisal of meaning, into *intrinsic pleasantness*.
Desmet and Hekkert [2007] collect Crilly et al.'s semantic interpretation and symbolic association in one group, called experience of meaning, and express the influence of individual and cultural differences on this category, along with contextual dimensions.
Desmet and Hekkert [2007] further relate the emotional experiences to the behavioural response of approach or avoid, as pleasant emotions pulls us to the source, while unpleasant emotions pushes us away from the source. Appraisal in this framework is an evaluation of stimulus (e.g. product) to situation and person (e.g. user), to produce a response, or what Desmet and Hekkert [2007] calls *product emotions*. The evaluation is based on some internal evaluation scheme of concerns and desires, in a given situation (see figure 2.2). [*"In short, appraisal is an evaluation of the significance of a stimulus for one's personal well-being"* [Desmet and Hekkert, 2007]]. Crilly et al. [2004] try to explain the result of the appraisal in the form of emotional affect through the product's instrumental, aesthetic, social, surprise and interest value, but does not touch upon what happens in the appraisal. From appraisal theory, a structure is proposed, where the product and the user's concerns together form a situational appraisal through a form of comparison based on internal understanding of benefits and possibilities, from which emotions arise [Desmet and Hekkert, 2007]. Here, concerns are defined as "*goals, motives, well-being, or other sensitivities"*.

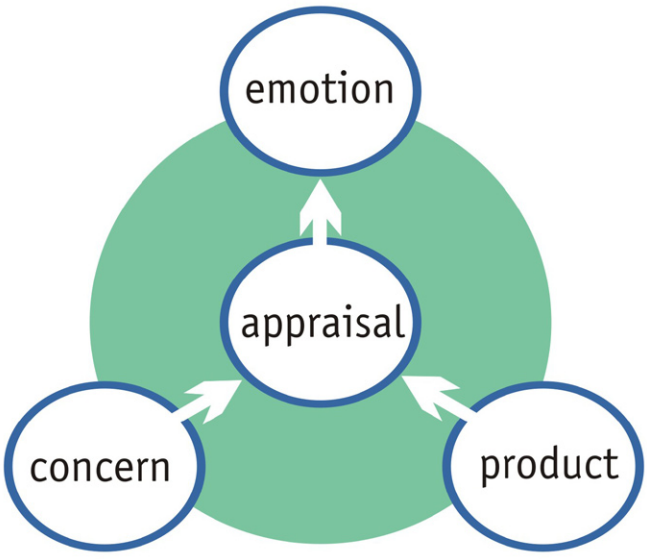


Figure 2.2: Development of *Product emotions* (adapted from Desmet and Hekkert [2007]).

Concerns are separated between universal concerns such as safety and love, and culture/context dependent concerns such as securing a seat for a friend in the cinema.
Desmet and Hekkert [2007] avoid discussing the connection between the four different experience manifestations of subjective feelings and the affect experienced. In the end, only the behavioural response of approaching / avoiding is mentioned as related to a change in the emotional experience.

2.3 Levels of processing

Norman [2004] suggests that processing happens at three different levels, based on the biological evolution: The visceral, behavioural and reflective level (see figure 2.3).

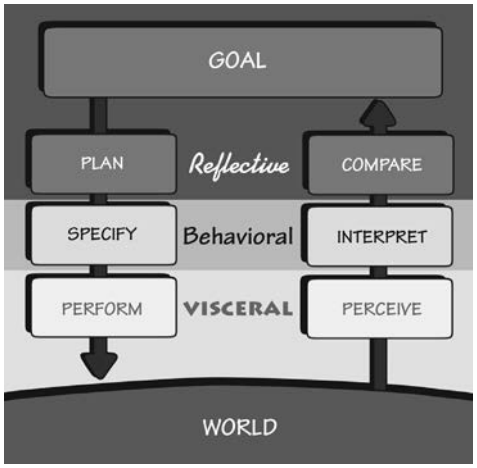


Figure 2.3: Three levels of processing, with it's relation to world and goal through excecution and evaluation. Adapted from Norman [Norman, 2013, p. 56]

The visceral level refers to the lizard brain, related to quick and direct motor responses to danger and survival. The behavioural level refers to the an analysing level, which can alter behaviour to specific situations on an unconscious level. Here, learnt actions which has become unconscious, such as finger movement when typing on a keyboard or grabbing a cup, are commenced. The reflective level refers to being observant of process and conscious evaluations [Norman, 2004, p. 21]. Here, causalities and predictions are commenced. Norman continues to argue that affect and cognition are present at any moment, to control behaviour. Affect can stem from both a visceral or more top-level processing levels, where emotion based on the visceral level are simple valence and arousal without any meaning, resulting in basic reactions such as approach or avoid, while emotions on the reflective level are contextual, contains agency and cause and therefore possibly can relate to other people, like e.g. guilt or pride.

Desmet and Hekkert [2007] and Norman [2013] relate product aesthetic to the visceral level of processing, suggesting that aesthetics are less related to evaluations, and more to a direct response to the stimuli towards either a positive (approach) or negative (avoid) survival instinct, being the same for all people and not affected by environment [Norman, 2004, p. 50–51].

2.4 Expanding the framework

Applying the theory by Desmet and Hekkert [2007] and Norman [2004] to the overarching work by Crilly et al. [2004], creates a framework of how products are experienced, and which factors affect the experience (see figure 2.4).

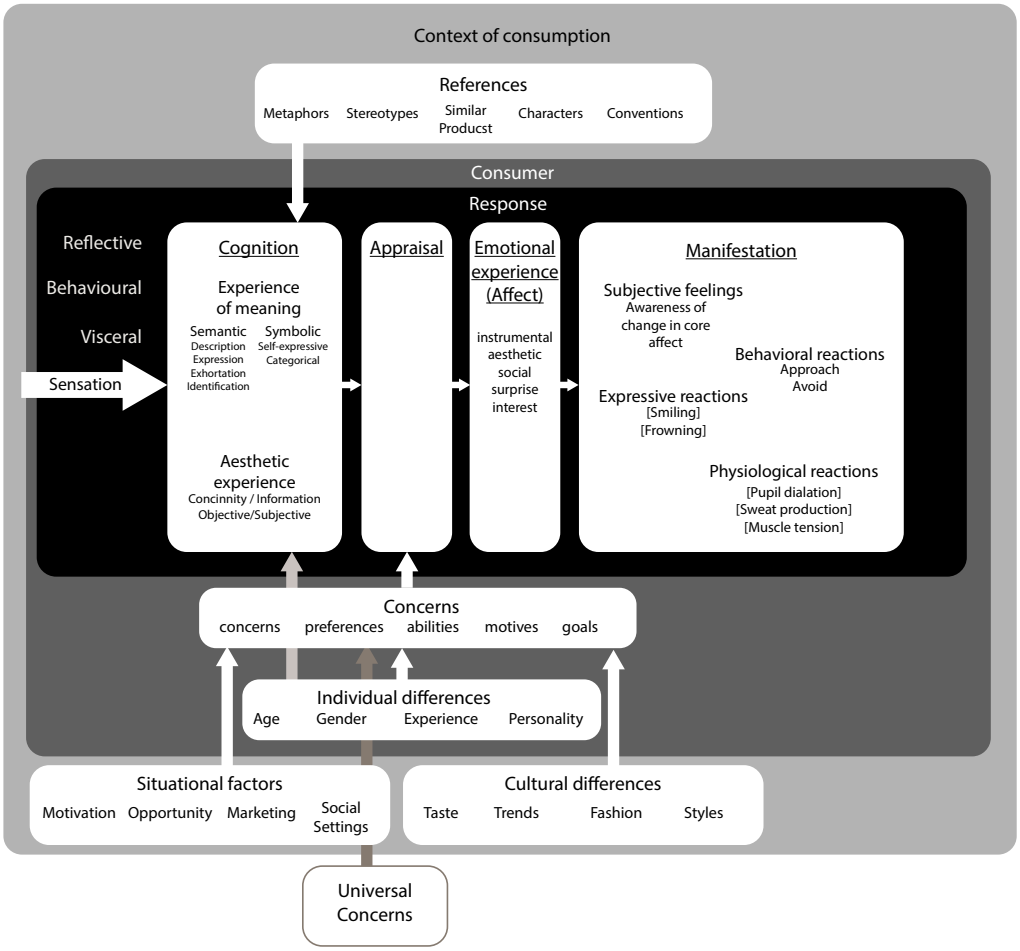


Figure 2.4: Extension of framework by Crilly et al. [2004], focusing on the *response*-part, by comparing work by Desmet and Hekkert [2007] and Norman [2013] to the framework.

Based on this framework, the connection between products and experiences can be described as the processing of the sensation of the product on three levels, that is the reflective, behavioural and visceral level. This forms an understanding of meaning and aesthetics by comparing to reference, where the aesthetics suggestively are processed mainly on the visceral level. This experience goes through an appraisal, connecting the product to the environment in the form of situational factors, cultural factors, individual differences and both situational and universal concerns. From this appraisal comes the emotional experience, which can be described through the product's ability to create instrumental, aesthetic, social, surprising and interest value. This emotional experience is manifested through awareness of subjective feelings, behavioural reactions, expressive reactions and physiological reactions. This further suggests that if the product and the concerns, along with the situational, individual and cultural factors can be mapped, this should explain what the appraisal of an experience is based on, and thus, a connection can be made.

As suggested in this framework, reflection on a product's influence on the emotional experience is not part of the flow of a user's response on experiences. As suggested by Norman [2013], causalities are formed only at the reflective level, and thus, what happens at the visceral and behavioural level will never be related to any causality, as they are unconscious. This confirms the hypothesis that asking users for causality to an experienced emotion in a product might cause an incomplete, artificial answer, while the measuring of emotional experience is a natural response to an experience. Further, this shows that only some behavioural responses can be measured by asking the users, as some responses are unconscious.

Chapter 3

Elicitation of product attributes

The first step towards understanding the relationship between product attributes and UX is to define the product attributes and UX aspects. This chapter will focus on the development of a method for eliciting relevant product attributes, by the examination of different tools, such as expert panels, affinity diagramming and semantic differentiation. The method will be tested and discussed through application with injection device case.

3.1 Defining products using semantic differentiation

Osgood [1952] argues, based on three hypothesises, for a way of crossing the bridge between physical world and experience world, that is the semantic differentiation. Using semantic differentiation or semantic differentiation method (SD or SDM) is to list semantic attributes of a sensation as a way of characterising an experience. This is based on the assumptions that 1) variation in experiences' character can be described by a number of dimensions, 2) that these dimensions can be described by a pair of polar terms, and 3) that a number of these dimensions can in fact describe a sensation, by creating a *semantic space* that expresses the actual meaning of the sensation [Osgood, 1952]. Looking at product design from this angle, design is like pinpointing a city on a map, as a product is located somewhere within a design space, defined by a number of *dimensions* produced by the product's attributes. If one can map the dimensions that form the design space, one can place any product, by finding it's value on each dimension.
To define these dimensions or semantics is, however, not a simple task. A method is presented with the aim of eliciting the attributes of a product, which defines this design space. The method is presented, used and evaluated, and the conclusion is presented for each iteration. Product semantics are the perceived attributes of a product that forms the symbols that creates user responses and value. It allows looking into the distinctive attributes of a product that users react to, and understanding what this attribute symbols for the user [Demirbilek and Sener, 2003]. Product semantics can be categorised in to four types of communication:

- To describe facts (the product's purpose)
- To express values and qualities
- To signal specific ways of actions (such as carefulness or preciseness)
- To identify the origin, nature and product area (e.g. product family or part's family) (Taken from Demirbilek and Sener [2003]).

Closely related to this way of thinking, a design school in Japan focuses on Kansei Engineering. Kansei Engineering is about enabling user's feelings and expectations through a product to create a pleasant interaction, or in the original words: "*translating technology of a consumer's feeling of the product to the design elements*" [Nagamachi, 1995]. Kansei means translated from Japanese *the feelings of the consumer towards a product* [Nagamachi, 1995]. This approach introduces four steps for designing products in a good way: 1) Identify users' Kansei, 2) Translate this Kansei into product characteristics, 3) Build product characteristics into the product, and 4) adjust product design to changes, trends and preferences. To explore the first step, Nagamachi [1995] suggests using SD.

SD has been used and build upon as a tool to define semantic descriptors for products, aiding in understanding how product features or attributes are related to user's expectations and experiences (For examples of application and discussion of SD in product design, see Mondragón et al. [2005]; Crilly et al. [2004]; Petiot and Yannou [2004]; Demirbilek and Sener [2003]; Hsu et al. [2000]; Hsiao and Chen [1997]; Lin et al. [1996]).
Using SD to explore product attributes can be combined with multidimensional scaling, to explore some overarching dimensions to the aforementioned semantic space [Lin et al., 1996; Petiot and Yannou, 2004].

Based on the theory by Osgood [1952], a method is developed to explore the *semantic space*, not of an experience but of a product, as a way of defining a product's attributes.

3.2 Development of the Word Elicitation Workshop

By combining elements from methods like Sensory Analysis, KJ-technique, the repertory grid, and focus group interviews, a Word Elicitation Workshop (WEW) is designed to elicit product attributes (for a description of the methods, see appendix B). The workshop relies solely on the participants' skills for analysing data, as the researcher is not to perform any analysis, except evaluating it's quality, and moderating and facilitating the workshop. For a visualisation of the workshop flow, see figure 3.1

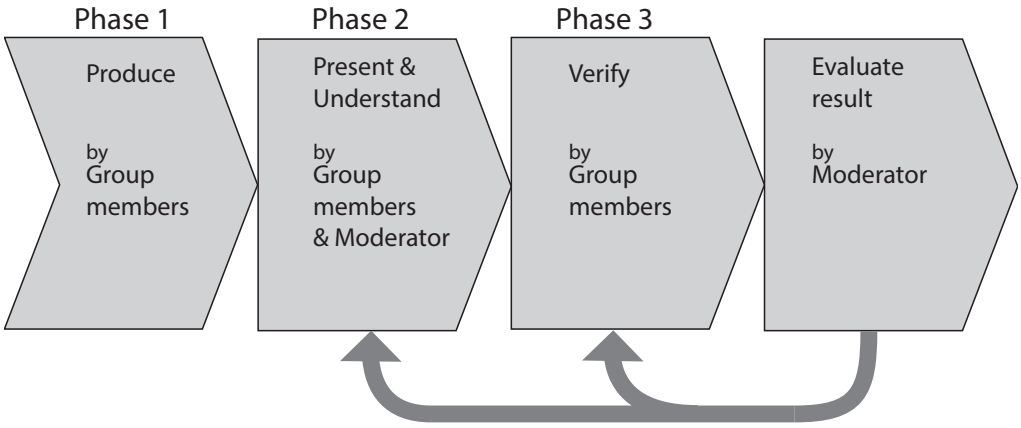


Figure 3.1: Flow of the Word Elicitation Workshop (WEW)

The WEW is based on a group of people (5-10), and a single focus question: *What describes the use, and differences in use of the presented products?*. The KJ-technique propose a useful way of creating data to analyse a problem in the form of creation of labels, based on a single focus question. By a number

of defined steps, the KJ-technique allows for organising and later qualitatively analysing data that is complex and otherwise immeasurable [Scupin, 1997].
Phase 1 of the workshop, as in the KJ-technique, the group will be instructed to note down on labels (e.g. post-it's) pairs of words or small sentences that answer the focus question. This phase works as a way of generating as much relevant data as possible, based on the experience of the group members. Application of the KJ-technique in this way has often been applied in market research Hebda et al. [2007]. The labels are made of contrasts, meaning that each label consist of two opposites words that together create a product (personal) construct [Kelly, 1955, p.151-159]
To aid the group members in producing this type of data, the group members will be handling and using product samples. The group members are instructed to pick up three product samples, and focus on ways that one product differ from another product, and how it is the same as the third product, to create the contrast word-pair. This method (the triad method), inspired by the rep test of repertory grid, allows for the deriving of latent constructs [Kelly, 1955, p.151-152], which can be used to define the product space.
The goal of the workshop is to describe a design space, defining what a product is, not how good it is. This is up to the users to tell. Therefore, the produced labels should not evaluate the product's quality but rather present metrics that could explain the product's quality. The group members are therefore instructed to make the labels in a descriptive manner, meaning that if a product is deemed better, the group member should note down what attributes make it better, and thereby avoid using value-defining words in their labels (like e.g. good, poor, or bad), as also suggested in ISO 11035:1994 [1994].

No communication between the group members is allowed in this phase. The phase ends, when all group members cannot think of any more labels. This is done to avoidgroup members influencing each other during the brainstorm, as individual brainstorming provides more rich data than a group brain storm Fern [1982]. This means that the data for now is as individualised as possible, and the group members have not conformed into having the same idea of the focus question, as the data is based solely on what the group members have experienced themselves. Later, the group members will be allowed to become inspired by the work of the other members.

If the group members cannot produce any data, the moderator can suggest users to recall different parts or aspects of the use such as different senses or different use scenarios of the product. However, this will bias the group members and should thus not be done if not necessary, and only to the minimum extend needed.

Phase 2 is to present the labels, by putting them all on a single wall or board, and reading the other members' labels. If a label is not understood by a group member or the moderator, it should be explained by the one who noted it and, if necessary, edited to make it more understandable, without changing the meaning of the label. This is done to ensure that all labels are understood, and to start forming a picture in the head of the group members. When group members present and explain their labels, this should encourage inspiration to produce additional labels, as the group members get alternative viewpoints on the focus question. The more heterogeneous the group, the wider the perspective on the subject, and the more inspiration they may acquire in this phase [Levine and Moreland, 2008, p. 111]. If new ideas come to mind throughout any of the phases, these should be noted down and placed according to where in the process the workshop is, to make sure that nothing is missing from the labels in the end.

The last phase is a verification of the labels. If beneficial, the focus group can make a quick clustering of the labels before or during this phase, for easing the following steps. The goal of the verification is only to remove redundancy and correct errors in the labels. To enable such a verification verification, the following criteria is set up:
1) If two labels are identical, one is removed.
2) If a group member recognise two labels as exact synonyms, this is presented to the rest of the group. Only if all members agree, the two labels are put on top of each other, though without removing any of them. Note that reducing the number of labels is not a goal at this point, and thus only exact synonyms should be put together. This might call for adding new labels, to specify the meaning other ones, if there occur disagreement in group members' understanding of labels.
3) If a group member recognise a label as evaluative (defined by it being impossible to prefer one of the poles, like e.g. good quality - bad quality), this is presented to the rest of the group. If all agree, the label can be redefined or split into several, to best keep the descriptive character, but removing the value-loading (e.g. good quality - poor quality can become robust - fragile and firm - unstable etc.). When all participants agree that the evaluative label's descriptive elements are represented by the newly made or previously made labels, the evaluative label is removed.
4) Lastly, if a group member finds a label irrelevant, this is noted directly on the label, with a dot or a sticker. If more group members find a label irrelevant, this should be noted with an equal number of dots or stickers. No labels are to be removed based on irrelevance, and this step should conclude the workshop, with no work to be done afterwards. This is used as a way of hypothesising on which constructs are more general, and which are diverse, by the markings of irrelevance. The labels that are marked represents constructs which some find

relevant and others do not, and therefore have a character of individual differences. The marking of irrelevant labels should conclude the workshop, as this step potentially can damage the group coherence by forcing group members to demean other group member's work, and therefore reduce the quality of work done after this step [Stewart et al., 2007, p.26]. This should ensure that individual differences are not neglected, when creating the list [Karapanos et al., 2009a]. This also suggests that when working further with the produced list, not all users will relate alike to the constructs, and some might find some irrelevant. Any label still present on the board or table will be put in a list, to create the exhaustive list of product attributes.
The workshop should focus on creating as large a vocabulary as possible, and therefore most time and effort should be put in the first phase. If the result from the workshop is of poor quality after completing phase 3, phase 2 and 3 can be commenced a number of times until the result is satisfying. A new brainstorming phase (phase 1) will be biased after commencing phase 2 and 3, and is not recommended, while new ideas for labels should always be welcomed throughout the workshop. Note, that if iterations are necessary, the last step of marking irrelevant labels should not be commenced until the workshop is otherwise finished.

Participants, moderator and product samples

The product samples used in the workshop should fill out the design space. This is done by having samples as different as possible in as many dimensions as possible. The result will only define the space that the samples represent, and what the group members deem as relevant experiences. Therefore, the more different samples, the better the result.

The group members could be experts in product design, or it could be users, but not a mix of the two, as this could potentially result in a hierarchy within the group, which is undesirable [Stewart et al., 2007, p. 10]. However, a list of descriptive product attributes should be produced quicker by an expert group, as they are more used to talk and think about different product attributes than users, and have a lot of experience in working with and understanding the products. An expert group might not be dependant on the triad method for eliciting words, but the interaction with real product samples should be used, to aid experts in recalling previous experiences, and focus on how the products are different. A group of untrained users should be able to produce the same list by the use of the triad-method for creating contrast word pairs, however it would arguably require a longer time to reach the same result.

The role of the moderator is fourfold: Firstly to present the goal of the workshop and encourage the group members to pursue this goal throughout the workshop to form cohesiveness in the group [Stewart et al., 2007, p.26]. Secondly

to resolve any inter-personal controversies that might occur during the workshop. Thirdly to keep the group on track of the workshop, by aiding in times of confusion, and making sure that all group members knows what to do. Lastly to continuously evaluate the quality of the data produced, so that an informed decision can be made on when the labels have the needed quality to conclude the workshop.
The researcher should not change the labels due to the researcher's own opinion or analysis. Any changes done to the list should be by, or on demand from the user- or expert panel based on their experience, analysis and discussion. This is to ensure as little impact from the researcher, enabling researchers with little or no experience within the given product category to still gain high quality results from the workshop, however, the researcher may ask questions to raise important discussion points if deemed useful to the quality and quantity of attributes. The researcher may and should analyse the panel's discussions to ensure that the researcher understands the meaning of the discussion before changing the list. Just as a moderator of a focus group interview, the researcher should only contribute to the workshop to ensure that the data and discussion stays relevant, adequate, and within the framework.

The product sample consisted of marketed products by Novo Nordisk A/S and competitor products, represented by Solostar Lanthus, Humapen Savvio, FlexTouch and NovoPen 5 (see figure 3.2). For the following analysis, the pens are anonymised with aliases. The aliases Pen1, Pen2, Pen3 and Pen4 is given the devices randomly.

Figure 3.2: The four injection devices Solostar, Savvio, FlexTouch and NovoPen 5 used as sample for the product evaluation

3.2.1 Additional tools

From the workshop data, two types of additional data can be required:

1. A condensed list of attributes, if the number of attributes is incomprehensible for further work, as also performed in a sensory analysis [ISO 11035:1994, 1994]. A condensed list might enable for a comprehensible view of a product's design space, and a categorisation of the attributes, which could provide focus points for deeper investigation into one of the attributes from the condensed list.

2. An evaluation of product samples on the extracted attributes as also performed in a sensory analysis [ISO 11035:1994, 1994]. A sample of product attribute evaluations enables not only an evaluation of the given products, but also a multidimensional mathematical analysis of the design space, to evaluate the relation between attributes (see appendix C).

Both of these data types can be achieved by adding additional phases to the workshop (see figure 3.3).

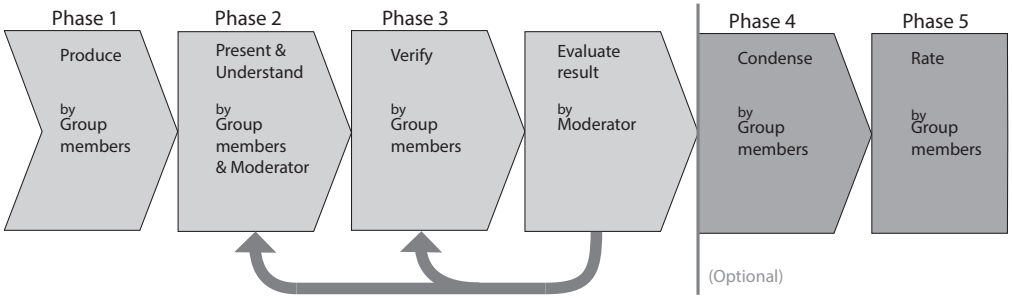


Figure 3.3: Flow of the Word Elicitation Workshop (WEW)

To create a condensed list of attributes, group members cluster the attributes by discussing commonalities. The number of clusters will also be the number of attributes in the condensed lists. When clustering is done, each cluster is named with a single headline label, either a copy of a label already present in the cluster, or a dedicated label written in this phase (still as a contrast word pair). The headline label should include the meaning of all the clustered labels to the extent possible. The headline labels are compiled into a condensed list of product attributes, representing as much of the original list as possible.
By using the clustering phase of the KJ-technique, the comprehensiveness of data is increased [Scupin, 1997] while detailing level decreases. Thus, the clustering should be controlled by the moderator, to ensure the best possible split between detail and comprehensiveness, all dependent on the amount and quality of data and the goal of the condensation. ISO 11035:1994 [1994] suggest having 15 attributes in the final list.

If evaluation of specific product samples on the elicited attributes is part of the desired outcome, this can be done in the end of the workshop (either on a condensed or exhaustive list of attributes), as suggested by ISO 11035:1994 [1994]. The product samples for which an evaluation is desired, should be included in the product samples used in all the workshop phases [ISO 11035:1994, 1994]. The product evaluation phase does not need to be part of a workshop, and can be done separately. However, it is important to have an expert panel to do such evaluation, and best case should be the same experts used for the WEW, to ensure the best possible understanding of the attributes. The product evaluation phase can also be used to evaluate the lists' reliability, as evaluation of the same product should produce results without much variance, when evaluated by the same and a different expert [ISO 11035:1994, 1994]. If not, this suggests that attributes are either interpreted differently or ambiguous.

There are no training sessions included in workshop, as otherwise suggested when making a product profile [ISO 11035:1994, 1994]. Therefore it is important to ensure that the group members have a common understanding of the attributes before initiating the evaluation. This should be secured through the explanation phase, but if the evaluation panel does not consist of the same panel who did the initial WEW, a glossary can be introduced, explaining the attributes.

3.2.2 Application and test

To evaluate the the Word Elicitation Workshop (WEW), the workshop is applied in the context of injection devices to extract an exhaustive list of product attributes, describing the experience of use. For this workshop, phase 4) condensing the list was included, while phase 5) product rating was left out for later application.

Procedure

The workshop follows the phases of producing, understanding and verifying labels, including a condensing and rating phase, as described in the aforementioned section on the WEW workshop. For each phase of the workshop, guidelines and rules are presented by the facilitator, visual to the participants throughout each phase in the form of a power point presentation (for the power point slides, see appendix D).
For the first phase, the presented rules are:

- Try to create descriptive and not evaluative word pairs
  - Avoid using value-loaded words which make preferring one of the poles impossible. (example good quality - bad quality)

- Use the devices on the table, to explore how they are different and how they are alike.
- No communication is allowed.

For the second phase, the presented rules are

- If you do not understand a label, ask aloud, and the person who made it will explain.
- Be inspired!
- If a label that is explained can be made more understandable without changing meaning, do so.
- You may move the labels around if you feel like it.

For the third phase, the presented rules are

- Remove only completely identical labels without discussing first.
- The goal is not to reduce the list
- You are allowed to disagree. Do not subdue to group pressure.

For the fourth phase, the presented rules are

- Sort the labels into subgroups, and give each subgroup a single label as headline.
- Remember to keep the label descriptive

If a participant have questions to the rules, these are answered immediately.

Pilot run

Prior to executing the workshop, a pilot run was made on 6 Engineering Psychology students at Aalborg University. As the pilot run was made solely to evaluate the procedural element of the workshop, ballpoint pens were used as product category instead of injection devices due to safety measures, as the Engineering Psychology students were not familiar with needle handling and the use of injection devices. The pilot run was time tracked, to evaluate the relative length of each phase of the workshop, and audio-recorded to evaluate the quality of interaction between the participants. The pilot run resulted in a few minor changes to the procedure, and worked as training for the facilitator to keep the workshop productive and within the time frame. About 15 different ballpoint pens were used for the pilot workshop (for a cutout of the ball-point pen sample, see figure 3.4).

Figure 3.4: Cutout of the ballpoint pen sample used for the pilot test of the WEW

The pilot run took 2 hours and 10 minutes, split between 35 minutes for producing, 5 minutes for break, 15 minutes for understanding, 20 minutes for verifying, and 45 minutes for condensing. The result was 146 attributes, condensed into 31. The result contained both auditive, visual and haptic attributes, some were specific to parts of the product while others were general, and some were related to handling the pen while others were related to the outcome of using them. The quality of the data produced in the pilot-workshop was evaluated as satisfactory, while the timing of the workshop was seen as critical, as the workshop should be limited to two hours. Additionally, a few changes were made to the phases:
Due to confusion in the condensation of the list, the facilitator asked the workshop group to create between 15 and 30 groups of labels. This was done to ensure that the panel did not use unnecessary time to cluster the labels into a few very broad themes.
As it was evaluated that a lot of time was spend unproductive searching for labels, a preliminary measure is included to the workshop, by splitting the board on which participants place their labels in phase 2 into a few broad categories of auditive, visual and haptic, to aid the group in quickly finding and grouping relevant labels in the following phases. Before condensing the list in phase 4, the preliminary categories are removed, to avoid biasing the result more than needed.

Apparatus

Product samples used for the workshop includes 12 different functioning or simulated functioning injection devices (some did actual injection of test-medium while others looked and felt like it, while they actually did not inject anything). Some were marketed devices by Novo Nordisk and competitors, others were closed down or current not yet marketed design projects from Novo Nordisk A/S. The researcher acted as facilitator and moderator for discussion during the workshop.

Results and analysis

The workshop was carried out in spring 2017 with an expert panel of 5 participants, all being designers, usability engineers and UX researchers from Novo Nordisk A/S, working with the design and research of injection devices (see figure 3.5). The workshop was held in a meeting room provided by Novo Nordisk A/S, and took 2 hours in total, with a break after the first phase.

Figure 3.5: Picture taken during the workshop with the expert panel of Novo Nordisk A/S

A total of 80 product attributes were produced and agreed upon (for the full list, see appendix E). From this, a condensed list was made, following the workshop steps, which resulted in 29 product attributes (see table 3.1, next page).
A few attributes from the exhaustive list was not grouped nor represented by itself in the condensed list (marked as [No cat.] in the exhaustive list presented in appendix E). It was argued by the expert panel that these were not possible to condense, but with too little significance to go on the condensed list, and high chance of being explained by what was already presented.
Further, one group of labels was not given a heading, which could be added to the condensed list (marked as [Unnamed cat.] in the exhaustive list presented in appendix E). The labels in this category is related to treatment focus point and effectiveness through handling speed and number of handling steps. As neither handling time, treatment focus point nor handling steps are evaluated as represented by the existing attributes on the condensed list, these are all added to the condensed list in the form of *quick - slow*, *embracing - pinpointing treatment* and *many handling steps - few handling steps* (recognised by the mark [added] in table 3.1).
One group of attributes, described by the label *cover - reveal*, was argued by the expert panel to be too general, and that too much detail would be lost, if this

Pole 1	Pole 2	Note
Heavy	Light	weight
Large shield surface	Small shield surface	
Tired slow down click sound	gentle slow down click sound	
Same clicks when dialling up and down	Different clicks when dialling up and down	
Mechanic click sound	Smooth click sound	
Dial with ridges/texture	Smooth surface dial	
Actuation and injection changes during injection	Actuation and injection is constant during injection	
Push button extension	No push button extension (spring load)	
Loud dosing	Silent dosing	
Quick continuous progress clicks	Slow continuous progress clicks	
Loud End of Dose	Quiet End of Dose	
Mechanic feel in dialling	Smooth feel in dialling	
Animated	Mechanical	Feedback
Emotional	Mechanical	
Detailed	Plain	
Auto	manual	
Discrete	Loud	
Sharp	Soft	Look
Item	Associatic	overall
Robust	Fragile	
Designed	Manufactured	
Seamless interaction / Expected interaction	Conscious interaction / Surprising interaction	
Small	Big	
Complex	Simple	Look
Vivid colours	Neutral colours	
Compact	Flexible / Light	Look
Bulky	Slim	
Cover	Reveal	
Rough	Smooth	Look
Quick	Slow	[added]
Many handling steps	Few handling steps	[added]
Embracing	pin-pointing	Treatment focus [added]
Proud needle	Discrete needle	[added]

Table 3.1: List of condensed injection device product attributes. The last four labels were added subsequent to the workshop, based on data that was not clustered or named by the expert panel, resulting in a total of 33 attributes.

was to represent the entire label group in the condensed list. The content of the group was the level of revealed/hidden needle, functionality, and drug window, along with the size of the drug window. Based on a discussion with the expert panel, the needle is given it's own label on the condensed lists, represented by a *proud needle - discreet needle* (recognised by the mark [added] in table 3.1), while the remaining was included in the *cover - reveal*.

Discussion of results

The condensed list of 33 attributes derived from the workshop contains a mix of general product attributes, and some related to a specific part of the injection device, like the needle, the needle shield, and the feedback when dialling and injecting, split between 24 full product attributes, and 9 part-specific. Further, some attributes seem relevant to any given consumer product category, while others are very product specific, split between 20 general such as *heavy - light*, *detailed - plain*, and *robust - fragile* and 13 device specific like *loud dosing - silent dosing* and *Mechanic feel in dialling - smooth feel in dialling*. Conclusively, there are in general two different levels of describing the product. One is by overall evaluative attributes based on both interaction and observing the product like e.g. *masculine - feminine* and *flashy - discrete*, describing the overall experience in general terms, independent of product category. The other is attributes pin pointing specific difference-defining attributes between products within the product category like e.g. *quick - slow continuous progress clicks*. The result of the WEW contains a mix of the two types.
It was mentioned by panel members that the condensed list was not of sufficient quality, and more work needed to be done to the list before applying it. Therefore, a number of iterations to the list-development is added to the procedure.

To verify the degree to which the the condensed list of attributes fills out the design space, a comparison is made to product semantics derived for other products (for a description of other studies, see appendix F). Only descriptive (not evaluative) semantics are included in the comparison, resulting in the research done by Hsu et al. [2000], Petiot and Yannou [2004], and Chuang et al. [2001] being relevant for the comparison. The research by Chuang et al. [2001] and Hsu et al. [2000] is based solely on visual impression, and not interaction, while the research by Petiot and Yannou [2004] is based on both visual and interactive impression, like the current study. The list of product semantics presented by Chuang et al. [2001] and Hsu et al. [2000] are very general, not really dependent on the product category (mobile phones and telephones, respectively), while some of the attributes suggested by Petiot and Yannou [2004] is much dependent on the product category (drinking glasses). In the comparison, attributes from Petiot and Yannou's study which are deemed irrelevant or obscure for injection devices (like e.g. *easy to fill - hard to fill* [Petiot and Yannou, 2004]) are ignored. Additionally, the result of the WEW pilot test on ball point pens is

included in the comparison.

The comparison shows that there are some descriptive attributes suggested by previous studies which are not included in the current list (see table 3.2), while others are closely related to the list, but named with other words (see table 3.3). In total 39 attributes are derived, which could potentially be relevant attributes of an injection device, while 19 attributes are evaluated as being synonyms to those on the current list, to be evaluated for which wording of the attribute is better. To evaluate whether any of these attributes should be added to the current list, and whether any of the attributes on the current list should be explained better, a second iteration of the list is done by the expert panel, based on these inputs.

Candidate attributes	
visible brand - invisible brand$^{\delta}$	Traditional - Modern$^{\alpha\ \beta\ \gamma}$
loose content - firm content$^{\delta}$	Childish - mature$^{\alpha}$
Loud actuation noise - no actuation noise$^{\delta}$	Masculine - feminine$^{\alpha\ \beta\ \gamma}$
Flashy - discrete$^{\gamma}$	Unoriginal$^{\alpha\gamma}$ / Plagiaristic$^{\beta}$ - creative, Existing - new$^{\gamma}$
regular - different$^{\delta}$	Common$^{\alpha\gamma}$/Normal$^{\beta}$ - Particular
vigorous - steady$^{\delta}$	Hard - Soft$^{\alpha\beta\delta}$
ergonomic - unmanageable$^{\delta}$	Obedient - rebellious$^{\alpha\ \beta}$
Large resistance - no resistance (Actuation)$^{\delta}$	Nostalgic$^{\alpha}$/Conventional$^{\beta}$ - futuristic, Common - novel$^{\beta}$
Very rollable - not rollable$^{\delta}$	Conservative$^{\alpha}$ / Nostalgic$^{\beta}$ - avant garde
continuous design - interrupted lines in design$^{\delta}$	Discordant$^{\alpha}$/Disagreeable$^{\beta}$ - harmonious
tight clip - flexible clip$^{\delta}$	Inert - active$^{\alpha}$
Standard - outstanding $^{\alpha}$	Rectangular - rounded$^{\alpha}$
cold - warm$^{\delta}$	Personal - professional$^{\alpha}$
Classy - vulgar$^{\gamma}$	Obtuse - brilliant$^{\alpha}$
hooded - built in shut down system$^{\delta}$	Old - new$^{\alpha\delta}$
natural - artifical material$^{\delta}$	Ordinary - individualised$^{\beta}$
long ownership - short ownership$^{\delta}$	Indistinct - distinct$^{\beta}$
disassembleable - not disassembleable$^{\delta}$	Idle - active$^{\beta}$
even - uneven (weight distribution)$^{\delta}$	Popularized - professional$^{\beta}$

Table 3.2: Candidate attributes derivde from previous research of descriptive attributes by Hsu et al. [2000]$^{\alpha}$, Chuang et al. [2001]$^{\beta}$, and Petiot and Yannou [2004]$^{\gamma}$, along with the WEW-pilot study$^{\delta}$

WEW	Potential Synonym
Heavy - light	Heavy - Handy[α β]
Emotional - mechanical	Rational - emotional[α β] functional - hedonic[δ]
Detailed - Plain	Plain - luxurious[α β]
Sharp - Soft	sharp edged - curvatured[β] curvy - edgy[δ]
Item - Associatic	Decorative[αγ] / Unrealistic[β] - practical
Robust - Fragile	Unstable - stable, Strong - fragile[γ]
Designed - Manufactured	Hand made - hi tech[α β]
Small - Big	Large - Compact[α β] big volume - small volume[δ]
Bulky - Slim	Tardy - streamlined[β]
Cover - Reveal	transparent - not transparent[δ]
Rough - Smooth (look)	Coarse - delicate[α β γ] textured - smooth[δ]
Complex - Simple (look)	Simple - complicated[α β γ]
Vivid - neutral (colours)	Colourful - solid colour[δ]
Auto - manual	
Discrete - Loud	
Quick - slow	
Many - few (handling steps)	
Embracing all - pin pointing (treatment)	
Compact - Flexible (look)	
Animated - mechanical	
Proud - discrete (needle)	
Large - small (shield surface)	
tired - gentle (slow down click sound)	
Same - different (clicks when dialling up and down)	
Mechanic - smooth (click sound)	
Ridget - smooth (dial surface)	
Change - constant (actuation and injection during injection)	
Large - no (extension of push button)	
Loud - silent (Dosing)	
Quick - slow (continuous progress clicks)	
Loud - quiet (End of Dose feedback)	
Mechanic - smooth (Feel in dial)	
expected - surprising (interaction)	

Table 3.3: Synonyms derived from a comparison of the WEW result with other elicitations of descriptive attributes by Hsu et al. [2000][α], Chuang et al. [2001][β], and Petiot and Yannou [2004][γ], along with the WEW-pilot ball point pen study[δ]. A break in the table is made to separate general attributes from part-specific attributes.

3.3 Second iteration of development of attribute list

To evaluate and optimise the list, the expert panel is gathered. The goal is choosing the meaningful attributes of the condensed list of attributes derived with the WEW as the foundation, while synonymous and candidate attributes from previous research are used as stimuli to inspire the expert panel. The iteration takes the form of phase 2 and 3 of the WEW in the form of a discussion within the expert panel. The expert panel used for the first development of the attribute list is used for this iteration. Some of the main focus points of the discussion are the level of description, and the product description level, as briefly touched in the discussion of the current list. The level of description refers to whether the attributes should be overall evaluative attributes based on both interaction and observing the product like e.g. *masculine - feminine* and *flashy - discrete*, describing the overall experience in general terms, independent of product category, or if the attributes should be pin-pointing specific difference definitions between products within the product category like e.g. *quick - slow continuous progress clicks*, or if a mix of overall and specific attributes are the best descriptors, as presented in the current list. The product description level refers to how the attribute list describes the complete product, missing as little detail as possible, given that the list must be reasonably comprehensible to the expert panel.

The focus group is introduced to the current list of attributes, produced in the WEW workshop, by putting all attributes on a table in the form of post-it notes, and presented on a projected table for an overview. Further, new candidate attributes from the analysis of other product semantics studies are presented in a different coloured set of post-it notes. Synonymous attributes from these studies are also presented in the same manner. The participants are asked to discuss the attributes with the goal of creating the best possible list of attributes, by picking presented attributes and producing new ones. If the group finishes the task, the result is discussed in the remainder of the time. The iteration is facilitated and moderated by the researcher. The data consist of post-it's notes produced during the workshop and a recording of the discussion.

3.3.1 Result

The focus group interview resulted in a couple of changes to the list of attributes. For each change, the argument made by the focus group is presented. The full transcript can be found in appendix G.2. References are made to the transcription in the form of a reference to the interview number (this is interview 1) and to the line number (e.g. [i1, l.134-136]). From the interview, four types of changes are made to the attributes from the list: removed, added, edited and starred (see table 3.4).

Pole 1	Pole 2	Note
Heavy	Light	weight
Large shield surface	Small shield surface	
Tired slow down click sound	gentle slow down click sound	[starred]
Same clicks when dialling up and down	Different clicks when dialling up and down	
Mechanic click sound	Smooth click sound	
Dial with ridges/texture	Smooth surface dial	
Actuation and injection changes during injection	Actuation and injection is constant during injection	[starred]
Push button extension	No push button extension (spring load)	
Loud dosing	Silent dosing	
Quick progress clicks	Slow progress clicks	[Edited]
Dominating End of Dose	No End of Dose	[Edited, starred]
Mechanic feel in dialling	Smooth feel in dialling	
Animated	Mechanical	Feedback [starred]
Auto	manual	
Discrete	Loud	
Sharp	Soft	Look
Robust	Fragile	
Seamless interaction / Expected interaction	Conscious interaction / Surprising interaction	
Small	Big	
Complex	Simple	Look
Vivid colours	Neutral colours	
Colourful	Solid colour	[added]
Bulky	Slim	
Cover	Reveal	[starred]
Rough	Smooth	Look
Quick	Slow	
Low force required	high force required	[added]
Very Rollable	Not rollable	[added]
Loose content	firm content	[added]
Even weight distribution	uneven weight distribution	[added]
Playful	Dead	[added]
Natural	Artificial	Materials [added]
Many handling steps	Few handling steps	
Proud needle	Discrete needle	
Detailed	Plain	
Compact	Flexible / Light	Look [Starred]
Designed	Manufactured	[Removed]
Item	Associatic	[Removed]
Emotional	Mechanical	[Removed]
Treatment embracing all	Treatment pinpointing	[Removed]

Table 3.4: Result of second iteration of the product attribute list. Noted in square brackets are changes from the second iteration in the form of additions, editions, removals and stars. Stars means further work is needed, while no solution has been found.

Removed: Four attributes were removed from the list as they were seen as concluding associations rather than product attributes. The attributes removed due to this criteria were: *designed-manufactured* [i1, l.276-385], *item-associatic* [i1, l.544-556], *emotional-mechanical* [i1, l.613-639], and *treatment embracing all-treatment pinpointing* [i1, l.594-612]. These attributes should be explained by the remaining attributes, however the expert panel suggested that this should be evaluated to ensure that the underlying attributes are in fact all included [i1, l.555].

Added: Seven attributes were added as extension to the current list, as they were seen as contributing and not yet present. These were *natural materials-artificial materials* [l.59-60], *Colourful-solid colour* [i1, l.388-416], *Low force requirements - High force requirements* [i1, l.227-249], *Very Rollable-Not rollable* [i1, l.79-83], *Loose content - firm content* (no recording of the addition of this attribute is available), *Even weight distribution-uneven weight distribution* [i1, l.87-90], *Playful interaction - Dead interaction* [i1, l.97-114].

Edited: Two attributes are edited to make the attributes more simple and understandable. These are *quick progress clicks - slow progress clicks* [i1, l.271-275] and *dominating end of dose - no end of dose* feedback [i1, l.474-507].

Starred: Seven attributes were starred, as editions were required while no simple solution were found. These are discussed and from this discussion, a solution presented:
Tired - gentle slow down click sound was argued to be two poles of two different scales that should be split up. One should be *tired - eager* and an antonym should be found for gentle to form the other one [i1, l.443-468]. Callous are suggested as antonyms, while intensive could be used, if callous is not seen as suitable.
Dominating end of dose feedback - No end of dose feedback was edited to include dominating EoD feedback. However, this was not seen as the best word to describe the amount of feedback, while the other pole could be discrete. Indisputable is used as a substitution for dominating to create the final edition of the attribute *indisputable - discreet* end of dose feedback [i1, l. 474-507].
Animated - mechanical was starred as it should be focused only on the interaction feedback and not the visual expression. Conclusively, it will be renamed *animated - mechanical interaction feedback* [i1, l.649-653].
Cover-reveal was starred due to an anticipated difference between hiding different parts of the device. Therefore cover reveal was seen as too generalised to produce valuable design insight. This should either be included by focusing on the visibility of the needle and mechanic functionality separately [i1, l.641-646]. Two attributes are created: *cover - reveal needle* and *cover - reveal mechanics*

Compact - Flexible was argued as two different attribute poles, where a new antonym should be produced separately for each pole. Further it was suggested to refer back to the attributes it was made to cover during the WEW [i1, l.520-541]. *Compact - flexible/light* covers *continuous - abrupt/complex shape* and *compact - shattered*. For the further analysis both *continuous - complex shape* and *compact - shattered* are included.
Actuation and injection changes during injection - actuation and injection is constant during injection was required to be more describing to get on the list, while the result of the attribute would in fact be meaningful. The attribute covers whether both interaction and feedback feels like a continuous flow, or like different actions in a sequence [i1, l.508-519]. To cover this attribute, two new attributes are created. These are *flowing interaction - changing interaction* and *Flowing feedback - Changing feedback*

The list of attributes derived from the second iteration with the aforementioned alterations consist of 40 attributes (see table 3.5 on the next page).

Pole 1	Pole 2
1) Heavy	Light
2) Large shield surface	Small shield surface
3) Tired click sound	eager click sound
4) Gentle click sound	Callous click sound
5) Same clicks dialling up and down	Different clicks dialling up and down
6) Mechanic click sound	Smooth click sound
7) Dial with ridges/texture	Smooth surface dial
8) Flowing feedbck	Changing feedback
9) Flowing interaction	Changing interaction
10) Push button extension	No push button extension
11) Loud dosing	Silent dosing
12) Quick progress clicks	Slow progress clicks
13) Indisputable EoD feedback	Discreet EoD feedback
14) Mechanic feel in dialling	Smooth feel in dialling
15) Animated interaction feedback	Mechanical interaction feedback
16) Auto	manual
17) Discrete	Loud
18) Sharp	Soft
19) Robust	Fragile
20) Expected interaction	Surprising interaction
21) Small	Big
22) Complex	Simple
23) Vivid colours	Neutral colours
24) Colourful	Solid colour
25) Bulky	Slim
26) Cover needle	Reveal needle
27) Cover mechanics	Reveal mechanics
28) Rough	Smooth
29) Quick	Slow
30) Low force required	high force required
31) Very Rollable	Not rollable
32) Loose content	firm content
33) Even weight distribution	uneven weight distribution
34) Playful	Dead
35) Natural	Artificial
36) Many handling steps	Few handling steps
37) Proud needle	Discrete needle
38) Detailed	Plain
39) Continuous shape	complex shape
40) Compact	Shattered

Table 3.5: List of device product attributes after second development iteration.

To evaluate whether the current list covers the entire span of the product visual and interactive expression, a second evaluation is made by comparing the current list with an analysis of the previous research on product attributes. The analysis of previous research is done through affinity diagramming, clustering and connecting the attributes into a chart resulting in five levels of description (for an overview of the analysis, see appendix F). The five levels of describing attributes is ”product sensation”, ”product expression”, ”emotional meaning”, ”user’s emotional response”, and ”value”. These levels define ways of describing what the user experience, based on what value is put to the product, ranging from no value in ”product sensation” to the emotional response the product cause in ”user’s emotional response”. The attributes from the list are placed in the categories from the analysis, to see which categories are covered by the current list, and evaluate if one description level is most beneficial to use for description. Some attributes are not possible to place in the categories, for which new categories are made.
The result shows that all of the 12 main clusters are represented in the current list (see figure 3.6), while the main part of attributes lies in the second and third description level, being the ”descriptive meaning level” and the ”emotional meaning level”, with some attributes on the sensation level, and only one on the fourth and fifth level in total (lvl.1 =8, lvl.2 =15, lvl.3 =16, lvl.4=1, lvl. 5=0 attributes).

Not all subcategories are represented at any description level, as some subcategories like e.g. ”liquid” from the categories ”static expression” and ”haptic” are not mentioned, as none of the injection devices analysed had any expression of wetness or stickiness on them. Others are not included, as they are not meaningful to measure, as the result is already known, as mentioned in the second iteration. These are categories like e.g. safety or difficulty. While these attributes are attributes of the device, comparing it to what gives value to the user does not make sense, as no one would ever prefer an unsafe or difficult to use injection device. However, there might be attributes related to this category, that could be meaningful to measure, to pinpoint what makes a pen feel safe and easy to use, and what is not affecting this experience. Such attributes are not present in this list. A lot of subcategories in the hedonic experience category is not part of the current attribute list while a new category is introduced to cover the list. From the current list, a lot of attributes are related to the naturalness or artificiality of the experience. This might be due to a different way of describing emotional meaning all dependent on the product category. Creating meaning from an interaction could arguably be described in whatever association the product conveys, like e.g. age, professionalism, location, authority, gender, and artificiality, which are attributes that a product as such does not possess, but is associated with.

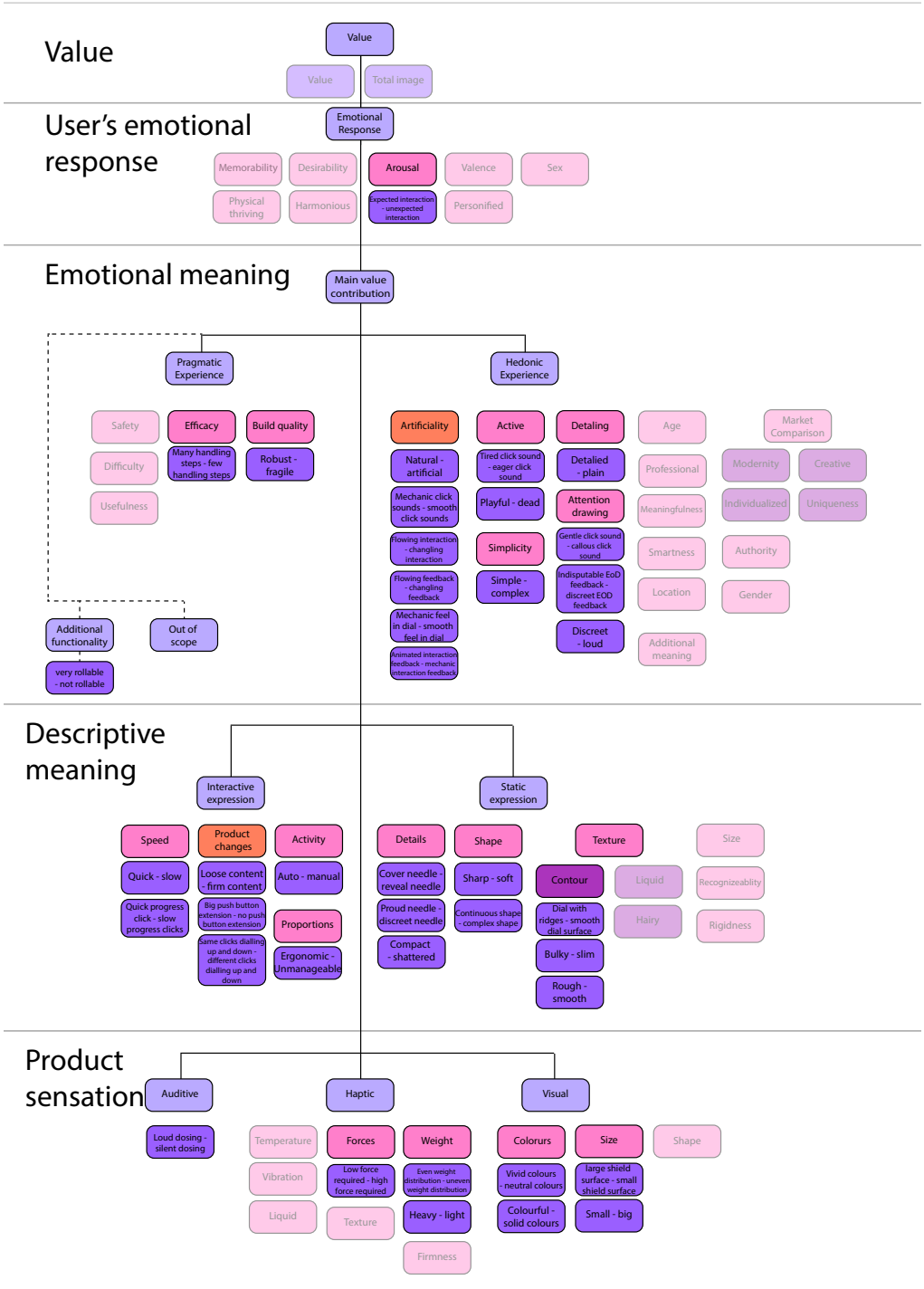


Figure 3.6: A comparison of the attribute list derived from the WEW and the analysis of other product semantics. Faded categories means that no attribute from the current list falls into this category. Orange categories means that these are created based on the comparison, as the current list did not fit in the categories.

Therefor, the absence of these categories should not mean that there is something missing from the list as such, but rather that there might be different ways of describing the emotional meaning. Whether the current list of attributes highly focused on the artificiality of the experience is the best way of describing the product cannot be concluded.

Based on this comparison, it is not possible to adjust the current list to a single level of description. However, the list covers most of the themes found relevant for describing a product, spread throughout the different levels of description. the subcategories not covered in one level is expected to be covered at another level, by describing the impression in a more high-level or low-level way, and therefore the list's ability do describe a product is deemed acceptable, with only a few hypothetical holes.

3.4 Third iteration of development of attribute list

The third and last iteration of the attribute list is done to ensure that the list of attributes are reliable and valid for evaluating real devices in the current form. While the above iterations focuses mostly on which attributes that are relevant to measure to cover the design space, the last iteration focuses on the usability of the attribute list, to ensure that the attributes are understood by the assessors, and that the scales and information on the evaluation sheets are understood.

The reliability and understandability of the attribute list is evaluated through a use evaluation study, where the expert panel rate a device on the full list of attributes and afterwards evaluate and compare their experience. Data is gathered in a following focus group interview, where the results are compared to evaluate whether attribute are understood and rated alike by the experts. If any attribute gets substantially different answers from different experts, these are discussed to evaluate whether the experts understood the attribute differently. If so, the attributes are re-iterated. Further, the list is evaluated by the expert panel, by asking whether there are anything redundant or missing on the list.
For the rating of products on the list of attributes, an evaluation sheet is developed, containing a list of the found attributes, placed on a 7-point category scale (see figure 3.7).

3.4.1 Result

Based on the discussion with the expert panel, a couple of changes were made to the attribute list. The full transcription of the interview can be found in appendix G.3. References are made to the transcription in the form of a line number (e.g. [i2, l.111-121]). First, changes to general themes about the list's format and content are presented. Further, each attribute suggested changed by the

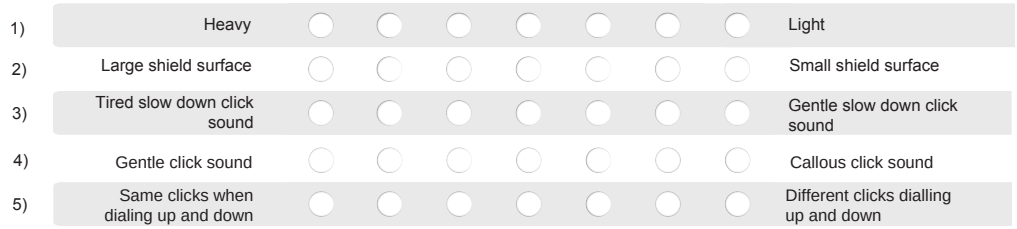


Figure 3.7: Cutout of the attribute evaluation sheet, developed for the evaluation of product attributes. For the entire sheet, see appendix D

expert panel is presented with the relevant arguments from the interview, along with a conclusion in the form of a change or no change.

Changes to general themes

Type specific product attributes were discovered during the review, as e.g. needle-shielding and dose-dialing were found to be relevant only for a specific type of products [i2, l.1-3]. Two suggested solutions were either to make a *not applicable* answer option, or to have sub category specific attributes that changes according to which sub-category of products that are selected. The latter is chosen as the best solution, as a *not applicable* answer option could potentially cause respondents to pick this category as an easy way out of evaluating complex attributes.

Static and interactive attributes are suggested split into two separate groups of attributes, to provide more context to the attribute [l. 430-440]. As some words like e.g. *discreet - loud* could be used to describe both aesthetic impression and the sounds provided during interaction, this method is implemented to produce the needed context without adding complexity to the attribute name itself.

Guidance are added to the evaluation sheet in the form of an instruction manual on the top of the evaluation sheet to ensure common ground in relation to a number of validity focus points and the introduction of a vocabulary.

Vocabulary is introduced to aid respondents to understand words and attributes where the expert panel could not find at better wording, but found the current name unclear. The words are added to the list based on which were experienced as not understood throughout the second and third iteration of the list. And described based on the descriptions of the attributes used by the expert panel.

Reference to other products and differences in frame of reference between respondents were discussed as a reason for much variance in responses, where the attribute was otherwise understood perfectly clear [i2, l.696-701, 701-707, 236-243]. This is argued to be only a problem when doing a single evaluation, while if more evaluations were made, the other devices would be the frame of reference [i2, l. 249-250]. However, if the first device is evaluated in reference to a whole different type of product, or if the second device is evaluated to a very different reference than the first evaluations, this may cause variation in data not caused by differences in the devices. Therefore instructions are added to the guidance, including a suggestion to the respondents to have a prototype device in their head based on current knowledge to evaluate all devices against and to avoid evaluating by referencing to other product categories.

Overall and part-specific differences Some attributes were mentioned as being evaluated different or with confusion due to different parts or elements of the product affecting the attribute in one or the other direction [l.40-51, 350-360]. Here, priority of which of the different elements that have the highest influence on the total evaluations might be different from evaluator to evaluator [i2, l. 367-370]. To make sure that the evaluators include all relevant aspects of an attribute, to keep as much uniformity in the understanding of the attribute, but without dictating a priority that the evaluators do not agree in, a suggestion is made in the guidance, towards looking at the product as a whole, and including any relevant aspect of the attribute in the one evaluation. This is, however, a point of concern in regards to creating attributes with a distinct meaning, providing similar responses for similar devices, which is not solved.

Changes of specific attributes

Some attributes underwent changes to ease the understanding. Only bigger changes to the attributes will be presented, while a list of the final attributes can be found in the following section.

Changing feedback - flowing feedback and changing interaction - flowing interaction is merged into one and named *continuous interaction - segmented interaction*. This is done as it is argued that when evaluating the flow of an interaction, you are already thinking about the feedback as well, and therefore there are no difference in the evaluation [i2, l.211-213]. Further, the wording is changed into *continuous interaction - segmented interaction* by suggestion to make the attribute easier understandable [i2, l. 127-137].
Large shield surface - small shield surface is removed, due to a narrowing of the product category, focusing solely on products without needle shields. This is done based on the conclusion that the current market includes very few devices with shields [Nordisk, 2017], and that this attribute is not applicable for devices without shields [i2, l.2-5]. On the contrary, dose preparing by dialling are set as

a criteria for the devices used in the final evaluation, as most products on the current market has this feature [Nordisk, 2017], through which a narrowing to a single subcategory of the product category is made.
Proud needle - Discreet needle and Cover needle - reveal needle are put together, represented by *Cover needle - reveal needle*, as these are seen as almost identical [i2, 492-500]. From this discussion comes another attribute about the expression being honest or like it is hiding it's purpose [i2, 517-569]. This is added to the list in the attribute *honest expression - hiding expression*.
Animated interaction feedback - Mechanical interaction feedback is changed to *Acts like human - acts like machine*, to ease the understanding [i2, 382-400].
Playful - dead is changed to *playful - dull* to better represent it's real meaning [i2, 692-695].
Conclusively, the final evaluation sheet used for evaluating the product attributes consist of 38 product attributes, split into two categories; interactive and static expression attributes (see the final sheet front and back in appendix D). They are presented to the respondent as a number of seven point category scales, with the attribute word pairs as poles of the scale.

3.5 Evaluation trough application of product attributes

For four of the devices used in the WEW sample, the expert panel carried out the final phase of the WEW workshop, in the form om a product attribute evaluation on the condensed list of attributes. Each attribute on the condensed list was listed as poles on a list of seven point category scales, as presented in the above section (for the evaluation sheets used, see appendix D).
The goal of the product evaluation is twofold: First to evaluate the quality of the product attributes derived through the WEW, and second to provide input for the comparison of product attributes, UX-aspects and UX-quality, presented in chapter 5.
Seven experts evaluated all four devices with a few exceptions (see discussion below). The result consisted of 4 samples evaluated on the 38 product attributes by 7 different experts. For a numerical summary of the evaluations, (see table 3.6 on the next page. For a further numerical summary, including standard deviation and confidence interval, see appendix H).

The range of responses indicates a high spread of the answers, as the span of answers in average is about half the range of the scale, and some attributes show a span of the entire scale for some devices like *many handling steps - few handling steps*.

