

The dark side of enjoyment

Using negative emotions to design for rich user experiences

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Abstract: This paper discusses the possibility of using negative emotions as a means for generating rich product experiences. The approach is based on the proposition that negative emotions can be enjoyable because of the ‘enriching benefits’ they bring to experiences. Psychological viewpoints on emotion are used to explain (1) why people sometimes seek to experience negative emotions and (2) what the conditions are that have to be met in order for negative emotions to be experienced as enjoyable. Four types of enriching benefits are distinguished: negative emotions empower for action, signify intriguing boundaries, intensify achievement, and enable contemplation. Protective frame theory from clinical psychology is used to explain that in order to enjoy these benefits, people need to be ‘shielded’ from the unpleasant elements of negative emotion by the use of a protective frame. On the basis of these mechanisms, ten different interaction qualities are introduced, which designers can use to generate rich user experiences.

Key words: *Design for emotion, Design methodology, Emotion theory*

1. Introduction

For a little more than a decade, emotion research has been actively used in the process of product design. The main aim of this effort is to predict what impact products and services will have on people’s emotions, and to try to design the product according to the most preferable effect. The research has resulted in a body of knowledge that helps us understand the role of emotion in the human-product relationship, and methods and tools to measure and design for emotion (e.g. [1]).

However, most research has focused on the nuances at the product-side of the interaction, resulting in theories about the general pleasure people experience with products (e.g. [2,3]). Little attention has been given to the different ways in which usage experiences can be pleasurable. As a result, most research relies on the basic assumptions that positive emotions contribute to a pleasurable experience, while negative emotions harm pleasurable experiences, and thus, that designers should aim for positive emotions, and avoid the product user to experience any negative emotions.

However, in life people have many experiences that involve negative emotions, but which are nonetheless engaging and even enjoyable. Furthermore, these experiences are not enjoyable despite the involvement of negative emotions, but rather because of them.

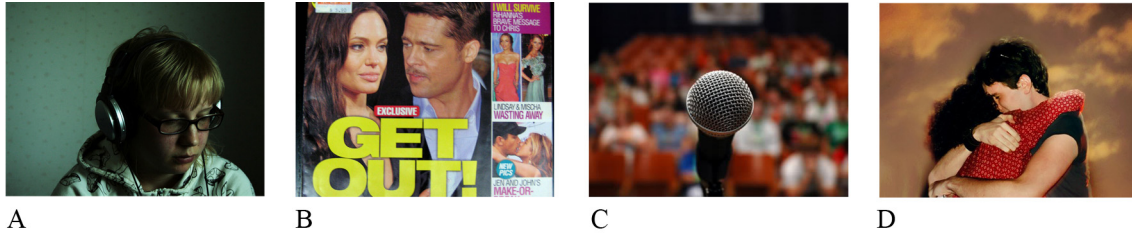


Figure.1 Examples of the enjoyment of negative emotions

Sources of art and entertainment contain some of the most obvious examples of this principle: People listen to gloomy music that makes them sad (figure 1A), pay to get scared by a thriller movie, get aggressive from a violent video game and buy gossip magazines only to get indignant about the stories (figure 1B). But also in real life people have negative emotions that are not necessarily unwanted. The excitement people experience when they have to give an important presentation is directly linked to their fear of social failure (figure 1C). On another account, when two people are very close to each other and have to separate for while, the sadness they experience when saying goodbye will make their importance to each other more tangible and significant (figure 1D). In each of these examples the negative emotions are not just put up with by the affected person, but are rather at the base of the enjoyable experiences itself.

The simplified equation of positive emotions to pleasant experiences, and negative emotions to unpleasant experiences, has created a gap between the range of emotions that designers are currently targeting through design, and the entire range of emotions that are potentially enjoyable. The main proposition in this paper is that negative emotions can contribute to engaging product usage, and that with the use of negative emotions, designers can create richer, more interesting product experiences. To ground this proposition we review some of the literature that explains why people sometimes seek to experience, and appear to enjoy, negative emotions. Furthermore, we discuss the conditions that should be met for negative emotions to be experienced as enjoyable, and we introduce an approach to use negative emotions to design for rich user experiences.