Attribute	*Pen1*	*Pen2*	*Pen3*	*Pen4*
Tired - Gentle slow down dosing click sound	5.29[3-7]	5.67[3-7]	5.20[4-7]	3.17[2-4]
Gentle - callous dosing click sound	3.43[1-6]	2.43[1-7]	2.83[1-4]	3.86[2-7]
Same - Different clicks dialling up and down	6.86[6-7]	1.43[1-2]	2.67[1-4]	3.29[2-7]
Mechanic - Smooth dial clicks sound	3.57[1-6]	3.43[1-7]	3.33[2-6]	3.57[1-6]
Continuous - Segmented interaction	3.71[2-7]	4.00[2-6]	3.17[2-5]	3.43[2-5]
Push button extension - No	7.00[7-7]	1.67[1-3]	1.17[1-2]	1.14[1-2]
Loud - Silent dosing	3.57[1-6]	5.57[4-7]	6.50[5-7]	4.57[2-6]
Quick - slow dosing clicks	2.43[2-4]	2.43[1-4]	3.40[1-4]	4.57[2-6]
Distinct - Discreet EoD signal	3.14[1-6]	2.43[1-4]	7.00[7-7]	5.50[1-7]
Mechanic - smooth feel	3.71[2-6]	3.86[2-6]	5.00[2-7]	2.71[1-4]
Acts like human - machine	4.71[3-7]	5.00[2-7]	4.00[2-6]	5.14[3-7]
Auto - Manual	3.43[2-5]	5.86[4-7]	5.50[2-7]	5.86[4-7]
Expect - Surprising interaction	2.14[1-3]	2.71[1-6]	3.60[1-6]	2.14[1-4]
quick - slow	2.00[1-3]	3.00[2-5]	3.33[1-6]	4.43[2-7]
low - high force required	1.57[1-3]	3.57[2-6]	3.50[1-6]	6.00[3-7]
Very - not rollable	4.57[3-6]	5.71[4-6]	3.83[2-6]	3.57[2-6]
Loose - Firm content	5.86[5-7]	5.71[3-7]	5.83[2-7]	3.86[2-6]
Even - Uneven weight distribution	2.57[2-3]	4.71[2-6]	3.50[1-5]	2.29[1-5]
Many - few handling steps	4.57[1-7]	3.71[1-6]	3.83[1-6]	3.86[1-7]
Heavy - light	4.14[2-7]	2.43[1-4]	3.50[3-5]	5.71[4-7]
Consistent - fragmented	3.43[2-6]	3.29[2-5]	3.83[2-5]	3.57[2-6]
Ridget/Textured - smooth dial	2.71[2-5]	3.57[2-5]	4.83[3-6]	3.14[1-5]
Playful - dull	5.14[3-7]	4.86[3-6]	3.33[1-5]	3.86[3-6]
Discreet - Loud	3.57[2-6]	3.00[2-6]	6.33[6-7]	3.86[2-6]
Sharp - Soft	3.57[2-5]	3.29[1-6]	4.67[2-7]	5.29[4-7]
Robust - Fragile	2.57[1-4]	2.00[1-5]	2.33[1-3]	4.29[2-6]
Small - big	5.29[4-7]	4.57[3-6]	4.67[4-6]	3.29[2-5]
Complex - simple	4.57[3-6]	4.29[3-6]	4.67[4-6]	3.43[2-5]
Vivid - neutral colours	5.86[4-7]	6.43[6-7]	1.83[1-3]	3.57[2-6]
Colorful - solud colour	6.00[5-7]	6.71[6-7]	3.83[1-6]	4.14[3-6]
Bulky - Slim	2.71[1-5]	4.71[3-6]	3.00[2-4]	5.43[5-6]
Cover - Reveal needle	5.43[1-7]	6.33[4-7]	6.00[2-7]	5.43[1-7]
Cover - reveal mechanics	2.86[1-6]	3.14[1-5]	4.00[2-6]	3.43[1-6]
Rough - Smooth	4.57[2-6]	5.57[4-6]	5.17[5-6]	4.29[3-6]
Natural - Artificial	4.86[4-7]	4.29[2-7]	5.67[4-7]	4.71[3-7]
Honest - Hiding expression	2.86[2-4]	3.00[1-5]	4.50[2-7]	3.71[2-5]
Detailed - Plain	4.14[2-7]	3.29[2-5]	4.33[2-6]	3.57[3-6]
Continuous - complex shape	2.86[2-5]	2.57[2-5]	3.17[2-5]	3.71[2-6]
Avg. range	3.4	3.5	3.4	3.7

Table 3.6: Product attributes evaluated for the four device, presenting mean and range of evaluations $mean[range]$. Numbers higher than four indicates that the product are more to the right pole, while numbers lower than four indicates that the product is more to the left pole. A number around four means equal levels of the two attributes. Last is an average of the range of the scales used when evaluating the attributes

The initial data verification is inspired by the flow suggested by Tormod et al. [2011], initiating with an ANOVA removing all attributes where the product does not have a significant effect on the attribute. This analysis is followed by an application of a PCA's, allowing for the examination of Tucker-1 plots to evaluate agreement and contribution amongst the assessors, and after this a visual inspection of a F- or MSE-plot for repeatability and discrimination [Tormod et al., 2011, p. 28], as also suggested by ISO 11035:1994 [1994]. As no repetitions are made during the product evaluations, no F- or MSE-plots can be made, and as no further panel training can be performed, the Tucker-1 plots will be used to evaluate performance rather than to secure it. To calculate and produce the needed tests and graphs, Panel Check version 1.4.2 is used. The program uses the statistics presented by Tormod et al. [2011], and is available at http://www.panelcheck.com/Home/ (accessed 28.05.2017). Additional analysis is done through inspection and evaluation of PCA through a number of plots like scree plots and bi-plots (for description of PCA and available plots and graphs, see appendix C)
Before applying a PCA to the data, it is verified for the application of a PCA. As suggested by Suhr [2005], the data must have the following structure:

- measurement level is interval or ratio,
- linear relationship between observed variables,
- normal distribution for each observed variable,
- bi-variate normal distribution between each pair of variables, and
- random sample.
- at least 5 observations (10-20 recommended) for each variable, and at least 100 observations.
- over sample to compensate for missing values [Suhr, 2005]

By collecting the ordinal data from category scales like the ones used, it is generally accepted that averaging the data provides interval data, believing that respondents have seen the categories as having equal space between each other. To ensure this, the categories are not named, as to be seen as a interval scale and not a categorical scale by the respondents. No indications of implications on this assumption was discovered during the workshop.

The linear relationship between observed variables might be untrue, but is accepted as a criteria when analysing data.
Normal distribution and bi-variate normal distribution is anticipated for data, but due to the small sample size, this cannot be verified. However, due to some attributes having a degree of interpretation, these might not prove to be normal distributed, as several true means might occur, one for each different interpretation.
Each variable includes at least five observations, as each attribute is rated 30 times with a few missing values on some attributes. In total 1018 ($7assesors * 4productsamples * 38attributes - missingvalues$) evaluations are made, compensating for missing values.

Illustration of attributes and dimensions: To represent the principal components (PC's) of a PCA, a flattening of the dimensions are performed, to visualise the PC's in a number of 2D plots (see figure 3.8).

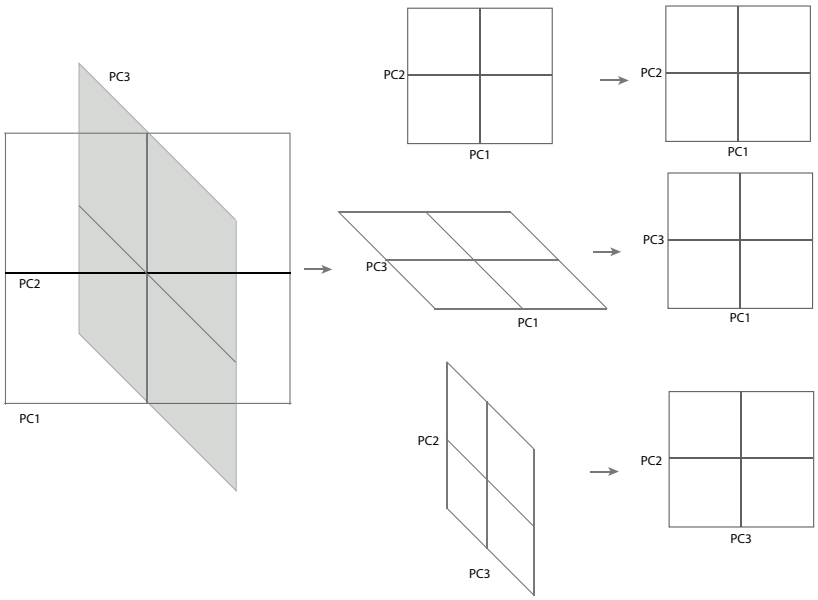


Figure 3.8: Illustration of the flattening used to present the three dimensions of the PCA

Each attribute is illustrated in the form of a vector, represented by an arrow, from the centre of the graph, to the coordinate representing the PC-values of the attribute (see figure 3.9), indicating how an increase of the given attribute affects the PC-space. In some plots, individual ratings from which the loadings are calculated are illustrated in the plots. these are represented by dots in the given coordinates, with colours indicating the data-point's relation. Further, while the attributes are calculated as one, the bipolar nature of the attribute includes both a negative and positive direction, where the negative direction is the opposite pole (for example, see figure 3.9).

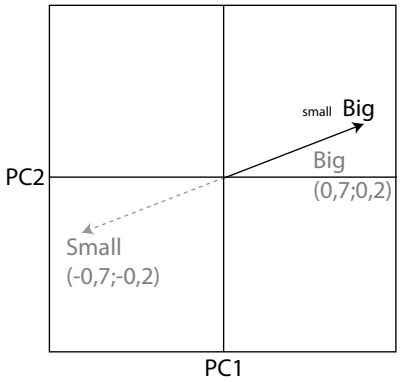


Figure 3.9: Representation of the bipolar attribute's characteristics in a PC-space. While the attribute consist of both the positive and negative direction, only the positive will be represented (highlighted with black text), and the opposite pole represented by the small text in the label.

When illustrated in the PC-space, the opposite pole of each attribute should be denoted as a vector with negative coordinates. To keep the plots simple and comprehensible, only the vector indicating an increase to one of the poles are presented by a vector, the label highlighting in size which pole the vector is showing, while the opposite pole is noted in smaller text in the same label (see figure 3.9).

Significance of attributes: An initial ANOVA on each attribute and the product's effect on the attribute is made, using the *Product Effect 2-way ANOVA* function in Panel Check. The ANOVA shows a number of insignificant attributes (see figure 3.10). Removing these attributes narrows down the attribute list to 18 attributes. Insignificance indicate that the products within the sample does not change the evaluation of the given attribute significantly, and the attribute is therefore not relevant for describing the design space the sample represents as the products have close to the same rating on this attribute.

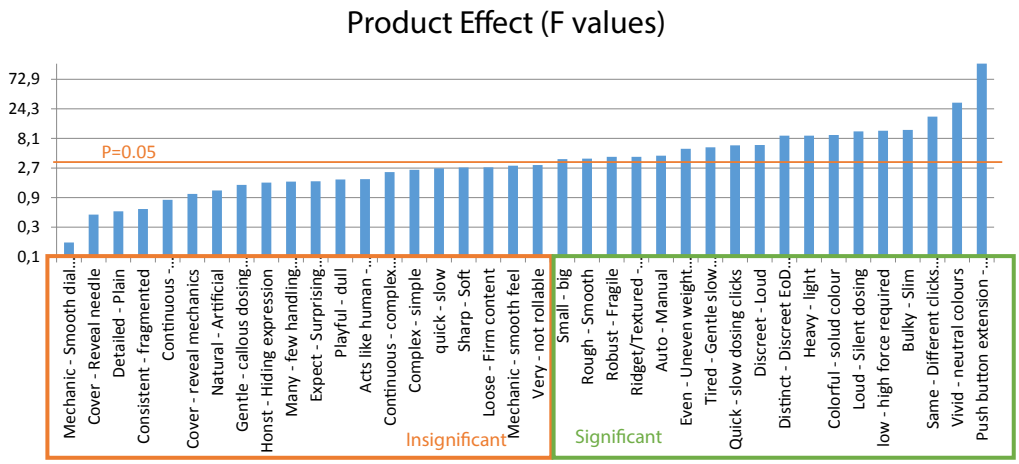
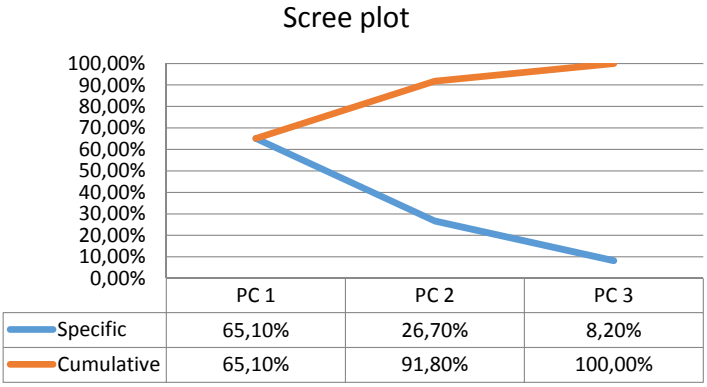


Figure 3.10: Diagram of F-values from an ANOVA, evaluating the device's effect on the 38 device attributes in ascending order. The horizontal line indicated the chosen significance level of P=0.05. The significant attributes are framed in green, while the insignificant are framed in orange. The values are shown in a logarithmic scale with a 3 time increase

Explanation of variance: A scree-plot is made to analyse the explanation of variance in the PCA, using the *PCA Explained Variance* function in Panel Check. This plot indicates that three components are relevant, cumulatively explaining 100 % of the variance, with the three components explaining 54.3 %, 27.2 % and 18.6 %, respectively (see figure 3.11). Due to the sample being of only 4 devices, 3 components is enough to explain any variance between the products, resulting in 100% cumulative explained variance.



	PC 1	PC 2	PC 3
Specific	65,10%	26,70%	8,20%
Cumulative	65,10%	91,80%	100,00%

Figure 3.11: Plot showing the PCA explained variance, both cumulative and specific for each component.

Evaluation of assessor disagreement and contribution: A tucker-1 overview is made, using the *Tucker-1 Overview Plot* on the assessors in Panel Check. This overview, a visual inspection on the first two principal components is made. If the assessors show great variance in response or little effect on the PC's within a single attribute, these will be investigated further (for the overview plot, see appendix H). One attribute indicating low loadings for some assessors on the first two components is *low force required - high force required*, showing both assessor A4 and A5 lying within the inner circle, indicating a critical loading level (see figure 3.12). A further evaluation of PC3 is therefore investigated to see, whether the critical assessors have critical loading levels in all three PC's (see figure 3.13). This plot shows that A4 and A5 have high loadings on the third component, and are therefore placed in the approved sphere of the PC-space. A similar evaluation is done with all attributes showing the same assessor behaviour.

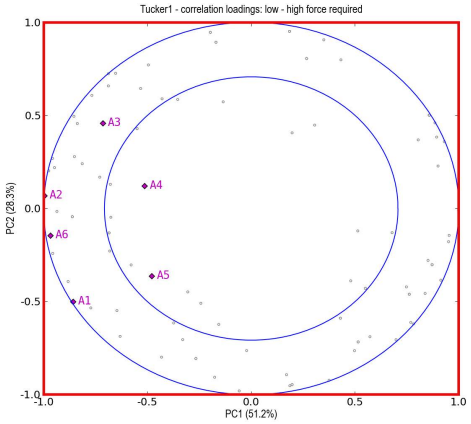


Figure 3.12: Tucker1 plot on the PC1 and PC2 for the attribute *low force required - high force required*. A1-A*n* indicate assessors individual placement in the PCA. Loadings from assessors within the inner circle indicates little effect on the PCA by the assessor. Long distance between the assessors indicate disagreement in evaluations

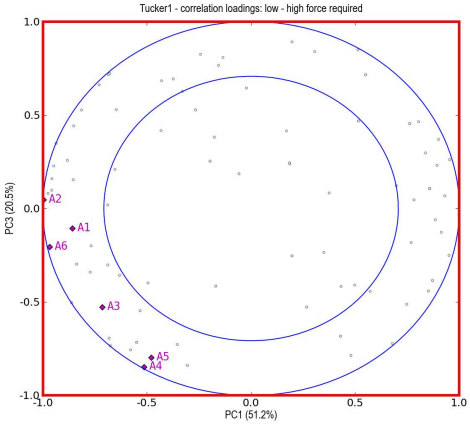


Figure 3.13: Tucker1 plot on the PC1 and PC3 for the attribute *low force required - high force required*. A1-A6 indicate assessors individual placement in the PCA. Loadings from assessors within the inner circle indicates little effect on the PCA by the assessor. Long distance between the assessors indicate disagreement in evaluations

Another evaluation is done towards evaluating the agreement level of the assessors. If assessors have very different loadings on the same component for a given attribute, this indicates that they might disagree on the attribute's meaning. An example of such disagreement is the auto-manual attribute, showing very different loadings for different assessors (see figure 3.14). An analysis of the third PC shows equal amount of disagreement (see figure 3.15).

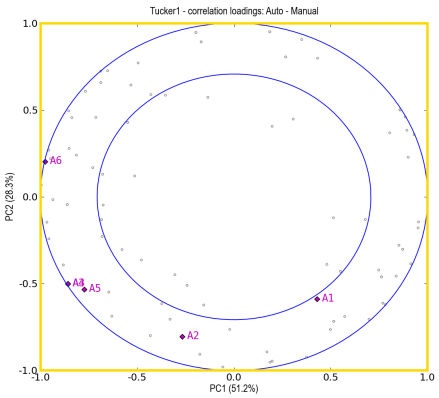


Figure 3.14: Tucker1 plot on the PC1 and PC2 for the attribute *Auto - Manual*. A1-A6 indicate the assessor's individual placement in the PCA. Loadings from assessors within the inner circle indicates little effect on the PCA by the assessor. Long distance between the assessors indicate disagreement in evaluations

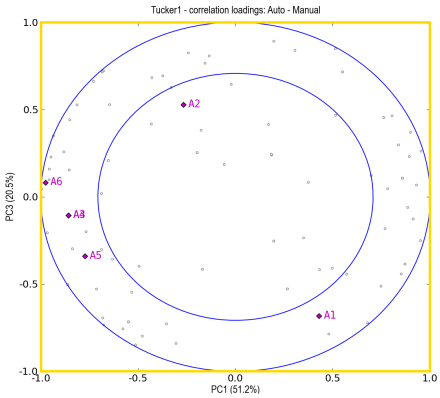
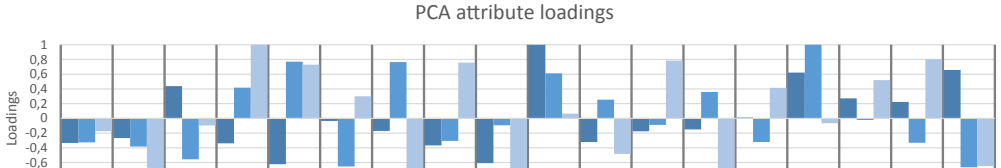


Figure 3.15: Tucker1 plot on the PC1 and PC3 for the attribute *Auto - Manual*. A1-A6 indicate the assessor's individual placement in the PCA. Loadings from assessors within the inner circle indicates little effect on the PCA by the assessor. Long distance between the assessors indicate disagreement in evaluations

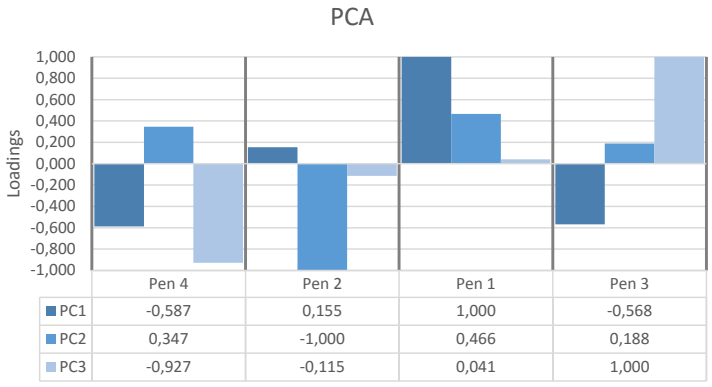
Following the same procedure, each attribute were evaluated for the agreement and variance explained between the assessors (see appendix H). An evaluation of all 18 attributes shows that there are some attributes showing disagreement between the assessors. While these indicate disagreement on the sample products' loadings on a number of attributes, no changes will be done to the list due to this disagreement. However, this does indicate a risk of variance in responses not due to differences in the samples but due to the assessors understanding of either the attribute or how to evaluate it.

Meaningfulness in data: A PCA on all 18 attributes for all devices are made, for which normalised loadings for the attributes, along with normalised scores for the products are derived, using the *Bi-plot* function in Panel Check (see figure 3.16 and figure 3.17 on the next page). The PCA shows that 15 of the 18 attributes have high loadings in at least one PC, while the remaining three attributes *rough-smooth, quick-slow dising clicks* and *auto-manual* show some loadings.



	Auto - Manual	Bulky - Slim	Colorful - solud colour	Discreet - Loud	Distinct - Discreet EoD signal	Even - Uneven weight distribution	Heavy - light	Loud - Silent dosing	low - high force required	Push button extension - No	Quick - slow dosing clicks	Ridget/ Textured - smooth dial	Robust - Fragile	Rough - Smooth	Same - Different clicks dialling up and down	Small - big	Tired - Gentle slow down dosing click sound	Vivid - neutral colours
PC1	-0,333	-0,267	0,439	-0,338	-0,623		-0,17	-0,366	-0,607	1	-0,322	-0,174	-0,15		0,621	0,272	0,223	0,659
PC2	-0,327	-0,383	-0,556	0,418	0,771	-0,654	0,765	-0,305		0,613	0,253	-0,089	0,36	-0,32	1		-0,331	-0,663
PC3	-0,173	-0,978		1	0,73	0,3	-0,873	0,759	-0,991		-0,483	0,786	-0,736	0,415		0,519	0,805	-0,648

Figure 3.16: Chart of each attribute's normalised loading on the three PC's, along with a table with the specific score. Highlighted with colours in the table are main loadings (above 0.5), while zero-loadings (below 0.1 [Brown, 2009]) are removed. This must be seen only as assistance for reading the table, and is not included in the analysis of data



	Pen 4	Pen 2	Pen 1	Pen 3
PC1	-0,587	0,155	1,000	-0,568
PC2	0,347	-1,000	0,466	0,188
PC3	-0,927	-0,115	0,041	1,000

Figure 3.17: Chart of each sample product's normalised loading on the three PC's, along with a table with the specific score.

Adding together the normalised loadings from the attributes and product scores on the three PC's, a bi-plot is created (see figure 3.18 and 3.19). The bi-plot shows that the attributes covers most of the design-space, as they are diverted within all the PC's with both positive and negative loadings. The products also show differences, indicated by the space between in all three PC's.
To evaluate whether the PCA proposes a meaningful way of looking at data, a visual inspection is made in regard to the placement of the attributes in the PC-space. As examples of meaning extraction from the PC-space, "high force required", "Manual" and "Push button extension" lies close to each other, indicating that an extension of the push button is experienced by the panel much as high force required and a manual feel. In the same manner, solid colours and neutral colours lies close to each other, indicating a relationship.

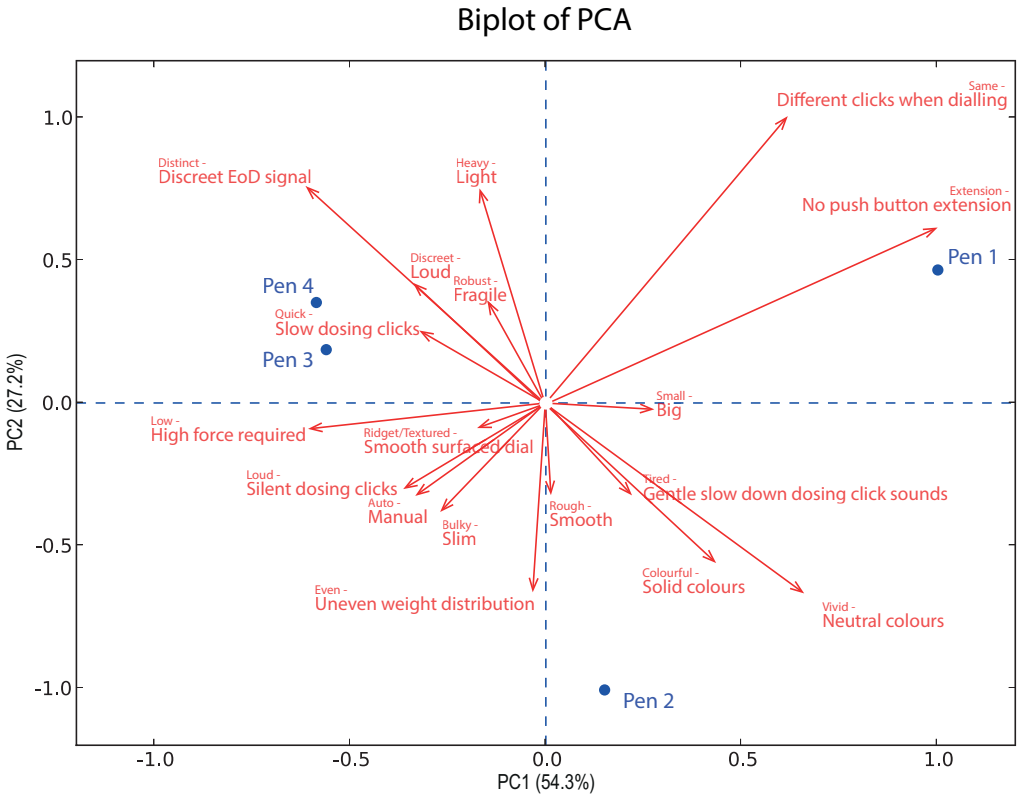


Figure 3.18: Biplot of attributes and product's placement on the two components PC1 and PC2 from the PCA.

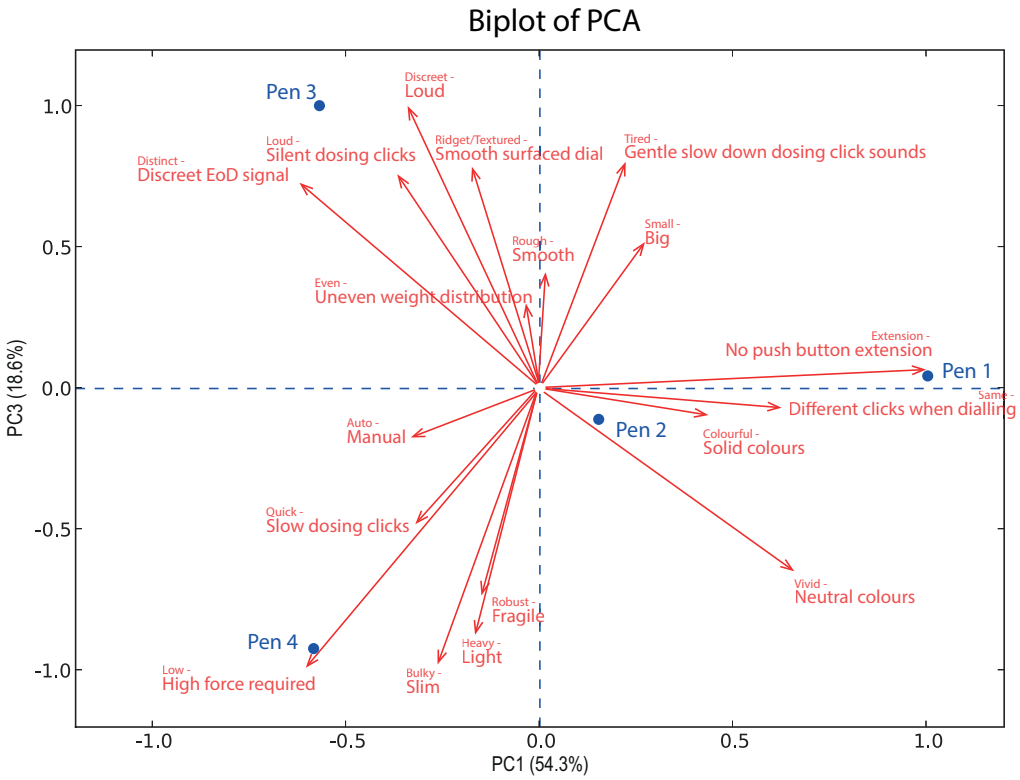


Figure 3.19: Biplot of attributes and product's placement on the two components PC1 and PC3 from the PCA.

For further investigation, conceptual directions within the PC space can be drawn by looking at commonalities within all attributes pointing in a certain direction. While this can be used to explore meaningful relationships, this is not the goal of the PCA, and should not be an evaluation criteria. If meaningful interpretations of dimensions was the goal, a factor analysis should be chosen as method [Härdle and Simar, 2007, page 275].

Discussion of product rating analysis

The analysis of the data concluded in 18 product attributes creating a 3-dimension design space represented by three PC's. While this was suitable for explaining the variance in the small product sample used, three dimensions are hardly sufficient to actually define the design space. This can be seen e.g. in how "Discreet EoD signal" and "Vivid colours" (the opposite pole of neutral colours) have almost equal loadings in the three PC's. Conceptually a discreet end of dose signal has nothing to do with vivid colours, but the vector or dimension showing this difference is missing in the current sample and thereby also the following PCA. This indicates that while the sample size is as small as the one used in this study, a risk is that the attributes cannot be separated. Say no product in the sample had a Discreet EoD signal without having vivid colours. In this case, a PCA will not be able to detect the difference between the attributes, as the analysis is based on purely mathematical calculation on variance.

Some attributes show some disagreement and difference from the assessors, indicated by the high range of responses, and the analysis of Tucker-1 plots. Over 50 % of the attributes (20 of the initial 38) were removed due to insignificance. While these were removed as no difference between products could be shown, this might be due to a small sample size of only 6-7 data points for each attribute per product, for a few attributes down to 5 data points, with a high spread across the scale. As of this, smaller differences could not be statistically supported, and relevant attributes might therefore have been discarded. Another explanation is that the product sample of four devices did not include products that differed on these attributes. To gain a more precise and reliable result, a bigger sample shold be used.

3.6 Discussion and evaluation of method

Application of the method shows the developed WEW's ability to create both exhaustive and condensed lists of product attributes, and evaluate the quality of such lists through product evaluation, however, some limitations were found in regards to application of the worskhop:
The WEW focuses on condensing rather than prioritising, meaning that the attributes on which the products are described, covers as much of the device as possible rather than narrowing down to elements that are deemed most important, and thereby ignoring parts of less importance. During the evaluation phases, it was, however, discovered that priority of the attributes were needed to keep the list comprehensible, as products such as an injection device were deemed too complex to describe in such a condensed way. Therefore further delimitation to product sub-categories were made, and attributes were discussed in regard to their importance to the final list. Describing the entire device in a comprehensible number of attributes within a single level of description were not achieved, as suggested in the comparison of the result to the analysis of levels of conceptual descriptions. Some attributes describe very low level concrete dimensions, others describe high-level abstract dimensions. Nothing was done to avoid this difference in description level, as the approach restricted only the experts to work with the data, and the researcher to only introduce the goal and methods and not dictate any additional alteration of the result. An additional analysis of the result could possibly allow for a streamlining of the conceptual description level, however at the cost of risk of misinterpretation of data by the researcher, and thereby the study's validity. Alternatively, the expert panel could be used only for the first three phases of the WEW and the final evaluation, where the condensation and evaluation of the list were made by the researcher, before the expert panel evaluated products on the final list of attributes. However, the workshop in it's current form ensures that the expert panel creates the list of attributes exactly like they think it should look, and therefore should have the best conditions for evaluating products in the list.

While the workshop has it's strength in being quick to execute and still producing a vast amount of ordered data, the workshop require a lot from it's participants, as they are asked to define a product design space within two hours. Even an expert panel as the one used in the application of the workshop presented in this report, would have benefited from a number of training sessions, to feel confident in creating descriptive contrary word pairs for a product. It was clear from the workshop that not allowing evaluative and emotional words in the labels was hard for the expert panel, who often times accidentally did a design evaluation, pointing out flaws and qualities in the products. This might be due to the fact that UX-researchers and designers are meant to evaluate design as part of their job. Not being allowed to do so, forced the workshop participants to

try to look through their evaluative approach, towards the descriptive attributes, which was not easy to them. As a result, the workshop needed a number of iterations on the understanding and verification phases for the condensed list of attributes to produce a high quality result. Further it was noted during these evaluations that a number of attributes had high amount of individual interpretation involved. This trend is supported in the evaluation of products, showing high variance between assessors on the same device, indicating lower levels of agreement in data. Alternatively, an expert panel consisting of mechanical engineers could have been used to create the product attributes list, as par of these people's experience lies within describing and defining products in measurable, concrete dimensions.

The panel used for the WEW and the following iterations consisted of employees of Novo Nordisk A/S for whom the participation in these sessions were a work task with low priority compared to other tasks. As of this, cancellations from panel members were experienced to a high extend. The expert panel were joint by eight people, of whom five ended up being part of the panel due to their participation in the initial phase, whereas the rest did not show up. Of the five experts, the evaluation iteration sessions were joined by between three and four members of the expert panel. It was not possible to gather the entire panel for these sessions. This posed some complications in regards to keeping the panel informed and up to date, and in the end gathering the product evaluations from the panel. For the final evaluation of products, some had to be done remotely due to lack of time by the panel members. Further, as the attributes showed a high amount of disagreement amongst the assessors in the inspection of the tucker-1 plot, no reaction in the form of training of the panel were performed based on the result, as otherwise suggested [Tormod et al., 2011, p. 28]. To enable for the development of a better expert panel and attribute list, the product evaluation could be performed in a repetitive manner, until the result showed sufficient agreement and consistency between assessors. However, due to the limitations of working with employed personal, this option was not used for the used panel.

Some attributes were ignored during the analysis, due to insignificant statistical evidence of difference between the products. While this meant that there was little reason to analyse the attributes, it does not make the attributes irrelevant. If another product sample, or a specific focus point in the product were chosen, the attributes could turn out to be significant to the result. Therefore these attributes should not be seen as less important to the product-defining list of attributes.

Conclusion on elicitation of injection device attributes A method for elicitation of product attributes were developed, called the Word elicitation workshop, including focus groups, brainstorming and working with tools for defining a product category word list in form of contrast word pairs. The word list developed with this method shows strength in defining product differences, while it does contain attributes with room for interpretation for the assessor and therefore the risk of assessor effect in evaluation. The workshop produced a product-category defining list of attributes after two hours work with an expert panel of UX-researchers, designers and usability engineers, which could be applied directly, however iterations were made to improve the quality of the list, before evaluating the final result. The method showed the complexity of working with non-evaluative descriptive attributes for experts in user-centered design. Training an expert panel to work in this way might improve the quality of the method. From the results, a design space was created using principal component analysis on evaluations of products on the list of attributes. A product sample of four devices, as used in the word elicitation workshop, limited the evaluation of the attributes, and suggestively, a larger sample should be used for definging a design space.

Chapter 4

Extracting descriptors for User Experience

User Experience (UX) is a very broad term, incorporating anything that could potentially affect the experience of interacting with products. Creating general measures for the quality of UX is problematic, as all products have different purposes, contexts, users, and applications. Going back to basic need psychology poses a framework for deriving UX measures useful to any product category, while pinpointing how the needs manifest themselves for the use of a specific product category shows where to improve the experience.

4.1 Fundamental human needs as descriptor for UX

To be able to measures UX, different approaches towards mapping and defining aspects of UX has been proposed. One way is looking at UX as the emotional reaction, based on the interaction or to be interaction with the product [Kraft, 2012, p.1], and thus a form of emotional appraisal of the situation [Desmet and Hekkert, 2007]. Crilly et al. [2004] suggest that this appraisal is produced by an evaluation of instrumental, aesthetic, social, surprise and interest value of the product while Desmet and Hekkert [2007] suggest in more broad terms that a scheme of general and specific concerns and desires towards ones well-being is used as evaluation criteria. Hassenzahl et al. [2010] suggest a general approach based on fundamental needs, and argues, based on work from among others Sheldon et al. [2001], that "*[. . .]the fulfilment of particular psychological needs can be understood as a source of positive experience. [. . .] Positive experiences can be distinguished based on the primary need fulfilled.*", meaning that any experience can be evaluated by how well a number of fundamental needs are fulfilled, as fulfilment of these needs are what make humans happy, while lack of fulfilment will cause negative affect. The needs that Hassenzahl et al. [2010] are referring to are a combined list of needs, including the "big three" from which the self-determination theory is developed (see Ryan and Deci [2000]), namely Autonomy, Competence, and Relatedness, and needs from other psychological theories, as presented by Sheldon et al. [2001].
In the literature review by Sheldon et al. [2001], a list of 10 hypothetical human needs was derived; competence, relatedness, popularity, stimulation, meaning, security, autonomy, luxury, self-esteem and physically thriving. These are based on a comparison of psychological needs from self-determination theory by Ryan and Deci [2000], Maslow's theory of personality and Epstein's cognitive-experiental self-theory (For a list and brief description of the 10 hypothetical needs, see table 4.1 on the next page).
Sheldon et al. [2001] suggest that of the 10 potential needs proposed, *autonomy, competence, relatedness, safety* and *self-esteem* are actual fundamental needs, while *Pleasure-stimulation, self-actualisation, popularity-influence*, and *physical thriving* are less relevant, while luxury is the least important.
Sheldon et al. [2001] conclude that of the 10 candidate needs, the "big three" (autonomy, competence and relatedness), but also self-esteem might be fundamental psychological needs, which produce positive experiences when fulfilled. Further, the notion of security was found to be a need that when not fulfilled leads to unsatisfying experiences, but did not as such cause positive experiences like the aforementioned four needs. Therefore this was also seen as a fundamental need, of a different character as a sort of "must-have", but not adding much value after achievement. The remaining candidates for needs that affect the experience positively or negatively was not seen as potent, and was therefore discarded [Sheldon et al., 2001].

Need	Description	Theory
Autonomy	Feeling like you are the cause of your own actions rather than feeling that external forces or pressure are the cause of your action.	Self-determination theory
Competence	Feeling that you are very capable and effective in your actions rather than feeling incompetent or ineffective.	Self-determination theory
Relatedness	Feeling that you have regular intimate contact with people who care about you rather than feeling lonely and uncared of.	Self-determination theory
Security	Feeling safe and in control of your life rather than feeling uncertain and threatened by your circumstances.	Maslow's theory of personality
Self-esteem	Feeling that you are a worthy person who is a good as anyone else rather than feeling like a "looser".	Maslow's theory of personality
Self-actualization	Feeling that you are deceloping your best potentials and making life meaningful rather than feeling stagnant and that life does not have much meaning.	Maslow's theory of personality
Physical thriving	Feeling that your body is healthy and well-taken care of rather than feeling out of shape and unhealthy.	Maslow's theory of personality
Pleasurable stimulation	Feeling that you get plenty of enjoyment and pleasure rather than feeling bored and understimulated by life.	Epstein's cognitive-experiental self-theory
Popularity	Feeling that you are liked, respected and have influence over others rather than feeling like a person whose advice or opinion nobody is interested in	Derber on the *American dream*
Luxury	Feeling that you have plenty of money to buy most of what you want rather than feeling like a poor person who has no nice possessions.	Derber on the *American dream*

Table 4.1: Listing of the 10 candidates for psychological needs, as presented by Sheldon et al. [2001], with definitions taken from Hassenzahl et al. [2010]

Accordingly, 5 psychological needs are determining the pleasantness of an experience (see table 4.2). In Sheldon et al.'s words, "*According to the current research, the answer is autonomy, competence, relatedness, and self-esteem. Security may also be a need, which becomes salient in times of privation.*" [Sheldon et al., 2001]

Autonomy	Competence	Relatedness	Self-esteem	Security

Table 4.2: The five psychological needs that determines satisfying events [Sheldon et al., 2001]

Need fulfilment is a good descriptor for past positive and negative experiences [Hassenzahl et al., 2010; Sheldon et al., 2001], however, the number and definition of the fundamental needs relevant to describe experiences is not settled upon. Both Sheldon et al. [2001] and Hassenzahl et al. [2010] showed significant relation between need fulfilment and the affect experienced. From a need fulfilment viewpoint, the quality of a product lies in it's capabilities to aid the user in fulfilling the fundamental needs. As Hassenzahl et al. [2010] argues, only in cases where the product is seen as responsible for (or attributing to) the experience quality, is the experience related to product perception in hedonic parts of the judgement. But products does rarely aid users in achieving all fundamental needs at once, and while they may aid in fulfilling some, they may challenge others. Relating to the case of injection devices, these products basically aids users in fulfilling the need for physical thriving and safety on a long term scale, while they suggestively challenge the user's need for relatedness and autonomy (for a discussion on living with diabetes and injection devices, see appendix I). Applying the evaluation of need fulfilment to UX, refers well to the appraisal phase of product experience, suggested by Desmet and Hekkert [2007] and Crilly et al. [2004]. While Desmet and Hekkert [2007] suggests that users evaluate a product against some general and specific *concerns* about the well-being of the users to form a positive product experience, Crilly et al. [2004] refers to instrumental, aesthetic, social, surprise and interest desires. A generalised list of needs should, according to Hassenzahl et al. [2010], cover the fundamental scheme that explains these desires or concerns suggested by Crilly et al. [2004] and Desmet and Hekkert [2007] which creates value regardless of contextual or personal differences. Any environmental factor can, according to Ryan and Deci [2000] be explained through these needs (in their work it is called motivation). When implemented into the framework presented by Crilly et al. [2004] (see chapter 2), this reduces the complexity of the framework, as any stimuli not coming directly from the product can be replaced with need fulfilment (see figure 4.1).

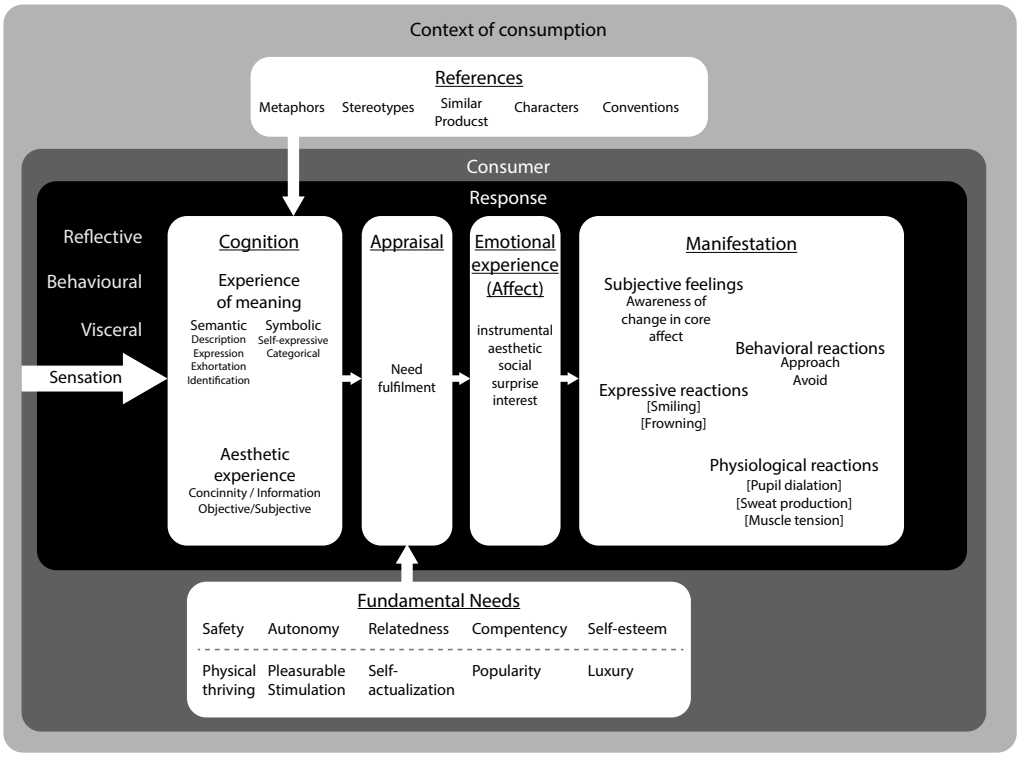


Figure 4.1: Simplification of the framework by Crilly et al. [2004] on how product are experienced, by applying the theory of UX as need fulfilment by Hassenzahl et al. [2010], to account for the user part of product appraisal.

To be able to evaluate a product, the possibility of negative experiences is as important to record as positive experiences, why the limitation to only 5 needs concluded by Sheldon et al. [2001] could potentially remove important basis for why a bad experience is bad, as the focus for that research was on satisfying experiences. E.g. one could imagine that very painful bodily states (low physical thriving) could provide uncomfortable experiences, even though physical thriving, as suggested by Sheldon et al. [2001], is not a good descriptor for what produces satisfying experiences "*in times of privation*" [Sheldon et al., 2001]. As Sheldon et al. [2001] mention, one cannot assume that the same thing that produce pleasurable experiences is what is lacking in bad experiences. Conclusively, no reduction in the number of needs can be made based on the work of Sheldon et al. [2001] nor Hassenzahl et al. [2010] to ensure that both positive and negative experiences can be explained. While Sheldon et al. [2001] showed that people are capable of evaluating how much they felt a sense of autonomy, competence etc., in a past experience, evaluating UX at the time of use might cause problems for the user, as the user will not be aware of latent needs, that is, what the user really needs [Kraft, 2012, p.30-31].

Therefore, relying on the fulfilment of fundamental human needs is by Kraft [2012] seen as inadvisable. Instead, defining fundamental human needs as product user needs, by understanding how the fundamental human needs manifest themselves in a given situation should be applied, to ensure valid and tangible criteria for good UX [Kraft, 2012, p.27–28]. To do so requires an understanding of the lives the users live [Kraft, 2012, p.32].

4.2 Fundamental needs in the context of injection devices

To create the best possible measures for the UX in the context of injection devices means going from fundamental human needs to fundamental injection device user needs when doing injections [Kraft, 2012, p.27-29], as understanding the situation and the user is as much part of understanding the UX as understanding the product [ISO 9241-210:2010, 2010]. The exploration on how need fulfilment are challenged in relation to injections is done in collaboration with anthropologists from Novo Nordisk A/S. The goal is to list a number of UX aspects, describing need fulfilment in the context of injection devices.

4.2.1 Method

To best enable the knowledge of the anthropologists, an interview is performed with the focus question being *how are injection device user's challenged by their status as injection device users, and what are the needs that they would benefit from fulfilling?* The anthropologists have years of experience working with understanding the users of injection devices, through a number of week-long studies on real users [Nordisk, 2017], and to best enable the anthropologist to present this knowledge, the open-ended unstructured interview form is chosen. For the analysis, several methods are evaluated for application (for a description and discussion on qualitative data analysis methods, see appendix J). A difference is expected in the type of data gathered from users compared to data from an expert reporting on behalf of users, presenting conclusions from several user studies, and therefore the purpose of the analysis method is different. For data with users, the purpose of the analysis method is partially to make sense of the data, and extract what and how data is valuable to the objectives. When talking to an expert, aware of the study objective, it should not be needed to the same degree to search for the important passages in the data. As the expert speaks on behalf of user studies, the process of extracting the valuable inputs has already been done, and what is presented by the expert would be the conclusions and means of understanding the data. Therefore, word-by-word or line-by-line initial coding as used in grounded theory to understand the actions present in the data could potentially be futile, as the message is already presented in meaningful ways, and transformed from actions to concepts by the

expert. Meaning condensation is evaluated to have the proper amount of analysis needed to create meaningful initial coding of the data, condensing the data and making it comparable to the rest of the data, without changing the character of the data.

When using meaning condensation, the data is split into meaning units and then condensed into a central theme. When done, the central themes can then be used for further analysis of how the data can help explain or elaborate on the research question [Kvale, 1997, p. 192] (For further description, see appendix J).

To triangulate, the result will be compared to previous research on the users of injection devices (presented in appendix I). This will further enable an evaluation of which of the fundamental needs that are most challenged by the users' situation.

4.2.2 Results and analysis

The interview is held may 17th 2017 with an anthropologist at Novo Nordisk A/S. The interview took 1h04m (for transcripts of the interview, see appendix G.4).
An extraction of natural meaning units results in 78 meaning units, which are condensed through meaning condensation into condensed meaning units or central themes (for the documented result, see appendix K). These units will be the base for reference to the interview in the form of a reference to the interview, followed by a reference to the natural meaning unit's number in the documented result, representing a part of the transcript with responding line numbers, the condensed meaning unit, and the central theme (e.g. [i3, unit 42]).
As suggested in the interview, it might be more meaningful to talk about goals than needs, why the list takes the form of experience goals rather than user needs. The evaluation of how each condensed unit helps define aspects of the user experience provide 13 experience goals, related to user needs, which are described below with the argument from interview data.
The experience goals are:

1. Users need to know whether or not they have taken their medicine, which is a problem to some. As it becomes a daily routine, whether or not it has been done can be hard to remember [i3, unit 4]. A little like turning off lights or locking the door, except there is no clear evidence whether it has been done before the body starts reacting.

2. The experience of using a device needs to feel simple and introduce only few things to understand. The action of taking the medicine should not be a problem, as there are plenty of problems already, having diseases needing injection treatment [i3, unit 46, 75, 43].

3. Users need to feel able to do the things they like, and avoid changing into a life that makes them unhappy. The lives they live is what makes users happy, and diabetes is what forces them to change into something they do not like. [i3, unit 70]
4. Users need to understand what is happening. If the user do not understand they will feel like a failure [i3, unit 50, 47]
5. The experience should not feel obtrusive or like 'it fills a lot' in the users life [i3, unit 74]
6. Users do not want to feel stigmatised by their situation. Rather, the experience should feel like it allows them to stay part of the community they like. [i3, unit 33, 37]
7. Users wants to feel served and relax [i3, unit 69, 71]
8. The experience should feel like it is easily integrated into a user's life, as users would benefit from integrating diabetes into their lives instead of pushing it away [i3, unit 57]
9. Users should not feel like they need to prioritise this above other priorities like e.g. feel togetherness and belongingness, as they will not do so. [i3, unit 36, 56, 58]
10. Users need to feel like the experience is made for them, and not for someone else [i3, unit 65, 32, 55]
11. Users need more than just getting told what to do, as this will not make them do it. [i3, unit 31]
12. Users need to be motivated by other things than staying healthy and weight loss to actually stay in control, as healthiness and weight loss is not a goal for the user in itself [i3, unit 34, 28]
13. Users need to feel like their actions are meaningful [i3, unit 41, 73]

4.2.3 Discussion of results

As suggested by the anthropologist in the interview, the user should be key in setting up criteria for the UX-aspects, and it is therefore important to see the experience from the user's perspective. Only users themselves can evaluate what makes them happy and how [i3, unit 63, 39]. Some key focus points related to user's perspective on the experience for the evaluation and further development on the list is derived from the interview, which will be presented below.

Diabetes is a cultural problem, and the treatment is a minor part of living with diabetes. Further, the tools for injecting the medicine is only part of the treatment,

as the injection device is only part of the package the user gets and needs to relate to. Additionally, the actual use of the device compared to receiving, storing, bringing, disposing and ordering the device is also just a small part [i3, unit 43, 45]. Conclusively, there might be problems that cannot be expected to be solved by the injection device, and there might be problems that the injection devices do not even affect. Therefore the UX-aspects needs to focus on the parts of the experience that is actually affected by the device, while still focusing on the aspects that actually affects the experience and not only the device's quality assessment. The presented data focus on what it is like living with diseases like diabetes. It does not tell how the injection device might solve these problems, or which problems are actually impacted by the use of injection devices [i3, unit 43, 53]. This suggest that an evaluation of which aspects might be relevant to measure in the context of using an injection device should be evaluated, to avoid setting up UX-aspects that has nothing to do with the device.

Using users own language enables them to stay in their own understanding of the world [i3, unit 75]. Therefore, any UX-aspect should strive to use words that users would likely use themselves, rather than medical or engineering words.

We cannot assume that one size fits all. People are different and have different cultures and impressions of aesthetics [i3, unit 62, 64]. Therefore what is adding to a positive experience is different between people, as well as the criteria themselves for a positive experience will be different. However, as suggested, moving down to fundamental ideas of a good life, we search for the same things, like fundamental needs. This suggest that while there are very different ways of realising and experiencing them, what we all strive for could be the same fundamentals.

Some users are fundamentally different than the people designing the devices, as they are part of a different culture, and value different things. We need to understand that this does not mean they are miserable and live bad, unhappy lives. Contrary, we need to understand that what we are asking them to do to get in control with their disease might force them to move themselves away from the culture they like living as part of, and thereby put them in a difficult situation. Things that are common and positive for us might be seen as negative and odd to them and the other way around. E.g. amputations might not be as much a horror scenario for them as it is to us, while healthy food and exercises is not part of a good life to them [i3, unit 51,52]. This suggest that people living with these diseases live with problems in their daily lives more due to the treatment of the disease than the actual disease.

You cannot ask users about needs, as they do not have needs they have not resolved. Instead you need to look at bad solutions that takes a lot of effort

from the users [i3, unit 3]. The work used to define UX-aspects thus cannot be based on asking users what they need to change in their experience, but rather an analysis of their behaviour. While this might initially be seen as contradicting the theory of need fulfilment, this relates to the construct of latent needs, that is what the user really needs but is not aware of, however fulfilling these needs will cause a pleasant UX [Kraft, 2012, p.30-31].

Based on this discussion, a number of criteria for what makes the UX-aspects good measures are set up. These are:

1. UX-aspects must affect the user's experience. Otherwise, the aspect is not relevant to measure.
2. UX-aspects should focus on aspects of the experience related to the injection device. Otherwise, the aspect is not relevant for relating to device attributes, even though it is relevant for the experience.
3. UX-aspects should describe the experience, not the product. This relates back to the initial thesis, as users should only evaluate experiences.
4. UX-aspects should be focused enough to expect a difference between how injection devices are experienced on the aspect, and accordingly the aspects should not be so general that the device have insignificant impact. In the same manner, the experience to be evaluated should be narrowed down to a timeframe where the use of the injection device would be of significant importance to the experience.

To determine the found experience goals' applicability as aspects of UX with injection devices, they are evaluated against the presented criteria. Additionally, findings from previous studies from both Novo Nordisk's anthropologists, and the published work by Wikblad et al. [1990] is evaluated on the same criteria as well.
A number of the found aspects do not meet criteria 1 of being relevant for the use of injection devices directly. Therefore these will be discarded from the initial list of aspects. A further investigation of how to apply these aspects will be conducted later. The aspects removed are:
"Users should not feel like they need to prioritise this above other priorities as they will not do so."
"The experience should feel like it is easy integrated into a user's life"
"Users needs to know whether or not they have taken their medicine, which is a problem to some."
"Users need to feel able to do the things they like, and avoid changing into a life that makes them unhappy. "
"Users do not want to feel stigmatised by their situation."
"Users wants to feel served and relax"

”Users need more than just getting told what to do”
”Users need to be motivated by other things than staying healthy and weight loss”

Left for the list are five aspects. These are condensed into contrast word pairs:

- Simple - Like a lot to deal with

  The experience of using a device needs to feel simple and introduce only few things to understand. The action of taking the medicine should not be a problem, as there are plenty of problems already, having diseases needing injection treatment.

- Understood - Confused

  Users need to understand what is happening. If the user do not understand they will feel like a failure [i3, unit 50, 47]

- Meaningful - meaningless

  Users need to feel like their actions are meaningful [i3, unit 41, 73]

- Obtrusive - Inconspicuous

  The experience should not feel obtrusive or like ‘it fills a lot’ in the users life [i3, unit 74]

- Meant for me - Meant for someone else

  Users need to feel like the experience is made for them, and not for someone else [i3, unit 65, 32, 55]

The study, suggested as inspiration in the interview is an analysis of the words used to describe the impressions of an injection device used for obesity control, and a following workshop with potential users done by Novo Nordisk [i3, unit 7]. In this study 10 metrics were derived in the form of contrast word pairs. These were

1. Painful – not painful
2. Understood by product manufacturer – not understood
3. For on the go – for home use
4. Intimidating – Appealing
5. Draws attention – discreet
6. Easy and simple – complicated

7. Effective – not effective
8. Medical – cosmetic
9. Scary – comfortable
10. Safe – un-safe

From this list, ”Effective – not effective”, ”Draws attention – discreet”, ”For on the go – for home use”, and ”Medical – cosmetic” are focused on the description of the device rather than the experience with the device, and therefore do not meet criteria 3 for UX-aspects. The remaining word pairs are measures of the experience with the device and thus, the following aspects can be added to the list:

- Painful – not painful,
- Intimidating – Appealing,
- Scary – comfortable,
- Safe – unsafe, and
- Easy and simple – complicated
- Understood by product manufacturer – not understood

Further, nine metrics were derived by Wikblad et al. [1990] about the experience of living with diabetes (see appendix I). These were

1. constrained - free
2. weak - strong
3. dominant - submissive
4. worthless - valuable
5. difficult - easy
6. unsafe - safe
7. tense - relaxed
8. monotonous - varied
9. independent - dependent

Due to the focus of this study, some of the metrics are deemed not affected by the device at all, and therefore do not meet criteria 2 of UX-aspects. These are ”dominant - submissive”, ”independent - dependent”, ”worthless - valuable”, and ”monotonous - varied”, why these are discarded. The remaining are seen as aspects of living with diabetes that can actually be affected by the use of injection devices, and therefore the following are added to the list:

- constrained - free,
- weak - strong,
- tense - relaxed,
- unsafe - safe, and
- difficult - easy.

Conclusively, this gives list of 12 potential aspects, when redundant aspects removed:

- Simple - Like a lot to deal with
- Understandable - Confusing
- Meaningful - Meaningless
- Obtrusive - Inconspicuous
- Meant for me - Meant for someone else
- Very painful – Not painful
- Intimidating – Encouraging
- Scary – Comfortable
- Safe – Unsafe
- Constrained - Free
- Weak - Strong
- Tense - Relaxed

While ”intimidating - appealing”, as presented by Wikblad et al. [1990] is a valid aspect of an experience, appealing seems like a close synonym to a purely positive experience. As this aspect should not be a direct measure on the quality of the experience, appealing is changed to encouraging.
”Understood by product manufacturer – not understood” is evaluated to be explained by the aspect ”Meant for me - Meant for someone else”, and is therefore

excluded. The aspects ”Constrained - Free” and ”Weak - Strong” are describing a personal state, while the remaining aspects describe a situation or experience. Therefore these must be asked in different ways to make sense to the user.

As suggested by Kraft [2012], user needs can often be related directly back to fundamental human needs [Kraft, 2012, p.27]. However, comparing the derived list of aspects to the aforementioned theory of fundamental need fulfilment does not make a clear one-to-one connection between aspects and fundamental needs. E.g. the aspect meaningful - meaningless could stem from a need for both security, competence, pleasurable stimulation or relatedness. One can easily imagine a user experience where the meaninglessness can be felt as a lack of pleasurable stimulation (like looking at art that does not make sense), but it could also lead to a sense of confusion, questioning own competencies, affect ones experience of safety, or one's ability to react socially correct, if it is thought that others do find meaning in the experience (relatedness). Other aspects have close relationships to one single fundamental need like e.g. safe - unsafe that should be closely driven by the need for security. A further exploration into deeper constructs of what makes an experience feel e.g. confusing or simple, could therefore be conducted to connect the fundamental needs with these aspects. However, as suggested in the results from the interview, doing so would move the aspects from what users experience, to how researchers defines an experience. Keeping the aspects at this level allows the respondents to evaluate it on aspects that are more easily related to how they see the world. The experience goals discarded from the list due to their content being of little relation to the actual use of the injection devices still pose real problems for users that could still be relevant for the design of injection devices. E.g. if new concepts are to be developed, focusing on aiding users in new ways, adding functionality to help other aspects than just the use of the device, like e.g. the transportation and mobility of the injection devices , and aspects not related to the device but rather the packaging or the ecosystem [i3, unit 71]. Accordingly, all dependent on what the device is meant to aid the user in doing, beyond injecting the medicine, the UX-aspects may change. Additionally, one could imagine tools to help users feel like they do not have to change their priorities away from what makes them happy to stay in control, to help them integrate diabetes into their lives, know whether or not they have taken their medicine, do the things they like, feel less stigmatised by their condition or feel served and relaxed. For the purpose of developing the methodology, the focus will stay on the UX of injecting with the injection device.

4.3 Evaluation through application of UX-aspects

The found UX-aspects are evaluated through application in a user study, to evaluate how well the found UX-aspects is understood and can be related to, when introduced to a user panel and to further provide input for the comparison of UX-aspects, product attributes and UX-quality, presented in the following chapter.

4.3.1 Method

The study is set up as a use-case study, where the user will use the product, and afterwards evaluate the the experience on the list of UX-aspects.
In a similar manner, the overall experience is evaluated through a 7-point category scale ranging from Negative to Positive, finishing the statement *"The overall experience was"*.
Due to the similarity of structure between the data derived from the product attribute rating and the UX-aspect rating, the same reservations and methods towards the data can be applied as for the evaluation of product attributes. The same structure of the aspects are defined as for the attributes, having two poles, meaning that the opposite pole can be seen as a mirrored placement in the PC space (see section 3.5, figure 3.9). However, painful - not painful have only one pole, where the zero-point lies at the right end of the scale, and not in the middle of the scale, as for the other aspects and attributes. The uni-polar structure of this attribute should be recognised in the analysis.

Data analysis methods

Initially, the data is evaluated for how well the UX-aspects explain the overall UX quality. This is done through an ANOVA on the linear model

$$OverallQuality \sim UXAspect1 + UXAaspect2 + ... + UXAaspect12 \quad (4.1)$$

By calculating the multiple R^2, explained simply as total variance / explained variance, a percentage of prediction power can be made [Tormod et al., 2011, p.235]. No analysis of where the error is made or if the error is systematic will be made. To perform this analysis, the function *lm* in the program R Version 2.3.2 is used (For the r-script, see appendix H).
Data will further be analysed and evaluated in a manner similar to the product attribute evaluations (see chapter 3, section 3.5), using the same tools in the program Panel Check version 1.4.2, like the *explained variance*, *Tucker-1 Overview on attributes*, *Product effect* and *Bi-plot* functions, allowing for a PCA and inspection and interpretation of Tucker-1 plots, along with normalised product scores and UX-aspect loadings on the principal components presented in graphs and bi-plots (for a theoretical description of these methods, see appendix C).

User and product sample

To gain the most valid results of how injection device users experience the use, a sample of real users with experience in what it is like to live with diabetes and using injection devices should be used for the evaluation. The reasons for this is twofold: First, as suggested in the anthropologist interview (interview 3), it it not easy for non-users to know and understand what is important when living with diabetes. As the UX-aspects are based on the problems injection device users experience in their life, for non-users to evaluate how well the experience solves these needs would be hard. Secondly, as suggested by Karapanos et al. [2009b], there are different elements affecting the experience dependent on when in the product adaption cycle the product is used. If users have never experienced injection devices, this would cause them to have a very different experience, driven by stimulation- and learnability qualities of the device, where an experienced users' evaluation would be driven by other qualities such as emotional attachment, long-term usability and usefulness [Karapanos et al., 2009b]. Therefore, if the user is not to bring home the device and use it until the final state of product adaption is done, this must be achieved by enabling a sample of users who can better do so instantly by comparing to previous experiences. While this does not compensate from applying the devices in long-term studies, the experienced users would have a better idea of what a device would feel like to live with for a long time.
Users with diseases treated with injection devices is a sensitive and hard to reach group for user studies, requiring contact and approval from health organisations and ethical councils, due to recruitment based on highly person sensitive criteria. For evaluating the understandability of the scales, a sample of non-users can be applied, only that this sample will not provide reliable data of what real users appreciate in the experience. The sample used in this study will be non-user sample, restricting the data for method-evaluation purposes only. No demographic data is gathered about the participants except for their gender. This allows for anonymity, if the same method should be used on diabetes patients or other injection device users.
The product sample is the same as used in the product attribute evaluation study, 4 marketed devices anonymised with aliases (see figure 4.2).

Figure 4.2: 4 marketed devices, used as sample for the study of UX-aspects

The list of UX-aspects is presented on a UX-evaluation sheet, including a vocabulary describing the aspects, and instructions for filling out the sheet, inspired by the sheet used for evaluating product attributes (for a cutout, see figure 4.3, for the entire sheet, see appendix D, section D.3).

The experience felt

1)	Simple	○	○	○	○	○	○	○	Like a lot to deal with
2)	Meaningful	○	○	○	○	○	○	○	Meaningless
3)	Obtrusive	○	○	○	○	○	○	○	Inconspicuous
4)	Meant for me	○	○	○	○	○	○	○	Meant for someone else
5)	Very painful	○	○	○	○	○	○	○	Not painful

Figure 4.3: Cutout of the evaluation sheet used to measure UX-quality. For the entire sheet, see appendix D, section D.3

The vocabulary is created by reading through definitions provided by online dictionaries of the words used as poles, selecting the ones that are similar to the understanding the word represents in the context from which it is derived to the list (for example, see figure 4.4). For some aspects no definition was available online, due to the aspects being short sentences. In these cases, the definition was created defining the meaning of the aspect dictated by the source of the aspect, copying the syntax style from the definitions found in online dictionaries. The poles of an attribute are kept together in the vocabulary to aid the user in forming the relation between the terms to create the construct on which the experience is evaluated.