2. Enriching Benefits of Negative Emotions

The examples in the introduction illustrate that people sometimes willfully engage in activities that they know will evoke negative emotions, and even seem to enjoy these experiences. Someone who decides to go bungee jumping, for example, will most probably be aware that this activity will evoke fear. Apparently, the prospect of experiencing negative emotions will not always motivate people to refrain from engaging in a particular activity. A possible explanation is that the benefits of the desirable effects are appraised as more important than the costs of the negative emotions that will be experienced during the activity. For example, an individual may overcome his fear of rejection and approach someone in a bar because this individual appraises the prospect of meeting new people as more important than preventing the experience of fear. This would mean that people in some cases willfully engage in activities *in spite of* the negative emotions these events may evoke. This explanation, however, is not sufficient. We propose that negative emotions can have ‘enriching benefits,’ and that it are these benefits that motivate people to seek out events that evoke these negative emotions. In fact, some emotion theorists provide explanation of the purpose of negative emotions, and based on these explanations we propose four basic benefits of negative emotions: negative emotions (A) empower for action, (B) signify intriguing boundaries, (C) intensify achievement, and (D) enable contemplation.

(A) Negative emotions empower for action

Negative emotions generally signal undesirable situations. Some negative emotions, like fear, anger, and frustration, can empower and stimulate people to focus on solving the problem at hand. Frustration, for example, can provide us with the determination and focus that are required to solve the undesired situation. Likewise, anger can provide us with the courage and power to stand up to our opponent, and fear may give us the strength and focus to save ourselves in dangerous situations. In some cases we try to manipulate our emotional state to be negative because of these empowering effects. Tamir and her colleagues, for example, conducted an experiment about anger in which they asked participants to select music before playing a role game [4]. Their results showed that participants who were instructed to play a confrontational part performed better in the game after listening to anger-inducing music; and that these participants even unconsciously *preferred* listening to anger-inducing music to prepare them for the confrontation at hand.

(B) Negative emotions signify intriguing boundaries

People have the basic need to understand the social and material world, themselves, and their relationship with the world [5]. Individuals are attracted to new, odd, or strange things because these ‘borderline’ situations can tell them something about the world or about themselves. People are curious by nature, and therefore also implicitly interested in the dark sides of life. This nature is observable in people’s urge to slow down and get a glimpse of the results of a car accident – which we know can be horrifying or disgusting. The popularity of tabloids illustrates people’s desire to be informed about (moral) violations of celebrities. Hemenover and Schimmack found that, when pushed far enough, stimuli that elicit extreme feelings of indignation or disgust can sometimes even be perceived as humorous. Through their experiment they showed that people can be disgusted and amused at the same time by a single stimulus [6].

(C) Negative emotions intensify achievement

People sometimes engage in activities that they are reluctant about because this makes them feel good about themselves. For example, someone who decides to ignore his strong appetite for a fatty hamburger, sacrifices the satisfaction of an inviting meal for the experience of pride or self-respect. Mixed emotions may be generated because of conflicting concerns [7]. An inherently pleasant product can block goal achievement, since something pleasant (like a hamburger) can obstruct us in reaching a goal (trying to lose weight). An example is when someone decides to go for a run in the park when it is raining: the situation that brings immediate displeasure will yield a greater sense of self-satisfaction on the long haul. Reaching goals usually requires us to invest personal resources, ignoring direct pleasures in order to gain goals that are deemed more important. The experience of negative emotions can intensify the prospect of achievement satisfaction and can make the achievement afterwards more rewarding.