Intimidating - Encouraging	Intimidating: Fill with fear, force by inducing fear Encouraging: Stimulate, promote or inspire with courage, assistance or approval

Figure 4.4: Example of description of a UX-aspect from the vocabulary provided to the users in the UX-evaluation. For the entire vocabulary, see appendix D, section D.3

Procedure

The participant is welcomed and introduced to the study's purpose and which information about the user that is gathered. If the user agree to the terms, the evaluation sheet is presented and described, after which the product sample is presented. The facilitator demonstrates how to simulate an injection into the injection pad, by removing the cap form the device, setting the dose by dialling, removing the needle cap, inserting the needle into the injection pad, injecting the test-medium by pressing the button, removing the needle from the injection pad, recap the needle and lastly recapping the device. Further, the user is asked to imagine that this simulation is an actual injection into their own stomach, and through this try to imagine how it would feel. If the participant have no questions, the study initiates by the user reading through the evaluation sheet, indicating evaluator, device and evaluation number and afterwards performing a simulated injection and evaluating the experience on the UX-aspects on the UX-evaluation sheet. The participant is told to ask the facilitator immediately if any questions or confusion arise about the handling of the devices, the meaning of what is written on the evaluation sheet or anything else. When the evaluation is complete, the participant is given a new evaluation sheet and a new device. This is repeated until all four devices are used, and the experience evaluated. If the participant have any comments or questions to the study, these are answered, after which the study commences.

4.3.2 Results and analysis

Ten users performed evaluations of the experience using the four devices, resulting in 40 UX-evaluations on the 12 UX-aspects along with an overall evaluation, with a few missing values (for a numerical summary, see table 4.3). The user sample used in this study consist of 10 Engineering Psychology Master's students, split between 4 men and 6 women.

Attribute	*Pen 1*	*Pen 2*	*Pen 3*	*Pen 4*
Simpe-Lottodealwith	2.3[1-5]	3.6[1-6]	3.7[1-6]	2.7[1-6]
Meaningful-Meaningless	2.9[1-5]	3.0[1-5]	3.2[1-6]	2.7[1-6]
Obtrusive-Inconspicuous	5.0[2-6]	3.7[2-6]	4.1[2-7]	3.2[1-6]
Meantforme-Meanforsomeoneelse	3.1[1-6]	3.5[1-6]	3.6[1-7]	3.4[1-7]
VeryPainful-NotPainful	4.6[3-6]	4.1[2-6]	4.8[1-7]	3.6[1-7]
Intimidating-Encouraging	4.6[2-7]	4.1[2-6]	3.3[1-6]	3.9[2-6]
Scary-Comfortable	4.6[3-7]	4.4[2-7]	3.8[1-6]	3.9[2-6]
Safe-Unsafe	2.4[1-4]	2.2[1-6]	3.9[1-6]	3.8[1-7]
Tense-relaxed	4.3[1-6]	4.0[2-6]	3.6[1-7]	3.3[1-6]
Understandable-Confusing	1.8[1-4]	3.8[1-6]	3.9[2-6]	2.1[1-4]
Constrained-Free	4.4[2-6]	3.7[3-6]	4.1[2-7]	3.8[2-6]
Weak-Strong	5.3[4-7]	4.8[3-7]	4.0[2-6]	3.9[1-7]
Negative-positive	5.4[4-6]	5.0[2-7]	3.8[1-6]	4.3[2-7]
Avg range	3.8	4.4	5.1	4.9

Table 4.3: Product attributes evaluated for the four device, presenting mean and range of evaluations $mean[range]$. Numbers higher than four indicates that the product are more to the right pole, while numbers lower than four indicates that the product is more to the left pole. A number around four means equal levels of the two attributes. The final row of the table indicates the average range.

Amount of variance explained: An initial ANOVA is made on a linear model for UX-quality explained by the 12 UX-aspects, as presented above, using the linear model function in showing that the found aspects explains 78 % of the variance in UX-quality (for the R-script and output, see H).

Significance of attributes: An evaluation of an ANOVA created using the *Product Effect 2-way ANOVA* function in Panel Check, shows only two significant attributes (see figure 4.5). Insignificance indicate that the products within the sample does not change the evaluation of the given attribute significantly, and the attribute is therefore not relevant for describing the design space the sample represents as the products have close to same score on this attribute. However, no aspects are removed due to this, as it is concluded that the sample size was too small with a large variation in responses to conclude on aspects which are not describing for the experience.

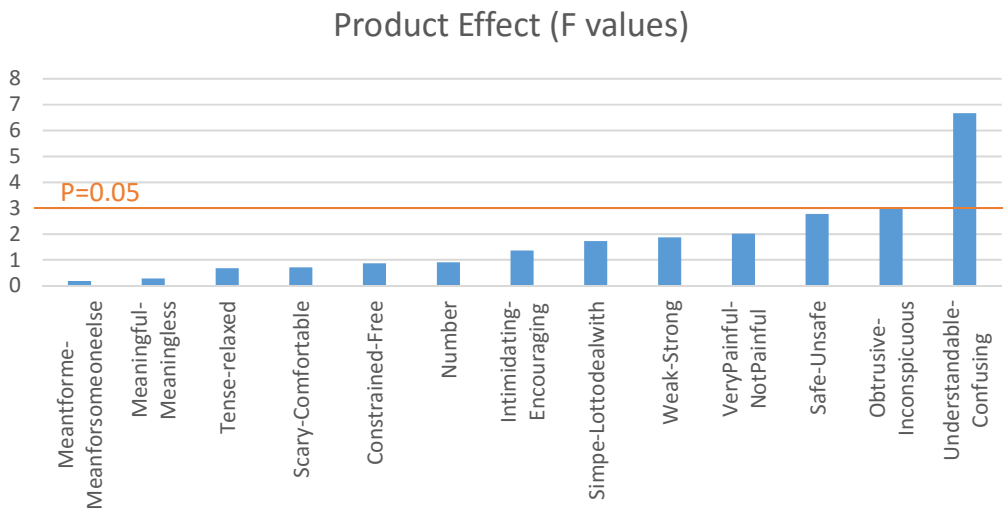
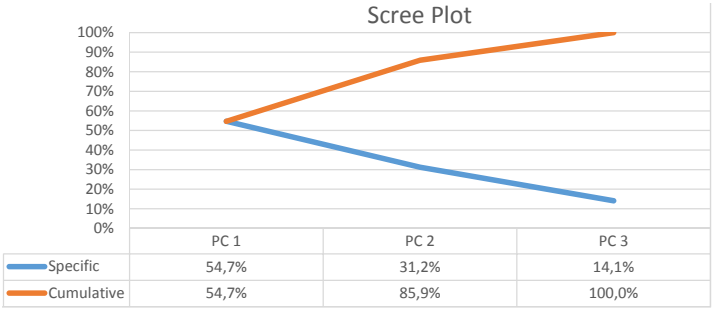


Figure 4.5: Diagram of F-values from an ANOVA created with PanelCheck, evaluating the device's effect on the 12 UX-aspects in ascending order. The horizontal line indicated the chosen significance level of P=0.05. As the table shows, only two aspects show significant product effect

Explanation of variance: A scree-plot is made to analyse the explanation of variance in the PCA. As suggested previously, the sample of 4 devices, results in 3 components to explain any variance between the products, resulting in 100% cumulative explained variance, while the PC's explain 54.3 %, 31.2 % and 14.1 %, respectively (see figure 4.6). Further, the scree plot indicates that PC1 explains the main difference and thus should have the highest say when analysing the results, PC2 having about half as much, and PC3 about a half of PC2.



	PC 1	PC 2	PC 3
Specific	54,7%	31,2%	14,1%
Cumulative	54,7%	85,9%	100,0%

Figure 4.6: Scree plot indicating cumulative and specific variance of UX-aspects explained by the PC's

Evaluation of assessor disagreement and contribution: The analysis is continued with a visual inspection of tucker-1 plots from a PCA on the flattened data for each attribute (for an overview of tucker-1 plots for all attributes, see appendix H, section H.2). The analysis shows a high degree of variance in responses for all aspects, as also suggested by the range differences presented above (for example, see figure 4.7 and 4.8). Additionally, some respondents show very limited effect on the PCA, however, these are not the same respondents throughout all attributes (also visible in figure 4.7 and 4.8).

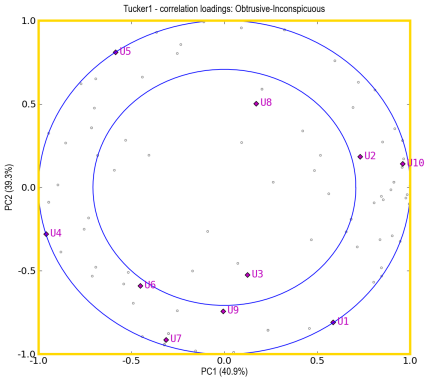


Figure 4.7: Tucker1 plot on the PC1 and PC2 for the attribute *Obtrusive - Inconspicuous*. U1-A10 indicate the respondent's individual placement in the PCA. Loadings from respondents within the inner circle indicates little effect on the PCA by the respondent. Long distance between the respondents indicate disagreement in evaluations

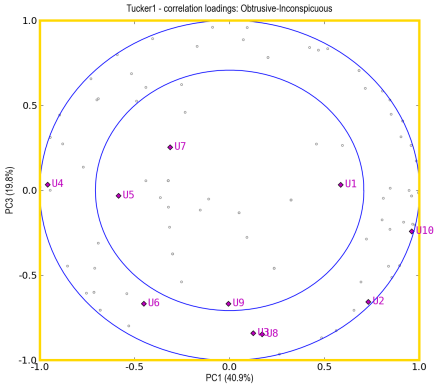
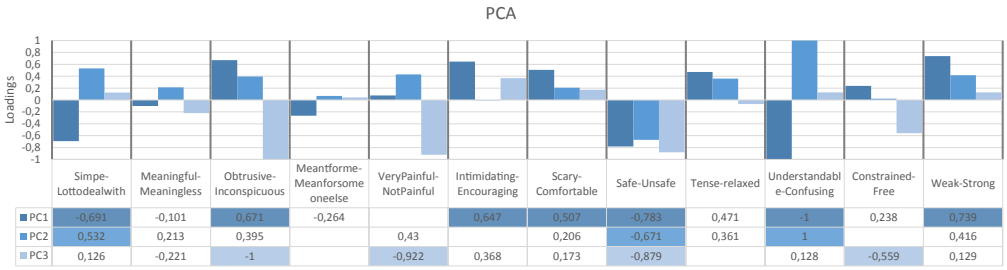


Figure 4.8: Tucker1 plot on the PC1 and PC3 for the attribute *Obtrusive - Inconspicuous*. U1-A10 indicate the respondent's individual placement in the PCA. Loadings from respondents within the inner circle indicates little effect on the PCA by the respondent. Long distance between the respondents indicate disagreement in evaluations

Meaningfulness in data: The attribute loadings on a PCA on all attributes shows that all attributes load high in at least one of the PC's except the attributes *meant for me - meant for someone else, Meaningful - meaningless* and *tense - relaxed*, whereas *meant for me - meant for someone else* hardly have any loadings at all (see figure 4.9). This indicates that this UX-aspect did not represent any difference between the samples used in the study, also indicated by the lowest product effect derived from the initial ANOVA.



	Simpe-Lottodealwith	Meaningful-Meaningless	Obtrusive-Inconspicuous	Meantforme-Meanforsomeoneelse	VeryPainful-NotPainful	Intimidating-Encouraging	Scary-Comfortable	Safe-Unsafe	Tense-relaxed	Understandable-Confusing	Constrained-Free	Weak-Strong
PC1	-0,691	-0,101	0,671	-0,264		0,647	0,507	-0,783	0,471	-1	0,238	0,739
PC2	0,532	0,213	0,395		0,43		0,206	-0,671	0,361	1		0,416
PC3	0,126	-0,221	-1		-0,922	0,368	0,173	-0,879		0,128	-0,559	0,129

Figure 4.9: Chart of each UX-aspect's normalised loading on the three PC's, along with a table listing the specific score. Highlighted with colours in the table are main loadings (above 0.5), while zero-loadings (below 0.1) are removed. This must be seen only as assistance for reading the table, and is not included in the analysis of data.

To visualise the UX-aspect's placement along with the product sample on the PCA, a bi-plot is made (see figure 4.10 and 4.11, next page). From the bi-plot, the data is verified for difference in the products used to create the PCA and redundancy in aspects.
First, the bi-plot shows how the product samples are placed very differently in the space, indicating that there were real differences in the experiences for the user. Looking at the UX-aspects, "Strong", "Inconspicuous", "Relaxed" and "Comfortable" are almost redundant in the first two PC's, while they differ in the third. However, "Strong" and "Comfortable" are very alike in all three PC's, indicating redundancy between these two aspects. As also present in the loading chart, "Meaningless" and "meant for someone else" shows only little effect on all three PC's, indicating small amount of added meaning to the analysis by implementing these UX-aspects. To exemplify the further analysis of the bi-plot, a few solid points are presented: In general, all aspects expected to be positive lies in the upper right square of the graph, while the negatives are located spread across the left part top and bottom squares. Noticeably, the negative aspects "confusing", "lot to deal with", and "meant for someone else" lies close together, while "painful" and "unsafe" lies very different places in the plot, indicating that these might be very different aspects from the three others, while still being negative. Adding this meaning to the sample, *Pen 1* seem to be related to positive UX-aspects, while *Pen 3* and to some extend *Pen 4* seem to be related to negative UX-aspects. *Pen 2* lies close to perpendicular to an imaginary positive-negative line, and should therefore be related to neither. *Pen 1* is related with relaxed, strong, inconspicuous, simple, understandable and meant for me. *Pen 3* is closely related to intimidating, while *Pen 4* is related to obtrusive, when inspecting all three PC's. *Pen 2* lies much by itself, not closely connected to any attribute in all three dimensions. While it lies close to "very painful" in the third dimension, this lies opposite in the second dimension, and have almost no loading on the first dimension.

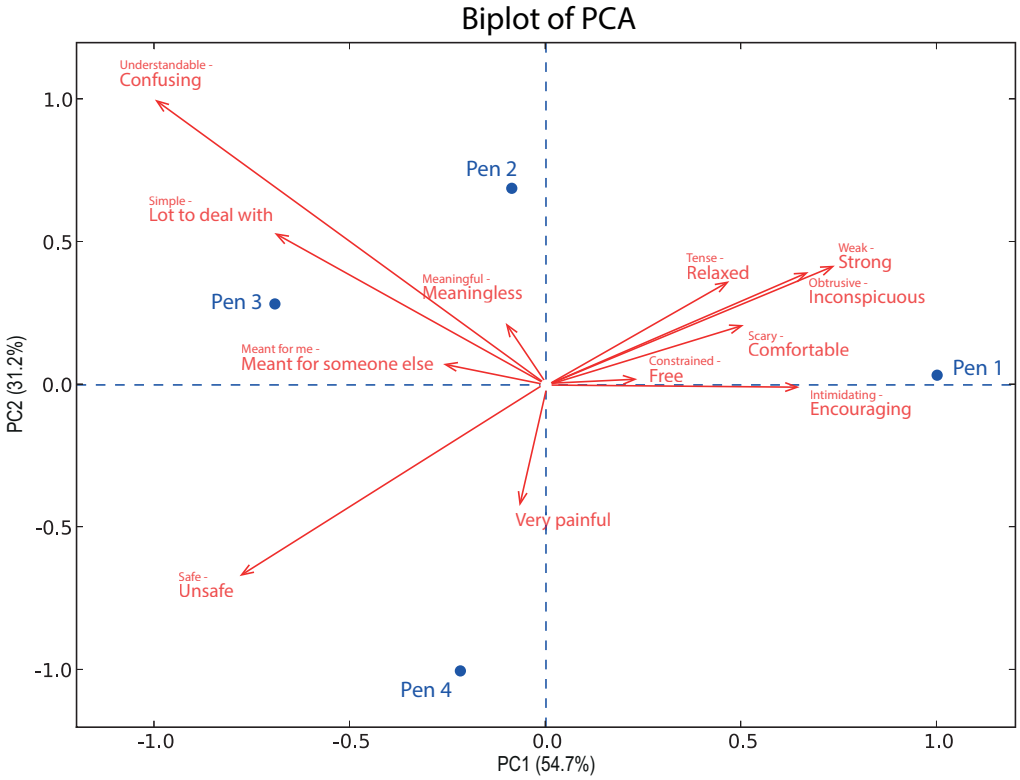


Figure 4.10: Biplot of attributes and product's placement on the two components PC1 and PC2 from the PCA.

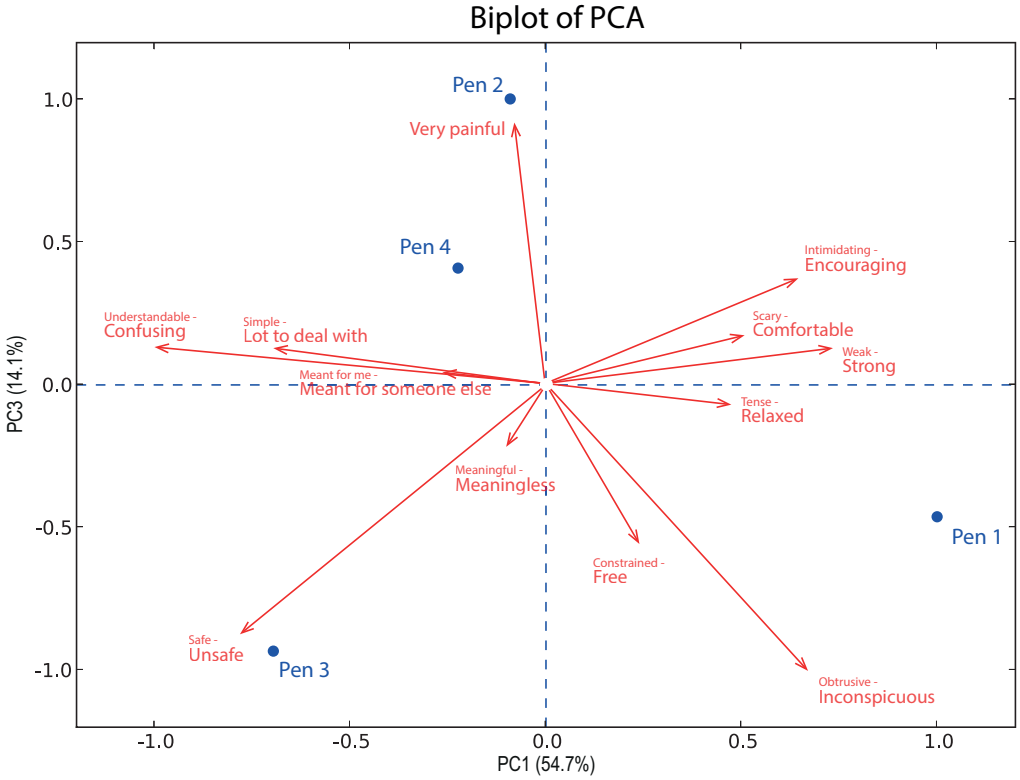


Figure 4.11: Biplot of attributes and product's placement on the two components PC1 and PC3 from the PCA.

As the goal of the analysis is only to evaluate the quality of the data, no further analysis of the results are made. Additional analysis of the current data will be presented in the comparing of UX-aspects to the product attributes in the following chapter.

4.3.3 Discussion of evaluation study

Through the analysis, a number of focus points emerged for the evaluation of data quality. First, the analysis showed a high amount of variance in response for the same product between respondents. The reason for this might be that either the users did not understand the aspects in the same way, the product performed different during the use-case, or users feel different about the experience, and thus rate it differently. No indication of neither confusion towards the aspect nor differences in the experience due to the product being different was observed during the use-case study. Contrary, users feeling different about the same experience seem to be a likely cause. As presented in the anthropologist interview, the *one size fits all* approach, does not apply to real users, who have very different lives and experiences [i3, unit 62, 64]. To compensate for this, an analysis of user differences could be performed, to see if any patterns emerge on specific user profiles, having a more homogeneous experience evaluation. This could provide the analysis with different solutions for further investigations, representing a specific user profile's experience of different devices. However, due to the small sample used in this study, no splitting of the data can be done in the current study.

Further, the analysis showed redundancy between two UX-aspects. While it might be that users understand ”strong” and ”comfortable” as the same, this seem unlikely, as they should conceptually be different, while they might share some traits like being a positive experience. A more likely suggestion might be that the product sample did not provide the stimuli for the user to separate these aspects, and that the following PCA could not represent the difference in three dimensions, as the dimension separating these two aspects were not included. By coincident, the devices which made the users feel strong could be the same that made them feel comfortable, not because they are the same, but because no device occurred that created a comfortable experience without making the user feel strong, while such devices might exist.

Additionally, some UX-aspects showed little effect on the PCA, such as *Meant for me - meant for someone else* and *meaningfull - meaningless*. If this is caused by the sample including only devices providing an experience with the same level of meaningfullness and meant for me-ness, while other relevant products within the product category exist where this is not the case, cannot be said. However, removing these aspects due to a sample size of four devices cannot be defended.

4.4 Discussion and evaluation of method

The analysis shows that the derived UX-aspects describe 78 % of the experience quality, meaning that the differences in experiences, changing only by the change of product, can be explained by 78 % by the given aspects of UX.
The initial intention was to model the needs from fundamental human needs to injection device user's needs. However, doing so moved the focus away from the initial idea of needs, to a focus of experience goals. However, this corresponds well with the suggestion of defining product *core tasks*, derived from the user needs pinpointing what the experience should feel like and thereby, what the product should do [Kraft, 2012, p.43].

During the analysis of UX-aspects, aspects that were not directly related to the use were discarded. As the UX begins even before using the product with expectations before and after seeing the product [Karapanos et al., 2009b], there might be elements not directly related to the use of the product which still affected the experience measured in the study. As suggested, expectations have a big effect on the experience. Therefore, there might be aspects not related to the use of the product, but to the expression of the device that are inevitable to be included in the measured experience, which are not accounted for.
As presented, the user sample for the use case study did not represent the real users of injection devices, as the participants did not have diseases needing treatment by injecting medicine. As of this, the results does not represent the experience of the real users neither. While the aspects are focusing on the needs specific for users of injection devices, and as other people have a hard time understanding these needs, it is likely that non-users will rate the experience differently than users. However, as argued, the understandability of the aspects can be verified using non-users. When further evaluating how well the aspects cover the quality, low validity must be anticipated, as it is most likely different things defining a good or bad experience for real users.

Conclusion on elicitation of UX-aspects: For defining the user' experience, an interview with an expert in the experience of living with diabetes and use of injection devices was made, from which a list of UX-aspects were derived on a base of fundamental human needs. The list was evaluated through comparison to previous work both published and internal in Novo Nordisk, including criterias dervied from the delimitation of the use case to be described. The result was a list of 12 UX-aspects, focusing on the main use of the injection device. The list showed high degree of variance in responses for the same device, which can be explained by difference in how the same situation is experienced differently by different people. A product sample of four devices, and a user sample not representative for the users limited the evaluation of the aspects, however, using the current data, the aspects explains 78 % of the UX-value for the user sample.

Chapter 5

Connecting product attributes, UX-aspects and UX-quality

Based on the data on product attributes and UX-aspects derived, described and verified in the previous chapters, a comparison analysis is made. The goal of the analysis is to enable a connection between product attributes and UX-aspects, to evaluate how the product attributes affect the experience. Thus, product attributes can be seen as the independent variable, while the UX-aspects and the UX-quality can be seen as the dependent variable.

5.1 Method

To calculate and produce the needed tests and graphs, the program R version 2.3.2 is used, with the packages SensoMineR and FactoMineR. The packages uses the statistics presented in Husson et al. [2011], Husson et al. [2017], and Husson et al. [2014]. The program is available at https://www.r-project.org/ (accessed 04.06.2017). For the R-scripts used to perform the analysis along with the produced output, see appendix H.3.
The analysis is based on a PCA of the product attributes, projecting the UX-aspect and UX-quality as supplementary variables to represent the space [Husson et al., 2011, p. 21], using the PCA function from the R-package FactoMinR [Husson et al., 2017].The result is a single PCA on the product attributes, with the UX-aspect placed on the same PC's, allowing for a comparison of the two data-sets. The PCA is based on averages of data, and thus does not include response variance (for a verfication of the response variance of the used data, see previous data verification analysis in chapter 3 and 4, section 3.5 and 4.3, respectively). The analysis is visualised in a plot of both attributes and aspects loadings in the PC-space generated along with both products and the overall experience evaluation. From a visual inspection, connections between attributes and aspect can be identified.
Additional analysis is made in the form of a preference-mapping heat map, indicating the position in the PC-space with the highest preference, based on the UX-quality evaluations. The preference mapping is performed by a PCA of the product attributes, following a placement of each user's quality-evaluation with a given *preference zone width* indicating the space of the PC's to which a preference is covering, using the carto function from the Package SensoMineR for R [Husson et al., 2014]. Evaluating preference heat maps indicates preference, not as a linear model, but as a given level of a number of attributes, not maximising the attribute but finding the *sweet spot*. Connecting the preference mapping to the loading of attributes of the above PCA with supplementary variables, allows for a interpretation of the level of attributes needed to design a hypothetical *best product*. Given the rather small sample size of both respondents and products used, the preference map is not available for the current data set. To explore the application of the preference map, an example data set are used. Therefore, no hypothesis is formed towards preference in regards to injection devices based on the preference mapping methods.

5.2 Analysis

The attribute loading analysis is based on the data derived in the previous chapters, condensed into means of attribute, aspect and quality for each device (see table 5.1 and 5.2). The means are derived from calculations of a linear model of the data, including evaluator and products as independent variables. This method returns a suggested mean, compensating for the unbalance in data and therefore, the mean derived with this method is not the mean found by averaging responses [Husson et al., 2014]. Additionally, to perform the analysis, means for the attributes are used to fill in missing values. As of this, the PCA performed on the data will be different than the PCA performed during the data quality evaluations in previous chapters.

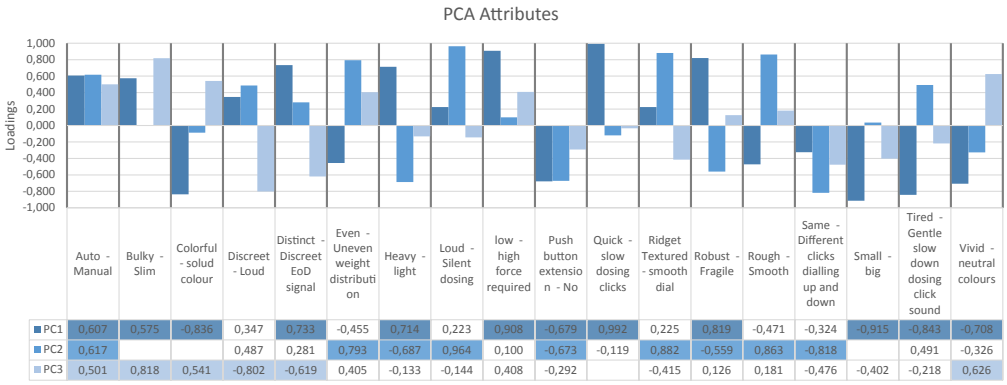
Device	E1	E2	E3	E4	E5	E6	E7	E8	E9	E10	E11	E12	O
Pen 1	2.3	2.9	5	3.1	4.6	4.7	4.8	2.4	4.4	1.8	4.4	5.3	5.4
Pen 2	3.6	3	3.7	3.5	4.1	4.1	4.4	2.2	4	3.8	3.7	4.8	5
Pen 3	3.7	3.2	4.1	3.6	4.8	3.3	3.8	3.9	3.6	3.9	4.1	4	3.8
Pen 4	2.7	2.7	3.2	3.4	3.6	3.9	3.9	3.8	3.3	2.1	3.8	3.9	4.3

Table 5.1: Averages of UX-aspects and UX-quality for the four devices used in the analysis. E*n* indicates the UX-aspects, while O indicates the overall UX-quality evaluation, with E1=Simpe-Lottodealwith, E2=Meaningful-Meaningless, E3=Obtrusive-Inconspicuous, E4=Meantforme-Meanforsomeoneelse, E5=VeryPainful-NotPainful, E6=Intimidating-Encouraging, E7=Scary-Comfortable, E8=Safe-Unsafe, E9=Tense-relaxed, E10=Understandable-Confusing, E11=Constrained-Free, and E12=Weak-Strong. The higher the number, the more the aspect is rated towards the right pole.

Device	A1	A2	A3	A4	A5	A6	A7	A8	A9
Pen 1	3.43	2.71	6	3.57	3.14	2.57	4.14	3.57	1.57
Pen 2	5.86	4.71	6.71	3	2.43	4.71	2.43	5.57	3.57
Pen 3	5.41	3.02	3.92	6.43	7.06	3.48	3.51	6.61	3.52
Pen 4	5.86	5.43	4.14	3.86	5.56	2.29	5.71	4.57	6
	A10	A11	A12	A13	A14	A15	A16	A17	A18
Pen 1	7.08	2.43	2.71	2.57	4.57	6.86	5.29	5.29	5.86
Pen 2	1.74	2.43	3.57	2	5.57	1.43	4.57	5.61	6.43
Pen 3	1.25	3.43	4.83	2.35	5.21	2.69	4.61	5.41	1.87
Pen 4	1.14	4.57	3.14	4.29	4.29	3.29	3.29	3.11	3.57

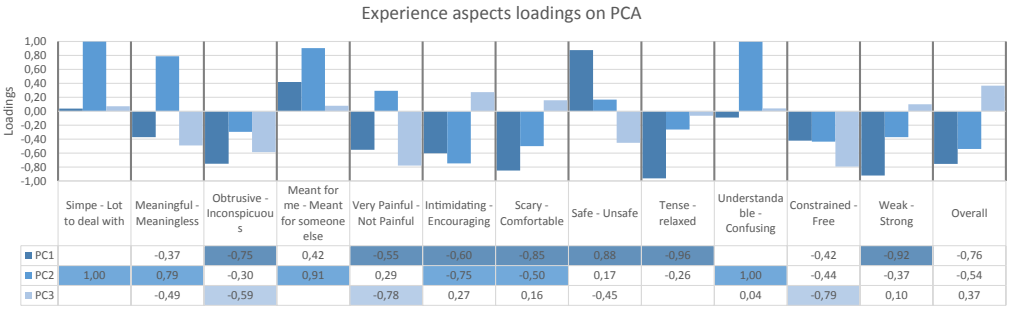
Table 5.2: Averages of product attributes for the four devices used in the analysis. A*n* indicates the product attributes. A1=Auto - Manual, A2=Bulky - Slim, A3=Colorful - solud colour, A4=Discreet - Loud, A5=Distinct - Discreet EoD signal, A6=Even - Uneven weight distribution, A7=Heavy - light, A8=Loud - Silent dosing, A9=low - high force required, A10=Push button extension - No, A11=Quick - slow dosing clicks, A12=Ridget/Textured - smooth dial, A13=Robust - Fragile, A14=Rough - Smooth, A15=Same - Different clicks dialling up and down, A16=Small - big, A17=Tired - Gentle slow down dosing click sound, and A18=Vivid - neutral colours. The higher the number, the more the attribute is rated towards the right pole.

Based on this data, a PCA is made on the products attributes, (see figure 5.1) after which the UX-aspects are projected into the PC-space (see figure 5.2). An initial overview shows that all attributes and all aspects have main loadings in at least one PC, indicating that all aspects and attributes have meaningful value to the PCA.



	Auto - Manual	Bulky - Slim	Colorful - solud colour	Discreet - Loud	Distinct - Discreet EoD signal	Even - Uneven weight distributi on	Heavy - light	Loud - Silent dosing	low - high force required	Push button extensio n - No	Quick - slow dosing clicks	Ridget Textured - smooth dial	Robust - Fragile	Rough - Smooth	Same - Different clicks dialling up and down	Small - big	Tired - Gentle slow down dosing click sound	Vivid - neutral colours
PC1	0,607	0,575	-0,836	0,347	0,733	-0,455	0,714	0,223	0,908	-0,679	0,992	0,225	0,819	-0,471	-0,324	-0,915	-0,843	-0,708
PC2	0,617			0,487	0,281	0,793	-0,687	0,964	0,100	-0,673	-0,119	0,882	-0,559	0,863	-0,818		0,491	-0,326
PC3	0,501	0,818	0,541	-0,802	-0,619	0,405	-0,133	-0,144	0,408	-0,292		-0,415	0,126	0,181	-0,476	-0,402	-0,218	0,626

Figure 5.1: Chart of the attribute's normalised loading on the three PC's, along with a table with the specific score. Highlighted with colours in the table are main loadings (above 0.5), while insignificant loadings (below 0.1) are removed. This must be seen only as assistance for reading the table, and is not included in the analysis of data.



	Simpe - Lot to deal with	Meaningful - Meaningless	Obtrusive - Inconspicuou s	Meant for me - Meant for someone else	Very Painful - Not Painful	Intimidating - Encouraging	Scary - Comfortable	Safe - Unsafe	Tense - relaxed	Understanda ble - Confusing	Constrained - Free	Weak - Strong	Overall
PC1		-0,37	-0,75	0,42	-0,55	-0,60	-0,85	0,88	-0,96		-0,42	-0,92	-0,76
PC2	1,00	0,79	-0,30	0,91	0,29	-0,75	-0,50	0,17	-0,26	1,00	-0,44	-0,37	-0,54
PC3		-0,49	-0,59		-0,78	0,27	0,16	-0,45		0,04	-0,79	0,10	0,37

Figure 5.2: Chart of the aspect's normalised loading on the three PC's derived from the attributes, along with a table with the specific score. Highlighted with colours in the table are main loadings (above 0.5), while insignificant loadings (below 0.1) are removed. This must be seen only as assistance for reading the table, and not part of the analysis of data.

To further visualise the PCA, loading plots are made of the attributes and aspects in a single plot (see figure 5.3 and 5.4). Both UX-aspects and the overall experience evaluation is projected as supplementary variables. The normalised product scores are included in the plot as well.

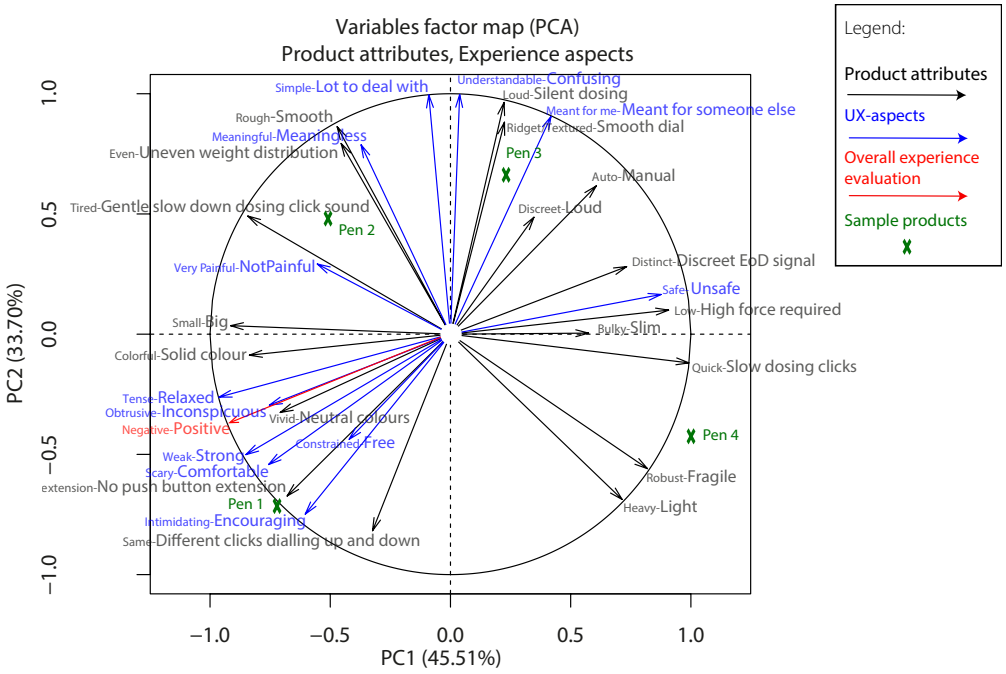


Figure 5.3: Plot of both products, attributes and aspects as vectors and coordinates of the PC1 and PC2, derived through a PCA of the product attributes, and fittet into the space. The overall score is highlighted in red, but is in the analysis included as a supplementing attribute like the UX-aspects. Arrows indicate attributes, aspects and overall evaluations as vectors, while the crosses indicate product's placement in the space. The large word in the label indicates how movement of a product in the direction of the vector affects the product's attributes or the following UX, while movement in the opposite direction is represented by the small word in the label.

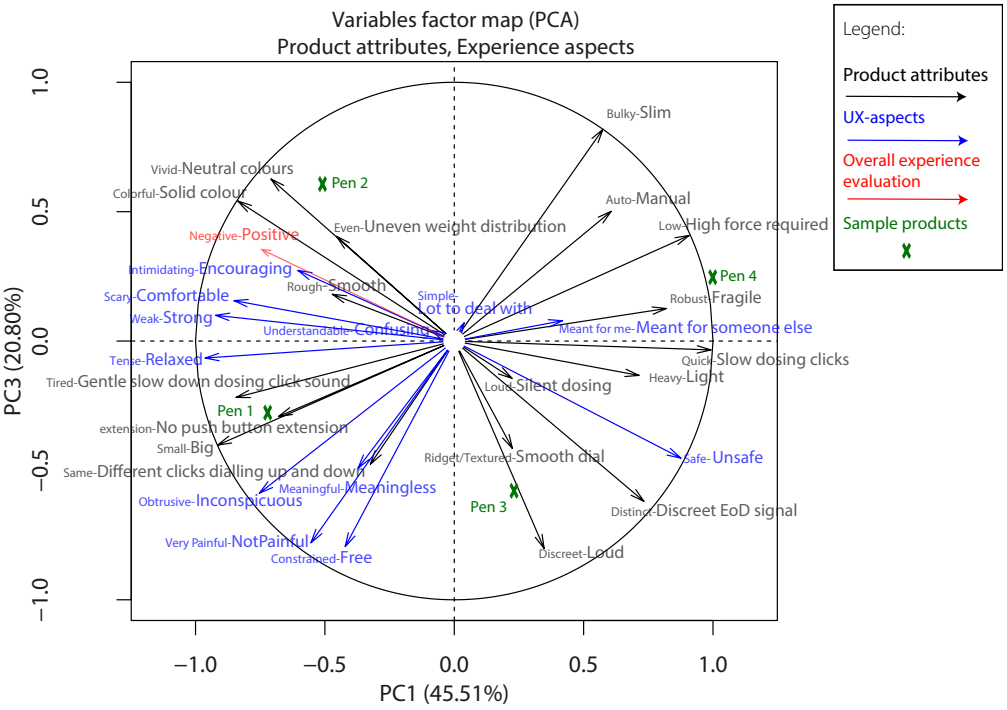


Figure 5.4: Plot of both product, attributes and aspects as vectors and coordinates of the PC1 and PC3, derived through a PCA of the product attributes, and fittet into the space. The overall score is highlighted in red, but is in the analysis included as a supplementing attribute like the UX-aspects. Arrows indicate attributes, aspects and overall evaluations as vectors, while the crosses indicate product's placement in the space. The large word in the label indicates how movement of a product in the direction of the vector affects the product's attributes or the following UX, while movement in the opposite direction is represented by the small word in the label.

To initially inspect the result of the analysis, attributes and aspects loading in the close proximity to the positive overall experience in all three PC dimensions are evaluated. The positive overall experience can be seen as a linear regression on preference, suggesting that movement in this direction adds value, whereas movement in the opposite direction removes value. ”Encouraging”, ”strong”, ”comfortable” and ”relaxed” are aspects located in the close proximity of a positive experience, while ”unsafe” and ”meant for someone else” lies in the opposite direction, meaning that ”safe” and ”meant for me” lies close to a positive experience as well. This is not a surprising result based on the previous analysis of what makes a positive experience. However, it indicates that a meaningful analysis is available of the PC-space. As shown in the figure, ”unsafe” is located directly opposite to a positive experience in all three PC-dimension, suggesting that a safe experience is synonymous to a positive experience for the user sample when using the products the products.

From the attributes, ”Neutral colours”, ”Solid colour” and ”Big” lies in the close proximity to a positive experience, while ”discreet EoD”, ”Loud”, and ”smooth dial” lies in the opposite direction, meaning that ”Distinct EoD”, ”Discreet” and ”Ridget dial” lies close to a positive experience as well. From this, a hypothesis for designing a positive experience could be to design an experience that feels encouraging, strong, comfortable, relaxed, safe and meant for me. Tools for doing so could be to create a device featuring neutral colours, solid colour, distinct EoD, a ridget dial, and a discreet expression. Additionally, to design a device that produces an understandable experience, applying loud dosing and a ridget dial could be used.

Additionally a preference heat-mapping can be made, based on the product attribute PCA and the overall evaluations from participants, as described in appendix C. However the dataset provides insufficient preference data points on the limited sample size, to create such a map. To examplify a preference map, a sample dataset is used, representing 100 preference ratings on 16 samples on a PCA of product attributes for cocktails Husson et al. [2014] (see figure 5.5).

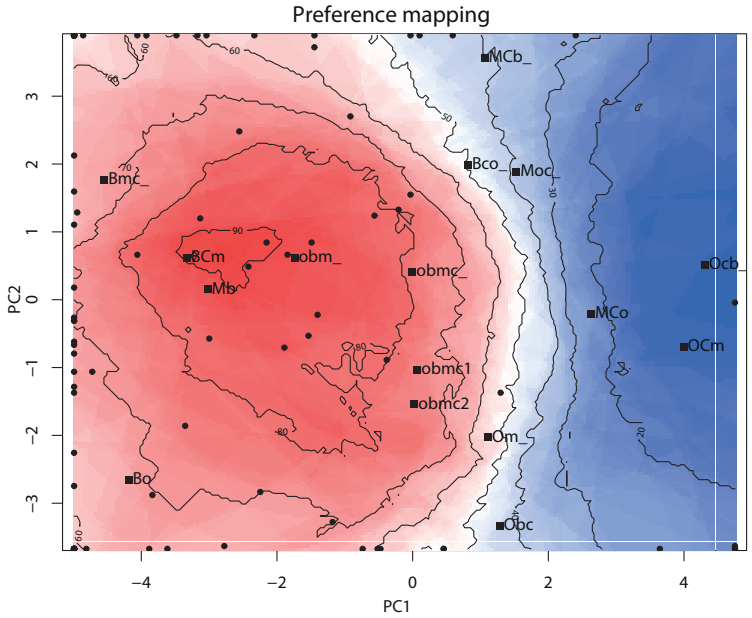


Figure 5.5: Example of preference mapping on PC1 and PC2 from a study on cocktails, taken from Husson et al. [2014]. Square dots indicates products from the sample. Red colour indicate preference, blue colour indicating disfavour

Preference mapping allows for locating the sweet spot (in this case in the area around the product BCm, located in the PC-space in the coordinates around [-2.8;0.8]). Relating this to the attributes' location in the PC-space allows for hypothesising on how to create a preferred product, by adding a certain level of attributes. Notice that the preference mapping does not assume linear relations, as the sweet spot lies not in one end of the space but close to the centre of PC2 and not all the way to the negative direction of PC1. This applies well with an assumption that any attribute can be "too much", as e.g. a very small product can be great until it gets too small. Additionally, several sweet spot could be present. Other methods, not assuming circular, but square, elliptic or vector characteristics of preference points, can be applied to discover different map types [Husson et al., 2014].

Chapter 6

Research evaluation

The goal of the current research is to create a method for connecting products to experiences without having users doing it. As presented in the previous chapter, this is achieved, however, some key observations have been done throughout the data gathering and verification, affecting the quality of the methods proposed to investigate connection between products and experiences.

6.1 Discussion

Throughout the the research, methods have been used that are generally applicable to extract relevant data for the specific content of any given product category, it being product attribute, UX-aspects or the connection between them. This allows for creating a result relevant for the specific product category, while still being applicable for any product category. This however requires some work, deriving the relevant product attributes and UX-aspects, instead of applying general terms to any type of UX, and measuring these terms. However, the result produced with these methods proves more relevant and useful for later designing from it.

To apply the methods, a marked delimitation of the full UX of using a product was done, narrowing the focus down to the actual use of the product, excluding preparation and storing. In the same manner, the experience evaluated by the users was a single use case of using the product, without preparation and storing. This poses two critical points in regards to investigating UX. First, the actual use of a product is only part of what a user does with a product, and this only part of the user experience, which exists before and after use, cumulated throughout the lifespan of the product, creating different time spans for UX [Roto et al., 2011]. As discussed in the extraction of UX-aspects, some of the problems occurring does so not because of the actual use of the product, but due to all the emerging requirements to the environment, like remembering to use the product or avoid children hurting themselves on the products. Second, experiencing a product only once and evaluating it make users focus on other elements than if used for a prolonged time span Karapanos et al. [2009b]. All dependent on when in the UX time frame a product is evaluated, different attributes will be important to the experience Karapanos et al. [2009b], and as of this, it is important to recognise which time frame is of interest, and measure the experience of the given time frame. However, the broader the focus, the more incomprehensible the result gets. As shown in the research of product attributes alone, several limitations was needed to stay within the frames of a comprehensible result.

The method used relies entirely on the panels and respondents experience, and very little on the researcher's knowledge on the product and UX. Accordingly, the research is available to researchers with little experience in the product category design field or user experience field. The skills required are in the field of facilitation, interviewing and qualitative data analysis. Instead of having a number of interviews with designers and ux-experts, after which the researcher analyse the data to reach a number of product attributes, this is all done by the expert panel. In the same way, instead of performing user interviews or observing users to understand the experience, this is done through an interview with an

expert in the field. This both frees and limits the researcher, as the method does not allow for much interpretation of data, and ideas for what might have been useful ways of describing products or experiences cannot be implemented, if the experts do not see the same possibilities. As of this, the researcher is not in control of where the results might end, leaving the analysis to the experts. On the other hand, it allows for a more reliable result, as the analysis is not done by a single researcher, bu through a discussion in an expert panel and based on analyses of other studies done by experts. However, when comparing the data from the two studies, the researcher gets to interpret.

PCA as the method for data analysis provides a result inviting for subjective interpretation and searching for connections through plots, making the analysis subjective and never-ending, as there are always more data to be derived from existing or new plots or graphs. However, the PCA in itself have no statistical measure, and thus does not provide any significant results. That being said, confidence intervals on e.g. score plots can be applied, using the bootstrap method, simulating a number of virtual panels using parts of the current panel, using the SensoMinR tool (see figure 6.1) [Husson et al., 2014]. The figure shows, as suggested, high amounts of variation in the data, resulting in large confidence intervals, in the case of two of the devices overlapping.

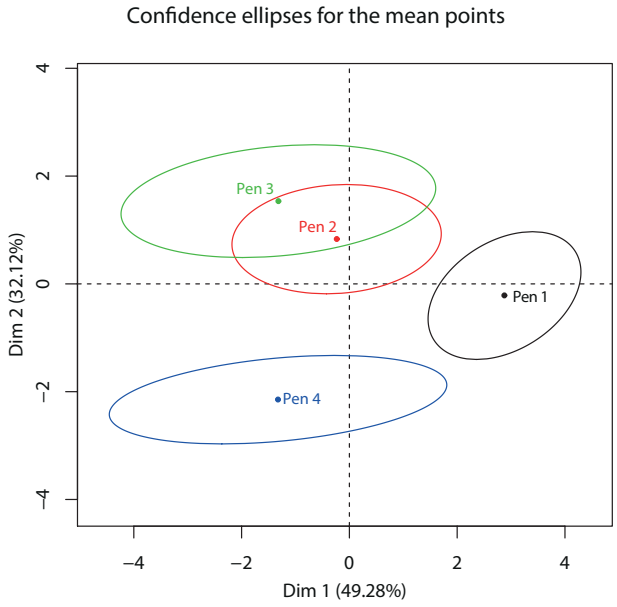


Figure 6.1: Application of conficende intervals for a score-plot of a PCA on the UX-aspects derived through the use of bootstrapping, using the *panellipse* function of the SensoMineR package for R [Husson et al., 2014]. Notice that this PCA is not similar to the PCA presented previously, due to a different calculation of mean from the raw data, however, a mirroring and slight rotation would result in almost the same placement.

Doing the PCA to perform the data verification and the comparison of the attributes and aspects, assumes linear relation, as presented by the straight vector line in the bi-plots. Comparing the UX-aspects to a positive experience vector which is also represented as a linear relation, this makes sense, as an experience that is comfortable is good, and an experience that is more comfortable is even better, continuing to a hypothetical infinite comfortable and infinite pleasant experience. However, when comparing to the product attributes, on cannot assume that an infinite big device will provide an infinite pleasant experience. Here, the narrowing of the design space to define the products within the sample is important. The products within the sample have a finite size difference, and this is the size difference the design space defines. Moving beyond the product sample might cause the relation to change. The linear relation might not be the best description of the product attributes' relation to aspects and experience quality, especially if moving beyond the sample, however, it does show the general direction of the relation.

While the methods introduced in this work are well established in their separate fields, applying them together in the way presented in this work has, to the authors knowledge, not been done before. While the food industry is connecting experiences to products through sensory analysis and multidimensional analysis [ISO 11035:1994, 1994] and analysis of design quality through multidimensional scaling have been done [Petiot and Yannou, 2004], connecting derived user needs to product attributes, and in this way explaining the abstract concept of UX in a bigger space than just good/bad or some pre defined scales, is novel. This research has shown methods for taking the last step between connecting the product world with the experience world, and doing so in a way that is applicable to any product, suggesting methods for defining both product and UX in a multidimensional space, before connecting the two.

6.2 Conclusion

On a base of appraisal theory and product experience theory, a hypothesis was made on avoiding the risk of error connected with having users connect experience and products, by separating the two, and having users evaluate only the experience, and product experts evaluating the product, connecting the two evaluations afterwards.
Product attributes were derived based on semantic differentiation and personal construct theory, using the, for the purpose developed, word elicitation workshop with which a list of product attributes were derived and applied through evaluation of a product sample. The list showed some degree of variation due to different interpretations by the assessors, and different levels of description, but was evaluated to cover the design-space of the product sample. However, the sample used to evaluate the list was too narrow, making it difficult to evaluate how well the list covers the design space of the full product category.
UX-aspects were derived on a basis of fundamental human needs psychology, which through expert interviews were pinpointed to the specific user group, creating product-user needs, which proved sufficient for describing 78 % of the UX-quality. The UX-aspects were evaluated through application, however with a user sample not representative for the real users and as of this, the results is not valid for representing the experience evaluation of the actual users. The understandablity of the the derived UX-aspects could however be evaluated and this was accepted.
Based on the inputs in the form of product attribute- and UX-aspects ratings on a product sample, an analysis of the connection is proposed and exemplified for how product attributes are related to UX-aspects and UX-quality. Further, the possibility of creating preference mapping was suggested, however, this was not possible for the current case, as the product sample size was too small .
The research have shown how to extract relevant product attributes and UX-aspects for a given product-category, and connecting the two in a meaningful way, through the creation of a design-space, on which the experience-space is projected, visually presenting the connection between products and experiences (see figure 6.2, next page). This allows for justified arguments towards explaining why a given product produce a given experience without asking the user to evaluate the product or explain why this is the case.
The methods applied in this research are to a high degree novel in this field of studies, and the methods should benefit from multiple applications and evaluations to refine this way of making user research and thereby heighten the quality of the final result.

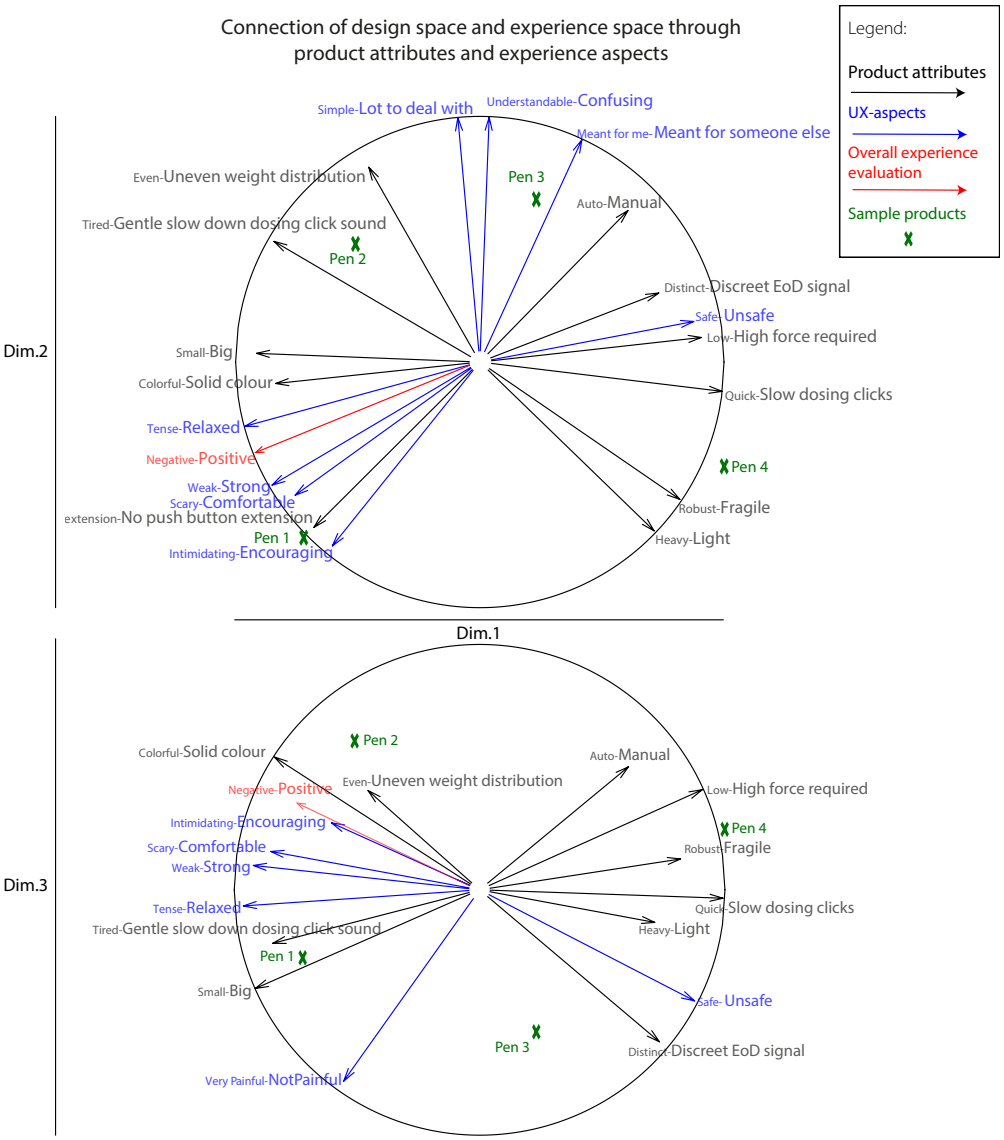


Figure 6.2: Illustration of the connection between design dimensions, represented by product samples and product attributes and experience dimensions, presented by UX-aspects and UX-quality fitted into the design space. Product's coordinates are normalised to fit in the plot, while it is the relative placement of the product in regard to the aspects and attributes that are of interest. The plot shows three dimensions flattened into a 2D illustration. Arrows indicate attributes aspects and overall evaluations as vectors, while the crosses indicate product's placement in the space. The large word in the label indicates how movement of a product in the direction of the vector affects the product's attributes or the following UX, while movement in the opposite direction is represented by the small word in the label. The plot is a simplified version of the figure 5.3 and 5.4, reducing the number of attributes and aspects of the two initial plots.

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Appendix A

User experience

Experiences with products in a broad perspective, focusing on more than just what a product can help a user with, has found interest, as a key part of human-centered design [Desmet and Hekkert, 2007]. Understanding not only the product, but also the user and the context of use, provide the means for better designing products that will be used as intended [ISO 9241-210:2010, 2010]. To explore the space of user, product and context of use, the term user experience is used.

ISO 9241-210:2010 describe user experience (UX) as a *person's perception and responses resulting from the use and/or anticipated use of a product, system or service* [ISO 9241-210:2010, 2010]. Further, UX is a consequence of *"product, user's internal and physical state, and the context of use"* [ISO 9241-210:2010, 2010] (see figure A.1).

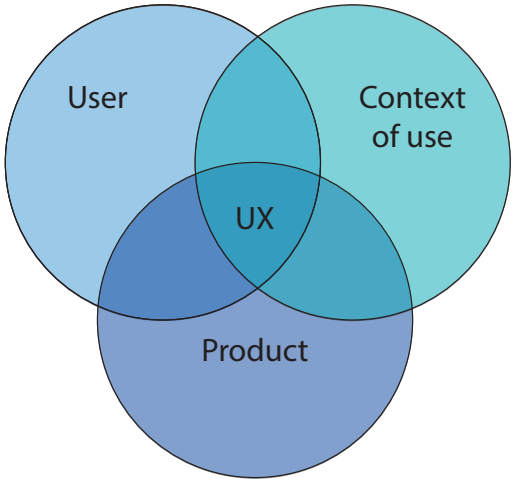


Figure A.1: Visualisation of the three elements defining a user experience (UX), that is user, product and context of use, as described by ISO 9241-210:2010 [2010].

The product can be described as an interactive system with a *"brand image, presentation, functionality, system performance, interactive behaviour and assistive capabilities"* [ISO 9241-210:2010, 2010].

The user can be described as a user of a interactive system, with *"an internal and physical state resulting from prior experiences, attitudes, skills and personality"*, while experience within the user produce *"... emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviours and accomplishments, occuring before, during and after use"* [ISO 9241-210:2010, 2010].

The context of use is defined as *"users, tasks, equipment (hardware, software and materials), and the physical and social environments in which a product is used"* [ISO 9241-210:2010, 2010], i.e. characteristics of users, tasks and environment.

UX is a specific kind of experiences, where a product or a system have a significant role in the experience which makes the experiencing person a 'user' of the given product [Roto et al., 2011; ISO 9241-210:2010, 2010]. This further implies that the product is an interactive product, with a user interface (UI) for the user

to interact with the system or product [Law et al., 2009; ISO 9241-210:2010, 2010].
Law et al. [2009] argues, based on research amongst specialists and practitioners in the field of UX, as described in ISO 9241-210:2010 [2010], that UX is in fact affected by the internal state of the user, earlier experiences and the current context, concluding that UX is personal, but can be affected by other people, and never the same for different people [Law et al., 2009]. However, as Hassenzahl et al. [2015] argues, people are able to discount for incidental affect when looking back at past experiences, but only if aware of the bias.

Another term with relation to UX is Brand-experience [Law et al., 2009]. Before interacting with a product, you cannot talk about user experience, but only brand experience or product expectations [Law et al., 2009]. These aspects will however affect the user's view on the product, and thus will alter the UX, if the product is used or anticipated to be used at one point.
It is important to emphasise that a product cannot *have good UX*, but rather it can have properties that conveys the means for users to have a good UX when handling them , as UX is not something within the product, but something within the user [Law et al., 2009].

UX is, according to Roto et al. [2011], limited to a specific period of time with at starting point and an end point, when encountering a system. Experiences that happen before first encounter of a product is, as mentioned before, not a user experience, but will build up expectations and thereby affect the UX when it occurs [Law et al., 2009].
Roto et al. [2011] suggest four types of UX, separated by the time it encapsulates.

Momentary UX is a momentary snapshot during interaction, exploring the UX here and now. Momentary UX might not be representative for the entire episode of use, but represents changes in emotions experienced in a single moment during the episode. Momentary UX can be seen as experiencing, where the live emotions are relevant.

Episodic UX is the experience of an ended episode of use, from initiation till ended effect. Episodic UX can be seen as reflection on experience. As suggested by Fredrickson and Kahneman [1993], users do not evaluate an episode as an *average* of experiences within the episode, thus, episodic UX cannot be seen as an average of momentary UX.

Cumulative UX is the summarised view on a product, based on several use-cases. Cumulative UX can be seen as recollecting experiences.

Anticipated UX may refer to anticipation of both momentary, episodic or cumulative UX, as all three might be imagined. [Roto et al., 2011]

Karapanos et al. [2009b] suggest three temporal phases of product adoption, with different product qualities relevant (see figure A.2).

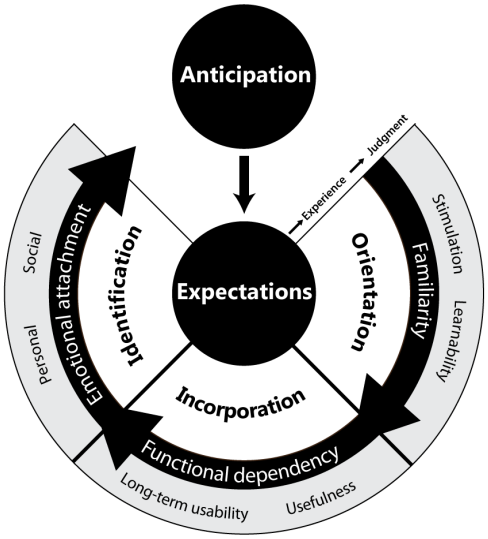


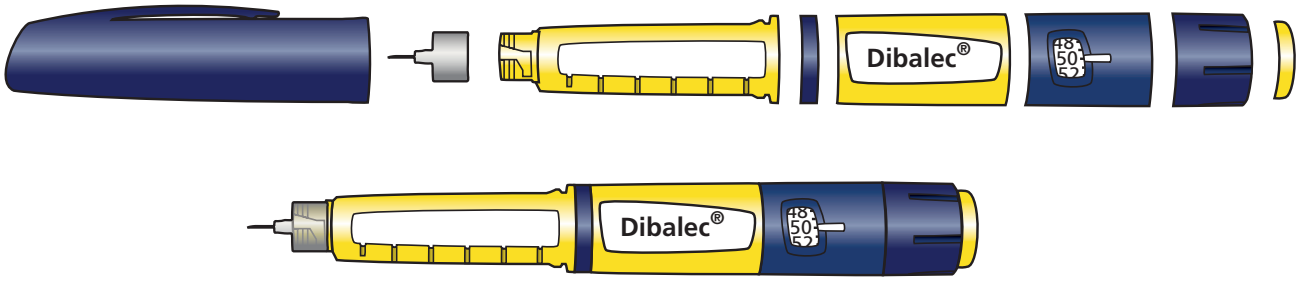
Figure A.2: Phases of product adoption with related product qualities [Karapanos et al., 2009b].

The three phases are:
Orientation, the initial experience with products, where stimulation and learnability are important qualities, as novel features and errors are encountered
Incorporation, where users reflect on the product's meaningfulness through long-term usability (repeated problems) and usefulness.
Identification where the products connects to the user's social and personal life through emotional attachment .
Before encountering the product, Karapanos et al. [2009b] argues that users anticipate experiences when encountering the product, which forms expectations. The expectations can be seen as evaluation criteria for the product.
Karapanos et al. [2009b] further argues that familiarity, functional dependency and social and emotional attachment motivates the transition between the tree phases, *orientation, incorporation* and *identification* respectively. Finally, Karapanos et al. [2009b] suggests that expectations change after first encounter with the product in such a way that prior expectations is not a good descriptor for product quality, as a product that meets prior expectations might not meet the current expectations.
Fredrickson and Kahneman [1993] suggest that people tend to evaluate experiences based on *snapshots*. These snapshots will determine the evaluation, and thus the feeling the person has, when an experience has passed. The

snapshots will represents the affective peaks in the experience, and not the average affect. Thus, people will not see an experience as a sum of emotions or affect throughout the experience, but as the sum during peaks in the experience [Fredrickson and Kahneman, 1993]. An example of this is presented by Redelmeier and Kahneman [1996], where patients evaluate an experience as more painful, if the perceived pain peaked in the end of the experience, rather than if the pain throughout the experience was high.

Appendix B

Methods for eliciting product attributes



To explore the relationship between experience aspects and product attributes, the product attributes needs to be defined. A product can be described in different conceptual levels. For example, a product can be described by it's mere physical measures, like e.g. weight and shape, or it can be described by it's sensory attributes, which is users' perception of the given physical measures like e.g. firm or massive. There are different approaches to explore these attributes, all dependent on the desired level of description. These different approaches will be described and discussed in this chapter to enable an evaluation of the methods' applicability in the current research.

B.1 ISO 11035:1994 - Sensory Analysis

The International Organization for Standardization (ISO) has made a standard for how to create a sensory profile for a product category [ISO 11035:1994, 1994]. The standard provides methods to extract and select one-dimensional sensory attributes, which describes user's experience of a product. By listing any sensory attribute, the intensity of this attribute can be assessed for a specific product in the given category [ISO 11035:1994, 1994]. This method propose training of a panel of assessors, which first define a list of sensory attributes for a specific product category, and then create a sensory profile for a number of product in this category [ISO 11035:1994, 1994]. To perform a sensory analysis, a panel of 6-10 people (users or experts) should be available. The method is highly reliant on the panel, which both creates the sensory attributes and place products in this space.
The extraction of a sensory profile is defined in six steps (see figure B.1):

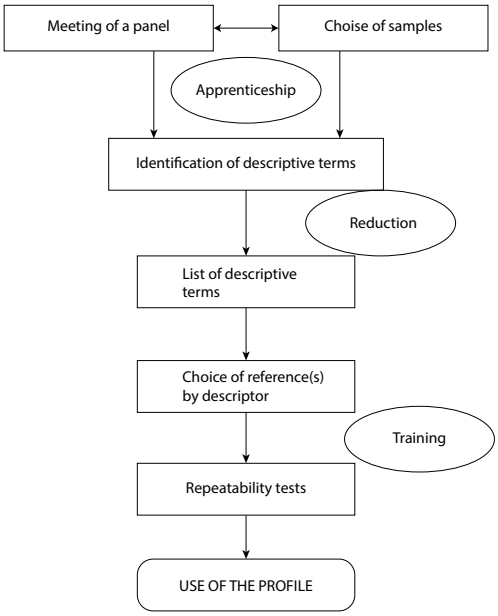


Figure B.1: Flow of the sensory analysis method, when performing a sensory analysis. Figure adapted from ISO 11035:1994 [1994]

1. Training of panel

The assessors of the panel should be able to describe a sensory experience, and do so repeatedly without too much variation, before commencing to enlisting sensory attributes.

2. Preparation of a list of descriptive terms

A comprehensive list of descriptive terms are extracted through presenting different products to the panel. At least four sessions should be commenced.

3. Reduction of the list of terms

The list of terms are compressed by first removing hedonistic terms, quantitative terms, product-terms, and irrelevant terms. Secondly, if needed, reduction of terms can be made by exploring the terms capability of defining products, by having the panel evaluate it's presence in different products. Those terms that are mentioned often as present, or mentioned as very intense will stay, while the rest are seen as irrelevant. A further reduction can be made through multidimensional analysis, where weak descriptors are removed, while synonymous and antonymous descriptors are replaced by one single descriptor. In the end of reduction, a maximum of 15 terms should be kept to have an operational sensory profile.

4. Choice of reference products

Reference products should be seen as a reference to a specific descriptor. Thus, there must be at least one product for each descriptor, to aid the panel in recalling the meaning of the descriptor. The reference product should have an average intensity in the given descriptor. If desired, more products can be used to represent the extremes within a descriptor.

5. training

The panel should be able to produce alike sensory profiles for the same product with little variance. when this is possible, the panel is ready to produce product sensory profiles.

6. use of profile

Closely related to the sensory analysis is the descriptive analysis, which also include training of a panel, producing a list of words to describe a sensory experience and after reducing the list, rating products on the list [Bech and Martin, 2005]. This method has specifically been developed to evaluating the quality of audio reproducing products. It also focuses on the mere *passive* sensory part of the product, just like the ISO 11035:1994 [1994] (here the sound attributes instead of taste attributes), but contrary to ISO 11035:1994 [1994] does not apply reference products.

B.2 KJ-technique

The KJ-technique (or KJ-method) is a Japanese developed method for combining problem identification and problem solving with creative thinking and teamwork [Scupin, 1997]. The method is based on the scientific background of problem solving, moving from the encounter of a problem through exploration, observation, hypothesising, testing and verifying. Some of these parts require field work, to spot the problem where it occurs and observe it where it happens, while testing hypothesises are easier done in laboratory settings [Scupin, 1997]. A further distinction between process of thought and process of experience is made, to form a w-shaped model for problem solving (see figure B.2).

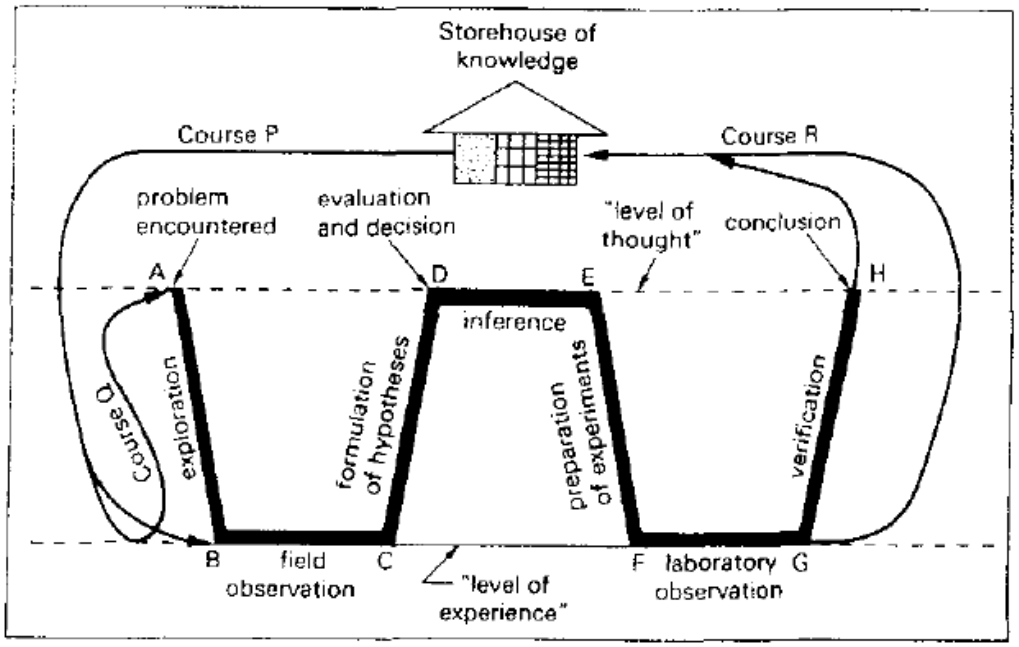


Figure B.2: The w-model of problem solving, suggested by Jiro Kawakita, from which he based the KJ-technique [Scupin, 1997]

To challenge this approach of field observations and laboratory observations with some thought process in between, the KJ-technique was developed.

The KJ-technique basically consists of four steps: 1) generate observations, 2) cluster observations, 3) chart-making, and 4) explanation. The first step is related to noting down observations on a problem. Here, each single observation should be on it's own label. The second step is to cluster the observation labels into groups, based on the content. Further clustering of the groups can be done, until the data is contained in a manageable number of groups. The last part of clustering labels is to name each group with a new label. The third step is to

draw the connection between the groups. These connections could be chronological hierarchies, causalities or other connections which might occur between the groups. The last step is the explanation of the finished chart, either in writing or verbally presented. In the explanation, the reasoning for each interrelation of labels should be presented in a meaningful manner. [Scupin, 1997]
The KJ-techinque has been applied in very different settings, from the originally proposed anthropology research, to creative idea generation [Kokogawa et al., 2012], to data analysis of experimental data through the affinity diagram, a sub part of the KJ-technique [Kurniawan and Zaphiris, 2005].

B.3 Repertory grid

The repertory grid, or the repertory grid technique (RGT) is a method for exploring and connecting personal constructs, based on the psychological research done by Kelly [1955]. Personal constructs are bipolar one-dimensional scales, from which we evaluate and experience objects. We try to place objects in these constructs, by rating them on bipolar scale. If an object cannot be placed, new constructs are created, to accommodate for the differences [Kelly, 1955]. Kelly [1955] suggests using a *Role Construct Repertory Test* (or Rep Test) for extracting personal constructs in regard to social roles [Kelly, 1955, p. 152-153]. The tests focuses on similarities and differences between pairs of three people that the subject knows. By asking how two of them are alike, and what makes the last one a contrast, this produces a bipolar dimension, with one pole being why two people are alike (inclusive-pole [Hassenzahl and Wessler, 2000]), while the other pole represents why the last person is different (exclusive-pole [Hassenzahl and Wessler, 2000]) (e.g. kind - angry) [Kelly, 1955]. Comparing three objects in this manner is called a triadic sort method, or just triad method [Tan and Hunter, 2002].
This method has been build upon, to create the RGT, which uses the same methodological approach to assess personal constructs [Fallman and Waterworth, 2005]. The RGT adds an additional layer after the extraction of constructs, which is rating each product on the constructs found, creating a grid of products and constructs for multivariate analysis [Fallman and Waterworth, 2005]. Using the RGT for exploring product attributes has been proposed by e.g. Hassenzahl and Wessler [2000]. Hassenzahl and Wessler [2000] argue that the RTG has advantages in form of producing relevant information, illuminating important topics without having preconception of these, and the possibility to perform multivariate analysis on the data, like multidimensional scaling, factor analysis, etc. Further, Hassenzahl and Wessler [2000] focus on a number of important factors, which must be considered when performing a RGT. The method require a number of accessible products, as different as possible within the design space. It further has no validation of the phrasing and labelling of constructs, and they have no structure when produced. In their evaluation of

the method, Hassenzahl and Wessler [2000] focuses on the RGT's ability to produce both descriptive and evaluative constructs, and it's sensitivity to individual differences. As the grid can be used to evaluate products, it can also be used to evaluate differences in users' experience.

B.4 Focus group interview

A focus group interview is a discussion about a single topic within a group of 4-10 people who have all experience with the topic in focus [Stewart et al., 2007, p. 1]. The dynamic and inspiration of having several people in the room is seen as a mean to get richer data from the participants than if they were interviewed one by one [Stewart et al., 2007, p. 10]. The focus group methodology poses several critical focus points, which will affect the data produced:
Cohesiveness, how the group members feel attracted to each other by having common goals, values, and experiences, is a main driver of a productive focus group, as it drives motivation towards reaching the goal of the focus group [Stewart et al., 2007, p. 25–26].
Both demographics, socioeconomic status, personality and physical characteristics of the focus group members can affect the process and outcome of a focus group interview as well [Stewart et al., 2007, p. 10]. A heterogeneous group of people may cause members of the focus group to be shy or less productive in discussion, or cause conflict among the group members, and make it harder for the moderator to create the needed cohesiveness within the group [Levine and Moreland, 2008, p. 111]. On the contrary, the differences between group members is what causes a group to produce more ideas than one person could do, and conflicts can result in new perspectives and strategy rethinking [Levine and Moreland, 2008, p. 111].
Having a group of people who feel equal and contributing provides the best results in the focus group interview [Stewart et al., 2007, p. 22] Difference in socioeconomic status can cause a focus group to loose this feeling of equality [Stewart et al., 2007, p. 22]. Another factor is the social power, which can lead to unproductive focus groups, as this difference can cause a number of undesired social effects. First of all, people with higher social power, like bosses or other authorities will tend to discuss and evaluate other group member's ideas rather than trying to come up with new ideas [Maier and Hoffman, 1961]. As shown by Fern [1982], focus group interviews are not good at producing new creative ideas, as the quantity of new ideas are higher for individual brainstorms than in focus group interviews.
Other techniques used for attribute extraction contain literature review [Guest et al., 2011], expert defined lists [Wikblad et al., 1990; Shen and Wang, 2016; Chang et al., 2003], experiments [Lin et al., 1999], and questionnaires [Hsiao and Wang, 1998].

B.5 Discussion of methods

The sensory analysis method is used for defining sensory profiles for foods and drinks [ISO 11035:1994, 1994], where the qualities of the product is related to sensation, rather than complex interactions with the product. The elicitation of a purely sensory profile might thus be insufficient, as the method does not accommodate the complexity of interacting with a product, which are also defined by understanding actions and reactions, and are thus not only on a sensory plan [Desmet and Hekkert, 2007]. The sensory analysis focuses strictly on descriptive product features, which is the goal for eliciting product attributes, whereas both descriptive *and* evaluative (value loaded) attributes can be expected when using the RGT [Hassenzahl and Wessler, 2000]. The KJ-technique has proven effective in producing descriptive attributes, however requiring an extensive analysis of the result before reaching such a result [Jensen et al., 2016; Als et al., 2016]. This analysis should also be applicable to data from the RGT. As suggested by Hassenzahl and Wessler [2000], instructing the participants is an approach to create a more descriptive (or evaluative) set of attributes.

As mentioned by Hassenzahl and Wessler [2000], the RGT does not provide any order or connection between the found attributes. However, the data allows for multidimentional analysis, which can be a way of producing such order. As shown by Jensen et al. [2016], the factor analysis can provide a constructive sorting of attributes into meaningful categories (for a discussion on factor analysis and other multidimentional analysis methods see appendix C). The KJ-technique provides an instant profile of the order of attributes, as the attributes are sorted and made into a chart as part of the process. It has further been evolved and used in ways that facilitate creativity, by using the inspiration from other people in the group to create a larger and more adequate list of ideas. Similar to the focus group interview, group members in the KJ-technique can relate to other group members' ideas and continuously add new ideas throughout the session [Hanington and Martin, 2012, p. 104-105].

Appendix C

Methods for analysis of quantitative evaluations

For qualitative data as derived from evaluations of experiences and products presented in the current study, mathematical and statistical methods can be applied to look for effects and connections in data. The methods used for analysing these data is presented in this appendix to enable application of the methods in the current research.

C.1 Linear model and ANOVA

A linear relationship between two variables (*y* and *x*) is often in real application assumed to be linear, and can therefore be described a the linear model,

$$y = \beta_0 + \beta x + \epsilon \tag{C.1}$$

, assuming that *y* can be described by an offset or intercept β_0, a variable *x* times a factor β, and an error ϵ. The error ϵ can often be assumed independent of the variables *y* and *x* and randomly distributed and can therefore be ignored in the model. To find the the relation between *y* and *x* is to estimate β_0 and β, by measuring *y* and *x* several times [Tormod et al., 2011, p. 175-176].
If a variable α is varied during an experiment, and the goal of the experiment is to see how varying α affect a constant dependent variable *y*, this can be tested through a one-way analysis of variance (ANOVA). *y* can be explained as

$$y_i = \mu + \alpha_i \tag{C.2}$$

μ being the overall mean, and α_i the effect of the i'th condition of α. The ANOVA shows the statistical difference when altering α, by testing the null-hypothesis $H_0 : \alpha_0 = \alpha_1 = ... = \alpha_I$. [Tormod et al., 2011, p. 194]
If a variable *y* is assumed to be affected by several variables $v_0, v_1, ..., v_r$, this can be presented in a linear model

$$y_{ijkr} = v_{0,i} + v_{1,j} + ... + v_{r,k} \tag{C.3}$$

which can be tested through a multi-way ANOVA, like the one-way ANOVA, looking at the effect of each variable on the overall mean, by explaining *y* as

$$y_{ijkr} = \mu + v_{0,i} + v_{1,j} + ... + v_{r,k} \tag{C.4}$$

to evaluate the effect of each variable [Tormod et al., 2011, page 200].
For some variables, there might be interaction effect between the independent variables. This effect can be included to the linear model, and tested in the ANOVA as e.g.

$$y_{ij} = \mu + v_{0,i} + v_{1,j} + (v_{0,i} : v_{1,j}) \tag{C.5}$$

$v_{0,i} : v_{1,j}$ denoting a possible interaction effect between V_0 and v_1. [Tormod et al., 2011, page 198]

Further, a simple analysis of the variance can be calculated, looking at the amount of variance explained by the ANOVA model, compared to the total amount of variance in the data, through the *multiple* R^2 value, showing in percentage the model's variance explanation.

C.2 Principal component analysis and factor analysis

A principal component analysis (PCA) is a mathematical evaluation of the covariance (dependency by removing redundancy) between a number of variables, to produce components (dimensions) describing data by weighing each variable on each component [Härdle and Simar, 2007, page 234–235]. The PCA minimises the cumulative length from each observation to the component axis, and thereby place components that explain the largest amount of variance [Suhr, 2005]. A successful PCA reduces the dimensions of data as much as possible, while still explaining as much of the variance between responses as possible [Härdle and Simar, 2007, page 234].
A factor analysis (FA) is in many ways equal to the PCA in underlying mathematical data manipulation, but where a PCA is looking at covariance to reduce data complexity, a FA is looking at correlation (dependency by removing variance) to create meaningful connections between variables. By assuming that responses are derived from a number of latent constructs, the factor analysis creates factors consisting of variable loadings, for the researcher to interpret which the latent construct describes data given variable loadings [Härdle and Simar, 2007, page 275]. Factor analysis can be used both confirmatory (CFA) or exploratory (EFA), based on whether the latent constructs which should be present in the data is known or unknown.
The goal of the PCA is to describe the same data with a fewer number of variables, whereas the goal of the FA is to measure latent constructs that cannot be measured directly [Suhr, 2005]. The goal should determine which analysis should be implemented on the data.
For both PCA and EFA, the number of factors or components to be derived are unknown before beginning the analysis of the data. This can derived by evaluating a number of criteria:

- How much of the total variance is explained cumulative by all components or factors (e.g. a criteria on 70% or 80%).
- Scree test, looking for an *elbow-point* in the data explained by the factors, meaning that any additional factor added will contribute much less to the total variation explained than the ones already present [Brown, 2009].
- The least explaining component or eigenvalue above 1, as an eigenvalue below 1 means that the factor describes less data than the initial variables.
- Interpretability of the given factors (not applicable for PCA) [Brown, 2009]

  To achieve valid interpretability, the following criteria should be fulfilled:

  - At least 3 observed variables per factor
  - Common conceptual meaning

  - Different latent construct for each factor
  - No cross loadings [Brown, 2009]

The FA changes it's factors based on how many to be derived, whereas the PCA calculates the same PC's, no matter how many are chosen.
Both the PCA and FA assume that

- measurement level is interval or ratio,
- linear relationship between observed variables,
- normal distribution for each observed variable,
- bi-variate normal distribution between each pair of variables, and
- random sample. [Suhr, 2005]

To gain a satisfactory result, further recommendations are:

- at least 5 observations (10-20 recommended) for each variable, and at least 100 observations.
- to over sample to compensate for missing values
- commonalities close to 1 in the result of multivariate analysis might suggest redundancy. [Suhr, 2005]

Presenting a PCA can be done so by presenting each attribute or/and sample's loadings on the PC, either non-normalised or normalised to a range from -1 to 1 for all PC's.
When visualising and evaluating loadings on PC's and factors, four types of loadings can in general occur [Brown, 2009]. Zero-loadings, meaning loadings with a numeric value below 0.1. Significant loadings, being loadings with a numeric value above 0.3 in a sample of 100. In smaller samples, the loadings must be higher to be significant. These can also be called main loadings, if no significance level is assumed. Complex loadings are attributes having main loadings in several PC's or factors . For factor analysis, complex loadings are unwanted, as it creates a blurred picture of meaningful factors, if several attributes load in several factors [Brown, 2009]. However, for a PCA, complex loadings is not a problem, as the rotation of the space is not important. Finally there are the remaining loadings which are not main loadings or zero-loadings. For PCA as presented in the current work, focus will be on highlighting main loadings and removing zero-loadings to ease comprehensibility for visualisation of the PCA.

C.2.1 PCA plots and graphs

Based on a PCA, a number of meaningful plots and graphs can be made to evaluate and make meaning of data. Some of these are: Scree-plot, tucker-1 plot, PC-loading plots and bi-plots.

Scree plot is a plot used for evaluating the variance explained [Suhr, 2005]. Looking for a suitable number of principal components (PC's) can be done so by evaluating the eigenvalues of each dimension. The eigenvalues describes the how much variance is explained by the given principal component. Looking for a break points in the graph indicates a suitable place to break the number of PC's. A break means that the following PC's provides markedly less variance description than the ones before the break point. If the eigenvalue falls below 1, the PC's provides less variance explained than the initial measure points which is not desired, as the goal is to provide a number of PC's which describes the data in a more comprehensible way than the initial measure points.

tucker-1 plot A tucker-1 plot is a way of representing a PCA, by unfolding the PC's, e.g. by assessor or attributes [Tormod et al., 2011, p. 21]. Doing so allows for a PCA, visualised by a single assessor or attribute, enabling a visual inspection of agreement and loadings for the given attribute or assessor. A tucker plot can be used to evaluate whether assessors agree on their ratings of a given attribute, by looking at variance in their loadings on the PC's, or it can be used to evaluate whether any assessor or attribute have no influence on the PCA solution [Tormod et al., 2011, p.218]. Doing so allows for evaluating a panel's performance or quality of attributes in regard to agreement and description level.

PC-loading plots and score plots helps interpreting a PCA. A loading plot is a graph showing all variables, plotted on two of the PC's as coordinates or vectors [Tormod et al., 2011, p.216]. Visually inspecting variables that are close means they have high correlation, while variables that are opposite have negative correlation [Tormod et al., 2011, p.216]. Score-plots are in the same way as loading plots a graph showing coordiantes of verctors, but instead of variables, the samples are shown on a score-plot. Visual inspection shows which samples have similar properties, and which are very different, by inspecting how close they are to each other in the PC-space [Tormod et al., 2011, p.216]. Plotting loadings and scores together forms a bi-plot, enabling further characterisation of the samples than just similarities. A PCA is in itself not a statistical method, and to compensate for this, plotting score- and loading plots with confidence intervals can be done, to evaluate the significance in difference between samples in the PC-space.

Supplementary descriptive variables in loading plots is a way of adding supplementary variables by projecting them to an existing PCA of primary variables, and representing those in a loading plot along with the primary variables [Husson et al., 2011, p.20-22]. Doing so allows for a comparison of two sets of descriptors for the same PC-space, e.g. two different occurrences of the same event or two different levels of descriptions (e.g. perception and physical measures) for the same event.

Preference mapping is a calculation and illustration of preference represented on the PC's derived from preference scores of the samples. By analysing and creating a preference map for each respondent, layering these preferences like a contour map, creates a preference map [Husson et al., 2014].

Appendix D

Apparatus for user testing and panel gathering

D.1 Presented Power Point

Word elicitation workshop

Goal: Create an exhaustive list of product attributes, describing usage of the device.

If time: Condense lists and evaluate products

2hours

Group of 8 people

3 phases

"what describes the use and differences in use of the presented products?"

- Produce
- Understand
- Verify

Phase 1

Create labels

- Why is one different?
- Why are the two others alike?

Big Small

Phase 1: Produce

- Try to create descriptive and not evaluative word pairs
  - Avoid using value-loaded words. This would make preferring one of the poles impossible (e.g. good quality – bad quality)
- Use the devices on the table to explore how they are different and how they are alike
- No communication is allowed

Break!
(~5 minutes)

Phase 2: understand

- If you do not understand a label, ask aloud and the person who made it will explain
- If a label that is explained can be made more understandable without changing it’s meaning, do so.
- You may move the labels around if it helps you
- Be inspired! Make new labels

Phase 3: Verify

- Remove only completely identical labels
- If a label is evaluative, find it’s descriptors.
- The goal is not to reduce the list
- You are allowed to disagree. Do not subdue to group pressure

Phase 3: Verify

- Mark any of the labels with a dot, if you think they are irrelevant to the list.
- Do not remove any labels

(Optional) Phase 4: Group

- Sort the labels into subgroups, and give each subgroup single label as headline.
- Remember to keep the label descriptive

(Optional) Phase 5: Evaluate product

- Evaluate products on the headline labels

D.2 Product attributes evaluation sheet

After the final iteration of evaluation of the list, and the development of the attribute evaluation sheet, the result consisted of 38 attributes, presented as opposite poles.

Evaluator _____ Device _____ Evaluation no. ____

Product evaluation sheet:

Please start by putting in your initals, which device you are evaluating and what number of evaluation this is for you (ranging from first to last evaluation). Read the instructions carefully before initiating the evaluation.

Evaluate the following interactive and static product attributes, by putting a cross in the circle you find fitting. The middle circle indicates equal level of the two poles, while the most right and most left circle indicates the most extreme level of this pole.

Please use as a reference what you know and have experienced about products in this category. Have in your head a "*prototype product*", that you would define as a standard device. Avoid evaluating it by referencing to other product categories like e.g. phones or coffee cups.

For some questions, parts of the product might have different levels of the given attribute. For these questions, please evaluate the product as a whole, and take into account any part you find relevant.

When you evaluate the product, limit your answers to focusing on the actual use of the product. The use starts at the product state you will find the product in, and ends when the user has completed their intentional action.

If any word is dificult to understand, see the glossary list, with descriptions of the words.

Interactive attributes:

1.1)	Tired slow down dosing click sound	○	○	○	○	○	○	○	Gentle slow down dosing click sound
1.2)	Gentle dosing click sound	○	○	○	○	○	○	○	Callous dosing click sound
1.3)	Same clicks when dialing up and down	○	○	○	○	○	○	○	Different clicks dialling up and down
1.4)	Mechanic dial click sound	○	○	○	○	○	○	○	Smooth dial click sound
1.5)	Continuous interaction	○	○	○	○	○	○	○	Segmented interaction
1.6)	Push button extension	○	○	○	○	○	○	○	No push button extension
1.7)	Loud dosing	○	○	○	○	○	○	○	Silent dosing
1.8)	Quick dosing clicks	○	○	○	○	○	○	○	Slow dosing clicks
1.9)	Distinct EoD signal	○	○	○	○	○	○	○	Discreet EoD signal
1.10)	Mechanic feel	○	○	○	○	○	○	○	Smooth feel
1.11)	Acts like human	○	○	○	○	○	○	○	Acts like machine
1.12)	Auto	○	○	○	○	○	○	○	Manual
1.13)	Expected interaction	○	○	○	○	○	○	○	Surprising interaction
1.14)	Quick	○	○	○	○	○	○	○	Slow
1.16)	Low force required	○	○	○	○	○	○	○	High force required
1.17)	Very rollable	○	○	○	○	○	○	○	Not rollable
1.18)	Loose content	○	○	○	○	○	○	○	Firm content
1.19)	Even weight distribution	○	○	○	○	○	○	○	Uneven weight distribution
1.20)	Many handling steps	○	○	○	○	○	○	○	Few handling steps

NB! There are more on the back.

Product evaluation sheet: Page 2

When evaluating static expression attributes, look at the product both with and without it's covers and caps, and evaluate the product as a sum of all impressions.

Static expression attributes:

2.1)	Heavy	○	○	○	○	○	○	○	Light
2.2)	Consistent	○	○	○	○	○	○	○	Fragmented
2.3)	Ridged/Textured dial	○	○	○	○	○	○	○	Smooth dial
2.4)	Playful	○	○	○	○	○	○	○	Dull
2.5)	Discreet	○	○	○	○	○	○	○	Loud
2.6)	Sharp	○	○	○	○	○	○	○	Soft
2.7)	Robust	○	○	○	○	○	○	○	Fragile
2.8)	Small	○	○	○	○	○	○	○	Big
2.9)	Complex	○	○	○	○	○	○	○	Simple
2.10)	Vivid colours	○	○	○	○	○	○	○	Neutral colours
2.11)	Colourful	○	○	○	○	○	○	○	Solid colour
2.12)	Bulky	○	○	○	○	○	○	○	Slim
2.13)	Cover needle	○	○	○	○	○	○	○	Reveal needle
2.14)	Cover mechanics	○	○	○	○	○	○	○	Reveal mechanics
2.16)	Rough	○	○	○	○	○	○	○	Smooth
2.17)	Natural	○	○	○	○	○	○	○	Artificial
2.18)	Honest expression	○	○	○	○	○	○	○	Hiding expression
2.19)	Detalied	○	○	○	○	○	○	○	Plain
2.20)	Continuous shape	○	○	○	○	○	○	○	Complex shape

D.3 Experience evaluation sheet

Based on the analysis of UX-aspects, a UX evaluation sheet is created, containing both the derived UX-aspects and an overall experience evaluation. The sheet includes the instructions needed for filling in the sheet. On the back of the sheet is included a vocabulary describing the scales used for the UX-aspect evaluations.

Evaluator _____ Device _____ Evaluation no. ____

Experience evaluation sheet:

Instructions:
Please start by putting in your initals, which device you are evaluating and what number of evaluation this is for you, starting with your first (1st) evaluation, ending with your fourth (4th). Read the instructions carefully before initiating the evaluation.

Use the device to simulate an injection in the pillow, and evaluate the experience on the following attributes. Imagine that it is your stomach you are injecting into.
Feel free to do several simulations to remind yourself what the experience was like.

If have any trouble understanding the words, see the back of the sheet for a glossary

The experience felt

1)	Simple	○	○	○	○	○	○	○	Like a lot to deal with
2)	Meaningful	○	○	○	○	○	○	○	Meaningless
3)	Obtrusive	○	○	○	○	○	○	○	Inconspicuous
4)	Meant for me	○	○	○	○	○	○	○	Meant for someone else
5)	Very painful	○	○	○	○	○	○	○	Not painful
6)	Intimidating	○	○	○	○	○	○	○	Encouraging
7)	Scary	○	○	○	○	○	○	○	Comfortable
8)	Safe	○	○	○	○	○	○	○	Unsafe
9)	Tense	○	○	○	○	○	○	○	Relaxed
10)	Understandable	○	○	○	○	○	○	○	Confusing

The experience made me feel

11)	Constrained	○	○	○	○	○	○	○	Free
12)	Weak	○	○	○	○	○	○	○	Strong

The overall the experience was

13)	Negative	○	○	○	○	○	○	○	Positive

Simple - Like a lot to deal with:	Simple: easy to deal with, use, etc. Like a lot to deal with: Hard to deal with, use, etc.
Meaningful - Meaningless	Meaningful: Full of meaning, purpose, value, etc. Meaningless: Without meaning, purpose, value, etc.
Obtrusive - Inconspicuous	Obtrusive: Unwelcome and intrusive Inconspicuous: Not noticeable or prominent.
Meant for me - Meant for someone else	Meant for me: Like it was targeted at or created for me Meant for someone else: Like it was targeted or created for other people
Very painful - Not painful	Very painful: Affected with, causing, or characterized by pain Not painful: Not affected with, causing, or characterized by pain
Intimidating - Encouraging	Intimidating: Fill with fear, force by inducing fear Encouraging: Stimulate, promote or inspire with courage, assistance or approval
Scary - Comfortable	Scary: Causing fright or alarm Comfortable: At ease, satisfied, physically supported
Safe - Unsafe	Safe: Secure from liability to harm, injury, danger, or risk Unsafe: Not secure from liability to harm, injury, danger or risk
Tense - Relaxed	Tense: in a state of mental or nervous strain; high-strung; Relaxed: Being free of or relieved from tension or anxiety
Understandable - Confusing	Understandable: comprehensible, perceive the meaning, Confusing: lack of clearness, lack of meaning
Constrained - Free	Constrained: Forced, compelled, obliged, restrained Free: Able to do something at will; at liberty
Weak - Strong	Weak: Liable to mentally yield, break, or collapse under pressure or strain Strong: Mentally powerful or vigorous

Appendix E

WEW results

The following list presents the exhaustive list of 80 injection device attributes, derived using the WEW-workshop.

Pole 1	Pole 2	Note
Heavy	Light	
Sturdy confirming handling sound and feel	Light or no confirmation handling sound and feel	[No cat.]
Precise	Granulated (grov)	[No cat.]
Soft push precise	Stable firm stand	(Shield sh.)
Embrace skin	Hits one spot on skin	(Shield sh.)
Coarse	Precise	(Shield sh.)
large shield surface	Small shield surface	
Tired slow down click sound	gentle slow down click sound	
Loud clicks when dialling down	Same clicks when dialling up and down	
Crisp click	soft click	
mechanic dosing click sounds	Smooth dosing click sounds	
Dial with ridges	Smooth dial material	
Cap with clip for pocket	Cap without clip	
High force to actuate	low force to actuate	
Continuous flow	Varying flow	
Changed force required to push button	Same force	
Changed ergonomics during injection	Same ergonomics during injection	
Push button extension	no push button extension	
Loud dosing	Silent dosing	
Loud	Silent	
Eager	Lazy	
Quick progress clicks	Slow progress clicks	
EoD click	No EoD click	
Loud EoD sound	Quiet EoD Sound	
Dial returns a few degrees from dialled position when released	Firm dial stays in 'dialled position at release	
Elastic band feel in dial steps	Firm feel in dial steps	
mechanic feel in dialling	Smooth feel in dialling	
Animated	Mechanical	(feedback)
Aesthetic interaction	mechanical interaction	
Smart	Dumb	[No cat.]
Guidance	Manual	

Automated	Manual	
More control	Less control	
Discrete	Attention seeking	
Discrete	Draws attention	
Sharp	Soft	
Straight shape	Curved shape	
medical	Consumable	
Friendly	Scary	
Elegant	Casual	
Compact	Elegant	
Designed	Manufactured	
Classic	Modern	
Elegant	Well designed	
Friendly	Technical	
Medical look	Domestic look	
Robust	Fragile	
Steady	Flimsy	
Rattling	Sturdy	
Reliable	Non sturdy	
Oval shape	Circular shape	
Sharp edges	round edges	
Fits my hand	Does not fit my hand	[Proportions]
Action and reaction happens in same place	Action and reaction are split	
Closely mapped	Spatially mapped	
Surprising	Expected	
Glossy	Matte	[No cat.]
Long	Short	
Many contrasts	Few contrasts	
Complex surface	Smooth surface	
Decorated	Reduced	[look]
Vivid colours	Neutral colours	
Light colours	Dark colours	
Blue	White	
Continuous shape	Abrupt shape	
Compact	Shattered	Look
Bulky	thin	
Fat	Slim	
Detailed	Plain	
Rough	Smooth	
Concealed dial window	Open dial window	
Small drug window	Big drug window	
Hidden functionality	Visual functionality	
All visible needle	All hidden needle	
Many handling steps	Few handling steps	[Unnamed cat.]
Quick	Slow	[Unnamed cat.]
Effective	thorough	[Unnamed cat.]
Embracing	Pinpointing	[Unnamed cat.]
Ready dial	Dial in idle position	[No cat.]
Thin	Thick	Material Thickness. [No cat.]

General attributes		part-specific attributes
Heavy - Light	Vivid - neutral (colours)	Change - constant (actuation and injection)
Large - Small	Complex - simple	large - no (extension of push button)
Animated - mechanical	Complact - flexible (look)	Loud - silent (dosing)
Emotional - mechanical	Bulky - slim	Quick - slow (continuous progress clicks)
Detalied - Plain	Cover - reveal (functionality)	Loud - quiet (EeD feedback)
Auto - Manual	Rough - Smooth (look)	Tired - gentle (slow down click sound)
Discrete - loud	Quick - slow	Same - different (clicks when dialling up and down)
Sharp - soft	Many - few (handling steps)	Mechanic - smooth (click sound)
Item - associatic	Small - big	Ridget - smooth (dial surface)
Compact - flexible	Robust - fragile	Mechanical - smooth (feel in dial)
expected - surprising (interaction)		Embracing all - pinpointing (treatment)
Designed - manufactured		Proud - discrete needle

Table E.2: Condensed list of product attributes, grouped by attributes that are part-specific and product general

From the condensation phase of the workshop, a list of 33 attributes are presented in the below table (see table E.2).

Appendix F

Product attributes

Several suggestions towards product attributes and features has been made, both product specific and general, and many different methods has been used, to elicit them.
While each product category is different, some tendencies are present between office chairs, telephones, cars, printers, sports mascots, and many other products for which product semantics has been researched, while a unified way of collecting them is not present.

F.1 Studies of product attributes

Different studies has come up with different list, categories and levels of describing product attributes, features or elements. Below is a list of research with different product-categories and the found product attributes.

Based on an open-ended interview about AV-systems which was examined and operated, Lin et al. [1996] reached 10 product attributes relevant for further investigation, which was *originality, design quality, market position, color implication, practicability, decoration, culture taste, detail treatment, total image and value*.

For describing images of office chairs, Hsiao and Chen [1997], referring to previous investigations, enlist 20 descriptive words, from which 7 are picked as the *best ones*. These are: ***grand***, ***comfortable***, ***practical***, ***elegant***, ***steady***, ***durable***, ***dignified***, *authoritative, individualistic, dynamic, advanced, emotional, characteristic, high grade, prevalent, compact, streamlined, handy, lovely, sleek* (*"best"* words emphasised). Further, they deconstruct a chair into five design elements being *back, seat, back support, armrests* and *base*.

For the description of images of telephones, Hsu et al. [2000] extracted a list of 24 antonym word pairs: ***traditional - modern***, ***large - compact***, ***coarse - delicate***, ***childish - mature***, ***heavy - handy***, ***masculine - feminine***, ***unoriginal - creative***, ***common - particular***, ***hard - soft***, ***obedient - rebellious***, ***rational - emotional***, ***nostalgic - futuristic***, ***handmade - hi-tech***, ***conservative - avant garde***, *decorative - practical, discordant - harmonious, standard - outstanding, inert - active, rectangular - rounded, personal - professional, simple - complicated, plain - luxurious, obtuse - brilliant, old - new*. From these, 14 were evaluated as representative based on a following expert review (emphasised).

Based on a search in catalogues, journals and websites, Mondragón et al. [2005] found over 100 words describing machine tools, from which a list of 18 descriptors were condensed by removing affinity-related, ones already in the technical specification of the product and in the end less significant ones. The remaining descriptors in antonym word pairs are: *High technology - traditional, intelligent - limited, easy to use - difficult to use, easy to clean - difficult to clean, accessible - not accessible, robust - light, compact - inconsistent, simple - complex, efficient - inefficient, flexible - rigid, reliable - unsafe, comfortable - uncomfortable, powerful - weak, stable - unstable, high quality - low quality, safe - dangerous, durable - ephemeral, quiet - noisy* (translated from Spanish).

Hsiao and Wang [1998] found from a questionnaire 35 words describing the form of cars, from which 15 were chosen, being *delightful, eruptive, young,*

healthy, home, highgrade, well bred, dignified, handy, city featured, lovely, agile, up to date, practical, and *speedy*. Further, Hsiao and Wang [1998] suggests five design parameters of car forms, which is *stretch body length, increase body height, stretch tail length, stretch head length,* and *increase tail height*. No data is available towards how these parameters and descriptors are chosen.

Chuang et al. [2001] listed 24 word-pairs describing images of mobile phones, from which 11 word pairs were selected based on cluster analysis on a test on experts (emphasised). The word-pairs were ***traditional - modern***, ***large - compact***, ***coarse - delicate***, ***heavy - handy***, ***masculine - feminine***, ***plagiaristic - creative***, ***hard - soft***, ***obedient - rebellious***, ***rational - emotional***, ***nostalgic - avant garde***, ***hand made - hitech***, *Sharp edged - curvatured, conventional - futuristic, unrealistic - practical, plain - luxurious, simple - complicated, tardy - streamlined, common - novel, ordinary - individualized, normal - particular, indistinct - distinct, idle - active, popularized - professional* and *disagreeable - harmonious*.

To evaluate printer design, Chang et al. [2003] used six predefined descriptive categories, which they argue is generally expected by consumers, to compare two printers against eachother. The categories were *fun, solid, friendly, modern, professional* and *scientific*. They further use word-pairs to evaluate each printer, which were *masculine - feminine, lively - steady, soft - hard, rational - passionate*.

In evaluating table glasses, Petiot and Yannou [2004] asked users to describe different glasses after handling. From these, 17 adjective pairs were derived, along with the semantic attribute the adjective pairs related to (in paranthesis). These were *traditional - modern (modernity), easy for drinking - not. . . (Ease of drinking with), decorative - practical (Decorativeness), unstable - stable (Stability), complicated - simple (Simplicity), Multiusage - occasional (Ordinariness), easy to fill - not. . . , flashy - discreet (Showiness), Easy to handle - not . . . , Classy - vulgar (Smartness), Common - particular (Smartness), Unoriginal - creative (Originality), Existing - new (Originality), Good perceived quality - bad . . . (Quality), strong - fragile, Masculine - feminine (Fragility), Coarse - delicate (Fragility)*.

For evaluation of sports mascots from e.g. olympic games, Lin et al. [1999] derived 14 adjectives from a projection experiment with both designers and non-designers. These were *Subject-centered, Active, Attractive, Artistic, Unique, Cute, Striking, Creative, regional, Energetic, Memorable, Merry, Symbolic* and *modern*.

Wikblad et al. [1990] researched diabetes patients' attitude towards what the

disease diabetes mean to them. From a predefined list of adjective pairs, nine were found to be descriptive, described with descriptor: *constrained - free (Free), weak-strong (Strong), dominant - submissive (Dominance), worthless - valuable (Value), difficult - easy (Difficulty), unsafe -safe (Certainty), tense - relaxed (Relaxed), monotonous - varied (Variability), independent - dependent (Dependence).*

Shen and Wang [2016] Extracts four high-level words as descriptors through a factor analysis on 60 commonly used words, put into an evaluation questionnaire. These four high-level words are: *Innovative, Attractive, Changeable* and *durable*.

Guest et al. [2011] made a vocabulary for emotional and sensory aspects of touch perception. From a list of 262 words, generated from litterature review on tactile perception, a vocabulary was extracted through a user test, filtering out words that were not related to touch, and words that were synonyms. The resulting list were split into two catergories: sensory and emotionally. The sensory attributes were: *Jagged, Sharp, Prickly, Pointy, Gritty, Coarse, Rough, Hard, Bumpy, Firm, Vibrating, Lumpy, Dry, Freezing, Burning, Hot, Wooly, Hairy, Cold, Cool, Fuzzy, Rubbery, Sticky, Warm, Damp, Wet, Moist, Fluffy, Greasy, Slippery, Smooth, Soft* and *Silky*. The emotional attributes were *Comfortable, Relaxing, Enjoyable, Desirable, Pleasurable, Soothing, Calming, Sensual, Erotic, Sexy, Arousing, Thrilling, Exciting, Irritating, Irritable* and *Discomfort*.

In a pilot-study of the WEW-workshop, present in the current work, product attributes for ball-point pens were derived. here, 31 attributes were derived, and translated from danish into: *noisy writing - silent writing, dedicated grip - non dedicated grip, thin line - thick line, visible brand - invisible brand, loose content - firm content, Loud actuation noise - no actuation noise, Colourful - solid colour, Pointy ball - round ball, regular - different, vigorous - steady ball, ergonomic - unmanageable, functional - hedonic, rollable - not rollable, continuous design - interrupted lines in design, transparent - not transparent, curvey - edgy, hard - soft, textured - smooth, hooded - built in shut down system, natural - artifical material, long ownership - short ownership, big volume - small volume, even weight distribution - uneven (...), kold - warm, disassembleable - not disassembleable, tight clip - flexible clip, pigmented line - not pigmented line, coloured ink - not coloured ink, resistance at actuation - no resustance (...), new - old*, and *dry ink - wet ink*.

For a more general approach, Hassenzahl and Monk [2010] suggested a number of emotional attributes general for any product, representing two broad categories of value: pragmatic and hedonic. The attributes, in contrast word pairs are *confusing – clearly structured, unpredictable – predictable, simple – com-*

plicated, and *practical – impractical* for pragmatic value, and *dull – captivating, tacky – stylish, cheap – premium*, and *unimaginative – creative* for hedonic value, along with two general evaluations *good - bad*, and *ugly - beautiful*.

F.2 Product and population differences

Hsu et al. [2000] showed that users and designers have very different understanding of product semantics and choose different words to describe products.

Mondragón et al. [2005] showed that commercial products, in this experiment machine tools, have different product semantics than consumer goods, as users perception of e.g. safety does not relate to fulfilment of some safety standard, but rather on the *feeling* of safety while handling the device. Further, the research shows some differences in product evaluation between experts, managers and regular users [Mondragón et al., 2005].

F.3 Analysis of attribute categories

To explore if some general categories of attribute are available, an analysis of the words derived from aforementioned studies are done.

F.3.1 Method

The analysis is made by printing out and clustering each attribute in terms of it's affinity, creating an affinity diagram as suggested in the KJ-technique Hanington and Martin [2012]. The affinity diagramming follows the steps suggested by Scupin [1997], by label clustering, clusters naming, and chart making, followed by explanation of the chart. The attributes for the research are the ones presented by Lin et al. [1996]; Hsiao and Chen [1997]; Hsiao and Wang [1998]; Hsu et al. [2000]; Mondragón et al. [2005]; Chuang et al. [2001]; Chang et al. [2003]; Petiot and Yannou [2004]; Lin et al. [1999]; Wikblad et al. [1990]; Shen and Wang [2016]; Guest et al. [2011], as described in this chapter, along with data from the pilot of the WEW study, presented in chapter 3.

F.3.2 Results

The result of the clustering consists of 12 main clusters, with sub-clusters within most clusters. Applying a connection between the 12 clusters, creates a chart, as presented in the next page.

- Value
  - Value
  - Total image
  - Emotional Response
    - Memorability
      - Memorable
    - Desirability
      - Desirable
        - Langt ejerskab - kort ejerskab
        - Attractive
    - Physical thriving
      - Healthy
        - Comfortable - Uncomfortable
        - Discomfort
        - Comfortable
    - Harmonious
      - Disagreeable - Harmonious
      - Discordant - Harmonious
    - Personified
      - Cute
      - Friendly
      - Lovely
    - Arousal
      - Relaxed
      - Thrilling
      - Soothing
      - Calming
      - Relaxing
      - Exciting
      - Arousing
    - Valence
      - Fun
      - Delightful
      - Enjoyable
      - Irritating
      - Merry
      - Irritable
      - Pleasurable
    - Sex
      - Sensural
      - Erotic
      - Sexy
  - Main value contribution
    - emotional
      - Rational - Emotional
    - Rational - passionate
      - Decorative - Practical
    - Funktionel - Hedonisk
      - Pragmatic Experience
        - Safety
          - Safe - Dangerous
          - Reliable - unsafe
          - Difficulty
            - Unrealistic - practical
            - Easy to use - Difficult to use
            - Difficulty
        - Usefulness
          - Practicability
          - Practical
          - Efficacy
            - Efficient - Inefficient
            - Intelligent - Limited
            - Handy
        - Build quality
          - Handmade - hi tech
            - Design quality
            - Durable
            - Fragility
            - Stable - unstable
          - High quality - lowquality
            - Quality
            - Stability
            - Robust - light
            - Durable - ephemeral
        - Additional functionality
          - Hætte - indbygget lukkefunktion
            - Dedikeret greb - ikke dedikeret greb
          - Kan rulle - Kan ike rulle
            - Kan skilles ad - kan ikke skille sad
          - Easy to clean - difficult to clean
        - Out of scope
          - Ease of drinking with
            - Regional
            - Culture taste
            - Accessible - not accessible
          - Well bred
            - Tynd streg - Tyk streg
            - Subject centered
            - Affjedrende kugle - ikke-affjedrende kugle
          - Skarp kugle - Rund kugle
            - Pigmenteret streg - Ikke-pigmenteret streg
            - Market position
            - Larmende skrift - stille skrift
      - Hedonic Experience
        - Artificiality
          - Naturlig - kunstmaterialer
          - Smartness
          - handy
          - Smartness
          - Location
          - City featured
          - Home
        - Active
          - Artistic
          - Energetic
          - Eruptive
          - Changeable
          - Authority
          - Authority
          - Agile
          - Variablity
          - Free
          - Dominance
        - Simplicity
          - Simplicity
          - Simple - complicated
          - Simple - complex
          - Professional
          - Popularized - Professional
          - Personal - Professional
          - Professional
          - Meaningfulness
          - obtuse - brilliant
          - Dignified
        - Gender
          - Masculine - feminine
          - Detaling
          - Decorativeness
          - Plain - Luxurious
          - Detail treatment
          - Elegant
          - Trust
          - Certainty
          - Dependence
          - Scientific
          - Highgrade
        - Age
          - Young
          - Childish - Mature
          - Attention drawing
          - Striking
          - Showiness
          - Additional meaning
          - Strong
          - Symbolic
          - Grand
        - Market Comparison
          - Modernity
            - Traditional - modern
            - Up to date
            - Modernity
            - Modern
            - Old - new
            - High technology - traditional
            - Individualized
              - Ordinary - individualized
              - Ordinariness
              - Individualistic
              - Normal - particular
              - Almindelig - Anderledes
              - Common - novel
              - Common - particular
              - Prevalent
          - Creative
            - Plagiaristic - creative
            - Creative
            - Originality
            - Unoriginal - creative
            - Obedient - Rebellious
            - Conservative - Avant garde
            - Nostalgic - Avant garde
            - Nostalgic - Futuristic
            - Conventional - futuristic
            - Innovative
            - Uniqueness
              - Standard - Outstanding
              - Characteristic
              - Indistinct - Distinct
              - Unique
    - Interactive expression
      - Speed
        - Speedy
      - Proportions
        - Ergonomisk - Uhåndterlig
      - Activity
        - Dynamic
          - Active
          - Inert - active
        - Lively - steady
          - Idle - active
          - Steady
    - Static expression
      - Details
        - Jagged
        - Coarse
        - Decoration
        - Kontinuerlig i designet - afbrudte linjer i
      - Size
        - Large - compact
        - Compact - Inconsistent
        - Compact
        - Shape
          - Pointy
          - Lumpy
          - Sharp
      - Rigidness
        - Rubbery
        - Flexible - rigid
        - Solid
        - Coarse - Delicate
        - Recognizeablity
        - Synligt brand - usynligt brand
      - Texture
        - Hairy
          - Fuzzy
          - Hairy
          - Wooly
          - Fluffy
        - Liquid
          - Greasy
          - Wet
          - Dry
        - Contour
          - Sleek
          - Bumpy
          - Smooth
          - Gritty
          - Rough
    - Auditive
      - Aktiveringslyd - ingen aktiveringslyd
      - Quiet - noisy
    - Haptic
      - Texture
        - Teksturered - glat
        - Prickly
        - Forces
          - Modstand ved aktivering - ingen
          - Stram klips - Fleksibel klips
      - Temperature
        - Kold - varm
        - Cold
        - Hot
        - Warm
        - Freezing
        - Burning
      - Firmness
        - Soft - hard
        - Firm
        - Silky
        - Weight
          - Jævn vægtfordelng - ujævn vægtfordeling
          - Heavy - handy
      - Vibration
        - Vibrating
        - Liquid
          - Slippery
          - Moist
          - Sticky
    - Visual
      - Colorurs
        - Farverig - ensfarvet
        - Transperant - Utransperant
        - Color implication
      - Shape
        - Rectangular - rounded
        - Sharp edged - curvatured
        - Kurvet - kantet
        - Tardy - streamlined
        - Streamlined
      - Size
        - Stor volumen - lille volumen

The 12 clusters are 1) Value, 2) Emotional response, 3) Main value contribution, 4) Out of scope, 5) Additional functionality, 6) Pragmatic experience, 7) Hedonic experience, 8) Interactive expression, 9) Static expression, 10) Haptic, 11) Auditive, and 12) Visual.

1) Value contains only two attribute; value and total image. These were not possible to connect to others, as it seems like an overall evaluation of a product based on the experience.

2) Emotional response covers the attributes describing the value the product provides to the user, rather than attributes describing the product itself. This category has eight sub-clusters, that is 1) Memorability, 2) Desirability, 3) Physical thriving, 4) Harmonious, 5) Personified, 6) Arousal, 7) Valence, and 8) Sex.

3) Main value contribution covers the evaluation of product's main contribution to the users life as either pragmatic or emotional, and thus are a conclusion to the following clusters of hedonic and pragmatic experience.

4) Out of scope covers attributes that in no way can be relevant to an injection device, as it covers pars that no injection device has, like e.g. *easy to drink with*, and attributes not related to the actual use of the product like e.g. *easy accessible*.

5) Additional functionality covers attributes describing functionality that is not directly related to the primary use of the product, like e.g. *easy to clean*.

6) Pragmatic experience covers attributes related to how well the product aids the user in doing what is is asked to do, like it's practicability, durability and ease of use. This cluster has five sub-categories, that is

7) Hedonic experience covers the part the product experience of what the product express about it's nature, and thus not related to pragmatic properties. The attributes in this category describes the product in a space of it's *charisma*, without placing any value on it. This cluster has 16 sub-clusters, that is 1) materials, 2) smartness, 3) Location, 4) Trust, 5) Active, 6) Authority, 7) Meaningfulness, 8) Simplicity, 9) Professional, 10) Gender, 11) Detailing, 12) Age, 13) Attention drawing, 14) Additional meaning, 15) Market comparison. Market comparison has four subcategories, in 15a) Modernity, 15b) Creative, 15c) Individualised and 15d) Uniqueness.

8) Interactive expression covers on a product focused level, attributes describing the product when interacting with it. On this level, the attributes are not related to any value to the user. This cluster has three subclusters, that is 1)

activity, 2) proportions, and 3) speed.

9) Static expression covers on a product focused level, attributes describing the product when exploring it without using it. Contrary to the following three clusters (haptic, auditive and visual), the attributes in this cluster and cluster 8) interactive expression is not based on pure sensation on one of the senses, but defines the product based on sense-making of the sensory attributes, likely from more senses. On this level, the attributes are not related to any value to the user. This cluster has six sub-clusters, that is 1) details, 2) size, 3) Additional meaning, 3) Shape, 4) Recognizeability, 5) texture. Texture is further divided into three sub-categories, in 5a) hairy, 5b) liquid, 5c) contour.

10) Haptic covers on a purely sensory level, the product's haptic profile. This covers both tactile and proprioceptive sensations, produced when interacting with the product. This cluster has seven sub-clusters, that is 1) Texture, 2) Temperature, 3) Firmness, 4) Vibration, 5) Forces, 6) Weight, and 7) Liquid.

11) Auditive covers on a purely sensory level the products auditive profile, that is the sound the device produces.

12) Visual covers on a purely sensory level the products visual profile, that is the products contrasts, described in terms of three sub-categories: 1) colours 2) shape, and 3) size.

As suggested from the chart, a hierarchy can be derived for the clusters, suggesting five levels of describing product attributes (see figure F.1, next page).

Starting from the bottom, the first level, covering the clusters ”visual”, ”haptic”, and ”auditive”, describes the pure sensation of exploring and interacting with the product. This level has no meaningfulness in the sensation, but only attributes describing the sensation, separated by which sense is stimulated.

The second level presents a level of product expression. This level covers a description of the product based on meaningfulness of the sensation from the first level. No value are put into the attributes on this level. This level is split between ”static expression”, representing the sensation of a product that is not changing or moving, and ”interactive expression”, representing the sensation a changing or handled, active product.

The third level describes the product in terms of the emotional characteristics it provides to the user. On this level, the attributes are still focused on the product, but seen from an evaluative user. This level is split between a pragmatic and hedonic experience. Additionally in this layer is an evaluation of whether the

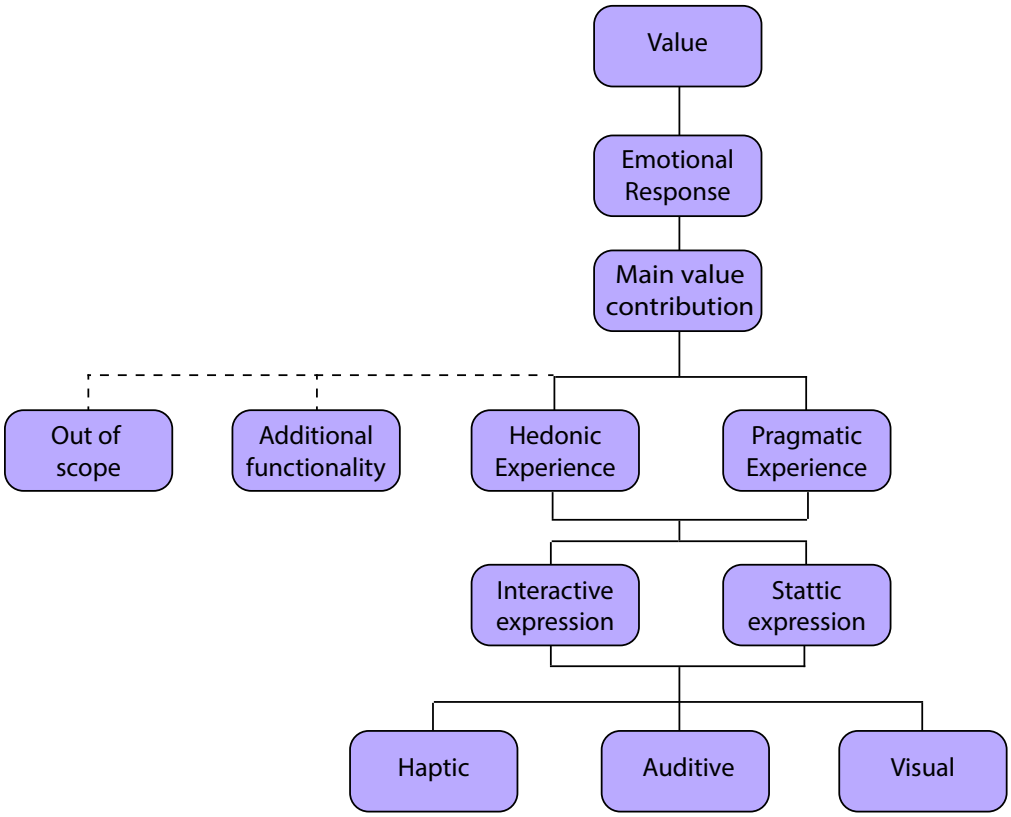


Figure F.1: Main clusters found, named, and charted using affinity diagramming

product's main purpose is pragmatic or hedonic. Hedonics are, as presented by Hassenzahl et al. [2000], the pleasure of a product, not based on its utilitarian purposes, but on its ability to create pleasantness

The fourth layer describes the product in terms of which emotions it awakes in the user. These attributes does not in itself describe the product, but rather the effect of the product on the user, or in other words the experience with the product.

The fifth and final level is an evaluation of the value of a product.

F.3.3 Discussion

The analysis shows that there are different levels for describing products, ranging from a purely sensory profile through the meaningfulness of the product, to the emotional response and total product value (see figure F.2).

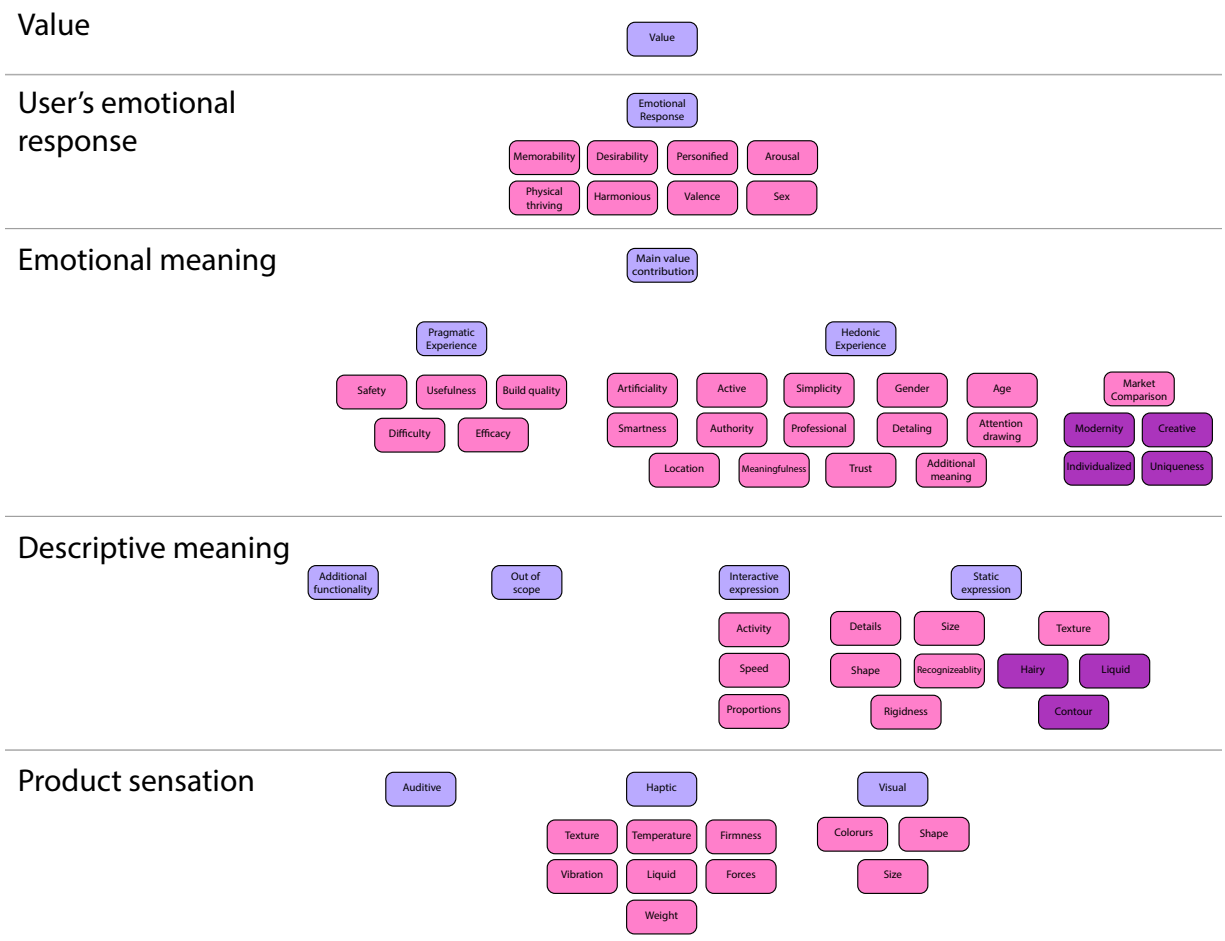


Figure F.2: Groups and description levels for product attributes

There are some subcategories with identical or almost identical titles from different levels of descriptions, as the same theme is described on different levels, like e.g. shape or activity. All levels could fulfil a product description in itself, without the other levels. However, choosing which level to use to describe the product, or connecting the attributes across the levels cannot be decided based on the current analysis. The higher the level, the easier it gets to interpret which range of the attribute that provides value for the user, but it also gets harder to know exactly how to design to achieve a given grade of the given attribute.

Appendix G

Transcripts

For some studies included in this research, interviews has been part of the collected data. For these interviews, transcripts have been made, to provide a transparent analysis. These transcripts are presented in the following appendix, along with guidelines for reading the transcripts

G.1 Transcription guidelines

The transcripts are made using the minimal transcript convention from the danish standard for transcripts "*Dansk Standard for Udskrifter og Registrering af Talesprog*" [Gregersen, 1992]. As suggested by Kvale [1997], a word for word transcription forms a hybrid data set, constructed without it's context and transformed from one discourse where it is meaningful to another where it is not, and is therefore dangerous and lacking in it's quality [Kvale, 1997, p. 167-168]. An approach is taken allowing for some interpretation in the transcriptions to create a degree of meaningfulness in the written sentences as a minimum. This is done by removing e.g. laughter, in itself meaningless talk like "*eehrm*" and "*yeeeees*", stutter, prolonging of words using these as thinking pauses, and several beginnings to one sentence like "*yes, so what can i... this is... you can actually look at it like [...]*". Further, talk about irrelevant subjects for the interview focus are not transcribed, and marked with "*[...]*" or *[irrelevant]* in the transcript. This produce a transcript that looks more like an actual written text, however, there are still several syntax errors, due to the nature of spoken words in discussion.