(D) Negative emotions enable contemplation

Events and situations can ‘touch’ or overwhelm people emotionally. Stories of tragedy, the national anthem, but also impressive works of art have the ability to bring tears to people’s eyes. Tan and Frijda [8] describe this effect as ‘sentiment’ and show how it occurs in film viewing. They argue that viewers surrender themselves to the powerful image or moment and become helpless in that sense. The feeling is very closely related to sadness,

which is evoked by an appraised sense of loss and lack of control. The result of this surrender is, on the one hand, that people start to connect with the object, as can be observed in patriotic feelings. On the other hand, the surrender can mentally detach people from the direct world, where they are more susceptible for reflection and contemplation.

3. Enjoying Negative Emotions

The fact that negative emotions are useful in the sense that they can provide behavioral and mental benefits, explains why people sometimes willfully seek to experience these negative emotions: go to scary movies, look at deformities, and drown themselves in sadness. But it does not explain why these negative emotions can be experienced as enjoyable. This issue is important because negative emotions are not always experienced as engaging; in some cases they are just experienced as plain unpleasant. The question is, therefore, what are the conditions that have to be met in order for negative emotions to be experienced as enjoyable?

These conditions are discussed in the domain of clinical psychology. Apter [9] introduced the concept of ‘protective frame’: negative emotions that are generally experienced as unpleasant, can become pleasant when they are experienced within a protective frame: an evaluation of a situation in which the individual ‘frames’ the threat or trauma as manageable and therefore transformable into excitement. Apter distinguishes between three types of protective frames, which are all based on creating distance between oneself and the emotional stimulus. The confidence frame is based on the confidence an individual has that a threat can be dealt with; i.e. parachutists can enjoy the jump given their confidence that the equipment is fully operational. The safety zone frame places the individual on a safe distance from the threat; i.e. a cliff can be enjoyed as long as one is sufficiently distant from the edge or behind a solid fence. The detachment frame signifies that an individual is observing a threat but not directly involved with it; i.e. the viewer of a thriller movie can enjoy the thrill because he knows that what he is watching is fiction. The distances these different frames provide are in some cases physical, like an actual distance or barrier between the individual and the threat, but can also be psychological of nature, like the notion that a threat is not real or can be dealt with. With a protective frame, unpleasant emotions can be turned into a source of excitement and adventure, and according to Apter, this is why many people find the rollercoaster exciting, go bungee jumping, and do almost any risky activity. A protection frame gives the individual a feeling of safety, even where dangers and threats are real, and this produces the paradox of danger-which-is-not-danger.

4. Using Negative Emotions to Design for Rich Experiences

A protective frame, an evaluation of the situation in which the individual can ‘frame’ the emotional threat, is required for enjoying negative emotions. This implies that, in order to use negative emotions to stimulate rich experiences, designers should have the ability to design products that enable users to construct protective frames. We have made two extensions to the protective frame theory in order to make it applicable to design. Firstly, Apter has focused mostly on enjoying situations because of the stimulating arousal they provide, like in parachute jumping. This is in our opinion however just one of multiple possible enriching benefits that negative emotions can offer. To also accommodate for other benefits, we added two ‘design relevant’ types of protective frames to the framework: the ‘reflection frame’ and the ‘interaction frame’. The reflection frame creates a distance between the user and the negative cause because it provides a window to the wider implications of the

situation. Knowing that a certain situation is actually good for oneself in the long run, the current negative emotion can be dealt with. The interaction frame on the other hand does not provide a distance between the negative cause and the individual, but rather gives the individual the opportunity to deal with the situation. This frame is useful for situations that elicit negative emotions because of a certain problem; instead of putting distance between the user and the problem, the interaction frame gives handles to solve it, or, to stay with the clinical psychology jargon, to ‘cope’ with it.

Secondly, in Apter’s theory negative emotions are converted to positive experiences. In contrast, we favor a co-activation approach. In this approach, the negative emotions are co-experienced with positive emotions, generating a richer experience (see [10] for a discussion of these different approaches). The proposition that positive and negative emotions can be co-experienced at the same time has recently gathered much support (e.g. [10-12]). We adopted this approach because it enables us to describe the effects of product design on people more accurately than the conversion approach.