G.2 Device attribute expert panel discussion: Second iteration

Transcript of a discussion with the device attribute expert panel 27-04-2017 regarding the second iteration of the product attribute list. This discussion is referred to as interview 1 [i1]

F: To hovedfokuspunkter som jeg gerne vil have vi snakker om det er dether med hvor generaliserende er vi. Fordi nogle af dem er meget generaliserende nogle af dem er meget produktspecifik hvis man kan sige det sådan.
P1: F de der ord det er.. hvad for en type eller kategori ord er det nu vi har lavet. Eller skalaer eller poler.
F: Jamen du kan se det som constructs så hvis man nu puttede alle sammen op så kunne man lave sådan et design rum hvor du kunne placere en hvilke som helst injektionspen i den så har den et eller andet niveau af hver.
P1: Ja jeg skal bare lige have det der ord fordi det er ikke sort. Der står for eksempel ikke sort hvid her. Der står heller ikke den er sort. De ord må ikke være beskrivende hvad var det nu de var.
F: Deskriptive
P1: Deskriptive så de skulle være beskrivende.
F: Uden at være evaluerende det er lidt det der er det vigtige
P1: Ja okay beskrivende uden at være evaluerende. For det er vel det vi skal vurdere om de her er ikke?
F: Jo jeg vil gerne have vi diskuterer hvor beskrivende de er og hvor generaliserende de er og jeg synes ikke nødvendigvis de skal være generaliserende fordi jeg vil også gerne have vi diskuterer hvor fyldestgørende der er for det her produkt her. For jeg forestiller mig at jo mere vi generaliserer jo mindre beskriver vi faktisk også produktet ved at det er sådan lidt abstrakte begreber vi når ud til og det vi så når frem til er svært at putte tilbage på devicet. Så det er de tre punkter jeg gerne vil have vi diskuterer.
P2: Og de er alle sammen meget sådan user experience relateret
F: Vil du uddybe det.
P2: Der er ikke. Der er ikke nogen der siger noget om.. er den dyr eller billig. øhm. er den..
P1: Social status.
P2: Passer den med resten af mit liv eller gør den ikke.
F: Man skulle helst kunne udelade brugeren fuldstændig fra de her. De skal kun være beskrivende for selve produktet og ikke en brugerevaluering af produktet.
P2: Nu tænkte jeg på sådan noget som at de har dem i køleskab ikke. Egner den sig til det. Altså der er nogle ting vi ikke har med her fordi vi har kigget meget på selve håndteringen. Du sagde fra man starter med at tage den til det er slut og der vil være nogle ting med udenom som vi ikke har med. For eksempel det med køleskab og så videre og også noget der handler om et medical injectable device. Vi har for eksempel ikke noget med om overfladen er tekstil eller plastic. Vi har jo zoomet ind på noget der vil være relevant for lige præcis de ting vi laver men ikke alle mulige ting man også vil gøre.
P1: Vi har zoomet ind på interaktionen med produktet. Den fysiske håndtering.
P2: Jeg tænker på en højtaler ikke. Hvis du havde spurgt for fem år siden til kriterier for en højtaler så ville du ikke have tænkt på, ahr måske lidt mere end fem år, tekstile overflader til højtalere så havde det ikke været en del af det her.
F: Tror du hvis vi går tilbage det her med om den egner sig til køleskabet for eksempel vil den kunne bliver beskrevet på dem vi har her. Er den for eksempel en sammenhæng af den og den og den og den.
P2: Vi ville vælge alt det fra der var lavet af stof eller med huller ind til elektronik. Hvis der var elektronik på at elektronikken skulle føles consealed så den egner sig til at være i. Så der var mere i forhold til at de her parametre hvad er det for nogle typer produkter der skal kunne evalueres ud fra dem. Det vil som jeg ser det være nogle standard. Det vil ikke være en pen med elektronik i fordi så skulle der tilføjes nogle flere. Så det var for at sige hvad er rammen.
F: Man kan sige at de skulle jo gerne kunne dække de penne som vi evaluerede sidste gang og der var ikke nogen med elektronik i. Så det er ligesom..
P1: Det var ligesom lidt mærkeligt du sagde det P2.
P2: Hvis vi tog den ud med nogle af de koncepter vi udvikler på nu så vil vi være nødt til at tilføje så hvor komplet...

P1: Så skal der ligesom et andet filter til. Lige nu så er det her måske et velbeskrevet interaktionsfilter eller beskrivende.
P3: Der er ikke så meget med materialer som jo også linker tilbage til kan det være i køleskabet som var et scope.
P2: De er mere på en anden måde. Men det er måske det der med at de er beskrivende uden at være evaluerende. Men for eksempel den der med medical den synes jeg ikke er der vel? altså hvad er det for et udtryk den har.
P3: Men har det noget at gøre med interaktionen. hvor scoper vi?
F: Det må gerne være det visuelle indtryk også.
P2: Og det er det jeg mener med at det er meget håndteringsnært. Men der er nogle der handler om.. Men de knytter sig mere til...
P1: Der er noget hard soft
P2: Der er også noget compact flexible men det leder mere hen til at håndtere noget end til at føle noget når du ser noget på et mindre funktionelt plan.
P1: Beautiful er det evaluerende.
F: Det ved jeg ikke om det er. synes du det er det?
P2: Det er sådan en diskussion du ikke må starte P1. Den stopper aldrig.
P1: Aldrig
F: Det som der er nogle der foreslår, jeg har prøvet at smide forslag op her, det som nogle gør og det som jeg synes vi snakkede lidt om det er det med at kigge på om den har en funktionel roller eller en pleasure rolle. Det er det jeg forestiller mig lidt i den her emotional mechanical.
P2: Der er for eksempel rollable not rollable det har vi ikke her og det vil da være et kriterie. Vi laver i hvert fald virkelig dårlig æstetisk design ud fra kravet om at de ikke må kunne rulle på et bord.
P1: det er så åndsvagt altså.
P2: Det er fordi du er sand user researcher som ved at det vigtigste det er dit ærlige feedback uden filter. Nej så det vil jeg da sige der var en der manglede hvis vi skal være tro nu så jeg dem bare.
[...]
P2: der er flere af dem der jeg kan genkende fra brugerfeedback i forbindelse med koncepter vi går ud med. Men der er jo også mange af dem, jeg tænkte den med vægten dernede altså vægtfordelingen, det er helt sikkert også noget der ville være relevant at få med. Og så er der mange af dem der aldrig bliver aktuelle på grund af vores brand. Så den der childish mature eller play.. vi har nogle gange haft nogle koncepter der var mere playful i forhold til rational i en oplevelse men vi går jo ikke ud med noget der er playful for det er ikke i compliance med vores brand guidance så på den måde er der jo nogle der kunne være relevante hvis det var et andet firma end os men vi skal kigge på at det var os.
F: I har ikke oplevet at der var nogle af jeres koncepter der blev vurderet til at være for playful?
P2: Nej omvendt måske at hvis vi var et mobiltelefonfirma så havde man valgt en anden telefon som havde en anden brand identitet.
P1: Nogle gange er der attributter som bliver betegnet som playful. For eksempel når vi har ting der bevæger sig for eksempel skjolde eller andre dimser eller hvis vores dial ligesom kører lækkert så kan folk godt finde på at artikulere playful som en beskrivelse af en attribut.
P2: Playful stod ikke der det var en vi kom op med ud fra childish.
F: Hvad ville det modsatte så være af playful. Serious eller
P2: Jamen den kan have begge.
P1: Den kan være uninteractive noninteractive det kommer lidt an på hvad der sparker den playfulness ikke.
P2: Ja fordi serious vil være i en. Der tænker jeg meget mere æstetik hvor det du taler om med interaktionen der er det mere at den er død jeg kan ikke finde et positivt ord for det.
F: Det behøver ikke at være positivt død er helt okay.
P3: Hvad med konservativ eller hvad

P2: Den tænker jeg meget er i seriøs linjen ikke men også et godt bud
F: Der er den der hedder inert active er vi lidt derovre eller er det noget helt andet.
P2: Hvad betyder inert
P1: Jeg ved heller ikke hvad det betyder
F: Så vidt jeg kan huske betyder det noget med passiv. Nu skal jeg nok kigge efter.
P1: Interaktion det kan være expected surprising så kan det også være playful og det kan være aesthetic og det kan være beautiful så hvad skal man sige der er sådan en hel verden inden for dether. Inden for ting der ligesom bevæger sig.
P2: Du kunne også sige melodisk. Der er tit nogle der siger dut dut dut eller wiuwut sådan rytmisk så der er noget.
P1: Rythmics
[...]
F: Nu ved jeg vi har sådan en et eller andet sted om slow down click sounds som var det der om det var på en behagelig måde det blev langsom eller om det var en trættende måde. Er det det samme er det også ovre i den.
P1: Jeg tror den du refererer til det er detder det er rigtigt det hører vi nogle gange så siger folk det er bare sådan wup bup bup. Så er det hele interaktionen der ligesom kan beskrives ud fra en rytme. En to tre og så. Det er ikke sådan en flexpen.
P3: en tro tre fire fem seks syv otte.
[...]
P2: Hvis nu der var en rytme i det dut dut duuu, dut dut duuu, dut dut duuu. Men det er der ikke når den ligesom bliver for lang.
P3: Så vi skal lave en sang til at hjælpe dem
[...]
P3: Men i har jo noget med click sound og feel of dial og mechanic smooth er det sådan noget rytme ikke rytme.
P2: Nej det er mere sådan noget karakteristik af hvordan er den. Hurtig eller langsom præcis eller sløv. Det andet det er mere på den der overordnede. Er det en playful eller æstetisk. Det er den overordnede oplevelse og det er sådan en helt overflødig kvalitet som alligevel kan give noget ekstra. Jeg tror hvis P4 havde været her så var det det der ækvilibrium når summen af de enkelte bliver mere end sig selv og det ligesom går op i noget mere.
[...]
F: Det er jeres til venstre og nogle synonymer jeg har fundet fra de andre som jeg også gerne vil have os til at snakke om. Om synonymerne er bedre eller hvad det nu kan være.
P2: WEW
F: Det hedder det i lavede sidst.
P2: Jeg genkendte ikke item associatic.
F: Den lavede vi også sidst i hvert fald.
P2: ja jeg kan se den står der. Det kan være en cluster som nogle af de andre lavede
P1: jeg tror det var en vi arbejde lidt med om det ligesom bliver noget andet end det det egentlig er. Om det bare er produktet i sig selv, altså en plasticcylinder der kan indeholde noget drug der kan hjælpe dig eller om det bliver min life safer ikkeat forveksle med light saber.
P2: Vil du have vi lige kigger på dem der og tænker
F: Ja det må i meget gerne.
P2: Vi har jo clusteret så den der detailed plain som vi har deroppe der har det været ikke i forståelsen plain luxurious men mere forståelsen decorative plain. Altså så simple versus decorative og sådan som jeg husker det så dækker detailed plain både at noget kan være dekoreret eller rodet men vi har jo også simple complex. Så det kunne godt være at decorative var bedre.
F: I stedet for detailed.
P2: Neeej. Fordi detailed dækker også over om noget er detaljeret altså om noget er formgivet i detaljen altså consideret i hver detalje eller om det bare er lavet så det dækker over flere ting. Heavy handy. Handy er egentlig..
F: Det sætter lidt heavy i et negativt lys synes jeg

P2: Ja men handy var egentli.. kan i ikke huske vi snakkede om det der med om noget ligger godt i hånden altså om det passer til hånden eller det passer i lommen eller hvad var det andre sagde
F: Der er også så vidt jeg husker den her om den er ergonomisk eller uhåndterbar.
P2: Det er negativt. Uhåndterbar er mega negativ
F: Men er det noget af det samme som den anden handy
P2: Ja og jeg tænker det er det der er min udfordring med det her system at man ikke vurderer kvaliteten. De skal helst være positive begge to. Når man så har valgt dem er det så features for når man så har valgt den rigtige kombination så skal man jo stadig gøre det bedst muligt.
F: Man kan også sige at der er ikke nogen grundt til at have en parameter her hvis vi godt ved hvilken ende vi gerne vil ende i.
P2: Nej det er det der er tanken. Der kan man sige når virkeligheden slår ind så er der mange ting som vi egentlig godt ved hvor vi vil ende men de er alligevel relevante fordi alting bliver på bekostning af noget. Så hvis vi vil vælge at den skal være, tag flex touch diskussionen, hvis vi vil have at den skal være handy og ergonomisk som en flex touch og ikke flex pen så koster det to kroner eller et ellre andet og så kan vi ikke få noget andet så ville det stadig væk være værd at vide om det var vigtigere.
P3: Også big small for det er jo flex problemet.
F: Det kan være vi skal prøve at gå dem her igennem og så hvis i synes at de ikke passer ind eller at der er noget andet vi har snakket om der passer bedre eller om de skal omformuleres så gør vi det.
P1: Det her det kunne være en svarmulighed for en bruger når vedkommende ser en pen eller hvad
F: Nej brugerne kommer ikke til at se det her. Ideen er at brugerne kommer til at se noget andet og det her det er måden vi som er gode til at analysere design beskriver produktet på
P1: Så hvis jeg ser den her pen og så jeg siger den virker sådan lidt soft agtig i det så starter den her og så kan du ligesom sætte et kryds længere herovre ad end her og så har du så et system bagved der fortæller dig hvad betyder det egentlig i kombination med alle de andre.
F: Ja så når vi så har fået det her så tager vi så et andet system nå men når brugeren så siger den her pen den får mig til at føle mig lidt utryg. Jeg synes ikke helt jeg er sikker på hvad jeg skal gøre. Så dudeludelut i en maskine er det måske fordi den er lidt for soft det kunne være en tendens at hvis den er for soft så ved jeg ikke hvad jeg skal gøre. eller hvis den er for mekanisk i kliklydene så ved jeg ikke hvad jeg skal gøre. Så det skal være de her ting som designerne kan sidde og kigge på og sige okay vi skal gøre den mere blød det kan vi nogle designtricks til. Hvor det er noget sværere at sige okay han siger at det er svært at vide hvad han skal gøre og han bliver utryg af den. hvordan laver vi lige det om til et produkt der gør der mindre. så det skal være sådan en maskine der gør det lettere. så de her er lettere at designe end en brugeroplevelse hvor brugeren ikke skal ind og røre ved det her fordi at måske ved de det ikke.
P3: Er det så også dit job at lave maskinen.
F: Ja i første omgang er mit job at definere det her og definere hvad brugeren skal snakke om. Og så skulle vi have været ude og undersøge det og så lave maskinen men det kommer.
[...]26:45
Så rough smooth look hvad synes i om den. Er den god.
P1: Jeg synes den er vildt god.
P3: Ja
P2: Yes
F: Discrete loud
P2: mega god.
[...]
F: Jeg går ud fra i siger noget hvis i synes det er helt forskrækkeligt
P2: Skal vi i samme tid se hvad der er alternativet du har set på.
F: Det kan vi godt lige tage med. Actuation and injection changing constant

P2: Jeg forstår ikke den her. Jeg kan godt huske hvad det handler om
F: Så det kunne godt tyde på at den skal hedde noget andet i hvert fald.
P2: Jeg tror det handler om
P3: Åååh det er den der force profil
F: Ja
P3: Det er det der med at når du trykker ned mod, så lige pludselig skal du overkomme og så skal du gøre tingene hurtigere. Er det ikke sådan noget. Versus med en flex pen hvor du konstant trykker ned.
F: Så tror jeg vi prøvede at kombinerer den med om lydene også var ens. Så generelt om det hele var en bevægelse eller om det var forskellige ting man skulle
P2: Ja for jeg husker også var der ikke et eller andet med push button eller shield inden under den der.
F: Men det kan være den simpelthen er for abstrakt til at det giver mening.
P2: Jeg tror i hvert fald at den skal have noget ekstra beskrivende på sådan så man ved hav det er man snakker om
P1: Jeg tror faktisk godt man kunne få et svar inden for rammen af det her hvis man var meget præcis med hvad det er omkring
P2: Om det er lyden
P1: ja præcis eller om det er trykkraften men så skal det specifikt være på det
F: Så der er i virkeligheden måske ti herunder eller fem eller et eller andet.
P1: Det kan godt være
P2: Den kan godt få en stjerne
F: Det starter vi med. godt. Shield surface large eller small
P2: Super. Er der også en om den er åben eller lukket. Det er på om den er exposed eller discrete eller der stod et eller andet.
F: Vi har noget med en nål i hvert fald om den er. Needle proud eller discrete
P2: Og har vi mere på shield
P1: er det sådan shield shape eller hvad open closed.
P2: Jamen den tror jeg skulle høre inden under at hvis du er i midten er du midt mellem dem sådan tror jeg tanken var ikke
P1: men det siger sådan noget om nålen det siger ikke noget om skjoldets åbenhed. Det er bare resultatet af skjoldets åbenhed
F: er den så lidt dækket under. Altså hvis vi skal prøve at holde det så kompakt som muligt er den så dækket. Er det derfor man holder skjoldet lukket set fra UX.
[...]
F: Sådan som jeg forstår det så er dether embracing skin
P2: Jamen der er også dether stability on skin. Og det vi har fra shield deep dive det er stability on skin og det er precision. Det er vel de to der primært knytter til den der. og så er der den som handler om den føles comfortable. Så det er måske tre i virkeligheden. Så nogle kunne synes at small var godt hvis det gav mere precision så hvis det var en stor glat overflade som ikke gav den der stability eller sturdiness så var det dårligt.
F: Så den er egentlig god nok som den er. Heavy light
P2: Yes
F: Continuous progress clicks quick slow
P3: Hvorfor ikke bare progress clicks
32:27
F: Nogen indvendinger
P2: Fedt
F: Designed manufactured. Den tror jeg gerne jeg vil have opfrisket hvad der betyder
P1: Jamen det var det der med om der var et lag af sukker på den eller om det bare er sådan en. For eksempel den der ikke også den virker for mig manufactured hvor en apple strømforsyning den virker designed.
P2: så i virkeligheden ligger den også i emotional mechanical måske. Havde vi en der hed technical eller var det den der lå under den her. Det tror jeg. Det er i hvert fald noget vi tit får feed back på om den ser teknisk ingeniøragtig ud eller om det er noget der er designet.
F: Okay. Kan man definerer hvad der får noget til at se mekanisk eller designet ud.

P1: Om brugerne kan det eller om i kan det.
F: Om i kan. Når brugerne siger den ser godt nok meget ingeniøragtig ud hvad ville i så tolke det som
P2: Så ser det typisk teknisk ud og det er med skarpe kanter og mange detaljer der er tilfældigt placeret. og der er måske nogle tekniske detaljer frem for nogle æstetiske detaljer. og helt sikkert som P1 siger kurver.
P1: Funktionelle detaljer tror jeg. fordi tekniske detaljer det.
F: det er vi ude i noget med funktionaliteten i den
P2: ja det er det jeg mener med at så er der nogle snapper eller nogle huller som du sådan set ikke kan se funktionaliteten i det ser bare teknisk ud. Hvorimod hvis der er en smuk samling et sted så ser den..
P1: jeg tror det var bare for at sige teknisk detalje det er resultatet af den funktionelle del der er der. Så det er noget med at trække funktionalitet ud tilfældigt på en eller andne måde. Det er bare fordi tekniske detalje det er det der bliver outputtet. det er det de siger det er. og grunden til det er det når man går baglæs det tror jeg er.
P2: det kunne godt være tilfældig. Tilfældig æstetik.
P1: Eller funktionel
P2: jeg synes ikke functional for du kan sagtens have en hammer der er skåret ind til benet i forhold til funktionen men den er smuk. Den vil du ikke sige var manufactured
F: det jeg kom til at tænke på i forhold til de ting i lige har nævnt så er det ting der står på nogle af de andre post its. Som for eksempel om funktionaliteten er dækket eller covered og om den er skarp eller blød eller. har vi også en rund.
P2: Du kan sagtens have en funktionalitet der ikke er dækket men som er forarbejdet. Som jeg nævnte du kan have en snap der bare ser tilfældig ud fordi det er sådan den mekanisk. altså det er sådan Rino lagde op til at den skulle tegnes nemmest muligt og så kan du have en hvor den er formgivet. men den er stadigvæk synlig den har bare fået. i designmanualen betegner vi det som considered details. så carefully considered details eller et eller andet. Så det at man har kigget på og gjort noget. Altså ændret på og justeret på nogle detaljer. Det jeg forestiller mig er at den her i rigtig høj grad vil blive beskrevet i eksempelvis den og den. og så er der noget der ikke er beskrevet endnu som jeg godt kune tænke mig at den blev lavet om til i stedet for. for det er sådan lidt en konkluderende en den her.
P3: hvad tænker du at den skal laves om til
F: Ja det er et godt spørgsmål
P2: Hvad tænker du at den allerede er. hvor er det du siger det.
P1: Når brugerne giver udtryk for at den er designed så er det fordi den i nogle tilfælde bliver betragtet som lidt soft og så er det for eksempel sådan noget med om den er.
P2: vi har ikke dem der dækker
P1: Small big
P2: Du kan have et Arne Jakobsen bestik med knivskarpe pointy men det er det at der er taget stilling at det er en deliberate shape at det ikke bare er en random shape. det er selve karakteren selve stilen. det er klart at der er en tendens til at de kalder det mere designet når det er kurvet og hvis der er noget glossy og der er noget farve så får vi tit udtrykket designet.
P1: og jeg tror at så er det dit ærinde at sige det er dem vi skal have ned
F: Ja så vidt muligt. det er svært lige at sige hvad er et godt design og skrive det ned på tre post-it's. og det kan godt være det er det her niveau vi kan nå til hvor vi siger.
P3: det du siger at du gerne vil bryde den ned. det her er noget brugerne egentlig siger og du vil gerne bryde den ned.
F: Ja hvis vi kan
P3: et niveau dybere.
P2: Har vi en der hedder æstetisk
F: Vi har den der hedder emotional mechanical. Er vi ovre i sådan noget.
P2: Kan vi prøve at lægge dem sammen som vi tror eller er der en rækkefølge.
F: Nej i må gerne rykke rundt på dem. Der er også om det er rough eller smooth look.
P2: Nogle gange kan rough være godt

P3: den kunne godt være. Når noget er manufactured er det så ikke tit robust. Det modsatte er så ikke fragile i det tilfælde.
P2: Jeg vil sige at hvis noget er manufactured så er det aldrig fragile i hvert fald.
P3: nej præcis. men tit så er det jo også robust og hvad er så det modsatte af det i den kontekst.
P2: ja for det er en god pointe i stedet for at sige hvad det er der definerer når noget er designed hvad er det så der definerer når noget [ikke] er og det er da helt sikkert at det er robust og det er helt sikker at det er nemt at støbe og det er alle de her ting ikke og det er rationelt fra et produktionsmæssigt perspektiv
P1: ja alt det der crap fra kina. Popcornsmaskinen til hundredeognioghalvfems i støvsugerbanden. altså der er ikke ret meget i den der er designed. Man kan også bare skrive bing bing china china.
F: Som modsætning
P1: Ja
P2: Min veninde arbejdede sammen med et produktionsfirma i kina hvis motto var because why not det var simpelthen deres slogan
P1: Så seksten knappen på produktete
P3: Because why not. Det er jo simpelthen
P2: men detailed og plain
F: Begge dele kan være godt design er det det du mener
P2: I den her relation. Ja du kan have detailed der er godt du kan have plain der er godt du kan have detailed der er dårligt du kan have plain
F: Det er derfor den er god at have med
P2: Så det vi har som considered details altså. Men der er ikke et positivt alternativ til det. Synes vi at de dækker. Der er ikke noget hvor der står technical.
F: Vi har den mechanical men det kan godt være at den.
P2: Men modsætningen er animated
P1: Det var mere hvordan den ligesom opførte sig
P2: Så kunne det være sådan noget technical human eller
P1: Ja det er en klassiker
P3: Det er sådan noget de ville siger. Er vi ikke niveauet højere. Men det er måske godt nok at sige jamen det vil de sige. Hvordan kan vi bryde det ned og har vi brudt det ned. Man hører da brugere sige at noget er teknisk eller i would like a human factor to it men hvad vil det så sige ikke.
P2: og problemet er at vi skal lave noget der beskriver men ikke udelukkende er positivt. vi skal komme med en definition af hvad godt design er men der skal være et alternativ som ikke er dårligt design. kan du følge.
F: Ja kommer med parametrene til design. hvad for nogle knapper kan man skrue på. men jeg kan sagtens følge.
P2: den her det er jo i virkeligheden næsten godt dårligt ikke. med mindre det er noget hvor du ikke synes du vil spilde penge eller værdi på det her. altså det oplever vi jo nogle gange at de kan sige. at noget kommer til at se for designed ud. for stylish eller posh eller hvad de siger. så er der for meget lir og for lidt. og nogle skal betale for det som de siger med det der hvis der er farve på en pakkemateriale. jaja det er jo mig der skal betale for det ikke.
F: Skal vi prøve at gå videre.
P2: Så man kunne godt sætte et minus ved den siger vi så.
F: Colours vivid neutral. Der nogle der bruger colourful eller solid colours.
P2: men solid colours er jo bare enkelt farve ikke. så det.
F: Så det er ikke direkte synonym. Er den her bedre til at beskrive. for jeg tror ikke vi har andre der handler direkte om farver.
P2: man kan sige det igen. er det relevant eller ej. Vi er så styret på brand og vi er ikke herre over den label der kommer på.
P1: Men det er ikke vigtigt
F: Det er ikke så relevant nej

P1: Fordi du skal vel egentlig bare have så mange parametre at du kan sige jamen hvis vi skal ændre det her design eller det vi kan se på det her design der ofte skaber dårligdom det er at det er solid color
F: For eksempel ja
P1: Så hvad vi kan ændre det er egentlig ikke fordi.
F: Så mit spørgsmål vil være om det er bedre at have parameteren fra colourful til solid color eller er det bedre at have fra vivid til neutral colors
P1: hvad er det nu vivid betyder.
p2: Levende
F: Livlig
P2: Farverig ville man kalde det på dansk.
P3: For mig er det lidt forskelligt. Colorful det er flere farver på produktet versus solid colors som er en farve hvor den anden er en vild farve versus en neutral farve. så jeg ser det faktisk som lidt forskellige ting.
F: Skal de begge to med
P2: Der var mit argument at vi kommer aldrig til. Hvis vi skal dække så skal de begge to med. Det bliver ikke noget vi er herre over.
F: er de lige vigtige. er der en der beskriver den anden. de dækker ikke over hinanden.
P3: Nej
F: Jeg skriver den på.
P1: mega fedt. endelig fik vi en ekstra.
F: Så har vi noget quick slow
P1: Den er god
F: extension of push button går fra large extension to none extension.
P3: det er mere en range end det er en modsætning.
F: ja altså du kunne godt skrive small der hvis vi skulle være pernippen men hvis der så ikke er nogen så er det jo bare ekstremt small.
P3: Ja men det kunne også extension versus none.
P1: Men er det de siger til den der push button eller er det slet ikke et relevant spørgsmål at stille.
P2: Vi skal jo ikke svare på hvad de siger men hvorfor de siger det. Så hvis de siger et eller andet så er det fordi vi ved at push button kommer ud.
P1: Så det kan designet ændre. så kan de gå ned og forlænge den. Så er det vel rigtigt.
P2: den er så underlig fordi den er så feature lignende.
F: og der kommer nogle her kan jeg se der er meget feature baseret som vi har forsøgt at lave om til en..
P1: Fordi man kunne ret beset lave den samme for skjoldvandring for actuation. er den lang eller kort.
P2: men man kan sige skjoldvandring for actuation det er jo mere tydelighed altså med mindre du går ud og tage en halv meters skjoldvandring så har det jo ikke nogen ergonomisk betydning. så er det mere tydelighed af interaktion og forskel i state. Grunden til at vi synes det er relevant og grunden til at vi prøvede at ændre på det det er jo at vi synes det er uoptimalt at fingeren skal helt der ud.
P1: jeg tror da også at der er nogen at skjoldvandring ikke er optimalt. det var meget bedre hvis man bare puttede den på og så gjorden den bare det den skulle. så skulle man ikke trykke eller noget du skulle bare lægge den på huden. Men det er en anden diskussion.
F: Slow down click sounds tired or gentle.
P2: Super gode. tired det er jo bare dårligt ikke.
F: ja det kunne man forestille sig.
P1: altså er gentle modsætning til tired. er det ikke mere sådan en jeg tænke en lidt lille ivrig hund. Altså i stedet for gentle. Jeg synes det to ting der.. det er sådan endepunkter på to lidt forskellige skaler.
P2: Plus der var aldrig nogen der ville sætte sig for at lave tired.
F: Vi må gerne antage at det måske er dårligt men per definition er det ikke dårligt at den er tired. det er noget vi ved fordi vi har gjort det mange gange.
P1: Hvad hedder sådan en årvågen ivrig hvad fanden hedder det. eager.

F: Eager kunne være et godt ord.
P3: er ivrig ikke også sådan en irriterende.
F: Men det kunne være måske være godt nok for så er det egentlig to poler som er lige irriterende hvis man kan sige det sådan.
P3: det er rigtig nok.
P2: Du ville skifte gentle ud med den. hvor jeg tænkte vil man gerne have den er gentle. Jeg er sikker på der ikke er nogen der vil have at den er tired. så er det mere vil man gerne hav den er gentle eller vil man gerne have den er energisk eller årvågen
F: Progressiv
P1: Jeg tror du skal finde en anden skala. en anden ende af en gentle skala. de bor ikke sammen de to der. Jeg tror den hedder tired til et eller andet.
F: Var det eager du foreslog. Gentle.
P1: Og så står der et eller andet her ovre.
F: Kunne det så være progressiv
P2: Jamen det var derfor jeg sagde energisk. Så det var min tolkning af din eager.
P1: Jeg synes bare eager det var meget godt.
F: Click when dialing up and down same eller different.
P1: hvordan kan det være different.
P3: Det er den jo på flextouch
[Siger klikkelyde]
P2: den synes jeg der er super fin
F: End of dose feedback loud eller none. Og der skal none også ses som i så lille at den ikke findes.
P3: Men der synes jeg umiddelbart igen jeg tænker loud silent eller none eller present. Men jeg forstår godt hvad du mener
F: Så hvis nu den ene pol var none og den anden var loud ville man så godt kunne sætte et punk imellem eller ville du hellere have silent. vi kan sagtens lave den om til silent.
P3: Jeg ved det ikke. Det giver måske mening i forhold til end of dose feedbacken. Det er bare når jeg ser den så tænker jeg ikke det er modsat poler loud og ingen.
P2: Vi ved der skal jo være et end of dose feedback. skal der ikke eller hvad. nej det er ikke en gang sikkert. Og det er auditive eller hvad.
F: Jeg vil påstå at det er begge dele egentlig som den ser ud der.
P2: men der skal være en indikation af end of dose. Så du skal have et eller andet om det så er visuelt eller taktilt
P1: at skalaen stopper eller et eller andet
P2: Hvad siger du?
P1: at skalaen stopper
P2: Ja det er det jeg siger om det er visuelt eller taktilt eller hvad man kalder det haptisk.
F: Så man kunne også give den fra ingen feedback til meget feedback så.
P2: Det vil være det samme som at sige nøjagtig dosering eller unøjagtig dosering. vi må ikke dosere unøjagtigt så kan vi ikke få den godkendt så kan det være lige meget altså
F: Men hvis nu den kommer meget tæt på none det er lige så interessant fordi selvom den aldrig nogen sinde når det ene punkt
P2: men det er der hvor jeg tænker silent hvad skal man sige det synes jeg da egentlig er fint så
F: og der kommer man ikke til at tænke på det som at det kun kan være auditivt.
P1: Jo for det som du også siger det er der kan være flere steder du ligesom provider med feedback fra. Så hvad skal man sige så kan det godt være vi tager end of dose klikket ud men bare det at skalaen går ned så vil vi stadig ikke lande på none.
P2: Så et eller andet med at sige at det er ikke overdrevet om det er dominerende eller silent. eller dominerende diskret eller et eller andet.
F: jeg skriver dominerende.
P2: Dominerende er måske ikke det rigtige men diskret er måske meget godt.
P1: Så kan man måske gå ind og diskutere er det redundant og er det okay
F: Yes. Interaction expected eller surprising.
P1: er det hele interaktionen spørger jeg så lige helt åndsvagt eller relaterer vi den til

P2: altså ligesom det her godt kan knytte sig til en del af dem og ikke det hele. Altså der er mange af de her karakteristika hvor man kan sætte det på et element på pennen eller hele pennen. så må det være det samme med den her
P1: for eksempel small big der tænker jeg det er vel hovedsageligt være relateret til størelsen på pennen ellers så kan det være alle de andre elementer også
P2: det kan være hætten eller pennen
P3: og det er jo det samme her for eksempel skjoldet på haiko der popper ud surprising ikke altså
F: Så det vil tilføje til puljen af hvor surprising er den her pen på en skala fra nul til hundrede kan man sige det det ved jeg ikke. Look compact flexible. Der er ikke noget. Der er nogle der bruger simple complicated i stedet for.
P2: Vi prøvede jo at sige at kompakt er noget andet end enkelt altså at du kan godt have. Altså kompakt det handler jo om distribution af volumen på en måde ikke. Så du kan jo godt have noget der ser komplekst ud men stadigvæk er kompakt. og du kan have noget der ser enkelt ud men ikke er kompakt.
F: Så hvordan i forhold til fleksibel hvordan er det modsætningen.
P2: Jeg tror vi starter med at skrive noget andet end kompakt ikke fragmenteret måske eller. jeg ved det ikke.
P1: Skal vi have adderet en eller.
F: Jeg er ikke sikker på jeg helt forstår hvordan de er modsætninger hvis man kan sige det sådan.
P2: det er også det jeg siger nu at jeg synes helt sikkert kompakt er en karakteristika der kunne være god at have med og egentlig synes jeg også fleksibel er en god karakteristika.
F: Hvad betyder fleksibel så er det om du kan bøje den eller om du kan skille den ad i den rækkefølge du selv har lyst til
P2: kan du huske hvad den dækker over
F: Nej. Det kan være jeg lige sætter en stjerne på den og så kigger jeg selv på den når jeg kan se hvad den skal dække over.
P2: Kompakt er i hvert fald noget andet end simpel og fleksibel P1 det er mere dig der kan sige noget om det. er det godt.
F: Jeg tænker vi vender tilbage til den. Handling steps many few.
P1: Yes
F: Item associatic. der er vi måske inde i igen med det om det er noget funktionelt pragmatisk eller om det er noget emotionelt.
P2: den vil ikke sige mig noget. Jeg frygter om jeg selv har været med til at lave den men den vil ikke sige mig noget uden at vide hvad det var.
P1: nej og man kan sige den er drevet af en masse den er drevet meget lige som design manufactured den er drevet af en masse karakteristika man kan ændre på for ligesom at opfylde de her.
F: Ja så det er måske også en konkluderende
P2: ja det tror jeg
P1: det tror jeg også den har det lidt ligesom designed manufactured så det vil jeg sige F den skal du selv lige prøve at kigge på og se om du synes den giver mening.
P2: Men husk at skriv at den skal erstattes af noget sagde moren så.
F: Ja og den er ikke beskrevet af det der står her i forvejen.
P1: jeg tror godt den kan være beskrevet af nogle af dem der ovre altså. Jeg tror også F i ærindet af at du ikke vil have otte milioner af de der så tror jeg at vi skal
F: helt i orden
P1: Fordi altså vanskeligheden er ikke for os at komme op med halvtreds der kan dække den der for det kan vi godt. Det er meget mere vanskeligt for os at ikke komme op med dem
F: Dosing loud silent.
P2: Super
F: Dial surface ridget smooth. Ja click sound mechanic smooth.
P1: Dial surface ridget smooth. HVad med sådan noget precise

P2: altså jeg tror den dækker over den ene jeg havde vi snakkede om flex pen versus flex touch at den føles smooth med den ene og den føles. Nå det er surface.
F: Jeg tror også feel in dial den kommer herovre. Så det er kun selve teksturen
P1: Ja
F: Click sounds den havde vi. Feel in dial mechanic eller smooth.
P2: Super
F: bulky slim. Treatment embrasing all pinpointing
P2: Kunne man måske der have compact eller slim hvis man endelig ville sige at man skulle have noget. Bulky bliver jo aldrig positivt.
F: Nej. Andre bruger tardy streamlines. jeg ved heller ikke om den er bedre.
P2: Tardy hvad betyder det.
F: Ja
P1: Tard det er jo sådan lidt retard. Nej tard er det ikke jeg ser sådan en pencil skirt for mig sådan meget tynd fin en.
P2: Tardy (uf?)
P1: lad os gå videre imens
F: Bulky slim der var ikke noget. Embracing all eller pin pointing treatment.
P2: Den kan vi da heller ikke.
P1: Embrasing all pinpointing. Om den ligesom var præcis eller hvad.
P3: om den er for alle eller for få
P1: Træg
F: Træg sådan som i sløv langsom
P1: Vi bevægede os i et meget trægt tempo
P2: Er der nogen æstetiske betragtninger på den
P1: Nej
P2: er det ordbogen
P1: Ja
F: Vi lader den stå det virker ikke som om det sådan er kritisk at den er der i hvert fald. I forhold til den her treatment der har jeg det sådan lidt er der nogle af de penne vi snakker om som gør det her bedre end nogle andre. Er der nogle der dækker mere eller føles som om de dækker mere.
P3: For eksempel sådan en som hvad hedder den den lille. Pen XXX den er måske mere pinpointing fordi at skalaen er lille så det er ikke alle der kan se doseringsskalaen altså versus en hvor man kan så embracer den fler.
F: Nååhr ja.
P3: Det var lige hvad jeg tænkte på da jeg så den der.
P2: lige præcis men så kunne man måske mere sige universal versus elitær eller selektiv hvis det var det. Det er sjovt for det er sådan nogle kvaliteter sygeplejerske ville komme ind på men det vil komme af ergonomi og i særdeleshed læsbarhed.
F: så vi er måske oppe i noget konkluderende som er et resultat af noget andet.
P2: Ja men var der ikke også noget andet i den der der handlede om kontrol
F: Jeg tror vi havde det der med embrace skin under den også
[...]
F: jeg sætter en stjerne ved den her at det måske også er en der er beskrevet af noget af det her.
P2: Eller skulle have noget hvis den skulle være beskrevet.
F: Robust fragile. Auto eller manual. Small big. Emotional mechanical. Der mener jeg at have nogle synonymer. Rational emotional eller functional hedonic.
P2: Men man kan sige rational emotional synes jeg dækker over det vi har skrevet. og det andet det kunne også være fint at have altså functional hedonic.
P1: Hedonistisk.
F: er der en i bedre kan lide eller er den god nok som den er. Det er kun hvis i synes at nogle af synonymerne beskriver den bedre. Hvis den er beskrevet fint som den er så lader vi den stå.
P1: man kan sige i sidste ende der de her det er ting du skal kunne gå ind og sige til designerne det her det skal du sørge for den ikke er her den skal være herovre i stedet for. med den her vi taler om ikke.

F: er det noget konkluderende igen
P1: Ja for så kan man sige hvordan gør de den mere mekanisk. jamen der er der så en masse ting der vil lede ind til at. eller hvordan gør de den mere emotionel.
P2: Men så tror jeg da at functional hedonic er bedre. altså så er det bedre når det er functional versus noget andet.
P1: Hedonic den er jeg lidt usikker på hvad pokker.
P2: det er når vi har sagt vi skal ikke lave (?lickable?) buttons for eksempel det hører ikke til i vores
P1: nej
P2: hvor det er fint nok at have på sin mobiltelefon eller et eller andet. også med emotional da vi var ude med pakkemateriale i starten på det. der var noget design som blev opfattet som inappropriate for den her type produkter hvorimod der så er nogle der synes det var en kvalitet de faktisk godt kunne lide ved det. altså fedt at jeg kan få sådan en æske der ligner en flakon til en parfumeflaske
P1: Hedonisk jeg ikke forstår.
F: jeg tror vi går videre. jeg har puttet den her op.
P2: Det er nydelse tænker jeg
F: Cover reveal functionality. er den god som den er.
P1: det er nålen ikke også
P2: det vil være vigtigt at man så ved hvad det er der skal dækkes og hvad det er der skal reveales. så man skal have det med. der er jo ingen der ønsker en transperant pen hvor man kan se mekanikken inden i og se hvordan stempelstangen bliver drevet af nogle fjedre.
P3: Der er nok nogle mekanisk ingeniør
P2: Ja vi er helt sikker ude i required så det er løgn. ganske få vil ønske det.
F: Sharp soft. Animatede mechanical. er det sådan interaktionsmæssigt sådan husker jeg den. Godt.
P2: og mechanic kunne måske også være functional måske dækker den over noget af det samme.
F: jeg sætter lige en stjerne ved den så jeg kan huske at det er interaktionsmæssigt for det havde jeg glemt. Lock look undskyld.
P2: Nå det kan også være æstetik ikke.
F: Ja det kunne det for eksempel. Look simple complex. Detailed plain den har vi diskuteret. Rough smooth.
P3: Ja
F: Godt jamen det var egentlig det jeg håbede vi kunne nå.
[...]

G.3 Device attribute expert panel discussion: Third iteration

Transcript of a discussion with the device attribute expert panel 09-05-2017 regarding the third iteration of the product attribute list. This discussion is referred to as interview 2 [i2]

F: Hvad synes I?
P1: jeg har noteret nogle ned, hvis vi kan gå igennem dem. Altså dem om skjold og dem om slow down click sounds kræver jo at der er slow down click sound og skjold til stede. Så duer de ikke rigtigt. Så enten skal man have en not relevant eller også skal det hele være så tilpasset det man sidder og evaluererer.
P2: Ja fordi man kan sige ellers så evaluerer man jo tired eller gentle. og hvis der ikke er slow down vil man sige gentle hvis ikke man synes de ikke er gentle men så mangler der noget.
P1: Men jeg er ikke sikker på jeg helt forstår hvad gentle betyder så.
P2: der er nogle af dem der kan alstå hvis der er slow down der er ligesom dum dum.. dum… dum…. men der kan også være en slow down der er ligesom når du hvad skal man sige bremser op inden et kryds i bilen at du bremser så det bliver en gentle og ikke en træt
P3: Jeg tænker også at den er næsten ikke til stede så er den vel meget gentle i det her tilfælde.
P2: jeg har også sat den nøjagtigt samme sted
P1: Jeg har ikke sat nogen for jeg synes ikke at den
P3: okay fordi der er jo et eller andet i starten også men det er utroligt gentle. Men man kan også opfatte det som hvad du siger der ikke er noget.
P1: Det er fordi den ikke er tired. det er fordi den ikke bliver langsommere og så synes jeg
P2: Men den bliver da lidt langsommere ikke hvis man. altså jeg tror også det kommer an på hvor langt du er oppe men hvis vi bare lytter til den her. Den har lige
P3: det er derfor jeg tænker at den er gentle
P1: jeg ville også sætte den i den retning hvis den havde jeg synes bare ikke den havde slowing down det var derfor.
P2: nej og det er der jeg tænker at hvis den så ikke slower down så tror jeg man tænker mere generelt lyder den generelt gentle eller generelt træt. så tænker jeg det bliver mere den generelle lyd.
P3: Jeg tænker den er bestemt ikke træt.
P1: Nej det er den ikke
P3: og det er gentle det ligger sådan fint i ordet så jeg synes egentlig den er meget super faktisk.
F: Men vil det så sige man kunne fjerne slow down og så bare kalde den tired click sound eller gentle click sound
P2: Ja
P1: Nej
P3: Nej slow down click sounds synes jeg er meget rigtig. det siger utrolig meget det skal du holde fast på.
P1: det er også min næste note at jeg har svært ved at finde ud af hvad det er for nogle clicks vi taler om i de næste.
P2: det har jeg også skrevet
P3: Det er også min første note er det dosing clicks er det dial clicks fordi senere kommer der et spørgsmål om dosing clicks faktisk
P1: Ja jeg har sat her ved nummer fire har jeg sat den meget ovre i gentle click sound men skrevet i en note at det er ved dial up og injection fordi det er bestemt ikke dial down så synes jeg den er det andet.
F: God pointe.
P2: og det er så endnu værre på mechanic click sound altså sekseren fordi der er det click sound så der kunne det være alle dial up dial ned uddosering.
P3: og det spørgsmål kommer næsten også lidt tilbage om det er mekanisk så vidt jeg husker. så er det mechanic feel in dial det er selvfølgelig noget andet men den feel i dial er meget afhængig af de click sounds. jeg tænker på at dele op i dial up dial down og så dosing clicks for at være specifik. men så kunne man have desuden et spørgsmål om den generelle opfattelse for det er også en vigtig. for det kan godt være at dial down clicks giver en negativ impact. for mig gør det ikke så meget jeg synes det er en emget fin generel opfattelse men det kan være det er forskelligt.

P1: Men igen der kommer man ud i noget der er generisk for det man kan stille en dosis på. hvis man sammenligner med single use devices der kan du ikke stille nogen dose tit og så vil de så ikke være relevant.
F: Så det kræver der er en dial det er selvfølgelig rigtigt
P3: Hvilken en tænker du
P1: Altså det med skjold det er jo kun for skjold devices og det med dial op og ned det er kun for devices der kan dial op og ned.
P2: ja lige præcis så man vil have brug for noget der dækker
P1: Ja man vil have brug for en not applicable kategori.
F: Ja
P2: og så tænkte jeg på det der med dial with ridges or texture at på en eller anden måde er det enten et ja eller nej. altså som den er stillet op så enten har du det eller også har du det ikke. men man svarer måske lidt ud fra hvor fine de er. Kan du følge det
F: Ja så det skulle den egentlig hede i stedet for
P2: Njahr men bare man er opmærksom på hvad skal man sige enten har den riller eller texture eller også er den glat.
P3: jeg synes det er meget fint at graduere den her det er meget tydeligt
P2: ja men så vurderer du vil granuleringen af de ridges så det er bare for at sige det er egentlig ikke nødvendigvis det der står så det er på en skala fra. måske skulle det være ridget texture dial i den ene side og så smooth surface dial måske er det i virkeligheden fordi du har skrevet dial with i stedet for ridget. altså det er detaljer ikke
P1: Men altså i det hele taget så er der mange af de her ord man kan tillægge dem lidt ens egen betydning
F: Ja kan du komme med et eksempel
P1: Jamen for eksempel hvis vi nu er ved den her dial with ridges om jeg så fortolker at den er mest dial with ridges hvis de er brede eller hvis de er tynde for eksempel. det kan jeg jo bestemme når jeg sætter den hvordan jeg fortolker det.
P2: og det er også der hvor jeg tænker fra rillet til smooth hvis man ser det som den barre så vil man nok sige at facetter hvis de har en lille runding på kanten de ligger måske lidt ovre mod smooth hvorimod hvis de ligger med en hak udaf så er det måske skarpere eller så vil man nok sætte den lidt. så mere at man vurderer noget andet end det der egentlig står.
P3: men er det godt hele tiden at tage det vi diskuterede lidt er valgmuligheder på den venstre og højre side. man kunne forestille sig at man bare har en betegnelse hvor man skal dele det fra høj til lav det vil sige er den heavy så er det den positive til venstre. det kunne man overveje for at undgå misforståelser men jeg har ikke følt det irriterende i det her spørgeskema. Det har i heller ikke
P1: Nej
P2: Nej
P3: så er det måske meget fint.
P1: Men jeg forstår ikke hvad flowing feedback og flowing interaction versus changing feedback changing interaction betyder. jeg har ikke udfyldt noget for jeg forstår ikke hvad det betyder. altså om det er. nej jeg forstår det ikke. Det kan godt være vi selv har været med til at formulere den men.
F: Det det startede som det var en beskrivelse af om det føltes som et flow hvor man bare gik ind og så blev man guidet igennem og kom ud på den anden side, eller om det mere var gør det så gør jeg det så gør jeg det hvor man skulle skifte imellem nogle forskellige.
P2: Så ville man måske mere sige sekventiel hvis det var det. Eller stepwise eller et eller andet. så continuous flow
P1: Så for eksempel tag denne her af. nej fordi nålen var slet ikke en del af det her.
F: Nej det er kun selve interaktionen
P2: Det var også sådan noget med i sin tid om den voksede ud. Altså vokser den ud og så trykker du ned. altså er det det samme der sker i begge ender af din interaktion. Er der konsistens. ja at når du drejer så sker der noget og når du trykker så sker der noget. sådan nogle ting var også med i det.
P3: Hvad er i bund og grund forskellen mellem feedback og interaktion F når du tænker på det.

F: Altså når jeg tænker feedback så er det det som pennen kommunikerer så det vil sige interaktionen det er hvad man gør med den og feedbacken er hvad den fortæller.
P3: Men jeg tænker på interaktion er resultat af feedbacken de er meget tæt på at være det samme. Jeg har ratet den på samme måde. jeg kan godt se at der er noget i det men jeg ved ikke rigtig om man skulle sætte det under et.
P1: Jeg ved ikke. jeg synes ikke rigtig det er changing men jeg tænker det der med at man får et end of dose click før man reelt er færdig med det man skal gøre. altså det med at man skal tælle til seks bagefter. Det er ligesom off men jeg kan ikke rigtig få det til at passe på nogle af dem.
P2: Det er det jeg tænker fordi så er det sådan nogle steps du skal udføre der ikke rigtig hører sammen. Så skal du pludselig tælle til seks hvor kommer det fra. hvor det andet det er sådan et flow. du gør det du gør det du gør det og så pludselig skal du tælle til seks.
P1: men det er måske. Jeg dialler og jeg kan se på scale drum der sker noget men der kommer ikke nogen knap ud. hvad er den så
P2: Så har den no push button extension
P1: det er rigtigt.
P3: Men jeg kunne forestille mig der ikke var nogen der blev overrasket over det. Her kan man se at der bliver dialet op. Så gør man her så kan man se den uddoserer det er meget fint flow i det sådan opfatter jeg det i hvert fald
P1: Men når man så igen sammenligner med noget andet altså da vi så de her videoer i sidste uge hos XXX og YYY hvor man ser dem bruge DEVICE T så er der godt nok forskel på hvor meget man bliver guided og hvor meget de kan nå at gøre forkert endda glemme at putte en nål på og så være ved at. faktisk endda glemme at stille en dosis og så stikke nålen ind hvor det går op for en at gud jeg har glemt at stille en dosis.
P2: Ja det vi blev spurgt om før det var hvad var forskellen på de forskellige devices og så skulle man lave nogle kriterier der gjorde man kunne hvad skal man sige nøgtern og objektivt kunne evaluere det. og der tænker jeg at forskellen for mig er der to. selve fornemmelsen af om der er et godt flow i det du laver. og der kan du have et komplekst altså mange steps eller få steps men du kan have et godt flow eller ikke et godt flow. og et eller andet sted har du complex simple ikke. nej du har mange og få handling steps hernede ikke. så måske hvis man kunne dække det med om det føles som en continuous interaction eller en
F: Segmenteret måske
P2: ja altså på en eller anden måde finde en formulering af det og så den anden ting jeg tænkte på med dig det var om der er et forced flow eller om der er mange valgmuligheder altså
P1: Jo
P2: Flexible flow eller forced flow
P3: Ja P1 jeg tænker i forhold til det du siger med at det du ser på videoer at der kan gå galt og når jeg så tænker på de bruger steps at så tror jeg man objektivt kan sige at de er relativt godt det er et relativt godt flow. for de kan ikke tænkes bedre i den her sammenhæng og med udgangspunkt i det så kan man bedømme det. jeg ved ikke hvordan man beskriver det men at nogle glemmer at sætte en nål på det har ikke noget med det her device at gøre.
P2: Men det har det jo i det øjeblik der er en konkurrent der laver et hvor de ikke glemmer nålen
P3: Ja men det er derfor det er relativt vi taler om det her device. Så det andet er en slags det er lidt volapyk synes jeg.
P2: Jeg tænker at hvis man har to koncepter og skal vurdere dem op imod hinanden man kunne sagtens have designet den her den ville have været dyrere men man kunne sagtens have designet den så man ikke kunne begynde at diale før man har en nål
P3: Nej det kan man ikke sagtensdet vil jeg påstå det kan man ikke sagtens. det vil jeg næsten påstå det kan man ikke så det er en relativ ting
P2: Det kan du jo godt
P3: Jamen hvis man kunne det hvis det var sandsynligt så var det blevet gjort
P2: det er da fordi vi ikke vil betale vi får ikke de penge hjem som det element tilfører

P3: men det skal da ses i den sammenhæng. det er i den relative sammenhæng. vi laver jo ikke handicapstole eller et eller andet vi laver en rar og enkelt og sandsynlig pen og det har vi gjort okay
P2: Hvis vi for eksempel siger at brugerne kunne vælge imellem at få for eksempel et nåleskjold og en skjult nål eller de kunne vælge at der var et styret flow så de skulle gøre det i samme rækkefølge hver gang.
P1: Jeg kender ikke DEVICE A ret godt men jeg forestiller mig at DEVICE A gør vel det som den her vil kunne altså ikke kan
P3: Ja men med det resultat at brugerstepsne er utroligt uforståelige. det er fordi man forsøger at løse det umulige. så jeg vil påstå at den her har et fantastisk flow i forhold til DEVICE A. Jeg ved godt at Novo påstår at færre brugersteps.
P1: Mindre guided. altså her kan jeg gøre det i hvilken som helst rækkefølge. jeg kunne selv se det da jeg var på hæmofeli der havde de deres helt egne systemer fordi vi gav dem ingen guidance overhovedet. så det var fuldstændig random hvilken rækkefølge man gjorde tingene i.
P3: Det kunne man tale til den positive eller til den negative side
P1: Vi behøver ikke være positive eller negative
P2: Nej
P1: det er bare sådan jeg forstår ordene for jeg forstår ikke ordene.
P2: Jeg tror man kunne have den tese at hvis man har et forced flow så indbygger du en kropslig vane med det du gør og dermed er der større sandsynlighed for at du husker alle steps. hvorimod hvis det ikke er den samme rækkefølge så får du ikke den samme kropslige hukommelse.
P3: Jeg vil sige at jeg har set med nogle brugerundersøgelser den pen der og je har sjældent set nogen lave fejl med den.
P1: det var faktisk ikke en gang den det var en flexpen hun havde fat i den gang
P3: Og også sjældent set folk være forbavset over den feed back så det er derfor jeg betragter det til at det er relativt.
P1: der er ingen af de to ting der er dårlige
F: Det er bestemt heller ikke meningen
P3: jeg har sat dem her fordi jeg synes der er meget fint flow i dem men er spørgsmålet om vi skal ændre ordlyden på det
P1: ja fordi jeg ikke forstår hvad det betyder.
P2: skal vi gå videre med nogle af de andre
F: Jeg har i hvert fald skrevet ned at det kunne være en mulighed at snakke om om det er continuous imod segmenteret og så om det er forced flow imod et. hvad er det modsatte så hvis det ikke er forced.
P2: Flexible
P3: Jamen jeg har helle aldrig jeg er modstander af ordet feed forward som er opfundet her i Novo.
P1: nej det er det ikke
P2: det er ikke opfundet her
P3: nej men det er opfundet af en eller anden intellektuel idiot men her har man en feed back og en interaction og det smager lidt af feed forward når du skriver det sådan og jeg tænker på hvordan. og jeg mener de er et af den samme historie. fordi det ene medfører det andet
F: Jeg har delt dem op ved sidste
P3: Feed back er lige så godt et ord som feed forward
F: Jeg delte dem op i feed back og interaktion efter sidste interaktion fordi at nu kan jeg ikke huske hvorfor men der var et eller andet argument for at den var nødt til at blive delt op det kan jeg godt lige kigge på men hvis vi synes det er det samme. har i rated den ens
P2: jeg har slet ikke rated
P1: Nej jeg har heller ikke rated den
P3: Ja undskyld min udtalelse omkring det det er lidt kategorisk det ved jeg godt
P2: Du skulle have sådan en fast disclaimer der hang over hovedet. risiko for kategoriske udtalelser.
P1: Jeg tror faktisk at jeg vil sige den her kunne godt have et ret godt fint flow i interaktionen men

feedbacken er lidt off fordi alt ikke er færdigt når den har end of dose click. Så jeg tror jeg ville rate den lidt forskelligt
P2: Ja og det er også der hvor på en eller anden måde vil det aldrig være godt hvis man skal vurdere ud fra nogle parametre der skal være positive i begge sider det vil jo aldrig være godt hvis feedbacket er off
P3: Jamen når ordet flow bliver brugt i forbindelse med interaktion så taler man allerede om feedback fordi flowet i det er at det går fra det ene til det andet så det er derfor man ikke kan skille det ad igen så taler vi om nogle forskellige ting.
P2: Jeg tror det vi snakkede om men jeg er ikke sikker. noget med at for eksempel de der dial back de lyder som en helt anden kategori end resten så der er ligesom noget feed back der er ikke konsistent eller et eller andet og det kan være plus eller det kan være minus.
F: Altså da jeg sad og skrev de her to der forestillede jeg mig sådan hvis man havde et kontrolpanel hvor man skulle styre en fjernstyret bil ud af en garage så startede du ovre i den ene side og så når du skulle åbne døren så var du midt på og når du skulle ud så var du i venstre side. det ville være mærkeligt hvis man startede i højre side og så gik over til venstre side og så gik ind i midten og gik tilbage til højre side. det ville ikke være et flow i hvordan man brugte systemet. og på samme måde hvis man stod herovre og feedbacken kom herovre og så skulle man gå her over og gøre noget og så ville feedbacken komme i midten men man skulle ikke gå over til midten. så ville det være feedbacken der havde et mærkeligt flow der var ændrende.
P2: men det synes jeg må være interaktionen ikke
F: det kan godt være det er det. det kan jeg satens følge
P2: Der synes jeg Willem har ret i det
F: Det synes jeg er fint så
P2: Så er der en hvor vi helst skulle være fuldstændig synkrone ikke. det er tieren.
P3: det er vi. den står helt til højre ikke
P1: Jo
P3: men det er fint
P2: der kan man se hvor relativt det er ikke
P1: med loud
P3: Vi er jo rørende enige indtil videre efter lidt diskussion. Nummer elleve der er vi nu
P2: jeg er tæt på silent
P1: jeg er tæt på loud
P3: jeg er også lidt tættere på loud end midten
P1: jeg ville faktisk have sat den der hvor du har sat den
F: Hvis i bare er enige om hvad det betyder. at i så er uenige om hvor høj den er
P2: Vi er uenige om det relative
P3: jeg tænker hvis man kunne justere det skulle man ikke justere det til at blive mere loude men hellere til den mere silent det er min forståelse af dem.
P2: Så du vurdere i forhold til det optimale
P3: Ja det ligger lige i midten tænker jeg.
P2: Det er bare det der med hvordan forstår man skalaen ikke
P3: Ja men det er faren ved at sætte to ord på fordi hvis man har en loud dosing og skalerer det så kan man sige så giver det muligvis en anden opfattelse hos brugeren. tror i det
P2: Jeg tror at som du siger F at når du er ude og evaluere så vil du altid have flere og så bliver referencen en gruppe af devices man har med ude.
F: Jeg er ikke bange for at det vil blive vægtet mærkeligt.
P3: jeg tænker nu er den lidt mere loud end den er silent fordi den er over midten sådan ser jeg på det
P1: og næste gang når man så har tre at vælge mellem så sammenligner man dem
P3: Det er utrolig vigtigt at du har et ulige tal her således at du har muligheden for at sætte den i midten det er utrolig vigtigt. Fordi det giver os automatisk den association.