Figure 2 depicts the general structure of rich experiences. The experience is initiated by a cause, which elicits the negative emotion with the enriching benefits. A protective frame around this cause subsequently ‘shields’ the user from the raw unpleasant elements of the experience, while preserving the enriching benefits. This yields a second, positive, emotion. The combination of the negative and positive emotion is the basis for the rich experience. Both the cause and protective frame are in essence designable features.

Imagine the following case: design an application for people who do not like to exercise at all, but who need to become a bit more physically active because their physician has told them that they need to take better care of their health. The emotion of frustration has the enriching benefit that it gives people determination and focus. So the first step would be to design a cause of frustration, e.g. an annoying sound that cannot be switched off or some desirable reward that cannot yet be obtained. Next, the precondition of enjoying this frustrating experience is the protective frame; we could for instance design it in such a way that they can control the source of the frustration, but not immediately, and only after some (physical) effort, which will provide them with a richer reward after all. These two steps should then provide both the cause and the protective frame that yields the rich experience.

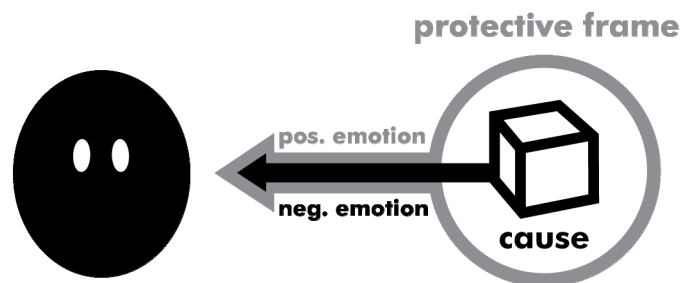


Figure 2: General structure of rich experience

5. Ten complex interaction qualities

In order to make the theory operational for design, it was applied in ten different interaction qualities. Interaction qualities are used by designers to denominate interactions without referring to its specific properties, thus enabling to talk about very different products in the same words. The interaction with a ticket machine can for

instance be playful, straightforward or soft, while the same words can be used to describe the interaction with different types of chairs. Most commonly the interaction qualities used by designers have a positive nature (e.g. playful) or neutral nature (e.g. straightforward, soft), following the paradigm that only positive or neutral emotions can be enjoyed. The ten interaction qualities that we propose are complex in nature, which means that they are partly negative and partly positive. By applying them to product design, we propose that users can experience the enriching benefits of negative emotions in an enjoyable way.

The following pages show these ten complex interaction qualities, along with examples of activities in the real world that contain these interaction qualities. Each of them was derived from one of the four basic benefits and follows the general structure of rich experience, so each one has a different cause and a protective frame, leading to both a positive and negative emotion. The graphic depictions of the different structures are included in figure 3.

(A) Negative emotions empower for action

The exciting (figure 3A)

This interaction quality relates to the description of excitement by Apter [13]. A threat normally elicits fear, if it is however at a sufficient ‘distance’, it can be enjoyed. This distance can be manifested in the physical world; like a barrier between a person and a dangerous edge. But it can also relate to more abstract concepts; sports can for instance be seen as containing simulations of threats and dangers in the real world. Certain stimuli trigger innate fears, like loud sounds, sudden bright light or quickly approaching objects, but can be made enjoyable by showing that they are either not really dangerous or can be coped with.

The challenging (figure 3B)

An obstacle elicits frustration; it is something standing in the way of achieving something. But on the other hand, without any obstacle to overcome, there would be no sense of achievement whatsoever. To mediate the frustration into a challenge, the obstacle should be encompassed by the possibility to overcome it. This quality occurs in any type of game, be it puzzles, video games or sports.

The dominant (figure 3C)

The dominant is the quality people enjoy when they exert their power. These kind of actions are meant to improve people’s (social) position in the world in an aggressive way. In its most extreme form it is called sadism; enjoying others having the pain, or seeing them loose. But milder forms are more common, for instance when someone plays a prank on a friend or beats them at a game. In these cases, the person is not aiming to actually hurt or humiliate their friend, but enjoys this experience because it is an abstraction of a real humiliation, which adds the necessary psychological distance.