P1: Nummer tretten har jeg sådan lidt jeg kan ikke helt se hvordan discreet og indisputable det kan være modsætninger.
P3: Indisputable det er sådan udiskuterligt helt klart og det andet det er uh den er meget stille og diskret
P1: Ja men jeg tænkre at den her har ikke indisputable end of dose fordi det ikke er end of dose. altså det er end of dose men du skal vente. men modsætningen er ikke diskret fordi den kan godt være diskret og indisputable.
F: men selve feedbacken
P2: du vurderer timeliness af feedbacken
F: Ja for du kan jo godt sige at feedbacken er meget indisputable den er også bare tilfældigvis forkert. Men den feedback der kommer er rigtig.
P3: Skal man skrive end of dose click der i stedet fordi nu taler P1 om en anden end of dose. true end of dose eller
F: jeg vil gerne have den også dækkede hvis det ikke var lyden man gik efter men hvis man nu mærkede det i pennen at den gav en lille vibration som DEVICE 2 gør rigtig meget hvor man kan mærke fjederen i hånden.
P2: man kan sige hvis du ikke vidste. det er fordi du ved at den kommer for sent
P1: Ja for tidligt
P2: ja undskyld
P1: men jeg kan sagtens høre den
P3: Hvordan har i rated den
p1: Præcis midt i
P3: Hvad med dig
P2: en fra indisputable.
P3: Jeg er også tæt på indisputable men imellem jer to jeg har lige sat den et hak fra diskret. den er meget klar.
P1: men det er fordi jeg vurderede den imellem at jeg synes den var diskret men nu var den diskret men man kunne også godt forstå den og så var den off timing.
F: Så man kan sige den ideelle feedback ville jo være begge dele måske kunne man sige. både diskret men også indisputable.
P3: Ja det kan man sige men kan det lade sig gøre
P2: Ja for er det signalet. karakteren af signalet eller er det timing af signalet.
F: jeg havde slet ikke tænkt på timingen
P3: det skal man nok heller ikke tænke på
P1: Nej så tror jeg måske bare
P2: Hvis nu sagde vi havde en Flex touch med true end of dose som de kaldte det og en med false end of dose. det kan man ikke sige vel. hvis man havde de to koncepter så ville man have brug for at fortælle hvad forskellen mellem de to var. men det ville vel komme i interaction. altså de vil have et lige så klart end of dose click eller utydeligt eller diskret eller indisputable men den ene der vil du være nødt til at tælle og i den anden skal du ikke tælle.
P3: men det står klart i
P1: Kan du kalde det signal i stedet for feedback
P2: Ja
F: Det er en god ide
P2: Super
P3: I stedet for signal skulle der så stå click er vi ikke forvente det. for i ifu står der at man skal vente ergo er det jo rent faktisk en feedback. Jeg er godt klar over at vi forsøger at gøre det men det er igen relativt tænker jeg. vi går ned med mekanik og så tænker du uh jeg kan indbygge mekanik der venter så og så mange sekunder men det er jo igen relativt til al sin enkelthed
P2: Men der er nogle der for eksempel DEVICE 2 og DEVICE M hvor der skal du måske kigge efter om cartridge holderen er fyldt eller om vinduet er blokeret er det den gule eller i nogle får du et auditivt
F: Så feedback dækker over mere end bare lyden

P3: det er det men det skal du så skrive meget klart
P1: Det er det jeg tænker signal er det ikke et godt ord
P3: det tænker jeg også hvis signal også giver tvivl så er det ikke et godt ord. jeg tænker enten skal der være fordi det er et end of dose click der er i den her det er entydigt. et signal er det så en kombination af det der står i ifu det skal være entydigt her.
P1: jeg tænker bare for mig der er signal vil betyde enten et klik eller noget andet jeg kan se eller altså bare et eller andet form for tegn på at den var færdig
[From here, two conversations break out independent of eachother. These are presented in the transcript below eachother.]
[Discussion no.1]
P3: Okay du tænker på at det er et klik
P1: Ja i den her sammenhæng men i DEVICE M vil det være luk ned for vinduet altså at noget forsvinder væk
P3: Nej men DEVICE M har du også et klik
P1: Men så i DEVICE 2 hvor han siger den også ryster det ved jeg ikke. Men ved feedback der tænker jeg også bare på timing men hvis det er signal så tænker jeg bare på hvad der sker
P3: Ja det er jeg enig i det er mere klart
[Discussion no.2]
P2: Indisputable det leder måske også til at man tænker at nu skal jeg vide hvad jeg skal gøre snarere end diskret eller højlydt eller diskret eller distinkt eller distinct eller loud eller.
F: Så vil du hellere have et andet ord
P2: Jeg tænkte bare
[Back to one discussion]
P2: P1 hvis nu der havde stået distinct eller loud i stedet for indisputable ville du så have haft lige så meget lyst til at vurdere timingen
P1: Nej. Nej det ville jeg ikke
P3: det er måske en meget god ide
F: Distinct
P1: End of dose signal ja så tror jeg ikke jeg ville sige den var (uf).
F: Vi prøver at gå videre der er stadig væk
P3: Vi kan blive ved jo
P2: På den næste den med dial der tænkte jeg du har igen med den der store forskel på dial op og tilbage heldigvis er feelen. lyden er forskellig men feelen er nogenlunde den samme. men det er bare igen
P1: Nej det er der ikke. der er meget mere prøv lige at mærk dine fingre det er meget mere hårdt
P2: Ja
P3: Hvordan har i rated den
P1: over imod mekanisk på grund af dial ned
P3: Jeg har nøjagtig det samme
P2: jeg har over mod smooth på grund af dial up som jeg synes er så smooth. og så bare noteret at det skal være
F: så det skal være mere tydeligt. og hvordan kunne man gøre det
P3: Jamen så kunne du opdele det i dial up dial ned eller hvad
F: Ja
P2: man kan sige i alle de sammenhænge hvor der ikke er konsistens i leverancen der så får du et problem
P3: Men jeg synes når du deler det op på den måde så er du nødt til at tilføje en tredie der er den generelle opfattelse for det er vigtigt synes jeg
F: Men kan man nøjes med den så
P3: Det har du gjort her i og for sig idet P2 opfatter det som nå jeg kan godt lide dial og vi tænker begge to den totale indtryk er mere mekanisk og det er på grund af den dial ned men det er derfor den ikke er meget mod mekanisk fordi vi er stadigvæk føler noget godt i den

F: Så det skal tydeliggøres at det er en total
P2: Jeg tror du skal være åben for at vægningen. så laver man en sum og vægningen af de forskellige elementer bliver så individuel. hvis jeg har dialet ned tre gange mens jeg har siddet og leget med den så er det måske det jeg har i fokus. hvis den lyd bare generer mig mega meget så er det det jeg har i fokus men som designer ved man ikke hvis man får det svar hvad man skal gøre noget ved så må man gisne om det er fordi den ikke er smooth nok eller er det fordi den anden er for skarp
P1: altså jeg sidder og laver sådan en kalkyle af hvad gør man mest altså man dialer mest op okay det er en god oplevelse men til gengæld når man så det er det virkelig skidt.
P3: jeg synes det er fint stillet op vi forstod det alle tre og
P2: Ja vi har bare svaret markant forskelligt fordi vi har vægtet det forskelligt
P3: det er vel også fint
P1: det kommer an på hvad man skal bruge det til
F: Bare i forstår den ens og evaluerer den på de samme kriterier at i så vælger at vægte kriterierne forskelligt det er måske okay
P3: Og det har vi gjort
F: Men hvis det er de samme kriterier i går efter så går jeg ud fra det er godt nok
P2: Altså det eneste er så at hvis jeg får en bruger som gerne vil have den var mere. alstå hvis jeg kommer hjem og får at vide at nu skal du lave den mindre mekanisk så ved jeg ikke hvad for en af dem. men det vil man så kunne gå ud og få feed back på eller man kunne lave en fortolkning.
F: Ja det må blive der vi når til
P2: Og jeg havde det samme på femtneren og sekstneren
P1: det havde jeg også. Animated betyder det
P2: det er sjælen. altså
P1: Betyder det at den er enhanced altså
P2: For eksempel det at. nej tilbage til når Disney tegnede tegnefilm så havde de de her principper for hvordan figurerne skulle bevæge sig hvordan skal en hånd lige svuppe lidt før den kommer tilbage du må aldrig bare gå til punkt a til punkt b i sådan en mekanisk bevægelse for at give liv til noget så skal du lige have de der bouncing et eller andet. så at føle at noget er mekanisk på den ene side eller har lidt sjæl eller er lidt levende lidt menneskeligt eller dyreligt så det er jo for eksempel når man drejer den der lille fjedrende effekt hvor den dialer tilbage hvis du prøver at dreje den her. holder lige så stille så fjedrer den lige så stille tilbage hvis du bare tager en dial ad gangen det så jeg lidt ligesom den der disney figur der lige
P3: Har du ikke kunne rate den P1
P1: jeg har rated den midt i fordi jeg ikke lige vidste hvad
P2: så det var det vi tænke
P1: og jeg tror faktisk jeg tænkte mest på push button så den giver mig ikke noget mekanisk
F: Kan man hvis man skal være mere sikker på alle forstår den kunne man så lave noget der for eksempel hed moves like human eller moves like machine. eller acts like human eller acts like machine
P1: Ja så tror jeg den ville være fin
P3: Ja eller human interaction feedback eller mechanical interaction feedback
P1: så tænker jeg igen på kommer knappen ud så jeg lægger ikke det i det som du tænkte i hvert fald. det kan godt være det er mig der er total firkantet
P3: Hvordan har du opfattet den så lige til nysgerrighed for vi har opfattet nogenlunde det samme kan jeg mærke
P2: Så har jeg ikke rated den fordi jeg synes den er mixed acrossed the elements. så igen hvad skal man sige synes jeg at når den uddoserer men den ligger ikke helt over som maskine den har en lille blødhed i sin
P3: Men den er så udpræget mekanisk og (uf) så man ikke kan undgå at lægge mere på den mekanisk side fordi det er bare et tool ikke
P2: ja men jeg synes den har lidt af det der
P3: Ja det sådan tænkte jeg. Men hvordan har du ændret ordlyden så

F: Jeg har prøvet at skrive acts like human eller acts like machine.
P2: så vil jeg vurdere den ikke helt over i machine men tæt på.
F: Er det en forringelse af den
P2: Det kan være det er mig der har en præference for at
P3: Men er det sådan human touch and feel eller mechanical machine touch and feel eller fordi acts like jeg ved godt alle de ord er lidt. fordi det er det indtryk den giver
P2: Vi har noget lidt længere nede på designet ikke. Har vi ikke sådan en
P3: skal vi sætte et lille kryds her og så gå videre
F: Ja vi har i hvert fald diskuteret den nu så kan jeg se om jeg kan finde på noget godt.
P1: Kunne personality bruges
P2: Ja super. det tror jeg. og så med auto manual for eksempel der havde jeg det samme problem at man kunne sige den var helt auto men jeg skal stadig væk selv sætte min nål på jeg skal stadigvæk selv dialle. så igen det bliver relativt.
P1: Jeg synes den var sådan lidt auto.
P2: Og du har synes den var ret auto.
P3: Et lille step ekstra auto i forhold til dig jeg synes også klart det er
P1: den synes jeg der var nemmere at læse
P2: Ja den er nem at forstå men referencen hvad er det ikke. og så i den næste der har jeg er det lyden eller designet. discrete eller loud. det var jeg i tvivl om.
F: jeg tror det skulle være generel expression
P3: designet. indtryk
P2: Ja så ville det være fint at sige expression så det var
P3: Kunne man lave det i bunker at man sige en bunke er design eller general impression og den anden bunker er. at man på den måde fordi det er egentlig meget dejligt at du bare skriver robust fragile sharp soft discrete loud fremfor at udpensle det i hver sektion sålede at du systematiserer det
F: Altså generelt så er der to kategorier med interaktionen og impression så det kunne man sagtens dele det op i
P3: Så det kunne man skrive så dem og så det næste
P2: men det sjovt der er vi lidt uenige på de her
P3: Vi bliver nok meget uenige på alle de sidste parametre tænker jeg også men lad os bare det er sjovt at se. Så det var discrete loud og så var det sharp soft og jeg tænker også helt klart på general expression her så det havde jeg heller ikke svært ved at forstå. Hvad synes i
P1: Jeg satte den mest ovre i sharp men det var fordi jeg havde sådan et eller andet i hovedet omkring nåleskjold der dækker noget andet så på grund af nålen var den mere sharp.
P2: jeg havde den også på mega sharp
P1: men jeg var i tvivl efterfølgende om jeg skulle kigge på formgivningen på den
P3: Jeg synes hele designet det er meget. Det er en lille smule aggressivt tror jeg.
P2: Ja og så synes jeg det er utroligt når man så når nu var jeg nået godt ned med min plunger ikke når man sidder og kigger på den uden cap på hvor meget mekanisk der egentlig er der påvirker ikke.
P1: Jeg har sat den lidt til højre imod robust.
P2: jge har taget den næsten over i
P1: Og så har jeg også taget den lidt til venstre.
P3: den er da mere smooth end vores er det er der ingen tvivl om men det er (uf) men undskyld vi var i
P1: Robust lidt over imod robust og lidt over imod expected
P3: jeg har også over imod robust
P2: jeg har meget over imod robust
P3: Jeg har også meget over mod robust eller næst sidst
P2: Ja næst sidst har jeg og så har jeg en over mod robust i expected
P3: den har jeg også
P2: Den var sjov for den var også overraskende god at evaluere
P3: har i også det

P1: ja
P3: Vi er ret enige. og small big
P1: den er mest over mod big
P3: det har jeg også. et efter midten du har den to efter midten
P1: Complex og simple mest over imod simple men jeg overvejede faktisk da jeg også sad og kiggede på den der plunger.
P3: Jeg er tilbøjelig til jeg har sat den i midten men vil være tilbøjelig til at pege den lidt mod komplex fordi det er lidt komplex med alt den der fluper der tages ud den ser ikke simpel ud.
P2: så er jeg spændt på hvad vi siger med colours. jeg er en fra neutral
P1: det er jeg også
P3: Jeg er også en fra neutral
P2: Sejt. og så er eg to fra solid
P1: jeg er en fra solid
P3: en fra solid også. nej hvor er vi da
F: så kommer designerne frem
P3: Og hvad med bulky
P1: Over i bulky
P3: Ja en over i bulky
P2: en over i bulky
P1: Jeg har faktisk sat den helt ud og så bagefter kom jeg til at tænke på bydureon og så tænkte jeg jeg burde nok rykke lidt
P3: Jeg har den en over imod bulky
P2: Ja det har jeg også
P3: Hvad med cover needle reveal needle
P1: Reveal needle helt over
P2: Ja
P3: jeg har næst-sidst
P2: Og der kommenterede jeg på den at hvad skal man sige nummer syvogtredive og nummer seksogtyve hvad er forskellen mellem dem. Proud needle discreet needle cover needle reveal needle
F: ja det har jeg også skrevet så hvis i er enige om at den er ens så vil jeg slette dne ene af dem
P1: Så synes jeg du skal slette proud fordi den er sværest at forstå
P2: det er sådan et internt term
P3: Men cover og reveal needle er selvfølgelig også lidt svært at forstå. Man tænker umiddelbart på skjold og sådan nogle ting men så tænker man okay hvor vidt er den når folk tager needlen af men du er i stand til at skjule den det er derfor jeg synes ikke man kan sætte den på total needle for den kan være covered her on. men det er svært når man tænker på alle de ting.
P2: Jeg skrev nemlig også inner needle cap cap og container. hvor er de henne i den her evaluering.
F: det har jeg også tænkt på ja. det er fint
P1: Fordi det i virkeligheden hedder handling needle eller ikke handling needle.
F: Det vil jeg gerne undgå
P1: men jeg tror det er det jeg har evalueret det på
P2: Jeg har været hardcore kan man se den kan man ikke
P3: Ja når den er covered kan man jo på den anden side heller ikke se den så den har fine betingelser for at blive covered
P1: kommer man til at kunne se den i løbet af processen.
P2: der er også sådan en der måske kunne være noget med protected eller ikke protected med nålen. Altså nu er det bare med det der nåle eller skjold deep dive vi har en af de ting der også er der.
F: er den relevant at få med. skal den være en af de fyrre attributter.
P3: Synes du den er relevant. jeg ville til at stille spørgsmålet.
F: jeg sætter en stjerne ved den
P2: Måske vil man have nogle der er generelle og så vil man have en kategori af nogle af man kan vælge alt efter hvad det er for nogle device man er ude

P3: jeg har næsten fordi nu agerede P1 imod proud discreet men der er selvfølgelig noget i begge spørgsmål. spørgsmålet er om du kan bearbejde til fordi hele enkeltheden i needle håndteringen i det her device synes jeg der er noget ufatteligt sympatisk i at der ikke er noget fis i en hornlygte og ting og automatik og vanvittige novo opfindelser og det bare så ærligt og lige ud af landevejen og let forståeligt for alle mennesker så den er rimelig proud tænker jeg men jeg ved ikke hvad du vil med det men sådan opfatter jeg det.
P2: Jeg tror det er tilbage til det der med at hvis man ser det her som sådan en design maskine der fortæller en hvad for nogle karakteristika der er gode at have og hvad for nogle der er dårlige så kræver det at det er den samme. til nogle devices vil noget være godt og til andre devices vil noget andet være godt.
P3: Men du kan diskutere dit snørrebånd i din sko. så kan du sige alle mennesker skal snørre deres snørrebånd det er det mest ærlige fine flotte så kan man have lgie pludselig nogle velcro strips og alle sko kommer til at se vanvittige ud og der kommer støvfnug imellem og alle de ting så på samme måde har nålen noget dybt sympatisk imens alle de opfindelser for at forsøge at undgå det. jeg vil næsten påstå det er ikke maskinen det er bare ærligt. det er selvfølgelig en tud men det er utroligt sympatisk tænker jeg.
P1: Forståelsesmæssigt er det en fin ting men når man så ser på brugerne og deres
P2: Lad os tage DEVICE T
P1: Se hvad DEVICE T har gjort ved det marked de har gjort et eller andet for at
P3: Jamen DEVICE T er et engangsdevice det er ikke kun DEVICE T det er alle de der engangsdevice der gør det for et engangsdevice du taler om to forskellige ting ting det er derfor man også kan relativere det. DEVICE H har vi forsøgt at lave en mellemting det blev noget vanvittigt noget for det er hverken fugl eller fisk så du skal ligesom tage de der der er nogle ting her i livet der er sandsynlige. her er de og sådan er de og det er de relative vilkår som man skal leve med og så skal du ikke prøve det andet så det er en livsfilosofi som jeg har og det tror jeg er utrolig vigtigt.
P1: Jeg kan godt se det man kan ikke sammenligne det men det kunne da være fantastisk hvis man kunne gøre det samme fjerne den der angst for insulin ved at lave noget der ikke var sådan noget knald ligesom DEVICE H.
P3: Jamen fjerner det angsten for insulin det er så egentlig taget et godt spørgsmål for der er vi nogle gange sådan halleluja majiuana.
P1: Du styrer os bare hvis vi skal videre
F: Ja men vi har masser af tid
P3: Det har vi ikke
P2: Det kriterie at noget ligesom er ærligt eller at noget er altså skåret ind til det essentielle. Det er jo en karakteristika som man typisk som designer synes der er værdifuld og er den repræsenteret eller er det noget andet og er det noget man kan bede brugere om at vurdere.
F: Altså brugere ser ikke det her
P2: Nej du skulle kunne se det når du er ude og lave research og så skulle du kunne komme tilbage og sige fordi
P1: HVad er essential impression
P2: Jeg tænkte meget på ham brugeren vi så ovre ved Eva og Kirsten som ikke vil have en pen som vil have vial and syringe og jeg tænker om jeg også selv ville det fordi det er så ærligt og så nøgent på en eller anden måde på en fin måde. men det kan jo være jeg synes det og så står der en eller anden overvægtig amerikaner som slet ikke kan se æstetikken i og æstetik i citationstegn ikke men æstetikken i at noget er nøgent og ærligt men hellere vil have et eller andet
F: Hvad er det modsatte af noget der er
P3: jamen jeg vil sige det er det samme det kompleks. eller uintuitiv eller uforståelig. Fordi fra vial syringe til flex pen så man kan sige de giver noget feed back. til den her vil jeg sige de er alle tre utroligt. Jeg synes den har fuldkommen berettigelse. det har den anden også. de har nogle andre vilkår men man skal ikke sige fordi noget er ærligt så kan man ikke have noget andet der ikke også er ærligt. Det er ikke ensbetydende men tingene skal have en
P2: Unaturligt altså du taler om en modsætning ikke. og det er ikke nødvendigvis unaturligt. Fortænkt

kunne det også være eller unødvendigt.
F: Fordi sådan som jeg forstår det så er vi lidt ovre i det der om den gemmer sin funktionalitet eller om den viser sin funktionalitet.
P3: Jamen jeg tænker på intuitivt det er. det kan jeg ikke lade være med fordi tingene der er unaturlige det kæmper for eksempel DEVICE A med ikke. det er hele intuiteten i det så skal man skrue noget op og det går ned og hvad fanden har jeg gang i hvad fandne sker der her og det er jo det modsatte af ærlighed.
P2: men problemet er jo at lige så snart du bliver mere advanceret end bare hammer og søm så forstår almindelige mennesker ikke de parametre der gør
P3: Det gør ikke så meget
P2: Med DEVICE A almindelige mennesker forstår ikke hvorfor den lige skal slippe altså hvorfor nålen ikke må sidde inde og skal disengage. Almindelige mennesker forstår ikke hvorfor man lige skal trykudligne
P3: Jeg vil nærmere sige om de forstår det eller ej de skal ikke forstyrres.
P2: vi er helt enige men jo mere automatiseret du gør tingene. jo mere komplekst det bliver mekanisk jo flere ting kan du risikere at brugeren bliver forstyrret af. Men hvis man kunne lave en DEVICE A hvor brugerne ikke blev forstyrret med det komplekse så måtte man jo godt pakke den ind i flødeskum eller hvad det er ikke. og så var den bare intuitiv
P3: Enig
P1: men er den dækket af den der auto manual
P2: det er lidt
p3: Jeg synes auto manual det er igen relativt. nu dømmer vi den her. det kan være vi bagefter kommer til at bedømme Solostar den her og det vil sige man bedømmer den relativt det er også fint så det er et meget reelt spørgsmål.
P2: Men jeg synes ikke den er dækket af det fordi jeg synes mere den handler om karakteren af hvordan den er manuel eller automatiseret. Så det er mere det der med måske er det det intuitive.
F: Om den er ekspressiv måske
P3: Du må ikke tage tankerne fra brugerne når du stiller spørgsmål. Det fine ved de her spørgsmål er at de alligevel er
P2: De her får brugerne aldrig at se
P3: Jeg tænker måden at spørge på de skal være så lidt manipulerende som muligt.
P2: Men F skal vide kriterierne som kunne være vigtige for os at få brugerne til at evaluere og så laver han en oversættelse af dem her til nogle brugerstudier så hvad skal man sige altså inden for sådan en traditionel designskole så er det godt design eller dårligt design ikke.
P3: Det kan man ikke bruge til noget det er rigtig nok. Men de her ord er der
P2: kan vi gå videre
P1: Hvor langt er vi nået.
F: Vi har et kvarter tilbage. Jeg har også noget data på hvad i har snakket om så jeg skal nok kunne finde ud af et eller andet.
P3: men generelt er spørgsmålene ret klare.
P1: Jeg havde en mere som var den der content hvor er den henne
F: Loose content det er nummer 32
P1: Jeg har ikke sat noget fordi altså taler vi om medicinen inden i
P2: Nåh
F: Igen så tror jeg vi snakker alle elementerne i den
P1: okay så mekanikken
F: Kunne også være
P3: Jeg tror vi var kommet til nummer syvogtyve og vi tager nummer syvogtyve.
P2: Jeg har kommentarer til otteogtyve niogtyve tredive
P3: skal vi tage nummer syvogtyve
P1: lidt til højre for cover

P2: lidt til venstre så over imod rough. Nå ja over imod cover.
P3: Jeg har den over imod cover.
P1: og så har jeg sat smooth lidt over imod smooth
P2: og jeg har sat lidt over imod rough
P3: Jeg har også imod smooth
P2: Og det var igen på grund af det der hvad skal man sige
p3: Jeg tænkte meget på brugeroplevelsen her
F: Så det er et spørgsmål om man ser den med hætte på er det det du mener
P2: Ja og der skrev jeg på både otteogtyve og niogtyve er det sound eller interaction eller design
P1: jeg har skrevt surface spørgsmålstegn
F: Hvad for noget siger du
P1: surface spørgsmålstegn altså er det design overfladen vi taler om
F: Ja
P1: (uf)
P3: Hvad tænkte du på med quick og slow F
P1: Der har jeg sat den midt i fordi jeg ikke vidste
F: der tænkte jeg på håndteringen af den om den føles hurtig eller langsom
P3: ja det tænkte jeg også på
P1: Ja
F: Hvor har i sat
P3: Jeg synes den er ret quick sådan set. jeg har sat den en til venstre for midten imod quick.
P2: jeg har sat den lige i midten fordi jeg tog nåleværket med.
P1: og så har jeg sat den næste ned mod low force required.
P2: jeg har sat den to steder fordi jeg tænkte at dial og dose er forskellig hvor jeg synes at dose synes jeg faktisk er super lav men dial der synes jeg den er lige en tand imod high force required.
P1: Så har jeg sat den lige lidt til venstre for midten på very rollable
P3: Hvad har du P2
P2: Jeg har sat den lige i midten
P3: Jeg har sat lige til højre for midten
P2: Den kan jo dreje trehundredeogotteoghalvtreds grader eller tohundredeogotteoghalvtreds
P3: Man må sige hvis cappen er på så er den helt fantastisk og hvis den ikke er på så er den mere som
P1. så jeg synes helhedsbetragtningen den er fin nok
P1: Men så er det loose content firm content. altså er det sådan noget her man tænker på
F: Ja for eksempel
P1: For jeg tænkte mere på er det frysetørret eller er det flydende.
F: Nå Nej nej nej det var ikke det jeg tænkte på
P2: Hvis man tager en flexpen så er der ret meget slør i push button når du dialer ud. (Bwaaaaahr)
F: Du har faktisk også lidt slør her
P1: Det kan jeg love dig for du også har her det er derfor det (uf)
P2: Men den slør synes jeg er min animerede ting den synes jeg bare er bounce eller fleksibilet hvor slør i flexpennen jeg synnes klart den har for meget slør i forhold til hvad jeg synes er okay. så snakkede vi om at det også er sådan noget med når du sætter cappen på
P1: Giver den et nice click og føles den
P2: Føler man at altså rasler det når man ryster eller rasler det ikke. Så i virkeligheden er det måske ovre i den robuste ikke robuste.
P3: Jeg synes også den var ovre imod robust sådan set. men måske skal den beskrives lidt tydeligere så eller hvad
F: Ja
P2: men man kunne også bare sige loose eller firm
P1: ja det tror jeg faktisk er bedre fordi så tænker jeg slet ikke
P2: Og så ved du bare lidt mindre hvad folk evaluerer 57:43

P3: det er jeg enig i
P2: og jeg havde den nemlig helt ovre i firm for jeg synes den var super firm
P1: så tror jeg også ville synes den var
P3: og jeg opfattede den som du siger. det er skide godt. Even weight eller uneven weight distribution
P1: Er det visuelt eller er det fysisk
F: Det skulle være
P3: fornemmelsen
F: Når man bruger den
P3: Jeg synes den er meget
P1: Jeg har sat den midt i
P2: jeg har sat den en fra even
P3: jeg er også en fra even
P2: Fordi jeg synes alligevel grand prix kaj bøjesen skeen der den er lidt bedre
P1: jeg sad virkelig og tænkte meget over playful og dead
P3: man skulle sige greatful or dead. Greatfulness
P1: Jamen jeg sad og prøvede at komme i tanke om nogle produkter der var playful sådan injektionspenne der var playful og det kunne jeg nok i virkeligheden ikke
P3: Jeg synes den er mere død end playful men kun en hak til højre
P2: Jeg har den to
P1: Jeg har sat den lige midt i
P3: Måske skulle man skrive playful og dull i stedet for. det er et flottere ord end dead
P1: Ja
P2: Ja
P1: det er et godt ord
P3: Så har man natural artificial.
P2: der kunne jeg have sat den i begge sider
P1: jeg har sat den lige midt i
P3: Jeg synes den er rimelig naturlig så det var ikke noget problem
P2: Jeg så på min krop som reference og så tænkte jeg nej den er en fra artificial
P3: Du er ikke en robot heldigvis. nej nogle gange ligner du lidt en robot. Many handling steps
P1: Ja jeg satte den over imod venstre over imod many handling steps
P2: Jeg har sat den en over imod højre
P3: jeg er også en over imod højre. Nej jeg har sat den næste mod højre undtagen en
P2: Det er igen altså vi forstår hvad du mener. referencen
F: Ja referencen er forskellig.
P3: det er igen det er en relativ bedømmelse det er en meget vigtig at man tager i betragtning
P1: Proud needle og discreet needle vil du så fjerne den eller
F: Altså vi var enige om at den betød meget det samme heroppe men vi diskuterede at der også er noget andet. det synes jeg er fint indtil videre så vil jeg overveje om jeg vil sætte noget andet ind i stedet for.
P1: Så formoder jeg der står detailed
[Irrelevant]
P1: Jeg har sat den lidt til højre for midten
P2: jeg har sat den i midten
P3: Jeg har sat den lidt til venstre
P2: Nej hvor vi er gode så
P1: Continuous shape eller complex shape der har jeg sat den over imod continuous
P2: jeg har sat den en mod continuous
P3: Jeg har sat den en mod complex
P2: hvorfor gjorde du det
P3: Fordi den er meget komplex med de mærkelige hakker det er fucking komplekst

P1: Og så compact har jeg sat den lidt til venstre
P2: Altså i forhold til hvad man kan P3
P3: Ja det er i forhold til hvad man
P2: Altså jeg tænkte i forhold til produktion og sådan. så er den da utrolig enkel. Nej jeg driller dig.Compact shattered.
P1: mest over imod compact
P2: Ja
P1: lige over midten
P3: Jeg er mest over imod shattered
P2: Jeg nåede faktisk at tænke at hvis nu der havde været en fuldfarvet pink label eller et eller andet så ville det have betydet meget for så altså grafikken hvad label grafikken betyder
F: Men i er enige om hvad det betyder
P1: Det tror jeg
F: At den er compact eller shattered
P1: Nej det ved jeg ikke om vi er
P3: Det er måske forkert af mig at sætte den længere imod shattered
P1: men du har da ret at hvis den er. hvis det er sultify lablen så er den da lidt mere shattered impression end hvis det var en mørk blå sort
F: Det var kun fordi du spurgte hvad det betød og så skulle jeg lige. at vi var enige om hvad det
P3: Hvad kunne man ellers kalde det i stedet for complex
P1: Bydurion er for eksempel shattered. den der der skal skrues sammen
P3: men sammenhæng hvad er det hvis man oversætter det
P2: Continuous eller
P3: Nej der er et andet ord der er bedre
F: Connective
P3: Åh.
P2: Consistent
P3: ja måske
P1: Continuous
P3: Consistent eller shattered. Ja det er bedre.
P2: Har vi compact et andet sted. fordi
F: vi har big small
P2: ja fordi vi havde noget med hvis vi nu har en cap der sidder og dingler når du åbner eller et hypokit hvor du åbner og så er der. det kan også være et udtryk for
P3: Du kunne også også skrive undskyld P2 at jeg lige (uf) du kom med consistent og fragmented for eksempel for shattered men måske er shattered et bedre ord
P2: og måske er det to parametre der er forskellige og hvis du smider nålen ud så kan du få plads til to
F: Ja
P2: Jeg tænker på det der med at noget er at DEVICE A bliver så lang nu så den ikke er
P1: den er ikke kompakt
P2: den er ikke kompakt. og kompakt er næsten altid godt for vores brugere. eller det er næsten altid noget de vurderer som positivt men man skal jo ikke vurdere noget hvor man ved hvad det gode er. det er lidt en udfordring ikke. F vil helst ikke have at skalaen er positiv negativ. den skal helst være noget og noget andet. Hvor DEVICE A den bliver for lang
P1: Men jeg må ikke. Compact behøve vel ikke være det bedste. det er bare fordi vi har den referenceramme vi nu engang har. det kan vel godt være man kan nævne noget der var bedste
P2: Ja hvis du for eksempel skulle have et plaster på. Nej nu siger jeg bare noget ævl ikke. jeg tænker at det forholder sig jo til kroppen. så alt efter hvordan det skal forholde sig til kroppen kan det være godt at det har en form eller en anden form. men i forhold til din krop. bare kroppen. dig og devicet skal være kompakt ikke. så det skal ikke flavre ud fra dig men hvis det så sidder på din arm så på din arm med din arm er det kompakt men hvis du tager plasteret af er det måske langt og uhåndterligt

P3: Man tænker ikke på små bind med det her kompakt men på kompakt tænker man mere på sammenhængen tænker jeg. det er derfor consistent tror jeg er et bedre ord.
F: Helt i orden. jeg tror vi er nødt til at stoppe
P1: fik du noget ud af det
F: Ja ja ja ja det var fint

G.4 Anthropologist Interview

Interview with anthropologist at Novo Nordisk A/S about injection device users, their lives and its implications on design of injection devices. This interview is referred to as interview 3 [i3]

F: Altså det mit speciale det handler om det er. og det er sådan lidt inspireret af de måde man laver brugerundersøgelser på her i Novo på. det der med at have sådan et produkt og så gå ud og få brugere til at evaluere produktet.
P: Ja. Og jeg skal lige have helt på plads du er på det der design og innovation ikke på DTU eller hvad
F: Nej jeg går på produkt og designpsykologi i Aalborg
P: Nå okay du er den vej. yes yes yes
F: yes. Og det som jeg kom til at tænke på når jeg var med på studier her i Novo det var at det der med at få en bruger til at lave en produktevaluering det er måske ikke skide smart i virkeligheden fordi brugeren kan jo ikke designanalysere. brugeren reagerer vel mest på hvad han synes om produktet som en helhed og så siger jamen det synes jeg er godt eller skidt eller der er noget jeg ikke kan lide. hvad kunne det være er det nålen. jamen det er nok nålen den er gal med eller det er nok den her mærkelige måde den drejer på men det er sådan en lidt kunstig projektering af hvad brugeren synes fordi de har jo helt sikkert en holdning til om det er godt eller skidt men det der med at få brugeren til at peje på hvad det så er ved produktet der skal laves om.
P: Ja det ved de ikke
F: Det ved de måske faktisk ikke. så det jeg tænke man kunne gøre det var at sige hvis nu vi får nogle designere eller nogen der er rigtig dygtige til at skille sådan et device ad så vi siger det her det er nogle punkter vi kan beskrive produktet på. og så vi i den anden ende har brugeren der kan beskrive deres oplevelse på nogle punkter som i virkeligheden slet ikke har noget med hinanden at gøre. men når vi så får dem til at bruge et device og får dem til at evaluere den her oplevelse så kan vi måske begynde at se nogle sammenhænge jamen det lader til at hver gang vi gør den her mere blå så sker der også et eller andet herovre som ændrer sig så de bliver mere overraskede eller aroused eller hvad det nu kunne være. Ja så det jeg havde håbet vi kunne snakke om i dag er hvad der er her ovre i oplevelsen og helt sådan hvad er det for nogle behov vi prøver at hjælpe brugeren med når vi laver sådan en pen og giver dem sådan en pen og hvad er det for nogle behov vi så skaber ved at give dem pennen fordi ligesom at. altså det er jo basically prøve at holde dem sunde og raske og ikke få de her anfald men ved at vi giver dem den her insulin og ved at vi giver dem en opgave de skal lave så skaber vi også en hel masse nye behov for dem som vi så prøver og løse igen så det var det jeg håbede at vi kunne snakke om. hvad det så egentlig er og om man kunne stille nogle parametre om og sige det er det her vi skal måle på. ikke kun om det er en god om det er en god oplevelse eller en dårlig oplevelse men hvorvidt det her bliver opfyldt for brugeren og hvor godt det bliver.
P: ja men det kan vi snakke snakke om
F: Ja
P: og det er jo faktisk nu apropos organisationen hvordan den er skruet sammen det er faktisk også derfor at det giver rigtig god mening for os som antropologer ikke at sidde i det samme team som dem der laver usability og den slags brugerundersøgelser som du har været en del af fordi det netop er i den helt anden. og hvis det er at man sidder sammen og det har vi gjort i mange år så bliver man tit forvekslet og så kan man ligesom. altså nu får vi lov til ligesom at være os selv eller fokusere på det som handler om hvad er det for nogle mennesker og hvad er det for nogle behov de har hvordan ser deres liv ud. og behov er jo ikke sådan noget man kan spørge folk om fordi folk har ikke nogle behov de ikke har dækket og det er jo sådan en af grundantagelserne i det antropologiske arbejde det er at folk løser deres behov og det har vi altid gjort som mennesker så derfor så kan vi ikke gå ud at spørge folk til behov men vi må observere og analysere og fortolke hvad vi tænker der kunne være mere optimalt. det kan vi ikke spørge til. så skal tingene i hvert fald være virkelig virkelig elendige. og det ser vi jo tit altså folk hvis de bliver adspurgt om de har brug for en memory funktion i forhold til at huske at tage deres insulin så siger de nej det har vi ikke men vi ser dem jo når vi observere hvad de gør have alle mulige systemer og praksiser som hjælper dem og så er det man kan gå ind og være kreativ og kunne vi lave de der systemer lidt mere effektive men det hjælper ikke at spørge dem om de har brug for det for det siger de nej til. de har løst det ikke. jeg har prøvet en konkret som har sin insulinpen i en kop og så putter han den med hætten ned og jeg kan ikke huske han har lavet et system så han kan huske at hvis den er nedad så har han taget den om morgenen og hvis den er opad så har han taget den om aftenen og det kan
F: Ja
P: og det kan han huske detder system så han har ikke burg for nogen memory funktion men umiddelbart så synes jeg alligevel det kræver ret meget at huske hætte ned og hætte op hvad betyder hvad. Det har han så lært sig selv fordi han har brug for en memory funktion ja. Men du har fuldstændig fat i den lange ende synes jeg når du siger at det hjælper ikke at teste ting fordi så forholder de sig bare til den ting som der ligesom er der inden for de rammer som den ting har. og så ved vi ikke om der ligger noget uden over den genstand som vi ikke har oplevet. Men hvad søren gør man så. og der tænker jeg altså vi lavede et studie en gang den gang vi var i samme afdeling os antropologer sammen med designerne og usability folkene som var. og måske har du hørt om det men ellers kan du høre om det og der er en der er bedre til at fortælle om det en jeg er men det var med en sammenblanding af design og usability og antropologi hvor vi skulle lave noget for et projekt der hedder PROJEKT C dem der arbejder med obesity og så havde vi valgt at gøre det på den måde at vi havde indkaldt folk til sådan nogle intim brug i USA og vi havde dem til sådan nogle brugertests som du sikkert har været vidne til hvor man sidder og så har de noget så de skal forholde sig til det og sige om de kan lide og eller ikke kan lide og forklare hvad den ene og den anden og den tredie ting blev vist. og der havde de nogle forskellige prototyper med. så gjorde vi det at jeg sad med til de der interviews uden at sige noget og lyttede efter hvad det var de sagde altså som var mere relateret til oplevelser for eksempel. altså den her giver mig en følelse af frihed eller den her den ser utrolig altså du ved nu kan jeg ikke huske dem helt specifik der var nogle af der der ord der var meget markante ord men det er et par år siden. men hvor de siger nej men den her den er diskret eller den her den er meget medicinsk. men sådan nogle mere beskrivende ord i forhold til det de oplevede med de forskellige

ting de blev vist. og dem sad jeg og samlede på i jeg tror vi kørte de der brugertests i to dage. så i to dage sad jeg og samlede ord som egentlig ikke var. alstå samlede på oplevelse samlede på sådan nogle mere kvalitative beskrivelser og dem skrev vi så ned og så samlede vi de samme folk igen som havde været inde i en fokusgruppe vi samlede dem faktisk i to fokusgrupper vi lavede en mande og en kvinde fra sådan en ide om at det sikker var nogle forskellge. det var en klog ide altså det viste sig at være en klog ide om at det var nogle forskellige oplevelser de havde alt efter hvilket køn de var når det handlede om overvægt. og så siger vi så jamen der er rigtig mange af jer der har sagt at den her den. har nævnt noget omkring (uf) så sagde vi nu glemmer vi alle de der ting men der var rigtig mange af jer der snakkede om frihed. men hvad er egentlig frihed og så snakkede vi om hvad frihed er og hvad det er og så siger man hvad er det modsatte og så kom der noget op der. og så lavede vi fra alle de ord de ligesom havde samlet dem tog vi og satte dem op og så bad vi dem om sige i fokusgruppen at diskutere hvad er det modsatte af det hvad kunne være på den anden ende af det spektrum. så fik vi ligesom sådan nogle begrebspar som man ligesom kunne sige sådan normaliserede de deres verden. og så havde vi dem dem lagde vi så dem ud på sådan et langt bord og så havde vi alle mulige ting med. så havde Louise taget alle mulige det var billeder af ting altså som også var noget device agtigt så bad vi dem om at placere dem er den her ting mere frihed eller mere constraints. er den her mere feminin eller maskulin er den her mere jeg kan ikke huske hvad de var. og så kunne man ligesom begynde at sige nå okay hvis den er lidt som du snakker om hvis den er lidt tyk så kunne det være den var mere feminin ikke og så kunne vi begynde at forstå noget om hvad er det der er altså og det handlede jo om at hive og det her det har vi kun gjort en gang. jeg synes det var super spændende og hvis du vil se noget af det så har Louise dokumenteret hele den der process det er i en eller anden rapport men den der proces med hvordan vi ligesom fik de der ord frem og hvordan vi fik folk til at evaluere i forhold til ikke nogle dimser eller dutter eller rød eller grøn men i forhold til nogle ord og det samme ords modsætning som vi så selv bad dem om at finde. det var gruppen der skulle finde hvad er så det modsatte og det kunne være lidt svært ikke. hvis det var en der så hvis der var noget der var blevet nævnt der var tiltrækkende hvad er så det modsatte så kunne de begynde at diskutere hvad det modsatte var og mænd og kvinder havde ikke nødvendigvis de samme ting som modsætninger og så videre. og det er jo i virkeligheden det vi også gør når vi laver det antropologiske arbejde altså det her det var jo bare at kombinere det antropologiske med designarbejde men når vi laver det antropologiske arbejde så handler det jo om at vi prøver på så lidt som muligt over hovedet at introducere nogle ord som folk ikke selv bruger. Så for eksempel diabetes altså hvis man snakker i danmark så er der nogle der siger diabetes og nogle der siger sukkersyge men hvis jeg som interviewer starter med at sige diabetes så kender de jo godt ordet diabetes og så begynder de bare at sige det. Så derfor så er det vigtigt at man sådan siger ja vi er her jo i dag for at snakke om den. og så ved man ikke en gang kalder de det en sygdom eller en tilstand altså du ved. så man lyder sådan helt usikker i starten fordi man vil ikke sige noget som de ikke har sagt så jeg har sådan et indgangsspørgsmål som jeg bruger rigtig meget som virker rigtig godt. fordi de ved jo godt hvorfor de er kaldt ind til det de ved godt hvorfor de er med. så hvis jeg siger hvornår startede det hele for dig. Så siger de det hele hvad mener du. ja altså det bestemmer hvad der hører med til historien. nå men så kan. det kan starte på alle mulige tidspunkter det kan starte med jamen jeg fik et job hvor jeg havde en sundhedsforsikring så gik jeg til lægen for første gang i ti år. Nå så var det der det ligesom startede der fik jeg diagnosen for første gang. Der er nogle andre der siger det startede faktisk da jeg var spædbarn fordi min mor var bange for at det var krigstid og så gav hun mig piskefløde i sutteflasken ikke. så blev jeg overvægtig. Så får man deres oplevelse af både hvad det er og starttidspunkt og så begynder de også at sige nogle ord og så kan man så tage de ord de siger og arbejde videre med dem og så en gang imellem så kan man godt høre man kommer til at sige noget helt forkert og så retter man bare ind eller man kommer til at sige diabetes og de siger i virkeligheden noget sugar. og så siger man okay sorry jeg kan godt høre du kalder det sugar men kan du så fortælle hvorfor kalder du det det. fordi de ved jo også godt at de siger noget andet end jeg siger og så kommer man den vej ind til at tale om livet med den her sygdom fra deres perspektiv. og der fra og så til altså det er jo en lang lang vej hen til altså at kunne putte det ind i nogle dimser men der har vi jo altså og det er jo en øvelse som vi bliver ved med at skulle forholde os til at altså vi har lige haft sådan en dialog også med vores Seattle afdeling hvor de siger jamen prøv at hør hvorfor kan vi ikke lave den her fem sekunders rutine et eller andet de vil have folk til at gøre for at det kan fungere med det digitale løsning. hvorfor skal folk gøre med de der fem sekunder altså whats in it for them altså de bliver nødt til at. så vi prøver hele tiden på vi tegner meget sådan et bjerg eller vi laver det jo som to bjerge og siger novo nordisk er her og så er patienterne her og de lever i et helt andet land og ingeniørerne bliver meget utrygge har vi fundet ud af nu hvis vi siger at de har en anden rationalitet fordi at sige at der findes flere forskellige rationaliteter det er de færreste ingeniører der kan håndtere det fordi rationel er rationel men det er jo sådan det er. så vores arbejde som antropologer handler om at hele tiden gøre opmærksom på at det vi synes er rationelt synes de ikke er rationelt. og derfor kan vi hverken bruge vores sprog eller vores værdier eller vores altså forestillinger om hvad der er rigtigt og forkert til noget som helst. og derfor laver vi jo rigtig mange brugertest men hvis vi laver brugertesten med at spørge dem hvad synes du om det her så får vi heller ikke meget og derfor synes jeg faktisk at vores setup i det der DEVICE C projekt i forhold til metodik var utrolig vellykket fordi vi både gjorde det som usability folkene plejer at gøre men så derfra ligesom udtrak essensen af den oplevelse folk synes de havde. og jeg tror også nu ved jeg så ikke fordi vi ligesom kort tid efter blev vi delt i forskellige afdelinger men jeg tror hvis du spørger Louise så har det haft stor indflydelse på hvordan de har arbejdet med design af den der DEVICE C pen fremadrettet. Der var en af dem jeg kan huske det var en af de der modsætningspar var det ser meget medicinsk ud og hvor vi så i diskussionen af hvad er så det modsatte af medicinsk og der var det sådan noget med om det skulle se naturligt ud og er naturligt det modsatte af medicinsk og hvor det gik op for os at det medicinske var positivt i den her sammenhæng hvor når du for eksempel snakker diabetes så vil du måske hellere have medicin det ser mere sådan hverdagsagtigt ud hvor at de her folk som er obese de har prøvet hvad som helst af mystisk naturmedicin for at overkomme deres obesity eller at gøre noget

ved den så de vil faktisk ikke have det ser naturligt ud jo mere medicinsk og klinisk det så ud desto bedre. og det var noget andet altså. og det kom frem i sådan nogle altså det kom jo ikke direkte det kom sådan af omveje fra. så er der sådan noget som med også at vi tror jo altså der er jo ting vi tror og det kommer rigtig meget frem når vi så bliver kaldt ind til sådan nogle ingeniørteams for at drøft noget. og vi har lige haft en ned vores DEVICE A team som gerne vil vide nogte om om folk inspicerer cartridge før de tager deres insulin og de har alle mulige snakke om det fordi hvis de nu og bla og de laver sig alle mulige forestillinger om det. men man kan bare sige det gør de ikke. de kigger ikke på den. bum. altså de skal slet ikke diskutere om de skal se den på den ene side eller på den anden side eller om de skal se den på hovedet og der kunne man nemt lave en brugertest jamen kan de best lide at du kan se den på den her måde på den her måde eller på den her måde jamen det vil de jo svare på hvad de bedst kunne lide hvilken måde de bedst kunne lide at se på den på men faktum er at de aldrig kigger på den. så de har fuldstændig tillid til at den der cartridge er der altså selvfølgelig er den der altså. men det er jo Novo nordisk mindset det er jo ingeniøren mindset altså det er da mærkeligt at de ikke lige tjekker om der er medicin i. nej det gør de ikke der regner de med at der er. og det kan være rigtig rigtig svært at forstå og det arbejder vi jo og det er jo naturligt nok det er jo ikke for at tale dårligt om vores ingeniører de gør jeg det bedste de kan og det her med at man bor i hver sin verden og har sine egne værdier og rationaliteter det gælder jo os alle sammen. og så er vi bare nogle der er trænet til at havae det som vores profession at gå over i nogle andre verdener og kunne forstå at her ser verdenen anderledes ud. og den ser vitterligt anderledes ud og en af de aller aller største erkendelser med lige for tiden det er at patienterne med type to diabetes ikke nødvendigvis har som mål at blive mere sunde. det er super svært for alle de her marathon løbende novo nordisk ingeniører at forstå fordi samtlige af os der er og mig selv inklusiv som er her hvis vi fik en type to diabetes diagnose så ville vi straks gå analytisk til værks og sige hvordan kan jeg kurere det her hvordan kan jeg være mere sund og hvad kan jeg gøre. og det gør de ikke. men de gør det jo ikke fordi altså det er jo derfor de har fået sygdommen så der er jo sådan et indbygget paradoks i type to diabetes som er at du får sygdommen fordi du ikke gør. der er noget du ikke gør eller gør på en bestemt måde. og for at komme i god kontrol med din sygdom så skal du gøre noget andet. men det er jo netop det andet du ikke kan og det er derfor du har fået sygdommen. men hvis vi sidder herovre og siger nå men så skal de gøre noget andet og nu viser vi hvordan de skal gøre så kommer vi ikke særlig langt fordi det gør de jo ikke altså.

F: Men hvad er det så. nu siger du de vil ikke

P: Være sunde

F: være sunde og raske. hvad er det så de gerne vil.

P: De vil for eksempel gerne altså vi har en som siger min største prioritet er at min familie har tag over hovedet altså det er nok vigtigere end min sundhed. ja det kan jeg så godt forstå. eller at de vil gerne ud og spise med deres venner på den restaurant som serverer fried chicken og macaroni and chees og corn bread og som er det mad de er vokset op med hele deres liv. og de vil gerne være en del af et fællesskab. vi har også et filmklip hvor vi snakker med en kvinde som har type to diabetes og som har faktisk formået at komme i rigtig rigtig god kontrol. men det altså du kan også se det med vægttab. hun fik at vide at hun skulle tabe vægt. men vægttabet er jo aldrig det som man gerne vil men fandt ud af da hun tabte noget vægt at hun så kunne lege fangeleg med sit barnebarn. det vil jo være. hun vil gerne lege fangeleg med sit barnebar. det er relationerne altså det er det det handler om. og så fandt hun en måde hvor hun kunne holde sin diæt ved at have en ugentlig cheat day hvor hun måtte snyde. og på sin cheat day så måler hun ikke sit blodsukker fordi så det går alligevel galt. så hun har en dag om ugen og den dag om ugen viser sig så tilfældigvis at være den dag vi er der. og så spørger vi hende så hvad er så i dag. Ouuuh nu skal du se sagde hun så og så rejser hun sig op og går ud i køkkenet og tager sådan en bakke med doughnuts. og så siger hun vil i ikke have en. lad mig ikke være alene. spis den sammen med mig. togetherness thats what its all about. så hvis du tager folk ud af deres togetherness og beder dem om at være healthy så tilhørsforhold er vigtigere end sundhed. og nu bor de her folk tilfældigvis i en kultur hvor det tilhørsforhold de har det gør dem utroligt syge. så hvis vi så ber dem om at være raske så beder vi dem også om at trække sig selv ud af deres kulturelle tilhørsforhold. og dem vi ser lykkedes de spiser alene og de spiser ikke med deres kollegaer de flytter væk fra deres familie altså det er sådan nogle ret voldsomme ting man bliver nødt til at gøre for at komme væk fra det.

F: Så kan man sige at det at de bliver mere raske måske gør dem mindre lykkelige eller i hvert fald tvinger dem til at skubbe sig selv i en forkert retning.

P: Ja og det er jo meget dømmende at snakke om kan vi vurdere om de er lykkelige eller ej men i hvert fald så gør vi jo. vi dømmer dem jo faktisk til at være ulykkelige når de er tykke og unhealthy. de må være ulykkelige. nej det er de faktisk ikke. men hvis vi beder dem om at spise brocoli og tage det med i deres madpakke og spise den så er det faktisk en rimelig ulykkelig situation og stigmatiserende så det var også det at. det er det der hele tiden sker vi måler det her ud fra vores egne normer og værdier og holdninger og rationaliteter. og det er der hvor vi bliver nødt til at gå ind og kende deres. og det kommer så altså helt ned til designdetaljer.

F: Ja

P: er det naturligt at inspicere en pen for at se om cartridge er på plads. Nej. men den kan jo så godt være. der er jo andre end patienterne der er interessenter i det her spil for der er jo også alle mulige regler og regulativer og fda og ting og derfor kan det jo godt være man bliver nødt til at kunne se det alligevel ikke.

F: Men altså vi kan jo ikke redde verdenen med den her pen. men hvad er det så vi kan gøre med den.

P: Vi kan i hvert fald gøre det så lidt. Det som vi ved fra vores antropologiske arbejde det er at det er et benhårdt liv de her folk har. det er benhård og det er ikke for sjov at have diabetes. det er simpelthen virkelig nedern. det er op ad bakke på alle måder og det er super svært så vi kan lave bare. altså det må ikke være besværligt også. altså at tage sin medicin må ikke være besværligt. Der er rigeligt der er besværligt i de her menneskers liv. så derfor vi får altid det spørgsmål når vi viser vores materiale til nogle af vores kollegaer så siger de. altså jeg sidder

og bruger min karrier på at nedsætte newton fra nu ved jeg ikke helt hvordan det er med newton men tre komma fem til tre eller et eller andet i kraft man skal bruge på at trykke. altså gør det overhovedet en forskel. og så bliver vi nødt til at sige ja det gør det faktisk. jeg kan godt se i det store og hele og i mac donald og den ulykke de skaber og coca cola og sundhedssystemet og forsikringssystemet i usa og sådan noget altså er nogle faktorer som selvfølgelig betyder helt vildt meget så kan man godt synes at den der lille halve newton betyder ingen ting. men vi bliver jo nødt til at tro på at hvis vi på en eller anden måde kan gøre det mindre svært. de her folk de føler sig jo som en failure på rigtig mange måder også. og især når de går til lægen så hvis vi kan lave noget der gør at de føler i det mindste ikke her at de skal kæmpe en kamp.
F: Og hvad får det til at føles sådan
P: Jamen det er hvis man ikke forstår ting. altså hvis man ikke forstår. altså blodsukkermålinger for eksempel. det er mig en gåde hvorfor der ikke er nogen der har fundet på at lave noget der hjælper dem til at. vi har jo lavet nogle studier nogle antropologiske studier der viser at folk de fatter ikke en bønne af hvad det vil sige deres blodsukker er tohundrende eller tohundrede og tyve. de har jo fået at vide det skal ligge. nu er det amerikanske målestok ikke. der har de fået at vide det skal ligge mellem halvfjerds og hundrede og tyve og deres det ligger tit på tohundrede fordi sådan du har højt blodsukker og diabetes. men det gør ikke ondt at have højt blodsukker og det er faktisk ikke væmmeligt. men derimod er det faktisk ret væmmeligt når man har haft et blodsukker på tohundrede i flere år hvis man så får det ned på det niveau som det skal være. det føles rigtig ubehageligt i starten i de første mange måneder altså i en lang periode. men hvis du har det på tohundrede så er det du ender med at få amputeret dit ben og blive blind og få nyresvigt og alt det her ikke. så dillemaet er at du har et for højt blodsukker som ikke føles væmmeligt men giver dig de der komplikationer på langt sigt men hvis du får det ned så føler du det her og nu væmmeligt. og hvad kan du forholde dig til. og det er noget af det Peter arbejder meget med detder med forskellen mellem det biologiske og det kognitive. altså det er jo kognitiv viden det er godt det mellem halvfjerds og hundrede og tyve men kroppen siger det modsatte. og der har jeg endnu ikke hverken set eller hørt nogen der har fået det forklaret det på en måde der får dem til at forstå det andet end som en eller anden intellektuel øvelse. og der tænker jeg der er da i hvert fald potentiale der for at gøre noget hvor man ikke bare siger prøv at høre hvis du bliver ved med at ligge der så bliver du blind og får amputeret benet. og det som man så også skal sige det er noget vi har opdaget for nyligt altså ikke fordi det er nyt men fordi vi er begyndt at lægge mærke til det det er at det er blevet sådan en hverdagsalmindelighed at folk har amputerede ben. altså hvis jeg kendte nogen der havde amputerede ben. jeg kender jo ikke en gang nogen i mit privatliv. der er ikke nogen i min omgangskreds eller i min familie. altså jeg synes amputerede ben er ret alvorligt. altså det skræmmer mig seriøst. hvis jeg havde en sygdom hvor nogen sagde til mig shit du kan få amputeret benet så ville jeg blive bange. men her ovre de kender det er jo helt vildt de kender alle sammen en der har fået amputeret benet. de kender alle sammen en. det er en onkel eller en fætter eller en bedstefar. det vil sige de ved det godt men det bliver en del af deres normalitet som så gør at det slet ikke er lige så farligt. altså og noget af det de så får at vide de skal. altså vi ser dem jo sidde og sige ja lægen har sagt jeg skal spise salat. og så bliver ssaallaatt sagt som sådan noget bwadr noget ikke. altså som noget ækelt ikke. men det er fordi vi tror at salat er lækkert og det er det måske også som vi kender det. men der ovre der er salat virkelig bward. og amputerede ben er normalt og det gør jo ikke et amputeret ben mindre skr... men på en eller anden måde idet at det er der i dit liv og din omgangskreds gør det også mindre scary altså. så det er også noget med at vi tror vi kan skræmme med noget der ikke skræmmer for eksempel. men det har noget at gøre med at jeg ved ikke hvad vi kan gøre det er jo derfor vi er her så mange mand. altså nogle gange bliver vi jo også spurgt vi er to antoprologer og fyrretusinde i novo så hvis der er nogle der spørger hvad skal vi gøre så siger vi det ved vi virkelig ikke nu kan vi fortælle jer lidt om hvordan virkeligheden ser ud og kan vi så ikke være sammen om at finde ud af hvad vi kan gøre. altså bare det der med at forstå at et amputeret ben ikke er et skrækscenarie. det er det jo på sin vis men hende her der havde med barnebarnet og hun kunne løbe efter barnebarnet og med doughnuts og sådan noget hun siger sådan jamen så kom jeg til lægen og fik jeg insulin og så skulle jeg måle blodsukker og jeg skulle det hele og hvad ved jeg. jeg ved ikke en skid. jeg forstår ingenting. det eneste jeg ved det var min mor hun er død altså af det der diabetes. thats all i know. og så sidder hun der med sin pakke af genstande. så hvis den der pakke jeg er helt sikker på at det man kan gøre det ligger jo ikke kun i insulinpennen det liger jo i en eller anden måde den konstekst den indgår i og altså der kan du prøve at se nogle af sådan nogle. der er sådan nogle reklamefilm for diabetes medicin i usa hvor man må reklamere direkte til patienter hvor man også tænker. jeg tror ikke det er det men altså der må jo sidde nogle der har postet så mange mange mange penge i det men hvor det bliver projekteret som sådan noget yeah get into the groove og der er sådan noget. det er ikke sådan det er at have diabetes altså nu skal vi bare jeg tager lige et shot og så kører vi videre og livet er en fest. det der liv de har er jo vældig vældig skrøbeligt og diabetes er ofte a minor detail i et liv hvor at som en anden sagde jeg synes egentlig jeg er meget succesfuld og hun sidder fuldstændig ude af kontrol med sin diabetes. kæmpe kvinde med alle mulige sygdomme. og også en eller anden hudsygdom som gjorde hun så forfærdelig ud. det var ikke rart og alt det der mennesker der sidder der. og så siger hun jeg synes egentlig jeg har haft rimelig meget succes i min liv. og så prøver jeg at spørge ind til hvad er det du mener. jamen jeg har fire sønner de er alle sammen voksne og der er ingen af dem der har været i fængsel. nej det er sgu også ret fedt altså hvis man bor i sådan et område hvor der er drug og kriminalitet og man har fire sønner og det er faktisk ens største bekymring det er kommer de ud i noget lort så det er en kæmpe succes der er ingen af mine sønner der har været i fængsel. nej så kan det gødt være lidt svært at hive en diabetes pen frem og sige kan vi snakke lidt om den her ikke
F: Ja selvfølgelig. men vil det så sige at det er. er det et mål. vil du mene at det er et mål for os at gøre at diabetes så ikke var en del af hvad man synes man var. giver det mening.
P: ja en del af ens identitet eller hvad.
F: Ja

P: Nej det er jo faktisk dem der tager det åp sig som en identitet som lykkedes med det. dem som ligesom siger det er ikke mig. der er jo rigtig mange man møder de vil jo ikke injecere inde i stuen for eksempel fordi i stuen det er der man hygger sig. det er sådan et diabetes frit område. men dem som er ligeglade dem som har det med overalt det er jo også dem der kommer i bedre kontrol. så det er at gøre det muligt at integrere det i ens liv på en eller anden måde tænker jeg er vigtigt. det er jo også derfor det skal passe ind i tasken altså man skal kunne tage det med sig. derfor alle de ting omkring de er vigtige ikke. men der er også et andetmeget godt eksempel som kommer lidt nær devices et projekt vi lavede for nogle år siden da vi stadigvæk havde et portefølje for nogle produkter imod gigt som lukkede for nogle år siden. og der sad nogle designere her og lavede forskellige løsninger til emballage til det her gigtmedicin. og det her gigtmedicin bliver udleveret på hospitalet i en tomåneders pakker der varer to måneder til en ugentlig injektion. men det skal være på køl hele tiden også i transpottiden fra hospital til hjem skal det holdes koldt. så en af de løsninger der var blevet udviklet som vi testede i en fokusgruppe var en køletaske som ligesom samtidig var emballagen. sådan så man ligesom kunne få den der i den der taske sådan en engangskøletaske og så kunne man få den så kunne man ligesom tage den over skuldereen og så var alting koldt og så kunne man direkte putte den taske ind i køleskabet. og den var alle designerne her bare den der prototype og ideen om det ret forelskede i. og så møder vi de her brugere som alle sammen havde gigt i en fokusgruppe som siger. hvor der så er en og det er det der er så interessant fordi det er jo der hvor kvantitet ikke er vigtigt

P: [sneeze]

P: hvor kvantitet ikke er vigtigt hvor at så sidder der en og så viser vi den der. vi viser det bare på nogle tegninger. så siger han min kone vil aldrig. ja det foregår ovre i kolding. min kone vil aldrig have en taske i køleskabet der har været i bussen. og det var ikke noget med at syv ud af otte synes ikke. det var et statement fordi vi havde bare slet ikke set det. vi havde slet ikke set hvor ulækkert det egentlig var. men det er jo rigtigt så går man rundt med en taske. hvem ville putte sin egen taske ind i køleskabet ikke. det vil man jo ikke. men vi havde bare ikke opdaget det i en forelskelse af en ide. og det var ikke engang ham selv det var hans kone. min kone vil aldrig tillade at jeg havde puttet noget ind i køleskabet som jeg havde siddet med i bussen. det kunne vi jo godt se. det var jo fuldstændig åbentlys ikke. men det var jo fordi vi skulle jo lave noget der passede. der passede i livet. så der er jo hele tiden sådan nogle og i det der gigt projekt der lavede jeg sammen med peter en rigtig spændende undersøgelse af hvor man kan sige i det her bjerg ikke så er lille. man kan ligesom kigge på sådan nogle værdier som hvad er godt. vi tror på lille er godt vi tror på hurtigt er godt vi tror på diskret er godt vi tror på nogle forskellige ting. og jeg har også arbejdet med samme slags job som jeg har her har jeg arbejdet med i høreapparatindustrien. der har man samme lille og småt og diskret. og det gør nu at man nu har udviklet nogle høreapparater der er så mikroskopisk små så de der gamle mennesker der skal håndtere dem de kan overhovedet ikke ramme dem med deres finger og det giver ingen mening at de er så små men det er kun fordi der sidder nogle ingeniører og siger det skal være småt småt småt og det er lidt det samme vi har her basic ikke altså vi bliver nødt til at udforske hvad er det der er godt. og det kan vi gøre ikke diskret er ikke nødvendigvis godt. vil man gerne kunne få fat i det. og til gengæld så kommer de så siger de den der gule sharps container den bliver så gemt bag ved alt muligt fordi den gider de ikke er så grim men. og de der ting du nævner i starten af vores snak med oplevelser eller dem kan man jo bedre få fat i hvis man er hjemme hos folk. hvis man er der hvor man kan snakke om andre ting de også har. vi havde også et studie i kina en gang hvor vi havde haft sådan nogle ideer. vi havde sådan nogle kort fordi vi ville gerne forstå noget om deres smag i forhold til noget design. og så havde vi sådan nogle forskellige kort vi ville vise dem og så skulle de vælge imellem nogle forskellige kort. og de der mennesker de kunne slet ikke forholde sig til de der kort. de der billeder vi herhjemme har siddet og tænkt de er rigtig gode dem kunne de slet ikke forholde sig til. og da det gik op for os mens vi var på studiet at det kunne de ikke forholde sig til og vi var heldigvis hjemme hos folk. og vi ville gerne have dem til at vælge imellem tre skal det være mest den slags eller den slags. jamen så gjorde vi det i stedet for at vi hurtigt kiggeede os rundt i rummet og så tog vi tre ting ned fra deres hylder og så måske en mobiltelefon af vores egen ikke og brugte dem. fordi så kunne man tage deres verdens æstetik. vi var chanceløse hjemmefra for at forestille os hvad kinesisk æstetik det bød på. men lige så chanceløse er man altså når man kommer ud der. i sidste uge lavede vi nogle interview i ishøj glostrup det er lige så meget langt væk fra min verden som kina er. det der er det helt grundlæggende det er at man skal forlade sin egen rationalitet æstetik værdisystem prioriteringsliste i forhold til sådan nogle livsværdier ikke. det er bare anderledes.

F: Fra hvad du har sagt nu så begynder min ide at lyde lidt naiv det der med om man kan stille nogle punkter op som de kan evaluere deres oplevelse af noget

P: Ja men nej det var jo det vi gjorde her. men de punkter skal bare være brugercentreret. så altså jeg vil virkelig opfordre dig til at finde og se den der louise lavede den vi lavede sammen der. fordi vi stillede nogle punkter op og så evaluerede de. så tog de nogle genstande vi havde med ikke. både nogle packaging og nogle penne og så bad vi dem om at evaluere er den her mere naturlig eller medicinsk er den her mere menneskelig er den mekanisk. men det der var det vigtige her var at akserne som de evaluerede ud fra var deres. men dem kan man ikke bede dem om selv at lave. altså det var en analytisk opgave at lave de akser. så jeg tror ikke din ide er naiv jeg tror den er rigtig god

F: Ja fordi jeg ville egentlig gerne have hjælp til at definere dem her af dig. men ud fra hvor vi skubber devicet fuldstændig væk så det ikke er den det er sådan hele oplevelsen af at bruge den hvor vi skal have nogle akser.

P: der har jeg. jeg skal lige tænke. jeg tror jeg har faktisk en rigtig god ting jeg kan vise dig her.

[Pause]

P: og det der så er svært ikke. og det der er rigtig svært ved novo det er den der one size fits all strategi. altså i forhold til at tale dether så er det jo fuldkommen latterligt. det skal være det samme om det er ishøj eller kina eller usa eller brasilien og det kan man jo ikke. og derfor ser vi jo også der der tv reklamer der rammer helt altås vi har

snakket med folk som siger det er jo sådan noget pretty publicity eller også så siger de ja jeg har da set de der reklamer thats for the white rich people up north.
F: Jeg var lige været så heldig at se den der var det victoza ready
P: Tresiba ready
F: Tresiba ready ja lige præcis
P: Det er bare sådan nej det er ikke det firma jeg arbejder for det er det ikke. jeg vil ikke. jeg er ikke med. fat det. Tresiba ready.
[Pause]
P: Jeg har den her i en meget gammel version. jeg har også en bedre designet udgave men pyt nu med det. Her ikke der har vi nogle kvinder som sidder på en restaurant i harlem som vi er gået hen på fordi vi har i så mange interview hørt folk snakke om soul food så tænkte vi nu skal vi selv opleve det. så kommer vi hen på den her restaurant og det er fuldstændig der er ikke et bord at få det er tirsdag aften ikke. så vi kigger bare lidt rundt og så ser vi det her mad og så siger vi til de her kvinder om ikke jeg må tage et billede af deres mad. så bliver de sådan jamen vi vil være med på billedet altså jeg vil jo ikke intimidere dem og tage et billede af dem men de vil vildt gerne være med på billedet. for der er ikke noget de synes ikke der er noget at skamme sig over vel. nå men med dem her i tankerne så har vi stillet sådan nogle begrebspar op. du siger healthy altså vi ser faktisk det handler også om det her med hvad er det vi er i og hvad er det for en verden vores patienter er i ikke. så er vi healthy ikke unhealthy. vi er ikke obese og de er obese. vi er normale og det der med at være unhealthy og obese det er noget not normal. high quality of life low quality of life. happy unhappy. social belonging stigmatized. så havde vi sådan en anden en som vi spurgte nogen af vores kollegaer her inde på kontoret hvad er en drømmeferie det er også sådan noget vi typisk snakker med folk om hvad er der deres drømmeferie hvor kunne de godt tænke sig at komme hen. jamen så møder vi en der siger hiking in montana skiing in japan og diving i den røde sø red sea og sådan noget. hvor hvis vi spørger rigtig rigtig rigtig mange af dem vi interviewer altså det er jo næsten sådan så vi bliver helt overvældet af at vi får nogenlunde de samme svar hver gang så vil de gerne på krydstogt eller til las vegas. og hvad handler det om. det her det handler om at being active og det her ovre det handler om at lean back og be served. altså jeg vil bare læne mig tilbage og ikke gøre noget og så er der nogen der tager sig af det hele. og det her ovre det handler om freedom. men sjovt nok så handler det her også om freedom. og det her ovre det handler om status og sjovt nok så handler det her så også om status ikke. så det er sådan nogle. altså den her den er jo meget sort hvis det er jo meget stereotypt at sådan er vi og vi tror de er sådan. det der så er det er for den gamle præsentation den har ikke filmen i men vi har sådan film som viser stemningen på den der restaurant. hvor de synger og danser og så når vi så viser den og siger okay. de er faktisk ikke unhappy de er rent faktisk rimelig happy. det er ikke sådan at de er stigmatised de hører faktisk til ikke. det er ikke sådan at de har en lav livskvalitet nej de har faktisk en høj livskvalitet og det er ikke sådan at de ikke er normale nej det er faktisk rimelig normalt. så sådan her ser det ud men det der ligesom er sket. det der sker hvis vi beder dem om at være sådan her. hvis vi beder dem om at tage brocoli med og slanke sig og gøre ting for at blive sunde. så oplever vi jo det her. så er der bestemt ikke nogen frihed. og hvis vi bad dem om at tage på det her [hiking, diving] hold nu kæft altså. og jeg tror når du spørger om det her er der nogle konkrete så kan man i hvert fald sige at det skal være. altså hvad er normalt og normalt det er super farligt at arbejde med ikke. men hvad er stigmatiserende kunne godt være en ikke. hvad er stigmatiserende i forhold til at være social belonging. og den er nemlig rigtig stærk. anderledes end det vi forventer. det vil være en altså let me have my life. lad mig æde min soul food jeg elsker det. det er her jeg bor det er her jeg hører til det er det jeg er vokset op med. vi havde en fuldstændig fantastisk oplevelse med en kvinde hun siger. i know that fried chicken. i used to think it was a cultural thing. but now i know its not. its universal. everybody loves fried chicken. og everybode loves doughnuts og togetherness thats what its all about. så den ting der det må ikke. og hvis noget den der tresiba ready den kan i hvert fald få en til at føle sig udenfor. så det er tilhørsforhold og hvad gør vi så for eksempel så laver vi nogle penne der har en nål somder står i vores instruktionvejledning at de skal puttes i en sharps container. eller jeg ved ikke om det står der men det får de i hvert fald at vide og så putte de det i en sharps container og så går de ned på apoteket og så siger apoteket at de ikke vil have dem. så går de rundt med de der i tasken. det er jo ikke særlig sjovt vel og stå og gøre det rigtige og så står der en på apoteket og så står der en på apoteket og siger dem tager vi ikke imod. det har vi hørt så mange gange ikke. nå men så begynder de at gøre noget andet så begynder de at putte dem i noget papir og smide dem i skraldespanden og få en lille smule dårlig samvittighed. altså det er jo produktrelateret ikke. i den grad hvis det system der er omkring ikke er klar til at tage imod det på den måde som vi foreskriver så passer det heller ikke ind i systemet. så får man folk til at føle sig rigtig dårligt. vi har alligevel mødt mennesker der har sådan nogle kasser med nåle. med gamle nåle som de ikke ved hvor de skal gøre af så står de oven på et skab for at børnebørnene ikke skal få fingre i dem altså. så jeg tror at det der er de vigtige det er når man laver de der begrebspar det er at man ikke tror at de sådan som man tror de er. at obese ikke hører sammen med not normal for eksempel. at man har dynamikken. altså en eller anden forestilling om at det er dynamisk og fleksibelt. og det også er kulturelt. min gamle professor kirsten hestrup har skrevet en bog der hedder kultur det fleksible fællesskab. og det er det her jo meget
F: Ja helt bestemt
P: et billede af. så folk er dele af fællesskaber i de fællesskaber som de er en del af. og så tror jeg det skal være forståeligt uden at bilve. altså så tror jeg også en anden modsætning eller ting det er jo Peters ting om det intuitive og det som der skal forståes kognitivt ikke. og der er vi i vores del af verdenen i novo nordisk delen kognitiv er okay og godt vi skriver det da bare ned. så forklarer vi dem bare at de skal vente i seks sekunder så venter de i seks sekunder. nej pommes frites det gør de ikke.
F: sidst jeg var her der snakkede vi også om sådan noget af det der med hvor. ja vi brugte det her ord emotional simplicity. som var det der med altså du må rette mig hvis det er forkert men det der med om det fyldte meget.

P: Ja og det er jo også fleksibelt eller fluktuerende eller hvad man skal sige fordi der lavet nogle studier i hæmofeli hvor at hvis du er rigtig god til at tage. der skal skal de jo tage det intravenøst ikke. det er jo en svær procedure det her med at tage en hæmofæli medicin dosis fordi den skal ind i blodåren. det er voldsomt traumatiserende for det lille barn. Men for den enogtyveårige som har gjort det tre gange om ugen hele sit liv fylder det ikke særlig meget. så det kommer også an på livsfaser og hvor man er. men derfor kan vi heller ikke lytte til den enogtyveårige og spørge ham er det svært. nej det gør ikke særlig ondt. det fylder ikke særlig meget det gør ikke særlig ondt. så jeg tror det er rigtigt at man skal undersøge det. og det er måske meget godt billede med det her fordi hvis du beder dem her om at tage brocoli med for at tage dem her ikke [picture of women on restaurant] siger til dem ved du hvad når du skal ud og spise med dine tre veninder så tager du bare din egen lunchbox med så lav lidt salat så vil det jo være en emotionel fylde. det vil jo ikke være særlig simpelt på nogen måde. og på samme måde hvis du arbejder vi har jo hørt nogle sige jeg kan ikke tage min medicin med på arbejde fordi det skal være i køleskabet. de har ikke fattet det ikke behøver være i køleskab. men måske er det de siger at de vil faktisk ikke vise deres kollegaer at det har diabetes. så det fylder rigtig meget for mig at være social og sundhedsassistent og så faktisk have diabetes fordi det burde jeg jo ikke have fordi jeg burde jo vide bedre. så der kan man sige hvordan kan det fylde mindre. så hvis man laver sådan en der hedder at det skal være emotional simple så skal det være ud fra deres perspektiv. altså vi skal hele tiden have en dyb indsigt i hvad de menneskers værdisystem er.
F: Ja fordi jeg synes også at det jeg har oplevet det er det der med jamen hvis vi bare putter færre use steps og gør knappen nemmere at trykke på så bliver det lige pludselig simplere for dem.
P: Ja og det er jo ikke rigtigt.
F: Ja så det er det der med hvor meget fylder det for dem.
P: Ja og det kan være vi skal putte mindre. nu siger jeg bare noget. gøre sproget om den (uf) vi har lige været ude og lave en undersøgelse hvor vi så folk som havde den her DEVICE T pen som blev drillet lidt af nogle her i huset fordi de synes den er grim. men prøv at hør patienterne siger nu skal jeg vise hvordan man gør. man tager den der grå af. og så rykker man knappen over på den grønne eller tager den væk fra den røde og trykker man på den grønne knap. det er super simpelt. de skal ikke fatte en disse af nogen tal af nogen doser af nogen systemer af nogen nåle de skal ikke noget som helst vel. det er den grå og den grønne og den røde. det er ikke så svært. Og der kan man jo hvis man. det er jo vores ærinde hele tiden at prøve at gøre folk i stand til at gå i deres sko. og hellere at udviklerne bliver i stand til. altså tilbage til det indledende. at udviklerne er i stand til at tage de her sko på end det er at tage den der ting i hånden og gå ud og spørge.men det er ikke nemt.
F: Nej
P: eller også skal skal man gøre som vi plejer at gøre begge dele.
F: Ja og så tager og holder det op imod hinanden.
P: Ja
F: Altså vi er over ti tredive nu. jeg ved ikke hvordan.
P: Ja jeg tror jeg har noget lad mig se en gang. jeg har et møde her klokken elleve så hvis vi slutter lige om lidt så.
F: Ja det kan vi sagtens gøre. Det var i hvert fald det var virkelig godt det her det var lige hvad jeg skulle bruge
P: Jeg håber du kunne bruge det
F: Helt bestemt
P: og det er jo jeg tror en ting du kan bruge rigtig meget vi lærte vi var på en konference. novo nordisk har et stort program der hedder cities changing diabetes. som handler om de har puttet rigtig mange penge efter at prøve at finde ud af fordi det er jo et urbant i særdeleshed et urbant problem hvordan kan man gøre noget i byer som faktisk også forebygger og hjælper folk med at komme i bedre behandling. og på den konference så snakkede de om diabetes og lavede sådan en lille om diabetes som et komplekst problem. i modsætning hvor komplekst ikke var i modsætning til simpelt men kompleks var i modsætning til kompliceret hvilket var et super interessant distinktion synes jeg. fordi kompliceret er et problem som har rigtig mange dimensioner eller elementer og så videre og så nævnte de som eksempel at finde ud af at sende en mand op på månen. det er super kompliceret det er overhovedet ikke nemt. men når man først har fundet ud af det så kan man også gøre det igen. så ændrer vilkåret sig ligesom ikke. men hvor det komplekse problem der hvis du løser noget af det så popper der et nyt problem frem. eller hele fundamentet for problemets beskaffenhed det ændrer sig løbende. og der nævnte de som eksempel børneopdragelse. så har man en treårig så tror man lige den er der. så vupti så dagen efter så det der duede i går det duer ikke i dag. og så er man på spanden igen. og det synes jeg var sådan er det jo både diabetes som sygdom men også designet af ting der kan hjælpe er en kompleks process fordi så gør vi noget så popper der et andet altså det er ikke en ting jamen så bygger vi bare ovenpå så på et tidspunkt så har vi den.
F: Nej
P: Nej. og så er det så vævet ind i tilværelsens i øvrigt utrolig store grad af kompleksitet. så og når det så er sagt så er ingeniører opdraget til at løse komplicerede problemer hvor at det her med de komplekse og det menneskelige og det at tingene faktisk hele tiden ændrer sig godt kan være lidt svært. og det var et vilkår vi må leve med. altså det er et af de paradokser som er i det her som vi må hele tiden forholde os til. og for eksempel hele den her med vores fordomme om de andre de der fordomme vi har og forestillinger om hvem de andre er og hvad de kan og hvad de gør og hvad de synes det er ligesom sådan en man kan godt tage på feltarbejde og lave sådan en analyse og virkelig få empati og forståelse men selv som antropolog så går der et pra måneder så er man tilbage i sin egen forforståelse og sin egene holdninger. så tænker man hold nu op med at æde det mad. og så skal man altså det er ligesom sådan en musik der skal trænes. man kan ikke bare sige nu er den der nu har jeg forstået hvorfor de er super overvægtige og det faktisk ikke er noget jeg skal have fordomme overfor men jeg faktisk på en eller anden måde kan have en form for medfølelse over. det kan være rigtig rigtig svært. så der er

brug for mange af os der arbejder med den del af det for tror jeg at lave et bedre produkt.
F: Til at minde folk om det.
P: ja og lave aktiviteter der gør at vi husker at det også er mennesker som har deres rationalitet. altså deres rigtig rigtig gode grunde. de er jo ikke idioter når de sidder der og spiser al den mad og æder sig tykke og syge. de er bare en del af en kultur hvor det er normalen. altså ja. jeps.
F: Ja. tusind tak.

Appendix H

Data analysis tools and outputs

During analysis of the quality of both attributes and UX-aspects, a number of plots and tables are made, used for evaluating the results. These are presented in this appendix.

H.1 Product attribute analysis

H.1.1 Tucker-1 plots

The following tucker-1 plots (see figure H.1, next page) are made for each product attribute, representing the assessors on the plots, allowing for an inspection for assessors who in general does not contribute to the PCA, and to inspect for attributes with a high degree of disagreement amongst the assessors, indicating difference in their rating of the same product on the given attribute. The plots show only the two first PC's. Therefore further investigation of the PC3 is needed, while the overview is meant to discover attributes and assessors where there might be complications.

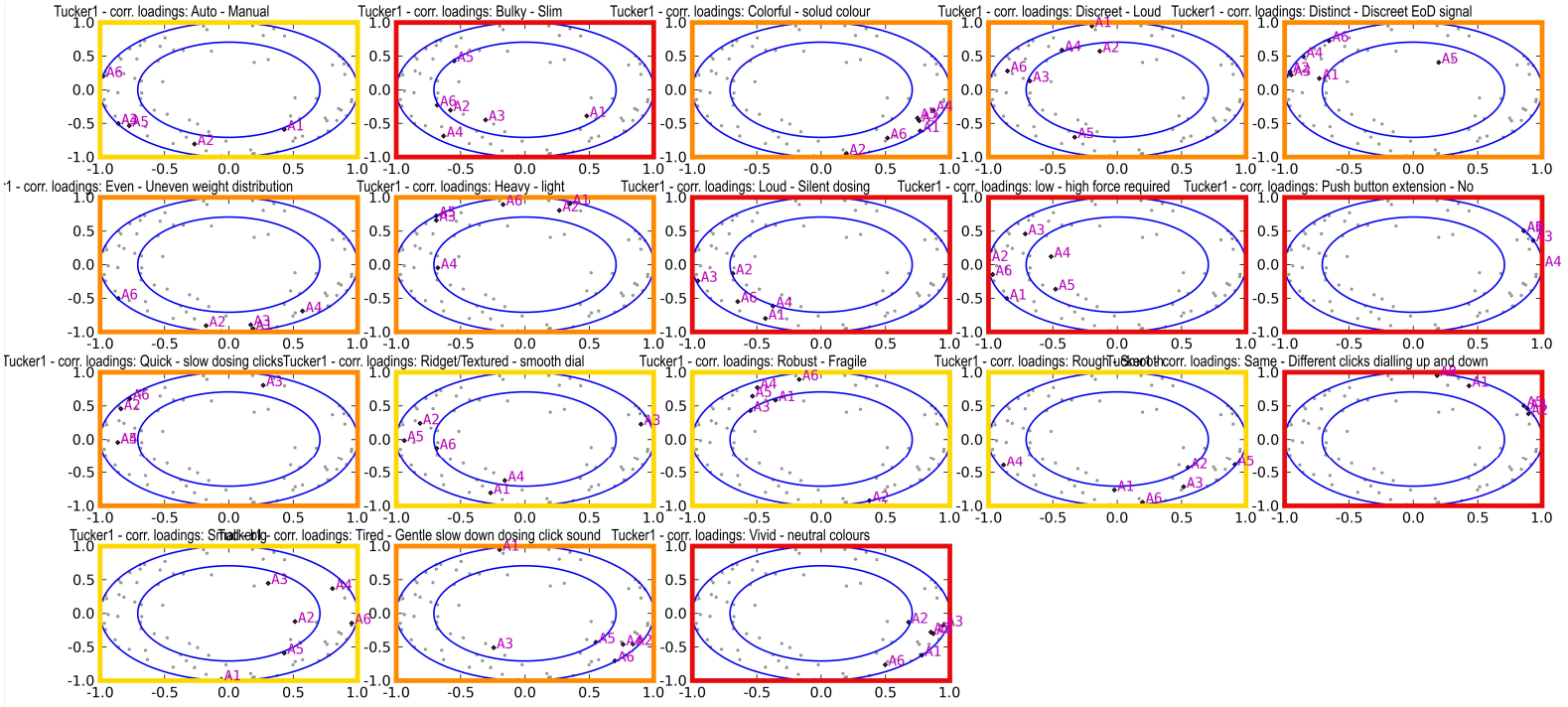


Figure H.1: Overview of tucker-1 plots on the first two components PC1 and PC2 for all 18 attributes. Assessors are denoted as A1 - A12

H.1.2 Numerical analysis of data

For the data derived for the product attributes on the sample, an extensive numerical summary is made, including mean, range, min/max value, confidence interval, standard deviation, separated by attributes and devices (se next page).

Assessor	Device	Att 1.1	Att 1.2	Att 1.3	Att 1.4	Att 1.5	Att 1.6	Att 1.7	Att 1.8	Att 1.9	Att 1.10	Att 1.11	Att 1.12	Att 1.13	Att 1.14	Att 1.16	Att 1.17	Att 1.18	Att 1.19	Att 1.20	Att 2.1	Att 2.2	Att 2.3	Att 2.4	Att 2.5	Att 2.6	Att 2.7	Att 2.8	Att 2.9	Att 2.10	Att 2.11	Att 2.12	Att 2.13	Att 2.14	Att 2.16	Att 2.17	Att 2.18	Att 2.19	Att 2.20	
		Tired - Ger	Gentle - ca	Same - Diff	Mechanic -	Continuou	Push butto	Loud - Sile	Quick - slo	Distinct - D	Mechanic -	Acts like hu	Auto - Mar	Expect - Su	quick - slo	low - high	Very - not r	Loose - Firr	Even - Une	Many - few	Heavy - ligl	Consistent	Ridget/Tex	Playful - du	Discreet - L	Sharp - Sof	Robust - Fr	Small - big	Complex -	Vivid - neu	Colorful - s	Bulky - Slin	Cover - Rev	Cover - rev	Rough - Sm	Natural - A	Honst - Hid	Detailed - I	Continuous -	complex
P1	Pen 1	7	1	7	5	4	7	6	2	6	3	6	3	2	2	1	6	6	2	7	3	2	3	3	2	2	2	5	6	6	6	3	7	1	6	5	4	5	2	4,11
P2	Pen 1	5	2	7	4	4	7	4	2	5	5	3	3	2	3	2	3	5	2	5	5	3	2	4	2	2	4	6	5	4	5	2	7	3	5	4	2	2	2	3,74
P3	Pen 1	5	5	7	3	2	NA	5	3	3	4	4	2	2	2	3	5	5	3	6	4	5	2	5	4	5	2	4	3	6	6	4	5	2	5	4	3	3	5	3,95
P4	Pen 1	4	3	6	4	7	7	1	4	4	4	5	4	1	2	1	4	6	3	3	7	6	3	6	6	4	3	4	3	5	5	5	4	2	4	5	4	5	4	4,16
P5	Pen 1	3	5	7	2	2	7	2	2	1	2	7	3	3	2	2	6	7	3	1	2	2	5	7	2	5	1	6	5	7	7	2	1	6	5	7	2	2	2	3,76
P6	Pen 1	6	6	7	1	4	7	3	2	1	2	5	5	3	2	1	4	6	2	5	6	3	2	4	5	5	3	5	5	6	6	2	7	2	5	5	3	5	3	4,05
P7	Pen 1	7	2	7	6	3	7	4	2	2	6	3	4	2	1	1	4	6	3	5	2	3	2	7	4	2	3	7	5	7	7	1	7	4	2	4	2	7	2	4,03
AVG	Pen 1	5,29	3,43	6,86	3,57	3,71	7	3,57	2,43	3,14	3,71	4,71	3,43	2,14	2	1,57	4,57	5,86	2,57	4,57	4,14	3,43	2,71	5,14	3,57	3,57	2,57	5,29	4,57	5,86	6	2,71	5,43	2,86	4,57	4,86	2,86	4,14	2,86	3,98
Min	Pen 1	3	1	6	1	2	7	1	2	1	2	3	2	1	1	1	3	5	2	1	2	2	2	3	2	2	1	4	3	4	5	1	1	1	2	4	2	2	2	2,37
Max	Pen 1	7	6	7	6	7	7	6	4	6	6	7	5	3	3	3	6	7	3	7	7	6	5	7	6	5	4	7	6	7	7	5	7	6	6	7	4	7	5	5,79
St.d.	Pen 1	1,5	1,9	0,38	1,72	1,7	0	1,72	0,79	1,95	1,5	1,5	0,98	0,69	0,58	0,79	1,13	0,69	0,53	1,99	1,95	1,51	1,11	1,57	1,62	1,51	0,98	1,11	1,13	1,07	0,82	1,38	2,3	1,68	1,27	1,07	0,9	1,86	1,21	1,27
CI (+/-)	Pen 1	1,11	1,41	0,28	1,27	1,26	0	1,27	0,58	1,45	1,11	1,11	0,72	0,51	0,43	0,58	0,84	0,51	0,4	1,47	1,45	1,12	0,82	1,17	1,2	1,12	0,72	0,82	0,84	0,79	0,6	1,02	1,7	1,24	0,94	0,79	0,67	1,38	0,9	0,94
Range		4	5	1	5	5	0	5	2	5	4	4	3	2	2	2	3	2	1	6	5	4	3	4	4	3	3	3	3	3	2	4	6	5	4	3	2	5	3	3,42
P1	Pen 2	7	1	1	7	2	1	6	4	1	6	4	7	1	5	6	6	7	2	6	1	2	4	6	6	6	1	6	6	6	7	3	6	1	6	3	2	2	2	4,11
P2	Pen 2	6	3	1	3	5	1	6	1	3	2	5	4	2	2	5	6	6	5	3	1	3	3	5	2	2	2	5	3	7	6	4	7	5	6	6	3	3	3	3,82
P3	Pen 2	NA	1	1	4	5	3	7	2	4	6	2	6	6	2	3	6	6	4	5	4	4	4	4	4	5	2	4	5	7	7	4	NA	3	6	3	3	3	5	4,17
P4	Pen 2	3	2	2	4	4	2	5	4	4	5	6	6	1	5	3	6	4	6	3	3	5	5	6	2	3	2	6	5	6	6	6	4	4	6	4	4	5	2	4,18
P5	Pen 2	5	7	1	1	6	2	5	1	2	2	7	5	5	2	2	6	7	5	1	1	2	3	4	2	3	1	4	3	6	7	5	7	2	6	7	5	2	2	3,79
P6	Pen 2	6	2	2	2	3	1	4	2	2	2	6	6	3	3	3	4	3	6	4	3	4	2	3	3	3	5	4	3	6	7	5	7	2	5	5	3	3	2	3,66
P7	Pen 2	7	1	2	3	3	NA	6	3	1	4	5	7	1	2	3	6	7	5	4	4	3	4	6	2	1	1	3	5	7	7	6	7	5	4	2	1	5	2	3,92
AVG	Pen 2	5,67	2,43	1,43	3,43	4	1,67	5,57	2,43	2,43	3,86	5	5,86	2,71	3	3,57	5,71	5,71	4,71	3,71	2,43	3,29	3,57	4,86	3	3,29	2	4,57	4,29	6,43	6,71	4,71	6,33	3,14	5,57	4,29	3	3,29	2,57	3,95
Min	Pen 2	3	1	1	1	2	1	4	1	1	2	2	4	1	2	2	4	3	2	1	1	2	2	3	2	1	1	3	3	6	6	3	4	1	4	2	1	2	2	2,29
Max	Pen 2	7	7	2	7	6	3	7	4	4	6	7	7	6	5	6	6	7	6	6	4	5	5	6	6	6	5	6	6	7	7	6	7	5	6	7	5	5	5	5,74
St.d.	Pen 2	1,51	2,15	0,53	1,9	1,41	0,82	0,98	1,27	1,27	1,86	1,63	1,07	2,06	1,41	1,4	0,76	1,6	1,38	1,6	1,4	1,11	0,98	1,21	1,53	1,7	1,41	1,13	1,25	0,53	0,49	1,11	1,21	1,57	0,79	1,8	1,29	1,25	1,13	1,3
CI (+/-)	Pen 2	1,2	1,59	0,4	1,41	1,05	0,65	0,72	0,94	0,94	1,38	1,21	0,79	1,53	1,05	1,04	0,56	1,19	1,02	1,19	1,04	0,82	0,72	0,9	1,13	1,26	1,05	0,84	0,93	0,4	0,36	0,82	0,97	1,17	0,58	1,33	0,96	0,93	0,84	0,97
Range		4	6	1	6	4	2	3	3	3	4	5	3	5	3	4	2	4	4	5	3	3	3	3	4	5	4	3	3	1	1	3	3	4	2	5	4	3	3	3,45
P1	Pen 3	4	4	2	4	4	2	5	4	7	7	4	2	6	2	3	4	5	4	5	4	3	5	3	6	6	2	5	5	3	3	3	2	3	6	7	4	6	2	4,11
P2	Pen 3	7	2	5	2	2	1	7	1	7	6	2	5	3	3	3	2	7	4	1	3	5	3	3	6	2	1	6	5	2	6	2	6	6	5	7	7	6	5	4,11
P4	Pen 3	4	4	2	2	4	1	7	4	7	2	6	6	NA	5	6	2	2	5	4	3	4	4	5	6	5	3	5	4	2	6	3	7	3	5	5	2	3	2	4,05
P5	Pen 3	7	2	1	6	2	1	6	4	7	6	4	6	1	3	2	6	7	2	6	5	2	6	5	7	7	2	4	6	1	2	3	7	2	5	6	6	5	2	4,26
P6	Pen 3	4	4	5	3	5	1	7	4	7	3	5	7	5	6	6	3	7	5	3	3	4	6	3	7	6	3	4	4	2	5	3	7	5	5	4	3	4	5	4,55
P7	Pen 3	NA	1	1	3	2	1	7	NA	7	6	3	7	3	1	1	6	7	1	4	3	5	5	1	6	2	3	4	4	1	1	4	7	5	5	5	5	2	3	3,67
AVG	Pen 3	5,2	2,83	2,67	3,33	3,17	1,17	6,5	3,4	7	5	4	5,5	3,6	3,33	3,5	3,83	5,83	3,5	3,83	3,5	3,83	4,83	3,33	6,33	4,67	2,33	4,67	4,67	1,83	3,83	3	6	4	5,17	5,67	4,5	4,33	3,17	4,13
Min	Pen 3	4	1	1	2	2	1	5	1	7	2	2	2	1	1	1	2	2	1	1	3	2	3	1	6	2	1	4	4	1	1	2	2	2	5	4	2	2	2	2,32
Max	Pen 3	7	4	5	6	5	2	7	4	7	7	6	7	6	6	6	6	7	5	6	5	5	6	5	7	7	3	6	6	3	6	4	7	6	6	7	7	6	5	5,68
St.d.	Pen 3	1,64	1,33	1,86	1,51	1,33	0,41	0,84	1,34	0	2	1,41	1,87	1,95	1,86	2,07	1,83	2,04	1,64	1,72	0,84	1,17	1,17	1,51	0,52	2,16	0,82	0,82	0,82	0,75	2,14	0,63	2	1,55	0,41	1,21	1,87	1,63	1,47	1,37
CI (+/-)	Pen 3	1,44	1,06	1,49	1,2	1,06	0,33	0,67	1,18	0	1,6	1,13	1,5	1,71	1,49	1,66	1,47	1,63	1,31	1,38	0,67	0,94	0,94	1,2	0,41	1,73	0,65	0,65	0,65	0,6	1,71	0,51	1,6	1,24	0,33	0,97	1,5	1,31	1,18	1,11
Range		3	3	4	4	3	1	2	3	0	5	4	5	5	5	5	4	5	4	5	2	3	3	4	1	5	2	2	2	2	5	2	5	4	1	3	5	4	3	3,37
P1	Pen 4	4	2	1	6	2	1	6	6	1	2	5	7	1	7	7	2	2	2	7	6	4	5	6	2	6	5	5	3	3	4	6	7	1	5	6	5	3	3	4,11
P2	Pen 4	3	3	5	5	3	1	5	6	7	4	4	7	4	6	7	3	3	5	3	7	3	3	3	5	7	5	3	2	3	3	5	7	4	5	4	5	4	6	4,42
P3	Pen 4	NA	2	4	5	5	1	5	4	NA	3	3	6	3	5	6	4	5	1	5	4	3	5	3	3	6	4	3	5	6	6	6	5	2	6	3	3	3	3	4,06
P4	Pen 4	4	4	5	2	5	2	2	4	5	3	6	4	1	4	3	4	2	2	4	6	6	3	4	6	4	6	4	2	2	3	5	4	5	3	6	4	3	3	3,82
P5	Pen 4	2	7	5	1	3	1	6	2	6	1	7	5	3	3	6	2	3	2	1	5	2	2	3	3	5	2	4	5	3	4	5	1	6	3	7	2	3	3	3,53
P6	Pen 4	2	6	1	2	4	1	4	6	7	2	5	5	2	2	6	4	6	2	4	6	3	3	5	4	5	2	2	5	5	6	6	7	2	4	3	2	6	2	3,92
P7	Pen 4	4	3	2	4	2	1	4	4	7	4	6	7	1	4	7	6	6	2	3	6	4	1	3	4	4	6	2	2	3	3	5	7	4	4	4	5	3	6	4,03
AVG	Pen 4	3,17	3,86	3,29	3,57	3,43	1,14	4,57	4,57	5,5	2,71	5,14	5,86	2,14	4,43	6	3,57	3,86	2,29	3,86	5,71	3,57	3,14	3,86	3,86	5,29	4,29	3,29	3,43	3,57	4,14	5,43	5,43	3,43	4,29	4,71	3,71	3,57	3,71	3,98
Min	Pen 4	2	2	1	1	2	1	2	2	1	1	3	4	1	2	3	2	2	1	1	4	2	1	3	2	4	2	2	2	2	3	5	1	1	3	3	2	3	2	2,13
Max	Pen 4	4	7	5	6	5	2	6	6	7	4	7	7	4	7	7	6	6	5	7	7	6	5	6	6	7	6	5	5	6	6	6	7	6	6	7	5	6	6	5,84
St.d.	Pen 4	0,98	1,95	1,89	1,9	1,27	0,38	1,4	1,51	2,35	1,11	1,35	1,21	1,21	1,72	1,41	1,4	1,77	1,25	1,86	0,95	1,27	1,46	1,21	1,35	1,11	1,7	1,11	1,51	1,4	1,35	0,53	2,3	1,81	1,11	1,6	1,38	1,13	1,6	1,42
CI (+/-)	Pen 4	0,79	1,45	1,4	1,41	0,94	0,28	1,04	1,12	1,88	0,82	1	0,9	0,9	1,27	1,05	1,04	1,31	0,93	1,38	0,7	0,94	1,08	0,9	1	0,82	1,26	0,82	1,12	1,04	1	0,4	1,7	1,34	0,82	1,19	1,02	0,84	1,19	1,06
Range		2	5	4	5	3	1	4	4	6	3	4	3	3	5	4	4	4	4	6	3	4	4	3	4	3	4	3	3	4	3	1	6	5	3	4	3	3	4	3,71

H.2 UX-aspects analysis

H.2.1 R-script for Linear model and ANOVA

For an analysis of the variance explained by the current UX-aspects, a linear model is made in using R. The following shows the R-script

```
> Experience_full <- read.table("C:/Users/Ras/Dropbox/Master's/Dataanalyse/Experience
Analysis/Experience_full.csv", header=TRUE, sep=";", na.strings="NA",
+   dec=",", strip.white=TRUE)

> Experience_full <- within(Experience_full, {
+   Number <- as.factor(Number)
+   Rep <- as.factor(Rep)
+ })

> LinearModel.1 <- lm(Negative.positive ~ Constrained.Free +Intimidating.Encouraging
+Meaningful.Meaningless +Meantforme.Meanforsomeoneelse
+   +Obtrusive.Inconspicuous +Safe.Unsafe +Scary.Comfortable +Simpe.Lottodealwith +Tense.relaxed
+Understandable.Confusing +VeryPainful.NotPainful +Weak.Strong,
+   data=Experience_full)

> summary(LinearModel.1)

Call:
lm(formula = Negative.positive ~ Constrained.Free + Intimidating.Encouraging +
    Meaningful.Meaningless + Meantforme.Meanforsomeoneelse +
    Obtrusive.Inconspicuous + Safe.Unsafe + Scary.Comfortable +
    Simpe.Lottodealwith + Tense.relaxed + Understandable.Confusing +
    VeryPainful.NotPainful + Weak.Strong, data = Experience_full)

Residuals:
     Min       1Q   Median       3Q      Max
-1.56967 -0.60509 -0.04924  0.54789  1.79150

Coefficients:
                                Estimate Std. Error t value Pr(>|t|)
(Intercept)                     4.481345   1.526932   2.935  0.00724 **
Constrained.Free               -0.187307   0.277500  -0.675  0.50614
Intimidating.Encouraging        0.131829   0.244908   0.538  0.59534
Meaningful.Meaningless          0.250346   0.188653   1.327  0.19699
Meantforme.Meanforsomeoneelse -0.083963   0.138877  -0.605  0.55113
Obtrusive.Inconspicuous         0.122171   0.159711   0.765  0.45176
Safe.Unsafe                    -0.463671   0.154704  -2.997  0.00625 **
Scary.Comfortable               0.155384   0.248774   0.625  0.53813
Simpe.Lottodealwith            -0.080824   0.143586  -0.563  0.57873
Tense.relaxed                   0.108894   0.201045   0.542  0.59306
Understandable.Confusing       -0.122389   0.142167  -0.861  0.39782
VeryPainful.NotPainful          0.001747   0.188790   0.009  0.99269
Weak.Strong                     0.097033   0.143227   0.677  0.50458
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9693 on 24 degrees of freedom
  (3 observations deleted due to missingness)
Multiple R-squared:  0.7813,    Adjusted R-squared:  0.6719
F-statistic: 7.143 on 12 and 24 DF,  p-value: 2.413e-05
```

H.2.2 Tucker-1 plots

The following tucker-1 plots (see figure H.2) are made for each UX-aspect, representing the respondents on the plots, allowing for an inspection for respondents who in general do not contribute to the PCA, and to inspect for attributes with a high degree of disagreement amongst the respondents, indicating difference in their rating of the same product on the given attribute. The plots show only the two first PC's. Therefore further investigation of the PC3 is needed, while the overview is meant to discover aspects and respondents where there might be complications.

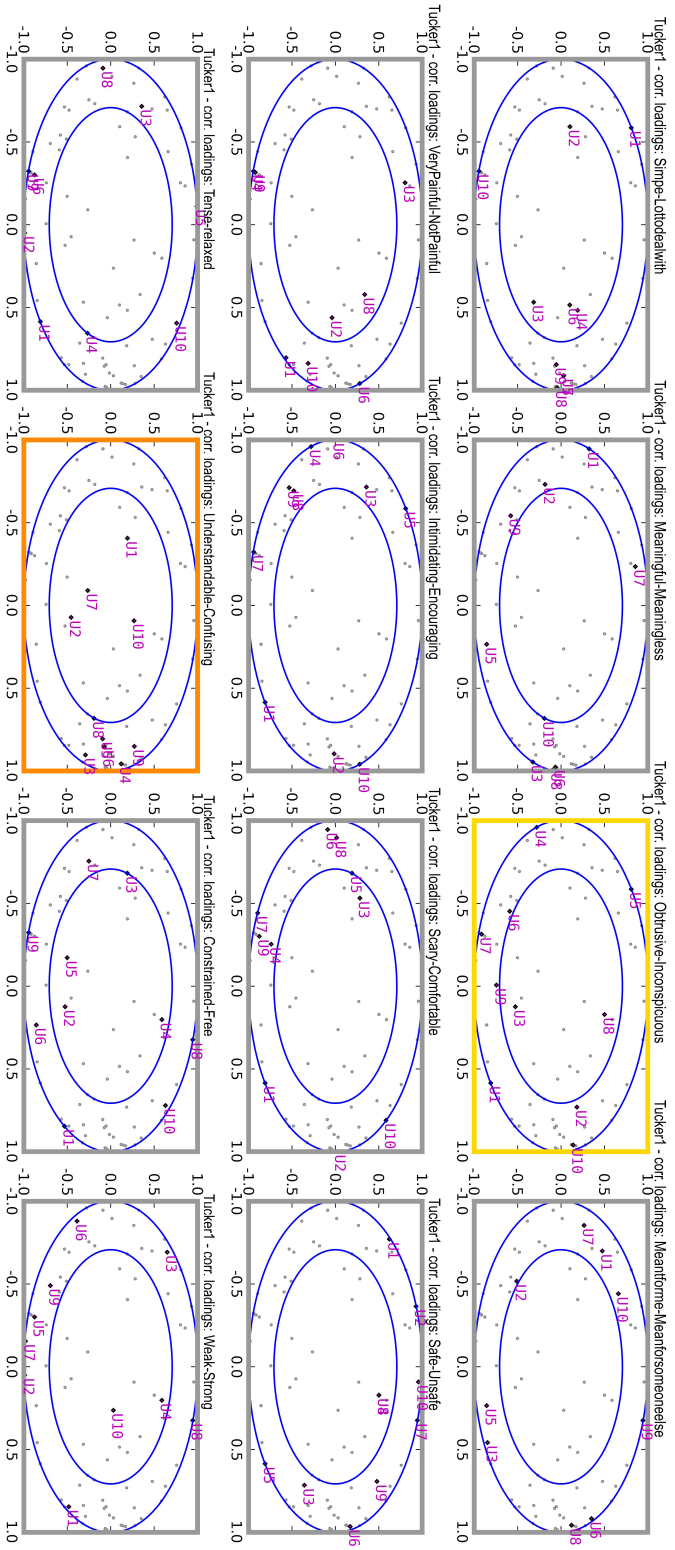


Figure H.2: Overview of tucker-1 plots on the first two components PC1 and PC2 for all 12 aspects.

H.3 Comparison of product attributes and UX-aspects

H.3.1 R-scripts

For the comparison of product attributes ad UX-aspects, the program R was used. The following pages will present the commands and outputs produced by the program. Commands are denoted with a ”>” in the beginning of the line, or a ”+”, if the line adds to a command of the above line.

Averaging data

The following shows the R-script used for deriving averages for product attributes for each device, using a linear model of the data, including evaluator and products as independent variables, compensating for the unbalance of data, giving a false mean by averaging.

```
----------------Data---------------------
Attribute <-
  read.table("path",
   header=TRUE, sep=";", na.strings="NA", dec=",", strip.white=TRUE)

Attribute <- within(Attribute, {
  Number <- as.factor(Number)
  Rep <- as.factor(Rep)
})

----------------Average------------------

results=averagetable(Attribute[,c("Assessor", "Device", "Rep", "Number", "Auto...Manual",
"Bulky...Slim", "Colorful...solud.colour", "Discreet...Loud",
  "Distinct...Discreet.EoD.signal", "Even...Uneven.weight.distribution", "Heavy...light",
"Loud...Silent.dosing", "low...high.force.required",
  "Push.button.extension...No", "Quick...slow.dosing.clicks", "Ridget.Textured...smooth.dial",
"Robust...Fragile", "Rough...Smooth",
  "Same...Different.clicks.dialling.up.and.down", "Small...big",
"Tired...Gentle.slow.down.dosing.click.sound", "Vivid...neutral.colours")],firstvar=5,
  formul=~Device+Assessor,method="coeff")
```

PCA with supplementary variables

The following shows R-script for performing a PCA on the product attributes, presented as mean values for the devices. On the PCA is projected the UX-aspects and UX-quality.

```
> library(FactoMineR)

> library(SensoMineR)


> Average <-
+   read.table("...Path...",
+    header=TRUE, sep=";", na.strings="NA", dec=",", strip.white=TRUE)

------------------ PCA ----------------------------

> Average.PCA<-Average[, c("A_Auto...Manual", "A_Bulky...Slim",
+   "A_Colorful...solud.colour", "A_Discreet...Loud",
+   "A_Distinct...Discreet.EoD.signal", "A_Even...Uneven.weight.distribution",
+   "A_Heavy...light", "A_Loud...Silent.dosing", "A_low...high.force.required",
+   "A_Push.button.extension...No", "A_Quick...slow.dosing.clicks",
+   "A_Ridget.Textured...smooth.dial", "A_Robust...Fragile", "A_Rough...Smooth",
+    "A_Same...Different.clicks.dialling.up.and.down", "A_Small...big",
+   "A_Tired...Gentle.slow.down.dosing.click.sound",
+   "A_Vivid...neutral.colours", "E_Simpe.Lottodealwith",
+   "E_Meaningful.Meaningless", "E_Obtrusive.Inconspicuous",
+   "E_Meantforme.Meanforsomeoneelse", "E_VeryPainful.NotPainful",
+   "E_Intimidating.Encouraging", "E_Scary.Comfortable", "E_Safe.Unsafe",
+   "E_Tense.relaxed", "E_Understandable.Confusing", "E_Constrained.Free",
+   "E_Weak.Strong", "E_Overall", "Device")]

> res<-PCA(Average.PCA , scale.unit=TRUE, ncp=3, quanti.sup=c(19: 31),
+   quali.sup=c(32: 32), graph = FALSE)


--------------------Plots-----------------------------

> plot.PCA(res, axes=c(1, 2), choix="var", new.plot=TRUE, col.var="black", col.quanti.sup="blue",
label=c("var", "quanti.sup"), lim.cos2.var=0)


---------------------Results---------------------------

> res$eig
       eigenvalue percentage of variance cumulative percentage of variance
comp 1   8.190904              45.50502                           45.50502
comp 2   6.065574              33.69764                           79.20266
comp 3   3.743522              20.79734                          100.00000

> res$var
$coord
                                                Dim.1        Dim.2       Dim.3
A_Auto...Manual                              0.6066928  0.616798185  0.50148160
A_Bulky...Slim                               0.5746098  0.004343892  0.81841598
A_Colorful...solud.colour                   -0.8364204 -0.087400539  0.54107492
A_Discreet...Loud                            0.3473920  0.486539053 -0.80162244
A_Distinct...Discreet.EoD.signal             0.7330191  0.281089314 -0.61941244
A_Even...Uneven.weight.distribution         -0.4548490  0.793332081  0.40464376
A_Heavy...light                              0.7139794 -0.687447818 -0.13284910
A_Loud...Silent.dosing                       0.2231789  0.964089710 -0.14395212
A_low...high.force.required                  0.9075035  0.099983919  0.40797138
A_Push.button.extension...No                -0.6794731 -0.673215781 -0.29171353
A_Quick...slow.dosing.clicks                 0.9922506 -0.119437131 -0.03425665
A_Ridget.Textured...smooth.dial              0.2246482  0.881783202 -0.41471865
A_Robust...Fragile                           0.8193547 -0.559327556  0.12574007
A_Rough...Smooth                            -0.4714900  0.863129468  0.18084439
A_Same...Different.clicks.dialling.up.and.down -0.3241536 -0.817637622 -0.47580793
A_Small...big                               -0.9148202  0.035348141 -0.40231151
A_Tired...Gentle.slow.down.dosing.click.sound -0.8431932  0.491428827 -0.21799774
A_Vivid...neutral.colours                   -0.7083258 -0.325837233  0.62618258

$cor
                                                Dim.1        Dim.2       Dim.3
A_Auto...Manual                              0.6066928  0.616798185  0.50148160
A_Bulky...Slim                               0.5746098  0.004343892  0.81841598
A_Colorful...solud.colour                   -0.8364204 -0.087400539  0.54107492
A_Discreet...Loud                            0.3473920  0.486539053 -0.80162244
A_Distinct...Discreet.EoD.signal             0.7330191  0.281089314 -0.61941244
A_Even...Uneven.weight.distribution         -0.4548490  0.793332081  0.40464376
A_Heavy...light                              0.7139794 -0.687447818 -0.13284910
A_Loud...Silent.dosing                       0.2231789  0.964089710 -0.14395212
A_low...high.force.required                  0.9075035  0.099983919  0.40797138
A_Push.button.extension...No                -0.6794731 -0.673215781 -0.29171353
A_Quick...slow.dosing.clicks                 0.9922506 -0.119437131 -0.03425665
A_Ridget.Textured...smooth.dial              0.2246482  0.881783202 -0.41471865
A_Robust...Fragile                           0.8193547 -0.559327556  0.12574007
A_Rough...Smooth                            -0.4714900  0.863129468  0.18084439
A_Same...Different.clicks.dialling.up.and.down -0.3241536 -0.817637622 -0.47580793
A_Small...big                               -0.9148202  0.035348141 -0.40231151
A_Tired...Gentle.slow.down.dosing.click.sound -0.8431932  0.491428827 -0.21799774
A_Vivid...neutral.colours                   -0.7083258 -0.325837233  0.62618258
```

$cos2

	Dim.1	Dim.2	Dim.3
A_Auto...Manual	0.36807620	0.3804400011	0.251483796
A_Bulky...Slim	0.33017642	0.0000188694	0.669804711
A_Colorful...solud.colour	0.69959908	0.0076388543	0.292762069
A_Discreet...Loud	0.12068121	0.2367202504	0.642598539
A_Distinct...Discreet.EoD.signal	0.53731702	0.0790112022	0.383671775
A_Even...Uneven.weight.distribution	0.20688763	0.6293757915	0.163736574
A_Heavy...light	0.50976661	0.4725845021	0.017648883
A_Loud...Silent.dosing	0.04980882	0.9294689690	0.020722212
A_low...high.force.required	0.82356257	0.0099967840	0.166440646
A_Push.button.extension...No	0.46168373	0.4532194878	0.085096784
A_Quick...slow.dosing.clicks	0.98456125	0.0142652283	0.001173518
A_Ridget.Textured...smooth.dial	0.05046683	0.7775416152	0.171991556
A_Robust...Fragile	0.67134212	0.3128473146	0.015810564
A_Rough...Smooth	0.22230283	0.7449924789	0.032704695
A_Same...Different.clicks.dialling.up.and.down	0.10507553	0.6685312807	0.226393187
A_Small...big	0.83689596	0.0012494911	0.161854551
A_Tired...Gentle.slow.down.dosing.click.sound	0.71097470	0.2415022917	0.047523013
A_Vivid...neutral.colours	0.50172548	0.1061699022	0.392104619

$contrib

	Dim.1	Dim.2	Dim.3
A_Auto...Manual	4.4937189	6.272118e+00	6.71783995
A_Bulky...Slim	4.0310132	3.110901e-04	17.89236890
A_Colorful...solud.colour	8.5411705	1.259379e-01	7.82049879
A_Discreet...Loud	1.4733564	3.902685e+00	17.16561547
A_Distinct...Discreet.EoD.signal	6.5599233	1.302617e+00	10.24895291
A_Even...Uneven.weight.distribution	2.5258217	1.037619e+01	4.37386471
A_Heavy...light	6.2235696	7.791257e+00	0.47145135
A_Loud...Silent.dosing	0.6080992	1.532368e+01	0.55354860
A_low...high.force.required	10.0545992	1.648118e-01	4.44609807
A_Push.button.extension...No	5.6365418	7.471996e+00	2.27317459
A_Quick...slow.dosing.clicks	12.0201782	2.351835e-01	0.03134798
A_Ridget.Textured...smooth.dial	0.6161326	1.281893e+01	4.59437852
A_Robust...Fragile	8.1961908	5.157753e+00	0.42234467
A_Rough...Smooth	2.7140207	1.228231e+01	0.87363445
A_Same...Different.clicks.dialling.up.and.down	1.2828319	1.102173e+01	6.04759916
A_Small...big	10.2173821	2.059972e-02	4.32359059
A_Tired...Gentle.slow.down.dosing.click.sound	8.6800516	3.981524e+00	1.26947343
A_Vivid...neutral.colours	6.1253981	1.750369e+00	10.47421788

> res$quanti.sup
$coord

	Dim.1	Dim.2	Dim.3
E_Simpe.Lottodealwith	0.03823216	0.9967989	0.07021511
E_Meaningful.Meaningless	-0.37178129	0.7876358	-0.49133338
E_Obtrusive.Inconspicuous	-0.75328511	-0.2951048	-0.58777096
E_Meantforme.Meanforsomeoneelse	0.41804973	0.9050317	0.07843510
E_VeryPainful.NotPainful	-0.55406188	0.2917948	-0.77966097
E_Intimidating.Encouraging	-0.60411652	-0.7486533	0.27305955
E_Scary.Comfortable	-0.85111663	-0.5011718	0.15629229
E_Safe.Unsafe	0.87626887	0.1651655	-0.45262921
E_Tense.relaxed	-0.96287598	-0.2618497	-0.06560950
E_Understandable.Confusing	-0.09005733	0.9951115	0.04053130
E_Constrained.Free	-0.42151006	-0.4373492	-0.79438969
E_Weak.Strong	-0.92233877	-0.3733925	0.09934389
E_Overall	-0.75656902	-0.5423572	0.36531079

$cor

	Dim.1	Dim.2	Dim.3
E_Simpe.Lottodealwith	0.03823216	0.9967989	0.07021511
E_Meaningful.Meaningless	-0.37178129	0.7876358	-0.49133338
E_Obtrusive.Inconspicuous	-0.75328511	-0.2951048	-0.58777096
E_Meantforme.Meanforsomeoneelse	0.41804973	0.9050317	0.07843510
E_VeryPainful.NotPainful	-0.55406188	0.2917948	-0.77966097
E_Intimidating.Encouraging	-0.60411652	-0.7486533	0.27305955
E_Scary.Comfortable	-0.85111663	-0.5011718	0.15629229
E_Safe.Unsafe	0.87626887	0.1651655	-0.45262921
E_Tense.relaxed	-0.96287598	-0.2618497	-0.06560950
E_Understandable.Confusing	-0.09005733	0.9951115	0.04053130
E_Constrained.Free	-0.42151006	-0.4373492	-0.79438969
E_Weak.Strong	-0.92233877	-0.3733925	0.09934389
E_Overall	-0.75656902	-0.5423572	0.36531079

$cos2

	Dim.1	Dim.2	Dim.3
E_Simpe.Lottodealwith	0.001461698	0.99360814	0.004930162
E_Meaningful.Meaningless	0.138221330	0.62037018	0.241408495
E_Obtrusive.Inconspicuous	0.567438462	0.08708684	0.345474700
E_Meantforme.Meanforsomeoneelse	0.174765575	0.81908236	0.006152065
E_VeryPainful.NotPainful	0.306984571	0.08514420	0.607871228
E_Intimidating.Encouraging	0.364956771	0.56048171	0.074561521
E_Scary.Comfortable	0.724399510	0.25117321	0.024427281
E_Safe.Unsafe	0.767847141	0.02727966	0.204873203

```
E_Tense.relaxed                 0.927130147 0.06856525 0.004304607
E_Understandable.Confusing      0.008110324 0.99024689 0.001642787
E_Constrained.Free              0.177670735 0.19127428 0.631054981
E_Weak.Strong                   0.850708808 0.13942198 0.009869208
E_Overall                       0.572396689 0.29415133 0.133451976


> res$quali.sup
$coord
             Dim.1     Dim.2     Dim.3
Pen1      -3.050459 -3.023739 -1.155378
Pen2      -2.153920  2.027951  2.563597
Pen3       0.977971  2.790373 -2.447041
Pen4       4.226407 -1.794585  1.038822

$cos2
               Dim.1     Dim.2      Dim.3
Pen1        0.47036383 0.4621598 0.06747641
Pen2        0.30275225 0.2683757 0.42887209
Pen3        0.06492785 0.5285713 0.40650083
Pen4        0.80599012 0.1453166 0.04869328

$v.test
              Dim.1      Dim.2      Dim.3
Pen1      -1.0658577 -1.2277453 -0.5971508
Pen2      -0.7525990  0.8234201  1.3249808
Pen3       0.3417119  1.1329906 -1.2647393
Pen4       1.4767448 -0.7286654  0.5369092

$dist
Pen1          Pen2    Pen3  Pen4
 4.447830  3.914586  3.838049  4.707675

$eta2
       Dim.1 Dim.2 Dim.3
Device     1     1     1
```

Appendix I

Living with diabetes and self-treatment

In 2015, the International Diabetes Federation estimated that one in 11 adults have diabetes globally, from which only half are diagnosed [Cavan et al., 2015]. Living with diabetes means a need for daily medical self-treatment, and that the body reacts differently to situations than it does on other people. This means not only taking medicine a couple of times daily, but a number of psychological implications and needs as well [Stuckey et al., 2014]. The first step towards helping people living with diabetes is to understand how they actually experience it.

I.1 Diabetes

Diabetes or diabetes mellitus is a disease caused by a reduced or completely stopped natural production of insulin, or a resistance in the body to the produced insulin. Both cases result in reduction of glucose uptake from the blood to the organs in the body that needs it, causing hyperglycemia (elevated blood glucose (BG) levels in the blood stream). Insulin is produced in the pancreas, located behind the stomach, when this is stimulated by eating [Zhang, 2008, p. 502].

Two main types of diabetes exists, type 1 diabetes mellitus (T1D), also known as insulin-dependent or juvenile onset diabetes and type 2 diabetes mellitus (T2D), also known as non-insulin-dependent diabetes or maturity-onset diabetes. T1D is caused by the body's immune system destroying the cells that produce insulin, resulting in reduced or stopped insulin production. People with T1D are dependent on insulin-injections every day. T1D affects about 0.5% of the world's population, and account for a small amount (about 7-12 % [Cavan et al., 2015]) of the total number of diabetics. [Zhang, 2008, p. 502]

T2D is caused by the body resisting the effects of insulin. This causes the pancreas to overproduce insulin to compensate for the lack of uptake. Eventually, the pancreas cannot maintain the overproduction, resulting in declining insulin production, followed by hyperglycemia. High BMI, increased age, and high cholesterol are all risk factors connected to developing T2D [Zhang, 2008, p. 502]. The impaired glucose tolerance causing the pancreas to produce higher levels of insulin is to a certain point only pre-state of diabetes, which can be normalised before it turns into T2D [Cavan et al., 2015]. Reducing calorie intake and exercise has proved to improve insulin sensitivity. Most T2D patients are recommended oral medication along with lifestyle changes to increase insulin sensitivity. However, if the insulin produced in the pancreas is reduced due to over production, T2D patients will have to take insulin like T1D patients. [Zhang, 2008, p. 502]

Diabetes related complications, resulting from any type of diabetes may include in worst case diabetic ketoacidosis, which can result in seizure or coma if not treated. Other complications include damage to retinas, kidneys, and nerves, resulting in impaired vision, reduced mobility and kidney failure, while damage to the larger blood vessels in the body can result in heart attacks, strokes and limb amputations. [Zhang, 2008, p. 502] If patients gets too much insulin, this can cause hypoglycemia, a decrease in BG level, which can result in feeling nausea and if not treated, seizure or coma [Zhang, 2008, p. 875].

In 2011, the United States reported 282,000 and 175,000 emergency room visits from adults caused by hypoglycemia and hyperglycemia, respectively [American Diabetes Association and others, 2014].

Treating diabetes by controlling the BG level and living healthy allows people with diabetes to live normal and healthy lives [Cavan et al., 2015]. However,

far from all diabetics experience this. Hart [1992] proposed the *rule of halves* of cronic diseases, explaining how about 50% of the of the people carrying a disease are diagnosed, of whom 50% receive care, of whom 50% achieve treatment targets, of whom 50% achieve the desired outcome. Resulting from this rule of halves, Novo Nordisk A/S expect that of the people living with diabetes globally only about 6% live a life free from diabetes-related complications [Novo Nordisk A/S, 2014]. Complying with the diabetes treatment seems to be hard, as a significant part of diabetes patients do not take their medicine to the needed extent, and adherence to these recommendations by diabetic patients are the lowest compared to other illnesses such as HIV, gastrointestinal disorder and cancer [DiMatteo, 2004].

I.2 Living with diabetes

A study of people living with diabetes called *Diabetes Attitudes, Wishes and Needs 2* (DAWN2) was conducted on approximately 16,000 people, including diabetics, family members of diabetics, and health care professionals (HCP's) in 17 countries across 4 continents [Peyrot et al., 2013]. The study was presented in form of a questionnaire, and contained open-ended questions related to *" self-management, attitudes/beliefs, disease impact/burden, psychosocial distress, health-related quality of life, healthcare provision/receipt, social support and priorities for improvement in the future."* [Peyrot et al., 2013]. The study is an elaboration on a previous DAWN study, conducted in 2001, which showed a number of concerns about living with diabetes [Peyrot et al., 2013]. The goal of the study was to create a multinational, multi-stakeholder study, which could provide the basic knowledge to make living with diabetes easier [Peyrot et al., 2013]. From the date from the DAWN2-study, a number of analyses have been made, trying to understand what it is like living with diabetes.

One of these analyses focuses on identifying negative and adaptive contributing psycho-social factors (emotional, psychological and social factors), by looking at personal accounts [Stuckey et al., 2014]. The analysis showed four general themes, two for negative effect, and two for adaptive and positive effect. The first themes for negative effect is the experience of negative reactions such as stress, anxiety, or fear, as the patients worry about hypoglycemia or the complications of diabetes. Living with diabetes makes people afraid of what could happen to them, like affected vision, leg amputation or even death, and uncertainty towards when such complications can occur. Further, people can feel depressed and hopeless due to having a bad illness, described as burying you in a bottomless well, and is said to be mentally hard to live with. Feeling surprised, scared, nervous and depressed where some of the words used to describe what diabetes made them feel. Further, some mentioned that they were living in denial, not accepting the disease.

The second theme is about feeling discriminated or misunderstood caused by lack of knowledge or indifference from other people. Diabetics were afraid of being seen as a drug user if injecting insulin in public, or that the disease could be seen as a *defect* or *flaw* in the person. Having restriction and treatments, makes diabetes patients feel like they are not like everyone else. Diabetics further mention feeling that other people are afraid or ashamed of them due to the diabetes, and that uneducated people tend to believe they know why they have it and what to do about it, criticised or lectured, focusing on personal shortcomings as the cause of the disease. Stigmatised, lectured, and a fear of embarrassing themselves in public due to diabetes are mentioned as key negative social factors on living with diabetes.
The third theme is about having a positive outlook and feeling resilience about diabetes, based on having hopes for the future, and being positive in general. Trying to stay positive and focusing on the positives was mentioned as an important factor combing with a disease like diabetes, looking forward and keeping control of their life. Another notion was a new found appreciation of life, making positive changes to their life and focusing on living a simpler life.
The fourth theme is about support through compassion and care from family, friends, HCP's and other diabetics. Feeling helped and understood by the people around, and making life changes to the entire family rather than only the diabetic, was mentioned as giving positive experiences. Having professionals care about their well being and not only treating the disease also created a adaptive, positive behaviour. Support from other people with diabetes was also mentioned as ways of staying positive and adaptive. [Stuckey et al., 2014]
Jones et al. [2016] found, from the DAWN2-study that insulin dependent diabetics feel more emotional distress than non-insulin dependant diabetics, likely due to a more severe state of the illness and a more demanding self-care.

I.3 Adherence to medication

Living with diabetes means living with a more strict set of rules than most people, due to a need of medication and a healthy lifestyle [World Health Organization, 2016]. However, adherence to such prescriptions are challenged by e.g. denial, fear, embarrassment and stigma [Peyrot et al., 2013; Stuckey et al., 2014; Osterberg and Blaschke, 2005].
Making the treatment as easy to follow as possible is one way of trying to help patients stay on track [Osterberg and Blaschke, 2005].
Adherence to the prescribed medicine is a big problem for chronic illnesses like T1D, and in some cases T2D, as research has found adherence levels from 78 % down to only 43 %, suggesting that a relatively high number of people do not get their medicine [Osterberg and Blaschke, 2005]. Resulting, 33 to 69% of all medication-related hospital admissions in the US are due to poor adherence to medicine [Osterberg and Blaschke, 2005]. In general, two types of barriers to

adherence exists, those in control of the patient, like decision to omit the dose or forgetfulness, and those occurring through interaction with the health care system, like lack of information or changes in prescriptions. Reasons for non-adherence include forgetfulness, other priorities, decision to omit doses, lack of information, and emotional factors [Osterberg and Blaschke, 2005]. Non-adherence is often related to other problematic elements in patients' lives, like

- Presence of psychological problems like depression,
- Presence of cognitive impairment,
- Treatment of asymptomatic disease,
- Inadequate follow-up or discharge planning,
- Side effects of medication,
- Patient's lack of belief in benefit of treatment,
- Patient's lack of insight into the illness,
- Poor provider–patient relationship,
- Presence of barriers to care or medications,
- Missed appointments,
- Complexity of treatment, and
- Cost of medication. [Osterberg and Blaschke, 2005]

The complexity of treatment does, according to Novo Nordisk's view, not only refer to the amount or length of the procedural steps needed to stay adherent, but also to the treatment's effect on emotional factors [Nordisk, 2017]. The emotional factors include an experience of being different than other people, feeling overwhelmed by the responsibility of treating yourself, misunderstood by other people, incurable, incompetent, and left alone without help, all manifested in the treatment [Nordisk, 2017]. A view that goes well with the findings by Stuckey et al. [2014], suggesting that the emotional burden of both living with diabetes and the threat of diabetes can be overwhelming and depressing, while lack of understanding and compassion adds to this feeling. Wikblad et al. [1990] found that similar constructs were often used by patients visiting clinics to describe their expereinces with diabetes. These were the constructs *constrained - free, weak - strong, dominant - submissive, worthless - valuable, difficult - easy, unsafe - safe, tense - relaxed, monotonous - varied*, and *independent - dependent*.

Appendix J

Qualitative analysis methods

Analysing qualitative data has been done in many different ways. While the methodology can be different, it should always be driven by the data and the desired outcome of the analysis. In this chapter, a number of analysis methods will be presented and discussed, to enable an evaluation of the methods' applicability in the current research.

J.1 Interview analysis by Kvale

Kvale [1997] suggests five steps of analysis of interview data, including exploration by the interviewee and condensation and interpretation by the interviewer, resulting in additional discussion during the interview and after the interview an interpretation of the transcripts of the interview (methods for this will be discussed later). This analysis will result in a re-interview, where the interviewee can comment on the analysis. In this way, the analysis is not solely occurring after data is collected, but also while it is collected, and after the initial analysis is done [Kvale, 1997, p.187-188]. As suggested by Kvale [1997], the analysis method used for analysing the transcribed interviews is only one of the interpretations of data, and any analysis is permeated by interpretation and thus does not give one all exclusive explanation [Kvale, 1997, p.204]. For the analysis of the transcripts, Kvale [1997] suggest six different methods, based on review of past used methods [Kvale, 1997, p.190]. These are, translated from Danish, Meaning condensation, Meaning categorisation, Narrative meaning structuring, Meaning interpretation, and Creation of meaning through ad-hoc [Kvale, 1997, p.190].

Meaning condensation is a way of condensing the data based on phenomenological analysis, by dividing the interview data into *meaning units (from the danish betydningsenheder)*, that is a part of the interview focusing on a single central theme. The analyst interprets the part of the interview, to produce a condensed description of what is expressed as a central theme of the meaning unit. Comparing the derived set of central themes, and asking how the central themes relate to the research question, the analyst can start to form an understanding of the data, which in the end can be condensed into a single descriptive statement [Kvale, 1997, p.194-195].

Meaning categorisation is a way of quantifying statements, by setting up criteria or categories, and counting or in other ways measure the support to a given category. As presented by Kvale [1997], meaning categorisation is used to test hypotheses [Kvale, 1997, p.196-197].

Narrative meaning structuring is a way of using the data from the interviews to create a meaningful coherent story, by connecting or developing the themes that are touched upon in the interview. Kvale [1997] uses the analogy of a little kid trying to explain an exiting event just experienced. The parent (or analyst) has the job of asking questions to fill out the holes in the story to make it meaningful. Creating the connections throughout the interview to make it a coherent story, and finding the stories in the following analysis are ways of creating a narrative meaning structuring [Kvale, 1997, p.197-199]. The narrative meaning structuring is as much a way of conducting the interviews as it is a way of

analysing them, trying to make a full story, asking or interpreting where there are holes.