The indulging (figure 3D)

The indulging is about enjoying activities that are not-done, either because they are bad for you or others, or frowned upon culturally. Examples are excessive eating during an all-you-can-eat buffet, which violates the socially accepted rule of moderation and health-aware behavior; or enjoying the television when you should really be working, which violates the norm of being a valuable member of society.

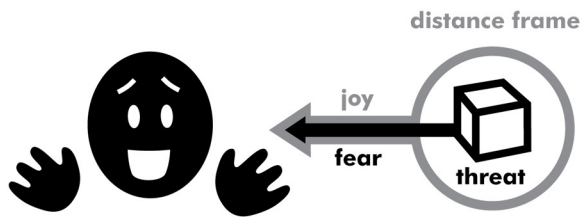


Figure 3A: Structure of
the exciting-interaction quality

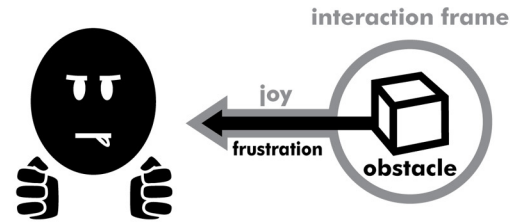


Figure 3B: Structure of
the challenging-interaction quality

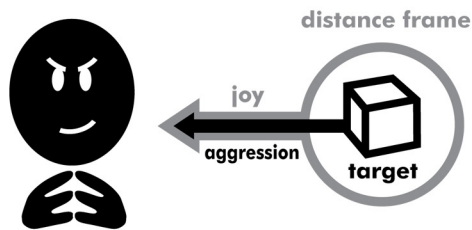


Figure 3C: Structure of
the dominant-interaction quality

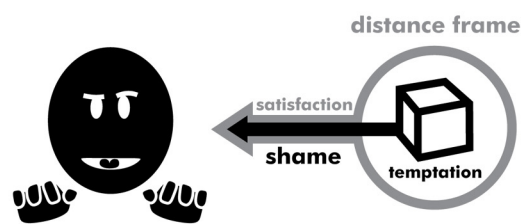


Figure 3D: Structure of
the indulging-interaction quality

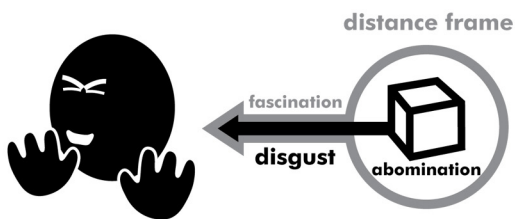


Figure 3E: Structure of
the grotesque-interaction quality

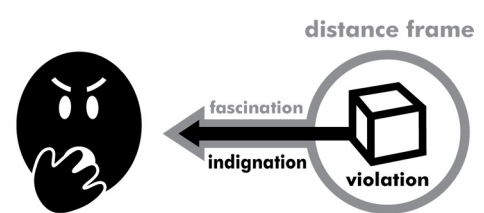


Figure 3F: Structure of
the scandalous-interaction quality

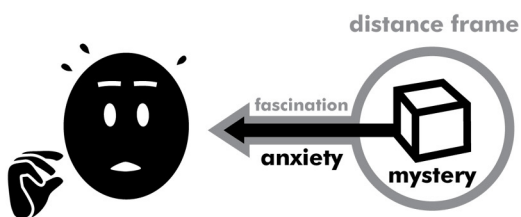


Figure 3G: Structure of
the eerie-interaction quality

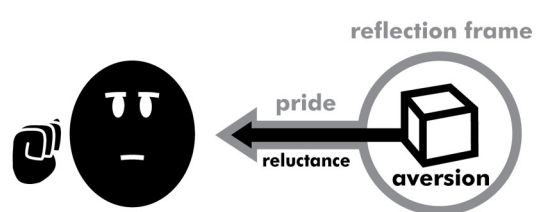


Figure 3H: Structure of
the self-sacrificing-interaction quality

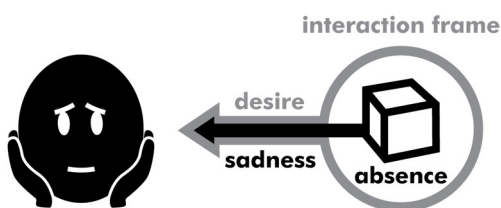


Figure 3I: Structure of
the unreachable-interaction quality

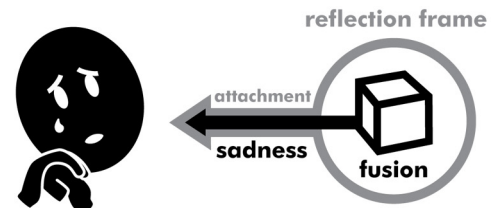


Figure 3J: Structure of
the sentimental-interaction quality

(B) Negative emotions signify intriguing boundaries

The grotesque (figure 3E)

The grotesque is about being fascinated by something that disgusts, physically or morally. Something disgusting normally provokes the reaction of avoidance, but if enough (psychological) distance is created it may elicit fascination, because it provides people with a safe opportunity to observe something new and intriguing. Examples of different strategies for creating this distance are: abstraction, stylization, exaggeration or humor.. This quality is used in entertainment aimed to gather a lot of attention, like shockumentaries and reality TV.

The scandalous (figure 3F)

The scandalous is a complex quality that on the one hand amazes, shocks or even outrages people, but on the other hand has such an attractive quality that it makes people want to know everything about it. It occurs when people witness someone violate the written or unwritten norms of society. The popularity of this quality is clear from the popularity of gossip magazines, but also serious news can open with a juicy story about politicians cheating with their expenses. A distance frame should keep this experience enjoyable; a scandal in one's own family is probably far from pleasurable.

The eerie (figure 3G)

The eerie is caused by an uneasiness or anxiety for something unknown or unfamiliar. This is different from the clear in-your-face type of fear that is present in 'the exciting'-quality. Instead this is the kind of unsettling fear that makes you feel pinned to the ground while watching horror movies or when seeing snakes, insects, and is also the basis of people's fear of the dark. It can be made enjoyable by providing sufficient distance (e.g. abstraction, stylization).

(C) Negative emotions intensify achievement

The self-sacrificing (figure 3H)

A lot of activities in life, like doing chores, dieting, or exercising are unpleasant because people feel reluctant to engage in them. But the experience will become rich if it provides, in addition to the reluctance, the opportunity for people to reflect that what they are doing is actually good for them. This quality can be found in exercise and diet programs, but also in little things like deciding to take the stairs instead of the elevator.

(D) Negative emotions enable contemplation

The unreachable (figure 3I)

Things or concepts that are important to people, but are currently out of their reach may elicit sadness. The missing 'objects' can be people or physical objects, but also concepts like a person's home or childhood. By giving people the opportunity to interact with these absent objects in some other way, they will experience this bittersweet desire. Examples are daydreaming of the ideal holiday, homesickness and nostalgia.

The sentimental (figure 3J)

Sentimentality is the feeling of being overwhelmed with emotion over a seemingly small matter. It is when we are 'touched' by a personal experience or an experience we witness in art. A get-well card from colleagues, a

waving flag or a helpless puppy can all be overwhelming because they symbolize something bigger; they make us reflect on friendship, patriotism and compassion. These experiences leave people with a greater sense of being connected to others or the world in general.

6. The complex interaction qualities applied to design

To test their value and practical usefulness the complex interaction qualities were tested in an idea generation session by the first author. The session had an open structure; the concepts could be for any context or user problem.