Meaning interpretation is a deeper analysis of the interview, taking in more than just what is said, but relates it to structures and relations, to create structure. The basis for interpretation is thus not only what is learnt through the interview, but also an interpretation of underlying meaning derived through application of professional or human skills. The analysis method is based on the phenomenon of *the suspicion's hermeneutics*, explained as ones inevitable suspicion that what a person says directly is not the real meaning, as it is biased by hidden intentions and intrigue [Kvale, 1997, p.199-201].

Ad hoc meaning creation is application of whatever techniques found useful for making sense of (especially very unstructured) interviews. Application of aforementioned analyses can be applied as part of the ad hoc methods e.g. to parts of the interview data, if it is deemed meaningful.

J.2 Grounded theory data coding

While the aforementioned methods focus solely on interview data, other methods, more or less related or inspired by the same sources as Kvale [1997], such as the five phased cycle of data analysis by Yin [2011] and Grounded theory's data coding as described by Charmaz [2006] are developed to incorporate different types of data sources in the analysis of qualitative data.

Grounded theory's data coding is how data analysis is initiated, when using grounded theory as a research approach. *"Coding means categorizing segments of data with a short name that simultaneously summarizes and accounts for each piece of data. Your codes show how you select, separate, and sort data to begin an analytic accounting of them"* [Charmaz, 2006, p.43]. An important part of grounded theory coding is to keep a theoretical mindset to the categorization that the coding results in [Charmaz, 2006, p.45]. Charmaz [2006] separates data coding into initial coding, focused coding, axial coding and theoretical coding.
The initial coding has the focus of describing the actions of the data in concise terms, word by word, line by line or incident by incident, all dependent on what makes sense for your data and objectives [Charmaz, 2006, p.47-48].
Focused coding is the synthesising of larger amounts of data about the a common theme of interest, connecting the initial coding of data, or in other words comparing data with data. When re-reading and exploring data, the focused coding may change several times, digging deeper into concepts and understanding new connections in data. Comparing data with previous coding is key

in this step, to reach a deeper understanding [Charmaz, 2008, p.59].
Axial coding is a way of defining dimensions of the data gathered, creating axises or building a *space* to define the data, the result is larger categories, presenting sub-categories of the previous coding, by adding dimensions such as conditions, actions and consequences. *"The axial coding relates categories to subcategories, specifies the properties and dimensions of a category, and reassembles the data you have fractured during initial coding to give coherence to the emerging analysis"* [Charmaz, 2006, p.60]. Axial coding is seen as an optional coding for creating additional structure in data if needed, and to the extent needed [Charmaz, 2006, p.61].
Finally, theoretical coding is coding by a set of predefined coding families, that is Causes, Contexts, Contingencies, Consequences, Covariances, and Conditions along with degree, dimension, interactive, theoretical and type coding families. Further, coding families from major theoretical concepts such as identity-self, means-goals, cultural and consensus can be used to code as well [Charmaz, 2006, p.63]. Theoretical coding and axial coding helps reassemble the data from the fragmented nature of coding data into small pieces, and to create a full picture that is interpretable [Charmaz, 2006, p.63].
While the analysis of the current data set ends here for grounded theory, the research approach proposes evaluating the formed hypotheses through field work [Charmaz, 2006, p.96].

J.3 Yin's five phased cycle

The five phased cycle of data analysis by Yin [2011] proposes an recursive method for data analysis of qualitative research, based on five phases: *(1) Compiling, (2) Disassembling, (3) Reassembling (and Arraying), (4) Interpreting*, and *(5) Concluding.* Beginning in the first phase and ending in the fifth, the analyst can move backwards through the phases if needed.
The first phase *Compiling* consists of collecting all the data and ordering it into a database, which means giving all data points similar definite dimensions like e.g. places, people, actions or whatever might be relevant. This is important if different data entries are made during the research like several interviews, notes and memos.
The second phase *Dissassembling* is separation of data into smaller units with one single theme, much like explained in *Meaning categorization*. This can be done either by coding data, or without coding it. Coding data in this case means dividing data units by looking at the content, and giving data units that are alike the same code of meaning, much like the initial open coding of grounded theory [Yin, 2011, p.187]. Beginning at a simple level of coding, just describing the data in a simple condensed way, additional layers of coding can be added to the initial coding, relating different data units to the same higher conceptual meaning, higher level coding can be made [Yin, 2011, p.186-190], much like

suggested in *Meaning categorization*.
The third phase *Reassembling (and Arraying)* is looking for patterns in the disassembled data units. If coded, the reassembling phase can be seen as adding additional conceptual meaning, creating even higher levels of coding. Additionally, arrays and matrices can be used to sort data units, much as suggested as axial coding in *Grounded theory*. [Yin, 2011, p.190-199]
The fourth phase *Interpreting* focuses on incorporating the reassembled data, and create comprehensive interpretations, that together forms an explanation of the data and an answer to the research question. Yin [2011] suggests five parameters of evaluating the quality of ones final interpretations of data, that is (1) Completedness, (2) Fairness, (3) Empirical accuracy, (4) Value-added, and (5) Credibility [Yin, 2011, p.207]. While these should be considered, Yin [2011] highlights, as Kvale [1997], that the interpretation phase is permeated with the analyst's own impression of data, and are thus not a conclusive truth [Yin, 2011, p.206].
The fifth and final phase *Concluding* emphasise the findings of the study en focus on it's significance. By the uniqueness of the data gathered, the conclusion to the data should therefore also be unique [Yin, 2011, p.220-221].

J.3.1 Memo writing

Memo writing is a key part of analysis in both grounded theory and the five phased cycle [Yin, 2011, p.186] [Charmaz, 2006, p.87]. It helps you keep track of changes, decisions and ideas occurring throughout the analysis, and therefore aids you in both documentation and conceptualise the work [Charmaz, 2006, p.72-74]. Further, memo-writing can help you document the implicit, by describing more or less thought through theories or underlying concepts, to quickly be reviewed and altered when new ideas occur [Chang et al., 2003, p.83-84].

J.4 Discussion

The core idea of segmenting data, analysing the meaning of each segment, and then connecting the segments back into a full image is present in most of the presented methods. Both *meaning condensation, meaning categorisation, grounded theory coding* and *the five phased cycle* is based on this idea. How practically to do it is, however different. Where Kvale [1997] suggest condensation into smaller sentences describing the central theme of each segment, to make data comprehensible, or categorisation, keeping the data only as a count in a category, grounded theory and the five phased cycle adds additional layers of coding, in the form of either coding for higher conceptual levels or in the form of axial and theoretical coding, trying to connect data further into ordered

schemes or hierarchies to make it understandable. The initial analysis or coding is about discovering and clarifying the meaning of the data. This meaning will then be the focus for the rest of the analysis. To diminish the risk of making an error by doing so, grounded theory focuses on comparing coding to the data to ensure that these codes fit the data throughout the analysis [Charmaz, 2006, p.59]. In the five phased cycle, this is done by recursion, going back to the initial coding or disassembling of the data if new ideas or problem occur [Yin, 2011, p.186].
Meaning interpretation and narrative meaning structuring are in it's core different, as the analysis directly tries to add to or *complete* the data rather than to explain the meaning of the data.

Appendix K

Analysis of UX aspects

To derive a number of aspects to measure the user's experience, an interview is conducted, followed by an analysis. This analysis included a splitting of the interview into natural units, a condensation of the natural units, and a following analysis of how these condensed units could help answer the research question. The analysis is documented in this chapter, along with the finalised list used for evaluating products on the UX-aspects.

On the next pages are presented natural meaning units, their meaning condensation into central themes, derived from the interview data with antrhopologists at Novo Nordisk A/S through meaning condensation Kvale [1997]. Added are line numbers from the transcript (for full transcript see appendix G.4), and a numbering of each unit.

Unit No.	Central theme	Condensed description	Line no.	Natural unit
1	research goal explanation		[1-3]	F: Altså det mit speciale det handler om det er. og det er sådan lidt inspireret af de måde man laver brugerundersøgelser på her i Novo på. det der med at have sådan et produkt og så gå ud og få brugere til at evaluere produktet. P: Ja. Og jeg skal lige have helt på plads du er på det der design og innovation ikke på DTU eller hvad F: Nej jeg går på produkt og designpsykologi i Aalborg P: Nå okay du er den vej. yes yes yes F: yes. Og det som jeg kom til at tænke på når jeg var med på studier her i Novo det var at det der med at få en bruger til at lave en produktevaluering det er måske ikke skide smart i virkeligheden fordi brugeren kan jo ikke designanalysere. brugeren reagerer vel mest på hvad han synes om produktet som en helhed og så siger jamen det synes jeg er godt eller skidt eller der er noget jeg ikke kan lide. hvad kunne det være er det nålen. jamen det er nok nålen den er gal med eller det er nok den her mærkelige måde den drejer på men det er sådan en lidt kunstig projektering af hvad brugeren synes fordi de har jo helt sikkert en holdning til om det er godt eller skidt men det der med at få brugeren til at peje på hvad det så er ved produktet der skal laves om. P: Ja det ved de ikke F: Det ved de måske faktisk ikke. så det jeg tænke man kunne gøre det var at sige hvis nu vi får nogle designere eller nogen der er rigtig dygtige til at skille sådan et device ad så vi siger det her det er nogle punkter vi kan beskrive produktet på. og så vi i den anden ende har brugeren der kan beskrive deres oplevelse på nogle punkter som i virkeligheden slet ikke har noget med hinanden at gøre. men når vi så får dem til at bruge et device og får dem til at evaluere den her oplevelse så kan vi måske begynde at se nogle sammenhænge jamen det lader til at hver gang vi gør den her mere blå så sker der også et eller andet herovre som ændrer sig så de bliver mere overraskede eller aroused eller hvad det nu kunne være. Ja så det jeg havde håbet vi kunne snakke om i dag er hvad der er her ovre i oplevelsen og helt sådan hvad er det for nogle behov vi prøver at hjælpe brugeren med når vi laver sådan en pen og giver dem sådan en pen og hvad er det for nogle behov vi så skaber ved at give dem pennen fordi ligesom at. altså det er jo basically prøve at holde dem sunde og raske og ikke få de her anfald men ved at vi giver dem den her insulin og ved at vi giver dem en opgave de skal lave så skaber vi også en hel masse nye behov for dem som vi så prøver og løse igen så det var det jeg håbede at vi kunne snakke om. hvad det så egentlig er og om man kunne stille nogle parametre om og sige det er det her vi skal måle på. ikke kun om det er en god om det er en god oplevelse eller en dårlig oplevelse men hvorvidt det her bliver opfyldt for brugeren og hvor godt det bliver. P: ja men det kan vi snakke snakke om F: Ja
2	Orgnaisation structure in Novo allows	It makes sense for the anthropologists not to sit with the designers, as they can focus on people	[32-37]	P: og det er jo faktisk nu apropos organisationen hvordan den er skruet sammen det er faktisk også derfor at det giver rigtig god mening for os som antropologer ikke at sidde i det samme team som dem der laver usability og den slags brugerundersøgelser som du har været en del af fordi det netop er i den helt anden. og hvis det er at man sidder sammen og det har vi gjort i mange år så bliver man tit forvekslet og så kan man ligesom. altså nu får vi lov til ligesom at være os selv eller fokusere på det som handler om hvad er det for nogle mennesker og hvad er det for nogle behov de har hvordan ser deres liv ud.
3	Dont ask people about needs	You cannot ask people about needs, as they make solutions, unless things are really bad	[37-41]	og behov er jo ikke sådan noget man kan spørge folk om fordi folk har ikke nogle behov de ikke har dækket og det er jo sådan en af grundantagelserne i det antropologiske arbejde det er at folk løser deres behov og det har vi altid gjort som mennesker så derfor så kan vi ikke gå ud at spørge folk til behov men vi må observere og analysere og fortolke hvad vi tænker der kunne være mere optimalt. det kan vi ikke spørge til. så skal tingene i hvert fald være virkelig virkelig elendige.
4	Dont ask people about needs	users will not say they need a memory function, as they have other methods of remembering, but the methods are not effective	[41-45]	og det ser vi jo tit altså folk hvis de bliver adspurgt om de har brug for en memory funktion i forhold til at huske at tage deres insulin så siger de nej det har vi ikke men vi ser dem jo når vi observere hvad de gør have alle mulige systemer og praksiser som hjælper dem og så er det man kan gå ind og være kreativ og kunne vi lave de der systemer lidt mere effektive men det hjælper ikke at spørge dem om de har brug for det for det siger de nej til
5	Need to remember if the medicine is taken	A user has his own way of remembering, but it is not an easy way. But he would not say he needed help to solve it	[45-52]	jeg har prøvet en konkret som har sin insulinpen i en kop og så putter han den med hætten ned og jeg kan ikke huske han har lavet et system så han kan huske at hvis den er nedad så har han taget den om morgenen og hvis den er opad så har han taget den om aftenen og det kan F: Ja P: og det kan han huske detder system så han har ikke burg for nogen memory funktion men umiddelbart så synes jeg alligevel det kræver ret meget at huske hætte ned og hætte op hvad betyder hvad. Det har han så lært sig selv fordi han har brug for en memory funktion ja.
6	Dont ask people to evaluate objects	If you ask users they will evlauate a product in it's own frame, but you do not know what's outside that frame	[52-55]	Men du har fuldstændig fat i den lange ende synes jeg når du siger at det hjælper ikke at teste ting fordi så forholder de sig bare til den ting som der ligesom er der inden for de rammer som den ting har. og så ved vi ikke om der ligger noget uden over den genstand som vi ikke har oplevet. Men hvad søren gør man så.
7	Method for eliciting experience aspects	While users evaluated products, more high level words about impressions and experience were noted down	[55-72]	og der tænker jeg altså vi lavede et studie en gang den gang vi var i samme afdeling os antropologer sammen med designerne og usability folkene som var. og måske har du hørt om det men ellers kan du høre om det og der er en der er bedre til at fortælle om det en jeg er men det var med en sammenblanding af design og usability og antropologi hvor vi skulle lave noget for et projekt der hedder PROJEKT C dem der arbejder med obesity og så havde vi valgt at gøre det på den måde at vi havde indkaldt folk til sådan nogle intim brug i USA og vi havde dem til sådan nogle brugertests som du sikkert har været vidne til hvor man sidder og så har de noget så de skal forholde sig til det og sige om de kan lide og eller ikke kan lide og forklare hvad den ene og den anden og den tredie ting blev vist. og der havde de nogle forskellige prototyper med. så gjorde vi det at jeg sad med til de der interviews uden at sige noget og lyttede efter hvad det var de sagde altså som var mere relateret til oplevelser for eksempel. altså den her giver mig en følelse af frihed eller den her den ser utrolig altså du ved nu kan jeg ikke huske dem helt specifik der var nogle af der der ord der var meget markante ord men det er et par år siden. men hvor de siger nej men den her den er diskret eller den her den er meget medicinsk. men sådan nogle mere beskrivende ord i forhold til det de oplevede med de forskellige ting de blev vist. og dem sad jeg og samlede på i jeg tror vi kørte de der brugertests i to dage. så i to dage sad jeg og samlede ord som egentlig ikke var. alstå samlede på oplevelse samlede på sådan nogle mere kvalitative beskrivelser og dem skrev vi så ned og så samlede vi de samme folk igen som havde været inde i en fokusgruppe vi samlede dem faktisk i to fokusgrupper vi lavede en mande og en kvinde fra sådan en ide om at det sikker var nogle forskellge.
8	Genders difference in obesity experience	We experienced differences about mens and womens experience of obesity	[72-73]	det var en klog ide altså det viste sig at være en klog ide om at det var nogle forskellige oplevelser de havde alt efter hvilket køn de var når det handlede om overvægt.
9	Method for eliciting experience aspects	Ask people about what they have said, and what is the opposite	[73-76]	og så siger vi så jamen der er rigtig mange af jer der har sagt at den her den. har nævnt noget omkring (uf) så sagde vi nu glemmer vi alle de der ting men der var rigtig mange af jer der snakkede om frihed. men hvad er egentlig frihed og så snakkede vi om hvad frihed er og hvad det er og så siger man hvad er det modsatte og så kom der noget op der.
10	Method for eliciting experience aspects	Discuss opposites to create a spectrum or conceptual pairs that normalised their world	[77-79]	og så lavede vi fra alle de ord de ligesom havde samlet dem tog vi og satte dem op og så bad vi dem om sige i fokusgruppen at diskutere hvad er det modsatte af det hvad kunne være på den anden ende af det spektrum. så fik vi ligesom sådan nogle begrebspar som man ligesom kunne sige sådan normaliserede de deres verden.
11	Method for evaluating products on concepts	Make users rate pictures of stuff on conceptual word pairs	[79-82]	og så havde vi dem dem lagde vi så dem ud på sådan et langt bord og så havde vi alle mulige ting med. så havde Louise taget alle mulige det var billeder af ting altså som også var noget device agtigt så bad vi dem om at placere dem er den her ting mere frihed eller mere constraints.
12	Method for connecting experience and product	You start to see connections between concepts and products	[82-85]	er den her mere feminin eller maskulin er den her mere jeg kan ikke huske hvad de var. og så kunne man ligesom begynde at sige nå okay hvis den er lidt som du snakker om hvis den er lidt tyk så kunne det være den var mere feminin ikke og så kunne vi begynde at forstå noget om hvad er det der er altså og det handlede jo om at hive og det her det har vi kun gjort en gang
13	Method documentation	You can find documentation to how to evaluate not product attributes but words and anthonyms	[85-89]	jeg synes det var super spændende og hvis du vil se noget af det så har Louise dokumenteret hele den der process det er i en eller anden rapport men den der proces med hvordan vi ligesom fik de der ord frem og hvordan vi fik folk til at evaluere i forhold til ikke nogle dimser eller dutter eller rød eller grøn men i forhold til nogle ord og det samme ords modsætning som vi så selv bad dem om at finde.
14	Group workshop method	The group had to find opposites	[89-91]	. det var gruppen der skulle finde hvad er så det modsatte og det kunne være lidt svært ikke. hvis det var en der så hvis der var noget der var blevet nævnt der var tiltrækkende hvad er så det modsatte så kunne de begynde at diskutere hvad det modsatte var
15	Genders difference in opposites in concepts	males and females did not have the same result	[91-92]	og mænd og kvinder havde ikke nødvendigvis de samme ting som modsætninger og så videre
16	Antthropology work methods	Anthrolopogist work is having users talk their own language, not putting words into their mouth when interviewing	[92-112]	og det er jo i virkeligheden det vi også gør når vi laver det antropologiske arbejde altså det her det var jo bare at kombinere det antropologiske med designarbejde men når vi laver det antropologiske arbejde så handler det jo om at vi prøver på så lidt som muligt over hovedet at introducere nogle ord som folk ikke selv bruger. Så for eksempel diabetes altså hvis man snakker i danmark så er der nogle der siger diabetes og nogle der siger sukkersyge men hvis jeg som interviewer starter med at sige diabetes så kender de jo godt ordet diabetes og så begynder de bare at sige det. Så derfor så er det vigtigt at man sådan siger ja vi er her jo i dag for at snakke om den. og så ved man ikke en gang kalder de det en sygdom eller en tilstand altså du ved. så man lyder sådan helt usikker i starten fordi man vil ikke sige noget som de ikke har sagt så jeg har sådan et indgangsspørgsmål som jeg bruger rigtig meget som virker rigtig godt. fordi de ved jo godt hvorfor de er kaldt ind til det de ved godt hvorfor de er med. så hvis jeg siger hvornår startede det hele for dig. Så siger de det hele hvad mener du. ja altså det bestemmer hvad der hører med til historien. nå men så kan. det kan starte på alle mulige tidspunkter det kan starte med jamen jeg fik et job hvor jeg havde en sundhedsforsikring så gik jeg til lægen for første gang i ti år. Nå så var det der det ligesom startede der fik jeg diagnosen for første gang. Der er nogle andre der siger det startede faktisk da jeg var spædbarn fordi min mor var bange for at det var krigstid og så gav hun mig piskefløde i sutteflasken ikke. så blev jeg overvægtig. Så får man deres oplevelse af både hvad det er og starttidspunkt og så begynder de også at sige nogle ord og så kan man så tage de ord de siger og arbejde videre med dem og så en gang imellem så kan man godt høre man kommer til at sige noget helt forkert og så retter man bare ind eller man kommer til at sige diabetes og de siger i virkeligheden noget sugar. og så siger man okay sorry jeg kan godt høre du kalder det sugar men kan du så fortælle hvorfor kalder du det det. fordi de ved jo også godt at de siger noget andet end jeg siger og så kommer man den vej ind til at tale om livet med den her sygdom fra deres perspektiv.
17	Difference of experience and design	Going from experiences to design is continuous	[112-114]	og der fra og så til altså det er jo en lang lang vej hen til altså at kunne putte det ind i nogle dimser men der har vi jo altså og det er jo en øvelse som vi bliver ved med at skulle forholde os til at altså
18	Going from NN world to user world is not easy	Users live in another world than engineers, and you need to think about what makes sense for the user	[114-118]	vi har lige haft sådan en dialog også med vores Seattle afdeling hvor de siger jamen prøv at hør hvorfor kan vi ikke lave den her fem sekunders rutine et eller andet de vil have folk til at gøre for at det kan fungere med det digitale løsning. hvorfor skal folk gøre med de der fem sekunder altså whats in it for them altså de bliver nødt til at. så vi prøver hele tiden på vi tegner meget sådan et bjerg eller vi laver det jo som to bjerge og siger novo nordisk er her og så er patienterne her og de lever i et helt andet land og
19	Going from NN world to user world is not easy	introducing users different rationality confuses engineers	[119-121]	ingeniørerne bliver meget utrygge har vi fundet ud af nu hvis vi siger at de har en anden rationalitet fordi at sige at der findes flere forskellige rationaliteter det er de færreste ingeniører der kan håndtere det fordi rationel er rationel men det er jo sådan det er.
20	Understanding the user's world through user testing	An antrhopologists job is to understand the difference between the two worlds through user tests	[121-123]	så vores arbejde som antropologer handler om at hele tiden gøre opmærksom på at det vi synes er rationelt synes de ikke er rationelt. og derfor kan vi hverken bruge vores sprog eller vores værdier eller vores altså forestillinger om hvad der er rigtigt og forkert til noget som helst. og derfor laver vi jo rigtig mange brugertest
21	Adding to normal user testing, focusing on experiences	Adding additional work to the normal usability testing was succesful, adding evaluation of experience	[123-127]	men hvis vi laver brugertesten med at spørge dem hvad synes du om det her så får vi heller ikke meget og derfor synes jeg faktisk at vores setup i det der DEVICE C projekt i forhold til metodik var utrolig vellykket fordi vi både gjorde det som usability folkene plejer at gøre men så derfra ligesom udtrak essensen af den oplevelse folk synes de havde.
22	Presenting knowledge to designers	Insights about experience changed designers way of working	[127-129]	. og jeg tror også nu ved jeg så ikke fordi vi ligesom kort tid efter blev vi delt i forskellige afdelinger men jeg tror hvis du spørger Louise så har det haft stor indflydelse på hvordan de har arbejdet med design af den der DEVICE C pen fremadrettet.

23	User's preference in device's medical look in diabetes and obesity	Medical look is good in the eyes of obese people due to their experience with a lot of different types of herbalism that did not work, while in diabetes it should rather look mundane or everyday like	[129-136]	Der var en af dem jeg kan huske det var en af de der modsætningspar var det ser meget medicinsk ud og hvor vi så i diskussionen af hvad er så det modsatte af medicinsk og der var det sådan noget med om det skulle se naturligt ud og er naturligt det modsatte af medicinsk og hvor det gik op for os at det medicinske var positivt i den her sammenhæng hvor når du for eksempel snakker diabetes så vil du måske hellere have medicin det ser mere sådan hverdagsagtigt ud hvor at de her folk som er obese de har prøvet hvad som helst af mystisk naturmedicin for at overkomme deres obesity eller at gøre noget ved den så de vil faktisk ikke have det ser naturligt ud jo mere medicinsk og klinisk det så ud desto bedre. og det var noget andet altså. og det kom frem i sådan nogle altså det kom jo ikke direkte det kom sådan af omveje fra.
24	Assumptions to product use	When relying on wrong assumptions project teams risk discussing elements like cartridge expection which has no relevance to the user	[137-142]	så er der sådan noget som med også at vi tror jo altså der er jo ting vi tror og det kommer rigtig meget frem når vi så bliver kaldt ind til sådan nogle ingeniørteams for at drøft noget. og vi har lige haft en ned vores DEVICE A team som gerne vil vide nogte om om folk inspicerer cartridge før de tager deres insulin og de har alle mulige snakke om det fordi hvis de nu og bla og de laver sig alle mulige forestillinger om det. men man kan bare sige det gør de ikke. de kigger ikke på den. bum. altså de skal slet ikke diskutere om de skal se den på den ene side eller på den anden side eller om de skal se den på hovedet
25	User tests on products can show irrelevant results	User testing on catridge windows shows preference within cartridge windows, but users do not use it	[142-145]	og der kunne man nemt lave en brugertest jamen kan de best lide at du kan se den på den her måde på den her måde eller på den her måde jamen det vil de jo svare på hvad de bedst kunne lide hvilken måde de bedst kunne lide at se på den på men faktum er at de aldrig kigger på den.
26	Users trust instead of inspect product	Users puts their trust in the producer of the pen, which the engineer does not understand.	[145-149]	så de har fuldstændig tillid til at den der cartridge er der altså selvfølgelig er den der altså. men det er jo Novo nordisk mindset det er jo ingeniøren mindset altså det er da mærkeligt at de ikke lige tjekker om der er medicin i. nej det gør de ikke der regner de med at der er. og det kan være rigtig rigtig svært at forstå og det arbejder vi jo og det er jo naturligt nok det er jo ikke for at tale dårligt om vores ingeniører de gør jeg det bedste de kan og
27	Different worlds of users and NN	Users worlds are different and antrhopologist are trained in finding the differences, which are significant	[149-151]	det her med at man bor i hver sin verden og har sine egne værdier og rationaliteter det gælder jo os alle sammen. og så er vi bare nogle der er trænet til at havae det som vores profession at gå over i nogle andre verdener og kunne forstå at her ser verdenen anderledes ud. og den ser vitterligt anderledes ud
28	Type II about being healthy	type II diabetics do not have as a goal to become healthy	[151-153]	og en af de aller aller største erkendelser med lige for tiden det er at patienterne med type to diabetes ikke nødvendigvis har som mål at blive mere sunde.
29	NN people about being healthy type II	If NN people got type II they would find out how treat yourself and to be more healthy	[153-156]	det er super svært for alle de her marathon løbende novo nordisk ingeniører at forstå fordi samtlige af os der er og mig selv inklusiv som er her hvis vi fik en type to diabetes diagnose så ville vi straks gå analytisk til værks og sige hvordan kan jeg kurere det her hvordan kan jeg være mere sund og hvad kan jeg gøre.
30	Type II treatment means changing personality	Type II is a paradoks, as people get it because they cannot do what is needed to control it	[156-159]	og det gør de ikke. men de gør det jo ikke fordi altså det er jo derfor de har fået sygdommen så der er jo sådan et indbygget paradoks i type to diabetes som er at du får sygdommen fordi du ikke gør. der er noget du ikke gør eller gør på en bestemt måde. og for at komme i god kontrol med din sygdom så skal du gøre noget andet. men det er jo netop det andet du ikke kan og det er derfor du har fået sygdommen.
31	Telling people how to treat type II is not enough	NN cannot tell people how to do and then expect them to do so	[159-161]	men hvis vi sidder herovre og siger nå men så skal de gøre noget andet og nu viser vi hvordan de skal gøre så kommer vi ikke særlig langt fordi det gør de jo ikke altså.
32	Prioritising treatment	type II's do not prioritise treating their illness over their other priorities	[162-168]	F: Men hvad er det så. nu siger du de vil ikke P: Være sunde F: være sunde og raske. hvad er det så de gerne vil. P: De vil for eksempel gerne altså vi har en som siger min største prioritet er at min familie har tag over hovedet altså det er nok vigtigere end min sundhed. ja det kan jeg så godt forstå. eller at de vil gerne ud og spise med deres venner på den restaurant som serverer fried chicken og macaroni and chees og corn bread og som er det mad de er vokset op med hele deres liv.
33	Type II's desires	Type II's want to be part of a community	[168]	og de vil gerne være en del af et fællesskab.
34	Type II's desires	Weight loss is not something you want. But one woman found that weight loss allowed her to play with her grandchild. That was something she wanted	[168-173]	. vi har også et filmklip hvor vi snakker med en kvinde som har type to diabetes og som har faktisk formået at komme i rigtig rigtig god kontrol. men det altså du kan også se det med vægttab. hun fik at vide at hun skulle tabe vægt. men vægttabet er jo aldrig det som man gerne vil men fandt ud af da hun tabte noget vægt at hun så kunne lege fangeleg med sit barnebarn. det vil jo være. hun vil gerne lege fangeleg med sit barnebar. det er relationerne altså det er det det handler om.
35	Disease and weight control methods	The woman had a cheat day to stay in control.	[173-177]	og så fandt hun en måde hvor hun kunne holde sin diæt ved at have en ugentlig cheat day hvor hun måtte snyde. og på sin cheat day så måler hun ikke sit blodsukker fordi så det går alligevel galt. så hun har en dag om ugen og den dag om ugen viser sig så tilfældigvis at være den dag vi er der. og så spørger vi hende så hvad er så i dag. Ouuuh nu skal du se sagde hun så og så rejser hun sig op og går ud i køkkenet og tager sådan en bakke med doughnuts.
36	Priorities	togetherness and belongingness is more important than health	[177-179]	og så siger hun vil i ikke have en. lad mig ikke være alene. spis den sammen med mig. togetherness thats what its all about. så hvis du tager folk ud af deres togetherness og beder dem om at være healthy så tilhørsforhold er vigtigere end sundhed.
37	Cultural influence	People lives in cultures that makes them sick. Asking them to be healthy means removing them from this culture	[179-181]	og nu bor de her folk tilfældigvis i en kultur hvor det tilhørsforhold de har det gør dem utroligt syge. så hvis vi så ber dem om at være raske så beder vi dem også om at trække sig selv ud af deres kulturelle tilhørsforhold.
38	Disease control means changing culture	Succeding controlling disease means removing yourself from family and make drastic changes	[181-183]	og dem vi ser lykkedes de spiser alene og de spiser ikke med deres kollegaer de flytter væk fra deres familie altså det er sådan nogle ret voldsomme ting man bliver nødt til at gøre for at komme væk fra det.
39	Defining happiness	It is risky to judge whether other people are happy or not	[184-187]	F: Så kan man sige at det at de bliver mere raske måske gør dem mindre lykkelige eller i hvert fald tvinger dem til at skubbe sig selv i en forkert retning. P: Ja og det er jo meget dømmende at snakke om kan vi vurdere om de er lykkelige eller ej men i hvert fald så gør vi jo.
40	Defining happiness	We may judge people to be unhappy being type II diabetics, while what actually puts them in an unhappy situation is forcing them to change	[187-191]	vi dømmer dem jo faktisk til at være ulykkelige når de er tykke og unhealthy. de må være ulykkelige. nej det er de faktisk ikke. men hvis vi beder dem om at spise brocoli og tage det med i deres madpakke og spise den så er det faktisk en rimelig ulykkelig situation og stigmatiserende så det var også det at. det er det der hele tiden sker vi måler det her ud fra vores egne normer og værdier og holdninger og rationaliteter. og det er der hvor vi bliver nødt til at gå ind og kende deres.
41	Connect design details to rationalities	Users rationalities goes all the way down to design details like inspecting cartridges	[191-193]	P: og det kommer så altså helt ned til designdetaljer. F: Ja P: er det naturligt at inspicere en pen for at se om cartridge er på plads. Nej.
42	Design stakeholders	There might be other stakeholders in design than the user's experience	[193-195]	men den kan jo så godt være. der er jo andre end patienterne der er interessenter i det her spil for der er jo også alle mulige regler og regulativer og fda og ting og derfor kan det jo godt være man bliver nødt til at kunne se det alligevel ikke.
43	Design goals of injection pens	taking your medicine must not be another complicated think, as type II's have hard and challenging lives living with their disease	[196-200]	F: Men altså vi kan jo ikke redde verdenen med den her pen. men hvad er det så vi kan gøre med den. P: Vi kan i hvert fald gøre det så lidt. Det som vi ved fra vores antropologiske arbejde det er at det er et benhårdt liv de her folk har. det er benhård og det er ikke for sjov at have diabetes. det er simpelthen virkelig nedern. det er op ad bakke på alle måder og det er super svært så vi kan lave bare. altså det må ikke være besværligt også. altså at tage sin medicin må ikke være besværligt. Der er rigeligt der er besværligt i de her menneskers liv.
44	Device design does matter	Engineers might think that small design changes does not have effect, but it does	[201-204]	derfor vi får altid det spørgsmål når vi viser vores materiale til nogle af vores kollegaer så siger de. altså jeg sidder og bruger min karrier på at nedsætte newton fra nu ved jeg ikke helt hvordan det er med newton men tre komma fem til tre eller et eller andet i kraft man skal bruge på at trykke. altså gør det overhovedet en forskel. og så bliver vi nødt til at sige ja det gør det faktisk.
45	Device design have an impact also in the big picture	Compared to bigger forces, it might seem like a minor detail, but we believe this actually matters	[204-207]	jeg kan godt se i det store og hele og i mac donald og den ulykke de skaber og coca cola og sundhedssystemet og forsikringssystemet i usa og sådan noget altså er nogle faktorer som selvfølgelig betyder helt vildt meget så kan man godt synes at den der lille halve newton betyder ingen ting. men vi bliver jo nødt til at tro på at hvis vi på en eller anden måde kan gøre det mindre svært.
46	Type II's experience at the doctor	People feel like failures in many ways, especially when going to the doctors. Devices should not be a place to fight	[207-209]	de her folk de føler sig jo som en failure på rigtig mange måder også. og især når de går til lægen så hvis vi kan lave noget der gør at de føler i det mindste ikke her at de skal kæmpe en kamp.
47	Aspects affecting type II's experience	Not understanding things makes people feel like a failure	[210-216]	F: Og hvad får det til at føles sådan P: Jamen det er hvis man ikke forstår ting. altså hvis man ikke forstår. altså blodsukkermålinger for eksempel. det er mig en gåde hvorfor der ikke er nogen der har fundet på at lave noget der hjælper dem til at. vi har jo lavet nogle studier nogle antropologiske studier der viser at folk de fatter ikke en bønne af hvad det vil sige deres blodsukker er tohundrende eller tohundrede og tyve. de har jo fået at vide det skal ligge. nu er det amerikanske målestok ikke. der har de fået at vide det skal ligge mellem halvfjerds og hundrede og tyve og deres det ligger tit på tohundrede fordi sådan du har højt blodsukker og diabetes.
48	Experience of lowering blood sugar	It does not feel bad to have high blood sugar. Adjusting to the right blood sugar feels bad for a long time	[216-219]	men det gør ikke ondt at have højt blodsukker og det er faktisk ikke væmmeligt. men derimod er det faktisk ret væmmeligt når man har haft et blodsukker på tohundrede i flere år hvis man så får det ned på det niveau som det skal være. det føles rigtig ubehageligt i starten i de første mange måneder altså i en lang periode.
49	Contradictig signals from body and knowledge	What feels bad for your body is actually what is good and vice versa.	[219-224]	. men hvis du har det på tohundrede så er det du ender med at få amputeret dit ben og blive blind og få nyresvigt og alt det her ikke. så dillemaet er at du har et for højt blodsukker som ikke føles væmmeligt men giver dig de der komplikationer på langt sigt men hvis du får det ned så føler du det her og nu væmmeligt. og hvad kan du forholde dig til. og det er noget af det Peter arbejder meget med detder med forskellen mellem det biologiske og det kognitive. altså det er jo kognitiv viden det er godt det mellem halvfjerds og hundrede og tyve men kroppen siger det modsatte.
50	Communicate information better	Make people understand what happens with high blood sugar levels can be done better	[224-227]	og der har jeg endnu ikke hverken set eller hørt nogen der har fået det forklaret det på en måde der får dem til at forstå det andet end som en eller anden intellektuel øvelse. og der tænker jeg der er da i hvert fald potentiale der for at gøre noget hvor man ikke bare siger prøv at høre hvis du bliver ved med at ligge der så bliver du blind og får amputeret benet.
51	Methods for persuading type II's to control disease	Intimidating type II's with amputations does not work, as this has become more common to them	[227-235]	og det som man så også skal sige det er noget vi har opdaget for nyligt altså ikke fordi det er nyt men fordi vi er begyndt at lægge mærke til det det er at det er blevet sådan en hverdagsalmindelighed at folk har amputerede ben. altså hvis jeg kendte nogen der havde amputerede ben. jeg kender jo ikke en gang nogen i mit privatliv. der er ikke nogen i min omgangskreds eller i min familie. altså jeg synes amputerede ben er ret alvorligt. altså det skræmmer mig seriøst. hvis jeg havde en sygdom hvor nogen sagde til mig shit du kan få amputeret benet så ville jeg blive bange. men her ovre de kender det er jo helt vildt de kender alle sammen en der har fået amputeret benet. de kender alle sammen en. det er en onkel eller en fætter eller en bedstefar. det vil sige de ved det godt men det bliver en del af deres normalitet som så gør at det slet ikke er lige så farligt.
52	Difference in reality between user and NN	Things like salad we see as good are bad to them and things we see as scary like amputations are common to them	[235-241]	altså og noget af det de så får at vide de skal. altså vi ser dem jo sidde og sige ja lægen har sagt jeg skal spise salat. og så bliver ssaallaatt sagt som sådan noget bwadr noget ikke. altså som noget ækelt ikke. men det er fordi vi tror at salat er lækkert og det er det måske også som vi kender det. men der ovre der er salat virkelig bward. og amputerede ben er normalt og det gør jo ikke et amputeret ben mindre skr... men på en eller anden måde idet at det er der i dit liv og din omgangskreds gør det også mindre scary altså. så det er også noget med at vi tror vi kan skræmme med noget der ikke skræmmer for eksempel.

53	Difference in reality between user and NN	We do not know what to do, but we know what it's like out there	[241-245]	men det har noget at gøre med at jeg ved ikke hvad vi kan gøre det er jo derfor vi er her så mange mand. altså nogle gange bliver vi jo også spurgt vi er to antoprologer og fyrretusinde i novo så hvis der er nogle der spørger hvad skal vi gøre så siger vi det ved vi virkelig ikke nu kan vi fortælle jer lidt om hvordan virkeligheden ser ud og kan vi så ikke være sammen om at finde ud af hvad vi kan gøre. altså bare det der med at forstå at et amputeret ben ikke er et skrækscenarie.
54	Type II's understanding of diabetes and treatment	The user really knows nothing on diabetes, so whatever she gets from the doctor is a full package that can help the user	[245-251]	det er det jo på sin vis men hende her der havde med barnebarnet og hun kunne løbe efter barnebarnet og med doughnuts og sådan noget hun siger sådan jamen så kom jeg til lægen og fik jeg insulin og så skulle jeg måle blodsukker og jeg skulle det hele og hvad ved jeg. jeg ved ikke en skid. jeg forstår ingenting. det eneste jeg ved det var min mor hun er død altså af det der diabetes. thats all i know. og så sidder hun der med sin pakke af genstande. så hvis den der pakke jeg er helt sikker på at det man kan gøre det ligger jo ikke kun i insulinpennen det liger jo i en eller anden måde den konstekst den indgår i
55	Difference between commercials and real life with type II	Commercials shows a life very different from the one type II's live	[251-255]	og altså der kan du prøve at se nogle af sådan nogle. der er sådan nogle reklamefilm for diabetes medicin i usa hvor man må reklamere direkte til patienter hvor man også tænker. jeg tror ikke det er det men altså der må jo sidde nogle der har postet så mange mange mange penge i det men hvor det bliver projekteret som sådan noget yeah get into the groove og der er sådan noget. det er ikke sådan det er at have diabetes altså nu skal vi bare jeg tager lige et shot og så kører vi videre og livet er en fest.
56	Diabetes in the context of a full life	Diabetes is a minor detail in a life, where other things matter more.	[255-264]	det der liv de har er jo vældig vældig skrøbeligt og diabetes er ofte a minor detail i et liv hvor at som en anden sagde jeg synes egentlig jeg er meget succesfuld og hun sidder fuldstændig ude af kontrol med sin diabetes. kæmpe kvinde med alle mulige sygdomme. og også en eller anden hudsygdom som gjorde hun så forfærdelig ud. det var ikke rart og alt det der mennesker der sidder der. og så siger hun jeg synes egentlig jeg har haft rimelig meget succes i min liv. og så prøver jeg at spørge ind til hvad er det du mener. jamen jeg har fire sønner de er alle sammen voksne og der er ingen af dem der har været i fængsel. nej det er sgu også ret fedt altså hvis man bor i sådan et område hvor der er drug og kriminalitet og man har fire sønner og det er faktisk ens største bekymring det er kommer de ud i noget lort så det er en kæmpe succes der er ingen af mine sønner der har været i fængsel. nej så kan det gødt være lidt svært at hive en diabetes pen frem og sige kan vi snakke lidt om den her ikke
57	Diabetes as part of ones identity	When people recognize diabetes as part of themselves they have more succes staying in control	[265-272]	F: Ja selvfølgelig. men vil det så sige at det er. er det et mål. vil du mene at det er et mål for os at gøre at diabetes så ikke var en del af hvad man synes man var. giver det mening. P: ja en del af ens identitet eller hvad. F: Ja P: Nej det er jo faktisk dem der tager det åp sig som en identitet som lykkedes med det. dem som ligesom siger det er ikke mig. der er jo rigtig mange man møder de vil jo ikke injecere inde i stuen for eksempel fordi i stuen det er der man hygger sig. det er sådan et diabetes frit område. men dem som er ligeglade dem som har det med overalt det er jo også dem der kommer i bedre kontrol.
58	Integrating treatment	Make it possible to intergrate it into your life	[272-274]	så det er at gøre det muligt at integrere det i ens liv på en eller anden måde tænker jeg er vigtigt. det er jo også derfor det skal passe ind i tasken altså man skal kunne tage det med sig. derfor alle de ting omkring de er vigtige ikke
59	Fitting treatment into peoples lives	We sometimes need users to tell us the obvious because we fall in love with ideas, trying to make something that fits into people's lives	[274-294]	men der er også et andetmeget godt eksempel som kommer lidt nær devices et projekt vi lavede for nogle år siden da vi stadigvæk havde et portefølje for nogle produkter imod gigt som lukkede for nogle år siden. og der sad nogle designere her og lavede forskellige løsninger til emballage til det her gigtmedicin. og det her gigtmedicin bliver udleveret på hospitalet i en tomåneders pakker der varer to måneder til en ugentlig injektion. men det skal være på køl hele tiden også i transpottiden fra hospital til hjem skal det holdes koldt. så en af de løsninger der var blevet udviklet som vi testede i en fokusgruppe var en køletaske som ligesom samtidig var emballagen. sådan så man ligesom kunne få den der i den der taske sådan en engangskøletaske og så kunne man få den så kunne man ligesom tage den over skuldereen og så var alting koldt og så kunne man direkte putte den taske ind i køleskabet. og den var alle designerne her bare den der prototype og ideen om det ret forelskede i. og så møder vi de her brugere som alle sammen havde gigt i en fokusgruppe som siger. hvor der så er en og det er det der er så interessant fordi det er jo der hvor kvantitet ikke er vigtigt P: [sneeze] P: hvor kvantitet ikke er vigtigt hvor at så sidder der en og så viser vi den der. vi viser det bare på nogle tegninger. så siger han min kone vil aldrig. ja det foregår ovre i kolding. min kone vil aldrig have en taske i køleskabet der har været i bussen. og det var ikke noget med at syv ud af otte synes ikke. det var et statement fordi vi havde bare slet ikke set det. vi havde slet ikke set hvor ulækkert det egentlig var. men det er jo rigtigt så går man rundt med en taske. hvem ville putte sin egen taske ind i køleskabet ikke. det vil man jo ikke. men vi havde bare ikke opdaget det i en forelskelse af en ide. og det var ikke engang ham selv det var hans kone. min kone vil aldrig tillade at jeg havde puttet noget ind i køleskabet som jeg havde siddet med i bussen. det kunne vi jo godt se. det var jo fuldstændig åbentlys ikke. men det var jo fordi vi skulle jo lave noget der passede. der passede i livet.
60	Assumptions to good products in general	We believe attributes like small and discreet is good, but that is not always true, and we need to research this	[294-303]	. så der er jo hele tiden sådan nogle og i det der gigt projekt der lavede jeg sammen med peter en rigtig spændende undersøgelse af hvor man kan sige i det her bjerg ikke så er lille. man kan ligesom kigge på sådan nogle værdier som hvad er godt. vi tror på lille er godt vi tror på hurtigt er godt vi tror på diskret er godt vi tror på nogle forskellige ting. og jeg har også arbejdet med samme slags job som jeg har her har jeg arbejdet med i høreapparatindustrien. der har man samme lille og småt og diskret. og det gør nu at man nu har udviklet nogle høreapparater der er så mikroskopisk små så de der gamle mennesker der skal håndtere dem de kan overhovedet ikke ramme dem med deres finger og det giver ingen mening at de er så små men det er kun fordi der sidder nogle ingeniører og siger det skal være småt småt småt og det er lidt det samme vi har her basic ikke altså vi bliver nødt til at udforske hvad er det der er godt. og det kan vi gøre ikke
61	Different products have different measures of good	Discreet is good for things you want to hide but bad for things you want to get a hold of	[303-305]	diskret er ikke nødvendigvis godt. vil man gerne kunne få fat i det. og til gengæld så kommer de så siger de den der gule sharps container den bliver så gemt bag ved alt muligt fordi den gider de ikke er så grim men.
62	Understanding the user's world through talking to users in their homes	Talking to people in their homes makes you realise that you have to put away your assumptions and learn about them, as they have very different rationality and aesthetics	[305-319]	og de der ting du nævner i starten af vores snak med oplevelser eller dem kan man jo bedre få fat i hvis man er hjemme hos folk. hvis man er der hvor man kan snakke om andre ting de også har. vi havde også et studie i kina en gang hvor vi havde haft sådan nogle ideer. vi havde sådan nogle kort fordi vi ville gerne forstå noget om deres smag i forhold til noget design. og så havde vi sådan nogle forskellige kort vi ville vise dem og så skulle de vælge imellem nogle forskellige kort. og de der mennesker de kunne slet ikke forholde sig til de der kort. de der billeder vi herhjemme har siddet og tænkt de er rigtig gode dem kunne de slet ikke forholde sig til. og da det gik op for os mens vi var på studiet at det kunne de ikke forholde sig til og vi var heldigvis hjemme hos folk. og vi ville gerne have dem til at vælge imellem tre skal det være mest den slags eller den slags. jamen så gjorde vi det i stedet for at vi hurtigt kiggeede os rundt i rummet og så tog vi tre ting ned fra deres hylder og så måske en mobiltelefon af vores egen ikke og brugte dem. fordi så kunne man tage deres verdens æstetik. vi var chanceløse hjemmefra for at forestille os hvad kinesisk æstetik det bød på. men lige så chanceløse er man altså når man kommer ud der. i sidste uge lavede vi nogle interview i ishøj glostrup det er lige så meget langt væk fra min verden som kina er. det der er det helt grundlæggende det er at man skal forlade sin egen rationalitet æstetik værdisystem prioriteringsliste i forhold til sådan nogle livsværdier ikke. det er bare anderledes.
63	UX aspects should come from the user	Make sure that the aspects are user centered. The axis should be the user's but they cannot make them themselves	[320-328]	F: Fra hvad du har sagt nu så begynder min ide at lyde lidt naiv det der med om man kan stille nogle punkter op som de kan evaluere deres oplevelse af noget P: Ja men nej det var jo det vi gjorde her. men de punkter skal bare være brugercentreret. så altså jeg vil virkelig opfordre dig til at finde og se den der louise lavede den vi lavede sammen der. fordi vi stillede nogle punkter op og så evaluerede de. så tog de nogle genstande vi havde med ikke. både nogle packaging og nogle penne og så bad vi dem om at evaluere er den her mere naturlig eller medicinsk er den her mere menneskelig er den mekanisk. men det der var det vigtige her var at akserne som de evaluerede ud fra var deres. men dem kan man ikke bede dem om selv at lave. altså det var en analytisk opgave at lave de akser. så jeg tror ikke din ide er naiv jeg tror den er rigtig god
64	One size fits all strategy is not perfect	One size fits all does not work. People are different according to where they come from	[329-335]	F: Ja fordi jeg ville egentlig gerne have hjælp til at definere dem her af dig. men ud fra hvor vi skubber devicet fuldstændig væk så det ikke er den det er sådan hele oplevelsen af at bruge den hvor vi skal have nogle akser. P: der har jeg. jeg skal lige tænke. jeg tror jeg har faktisk en rigtig god ting jeg kan vise dig her. [Pause] P: og det der så er svært ikke. og det der er rigtig svært ved novo det er den der one size fits all strategi. altså i forhold til at tale dether så er det jo fuldkommen latterligt. det skal være det samme om det er ishøj eller kina eller usa eller brasilien og det kan man jo ikke.
65	Commercials of diabetes	Diabetes commercials does not hit all types of people some see them as not for them	[335-337]	og derfor ser vi jo også der der tv reklamer der rammer helt altås vi har snakket med folk som siger det er jo sådan noget pretty publicity eller også så siger de ja jeg har da set de der reklamer thats for the white rich people up north.
66	Commercials of diabetes	Tresiba ready was an embarrasing commercial for Novo	[337-343]	Jeg var lige været så heldig at se den der var det victoza ready P: Tresiba ready F: Tresiba ready ja lige præcis P: Det er bare sådan nej det er ikke det firma jeg arbejder for det er det ikke. jeg vil ikke. jeg er ikke med. fat det. Tresiba ready.
67	Eating culture	Soul food, this famous type of food that girls eat and is not embarrased	[344-351]	[Pause] P: Jeg har den her i en meget gammel version. jeg har også en bedre designet udgave men pyt nu med det. Her ikke der har vi nogle kvinder som sidder på en restaurant i harlem som vi er gået hen på fordi vi har i så mange interview hørt folk snakke om soul food så tænkte vi nu skal vi selv opleve det. så kommer vi hen på den her restaurant og det er fuldstændig der er ikke et bord at få det er tirsdag aften ikke. så vi kigger bare lidt rundt og så ser vi det her mad og så siger vi til de her kvinder om ikke jeg må tage et billede af deres mad. så bliver de sådan jamen vi vil være med på billedet altså jeg vil jo ikke intimidere dem og tage et billede af dem men de vil vildt gerne være med på billedet. for der er ikke noget de synes ikke der er noget at skamme sig over vel. nå men med dem her i tankerne så har vi stillet sådan nogle begrebspar op.
68	Our world and type II's world	We tend to see ourselves as healthy, happy, not obese, high quality life. While type II's are the opposite	[351-354]	du siger healthy altså vi ser faktisk det handler også om det her med hvad er det vi er i og hvad er det for en verden vores patienter er i ikke. så er vi healthy ikke unhealthy. vi er ikke obese og de er obese. vi er normale og det der med at være unhealthy og obese det er noget not normal. high quality of life low quality of life. happy unhappy. social belonging stigmatized.
69	Our world and type II's world	They want to be served and do nothing while we want to be active	[354-352]	så havde vi sådan en anden en som vi spurgte nogen af vores kollegaer her inde på kontoret hvad er en drømmeferie det er også sådan noget vi typisk snakker med folk om hvad er der deres drømmeferie hvor kunne de godt tænke sig at komme hen. jamen så møder vi en der siger hiking in montana skiing in japan og diving i den røde sø red sea og sådan noget. hvor hvis vi spørger rigtig rigtig rigtig mange af dem vi interviewer altså det er jo næsten sådan så vi bliver helt overvældet af at vi får nogenlunde de samme svar hver gang så vil de gerne på krydstogt eller til las vegas. og hvad handler det om. det her det handler om at being active og det her ovre det handler om at lean back og be served. altså jeg vil bare læne mig tilbage og ikke gøre noget og så er der nogen der tager sig af det hele.
70	Our world and type II's world	They actually want the same, but have different ways of achieving it. They do not feel not happy, unnormal, bad quality life, but they will if we force them to change to our lifestyle	[362-373]	og det her ovre det handler om freedom. men sjovt nok så handler det her også om freedom. og det her ovre det handler om status og sjovt nok så handler det her så også om status ikke. så det er sådan nogle. altså den her den er jo meget sort hvis det er jo meget stereotypt at sådan er vi og vi tror de er sådan. det der så er det er for den gamle præsentation den har ikke filmen i men vi har sådan film som viser stemningen på den der restaurant. hvor de synger og danser og så når vi så viser den og siger okay. de er faktisk ikke unhappy de er rent faktisk rimelig happy. det er ikke sådan at de er stigmatised de hører faktisk til ikke. det er ikke sådan at de har en lav livskvalitet nej de har faktisk en høj livskvalitet og det er ikke sådan at de ikke er normale nej det er faktisk rimelig normalt. så sådan her ser det ud men det der ligesom er sket. det der sker hvis vi beder dem om at være sådan her. hvis vi beder dem om at tage brocoli med og slanke sig og gøre ting for at blive sunde. så oplever vi jo det her. så er der bestemt ikke nogen frihed. og hvis vi bad dem om at tage på det her [hiking, diving] hold nu kæft altså. og jeg tror når du spørger om det her er der nogle konkrete så kan man i hvert fald sige at det skal være. altså hvad er normalt og normalt det er super farligt at arbejde med ikke.

71	Feeling stigmatized as type II	Users should not feel stigmatised, but like they can live with the people and the culture they love	[373-390]	men hvad er stigmatiserende kunne godt være en ikke. hvad er stigmatiserende i forhold til at være social belonging. og den er nemlig rigtig stærk. anderledes end det vi forventer. det vil være en altså let me have my life. lad mig æde min soul food jeg elsker det. det er her jeg bor det er her jeg hører til det er det jeg er vokset op med. vi havde en fuldstændig fantastisk oplevelse med en kvinde hun siger. i know that fried chicken. i used to think it was a cultural thing. but now i know its not. its universal. everybody loves fried chicken. og everybode loves doughnuts og togetherness thats what its all about. så den ting der det må ikke. og hvis noget den der tresiba ready den kan i hvert fald få en til at føle sig udenfor. så det er tilhørsforhold og hvad gør vi så for eksempel så laver vi nogle penne der har en nål somder står i vores instruktionvejledning at de skal puttes i en sharps container. eller jeg ved ikke om det står der men det får de i hvert fald at vide og så putte de det i en sharps container og så går de ned på apoteket og så siger apoteket at de ikke vil have dem. så går de rundt med de der i tasken. det er jo ikke særlig sjovt vel og stå og gøre det rigtige og så står der en på apoteket og så står der en på apoteket og siger dem tager vi ikke imod. det har vi hørt så mange gange ikke. nå men så begynder de at gøre noget andet så begynder de at putte dem i noget papir og smide dem i skraldespanden og få en lille smule dårlig samvittighed. altså det er jo produktrelateret ikke. i den grad hvis det system der er omkring ikke er klar til at tage imod det på den måde som vi foreskriver så passer det heller ikke ind i systemet. så får man folk til at føle sig rigtig dårligt. vi har alligevel mødt mennesker der har sådan nogle kasser med nåle. med gamle nåle som de ikke ved hvor de skal gøre af så står de oven på et skab for at børnebørnene ikke skal få fingre i dem altså.
72	People's culture	remember that people are not as we believe they are, but they are formed by their culture, a flexible community	[390-396]	så jeg tror at det der er de vigtige det er når man laver de der begrebspar det er at man ikke tror at de sådan som man tror de er. at obese ikke hører sammen med not normal for eksempel. at man har dynamikken. altså en eller anden forestilling om at det er dynamisk og fleksibelt. og det også er kulturelt. min gamle professor kirsten hestrup har skrevet en bog der hedder kultur det fleksible fællesskab. og det er det her jo meget F: Ja helt bestemt P: et billede af. så folk er dele af fællesskaber i de fællesskaber som de er en del af.
73	Intuitive understood actions	things need to make sense to people in an intuitive not cognitive way	[397-400]	og så tror jeg det skal være forståeligt uden at bilve. altså så tror jeg også en anden modsætning eller ting det er jo Peters ting om det intuitive og det som der skal forståes kognitivt ikke. og der er vi i vores del af verdenen i novo nordisk delen kognitiv er okay og godt vi skriver det da bare ned. så forklarer vi dem bare at de skal vente i seks sekunder så venter de i seks sekunder. nej pommes frites det gør de ikke.
74	Mindfulness of actions being intrusive or overwhelming	How much something fills for a person can be very different depending on who the people are, their experience and their culture and it is not simple to say how much something fills to a person.	[401-423]	F: sidst jeg var her der snakkede vi også om sådan noget af det der med hvor. ja vi brugte det her ord emotional simplicity. som var det der med altså du må rette mig hvis det er forkert men det der med om det fyldte meget. P: Ja og det er jo også fleksibelt eller fluktuerende eller hvad man skal sige fordi der lavet nogle studier i hæmofeli hvor at hvis du er rigtig god til at tage. der skal skal de jo tage det intravenøst ikke. det er jo en svær procedure det her med at tage en hæmofæli medicin dosis fordi den skal ind i blodåren. det er voldsomt traumatiserende for det lille barn. Men for den enogtyveårige som har gjort det tre gange om ugen hele sit liv fylder det ikke særlig meget. så det kommer også an på livsfaser og hvor man er. men derfor kan vi heller ikke lytte til den enogtyveårige og spørge ham er det svært. nej det gør ikke særlig ondt. det fylder ikke særlig meget det gør ikke særlig ondt. så jeg tror det er rigtigt at man skal undersøge det. og det er måske meget godt billede med det her fordi hvis du beder dem her om at tage brocoli med for at tage dem her ikke [picture of women on restaurant] siger til dem ved du hvad når du skal ud og spise med dine tre veninder så tager du bare din egen lunchbox med så lav lidt salat så vil det jo være en emotionel fylde. det vil jo ikke være særlig simpelt på nogen måde. og på samme måde hvis du arbejder vi har jo hørt nogle sige jeg kan ikke tage min medicin med på arbejde fordi det skal være i køleskabet. de har ikke fattet det ikke behøver være i køleskab. men måske er det de siger at de vil faktisk ikke vise deres kollegaer at det har diabetes. så det fylder rigtig meget for mig at være social og sundhedsassistent og så faktisk have diabetes fordi det burde jeg jo ikke have fordi jeg burde jo vide bedre. så der kan man sige hvordan kan det fylde mindre. så hvis man laver sådan en der hedder at det skal være emotional simple så skal det være ud fra deres perspektiv. altså vi skal hele tiden have en dyb indsigt i hvad de menneskers værdisystem er.
75	actions being complicated	Have the device present a simple language and be simple gives fewer things to understand	[424-430]	F: Ja fordi jeg synes også at det jeg har oplevet det er det der med jamen hvis vi bare putter færre use steps og gør knappen nemmere at trykke på så bliver det lige pludselig simplere for dem. P: Ja og det er jo ikke rigtigt. F: Ja så det er det der med hvor meget fylder det for dem P: Ja og det kan være vi skal putte mindre. nu siger jeg bare noget. gøre sproget om den (uf) vi har lige været ude og lave en undersøgelse hvor vi så folk som havde den her DEVICE T pen som blev drillet lidt af nogle her i huset fordi de synes den er grim. men prøv at hør patienterne siger nu skal jeg vise hvordan man gør. man tager den der grå af. og så rykker man knappen over på den grønne eller tager den væk fra den røde og trykker man på den grønne knap. det er super simpelt. de skal ikke fatte en disse af nogen tal af nogen doser af nogen systemer af nogen nåle de skal ikke noget som helst vel. det er den grå og den grønne og den røde. det er ikke så svært.
76	Make developers understand users	Rather make the developer understand the user than to only evaluate products. Or do both	[430-436]	Og der kan man jo hvis man. det er jo vores ærinde hele tiden at prøve at gøre folk i stand til at gå i deres sko. og hellere at udviklerne bliver i stand til. altså tilbage til det indledende. at udviklerne er i stand til at tage de her sko på end det er at tage den der ting i hånden og gå ud og spørge.men det er ikke nemt. F: Nej P: eller også skal skal man gøre som vi plejer at gøre begge dele. F: Ja og så tager og holder det op imod hinanden. P: Ja
77	Aiding patients is a complex and changing task	Aiding patients is a complex problem that changes all the time. Therefore solutions will also need to change and there is not one perfect solution	[443-458]	og det er jo jeg tror en ting du kan bruge rigtig meget vi lærte vi var på en konference. novo nordisk har et stort program der hedder cities changing diabetes. som handler om de har puttet rigtig mange penge efter at prøve at finde ud af fordi det er jo et urbant i særdeleshed et urbant problem hvordan kan man gøre noget i byer som faktisk også forebygger og hjælper folk med at komme i bedre behandling. og på den konference så snakkede de om diabetes og lavede sådan en lille om diabetes som et kompleksk problem. i modsætning hvor komplekst ikke var i modsætning til simpelt men kompleks var i modsætning til kompliceret hvilket var et super interessant distinktion synes jeg. fordi kompliceret er et problem som har rigtig mange dimensioner eller elementer og så videre og så nævnte de som eksempel at finde ud af at sende en mand op på månen. det er super kompliceret det er overhovedet ikke nemt. men når man først har fundet ud af det så kan man også gøre det igen. så ændrer vilkåret sig ligesom ikke. men hvor det komplekse problem der hvis du løser noget af det så popper der et nyt problem frem. eller hele fundamentet for problemets beskaffenhed det ændrer sig løbende. og der nævnte de som eksempel børneopdragelse. så har man en treårig så tror man lige den er der. så vupti så dagen efter så det der duede i går det duer ikke i dag. og så er man på spanden igen. og det synes jeg var sådan er det jo både diabetes som sygdom men også designet af ting der kan hjælpe er en kompleks process fordi så gør vi noget så popper der et andet altså det er ikke en ting jamen så bygger vi bare ovenpå så på et tidspunkt så har vi den. F: Nej
78	Constant work of understanding people	Solving these complex problems means keep reminding yourself to see it from the user's perspective, and create activities to remind others about why they do as they do. They are not stupid, but part of a culture	[459-474]	Nej. og så er det så vævet ind i tilværelsens i øvrigt utrolig store grad af kompleksitet. så og når det så er sagt så er ingeniører opdraget til at løse komplicerede problemer hvor at det her med de komplekse og det menneskelige og det at tingene faktisk hele tiden ændrer sig godt kan være lidt svært. og det var et vilkår vi må leve med. altså det er et af de paradokser som er i det her som vi må hele tiden forholde os til. og for eksempel hele den her med vores fordomme om de andre de der fordomme vi har og forestillinger om hvem de andre er og hvad de kan og hvad de gør og hvad de synes det er ligesom sådan en man kan godt tage på feltarbejde og lave sådan en analyse og virkelig få empati og forståelse men selv som antropolog så går der et pra måneder så er man tilbage i sin egen forforståelse og sin egene holdninger. så tænker man hold nu op med at æde det mad. og så skal man altså det er ligesom sådan en musik der skal trænes. man kan ikke bare sige nu er den der nu har jeg forstået hvorfor de er super overvægtige og det faktisk ikke er noget jeg skal have fordomme overfor men jeg faktisk på en eller anden måde kan have en form for medfølelse over. det kan være rigtig rigtig svært. så der er brug for mange af os der arbejder med den del af det for tror jeg at lave et bedre produkt. F: Til at minde folk om det. P: ja og lave aktiviteter der gør at vi husker at det også er mennesker som har deres rationalitet. altså deres rigtig rigtig gode grunde. de er jo ikke idioter når de sidder der og spiser al den mad og æder sig tykke og syge. de er bare en del af en kultur hvor det er normalen. altså ja. jeps.