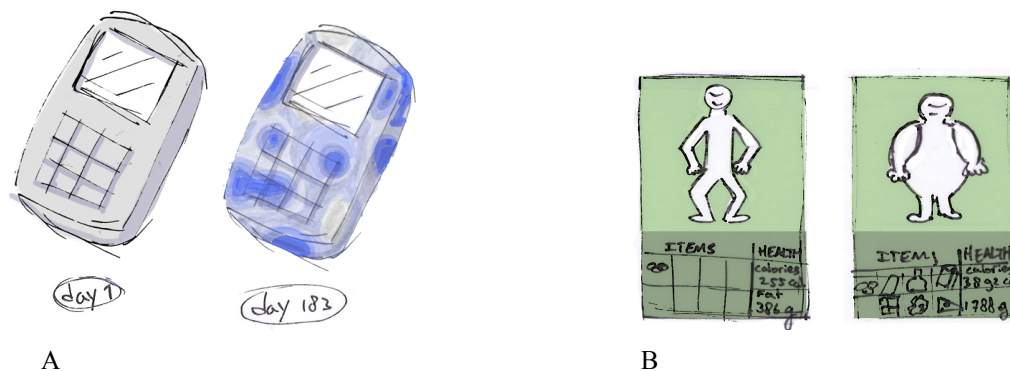


Figure 4: examples from the idea generation session

One of the ideas that used *the sentimental*-quality was a concept for a mobile telephone with paint layers that deliberately wear out over time, revealing increasingly bright colored layers underneath it (figure 4A). This was meant to emphasize that the phone becomes more personal with every use, since it only wears down where the user touches it. On the day of purchase the phone is completely grey, becoming more brightly colored after each use. At the same time the product symbolizes a greater theme of decay and eventual loss of all things. This rich experience should give users an attachment to the phone that a simple positive or neutral experience cannot provide (see figure 3J).

Another idea from the generation sessions was a smart shopping cart that reacts on the type of products the user places in the cart. The cart gives feedback to the user through a display using the *grotesque*-quality (figure 4B). When the user starts shopping a normal looking cartoon character is displayed, which changes shape and expression according to the type of products the user selects. If the user only selects items with a large number of calories, the cart will display an obese character. If the user selects only healthy products, the character will become slimmer and muscular. This type of interaction is thought to be more engaging and confronting for users than neutral messages about the nutritional values of products, while the abstraction and playfulness of the cartoon character should provide the distance frame (see figure 3E).

To be able to test some of the complex qualities with real users, a design case was set up that resulted in a working mockup of an electronic product. To this end, the Philips activity monitor [14] was redesigned and tested. The Philips activity monitor is an existing device that measures, stores and feedbacks on people's daily physical activity. The device uploads the data to a website that is linked to a program to stimulate users to reach a certain activity goal each day. In its current form the device and the website function in a factual and neutral way

by showing people how many calories they have burnt in text and graphs. The aim of the redesign was to use some of the complex interaction qualities to make the experience with the device richer and more engaging.

The *self-sacrificing*-quality was used in a function in which people could adjust their activity goals for the coming day (figure 5A). In the current product, people would check their activity level at the end of the day and often find out that they did not reach the recommended goal, which resulted in feelings of disappointment and frustration. The adjustment function provides a way to vent this disappointment by setting a higher activity goal for the next day, so users could in effect ‘punish themselves’ for not hitting their target. The user could set this target by turning the device to the desired level between 0 and 20, where each level gave a different audio tone as feedback, with increasingly loud and false tones for higher levels. This way, the fact that users were going to make it hard for themselves was not concealed or ignored, but rather emphasized to give users a sense of pride (see figure 3H).

The *challenging*-quality was used in a function that stimulates people to take short breaks from their work and have a little exercise (figure 5B). When people would accept the challenge, they had to chase a virtual creature walking ahead of them. The faster the user would walk or exercise, the sooner it would catch the creature. Since the users would be walking with the device in their pocket, all the feedback in the challenge was provided with audio signals. The frustration of not being able to immediately catch the creature, while being able to do something about this obstacle (by moving more), was meant to provide the challenge (see figure 3B).

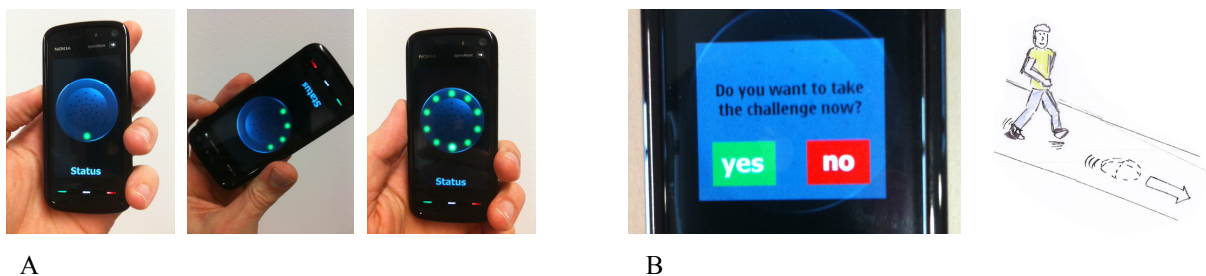


Figure 5: functions from the activity monitor mockup

The mockup of this concept device was presented to five users who tried it out for a few hours and gave feedback on their experience. The overall tendency was that they had to get used to the novelty of the rich experiences, but that they recognized at the same time that such functions can result in valuable and richer experiences.

7. Discussion

This article presents a different perspective of looking at emotions and experiences and provides an approach to use this perspective in practice. Although the approach was already used in idea generation sessions which yielded several interesting product concepts, it needs additional testing, and it will have to be applied in more detail to find out its true power and potentials.

The ten complex interaction qualities that this research produced were derived from discussions with artists and other researchers, literature research and personal contemplation. Although we feel that this set spans a substantial number of possible rich experiences, the list is by no means exhaustive. Further research could find additional complex interaction qualities.

For this research the two interaction qualities from figure 5 were implemented in a mockup device and tested with users in a small scale experiment. For future research it would be interesting to study the effects of prototypes with the different complex qualities on a larger scale, i.e. with more participants, in longer test sessions or even field tests, to rate the potential of each of them in consumer products, and to monitor users' experiences over time.

An interesting question is when rich experiences are suitable or appropriate for product design in the first place. From personal exploration we have found that it can greatly benefit neutral or 'boring' product experiences, in which case rich experience can give products a certain 'edge'. On the other hand, and arguably more interesting, the method can also be applied in product contexts that are already emotionally charged, because it provides a way to use the existing (negative) emotions in a situation, without trying to block them out or ignoring them altogether. For instance, the fear some children experience when going to their first day of school might be converted to excitement if there is some way to create a protective frame around the experience.

One of the more difficult problems in designing for rich experience will be the market acceptance. While consumers will more quickly and easily see the benefits of products that give them a pleasant experience with only positive emotions, they will arguably be harder to convince in buying products that give them a rich experience which includes negative emotions. On the other hand, there are several existing products with which people already have a rich experience; for example in the food domain, many products need an 'acquired taste' to be enjoyed. Products like wine, coffee, sprouts and chicory are often not liked by children, but popular with those who have 'learned to like' them. However, the acceptance of these food products weighs heavily on tradition, a luxury that rich experience products, which have yet to be designed, will not have.

One important issue this article does not address is the influence of personal differences on the possibility of rich experience enjoyment. Apter suggests there are excitement-seeking and anxiety-avoiding personalities [13], which determines how much 'distance' from danger a person considers to be safe. Designers can provide protective frames around negative causes to provide distance, but in the end it is the psychological appraisal that matters; some people will be scared of a cliff even when there is a sturdy fence between them and the edge. Also, for different people, different qualities may be appealing, based on their personalities, background and previous experiences.

Apart from individual differences, culture can also be a underlying source of different reactions to rich experiences. A lot of the theoretical concepts proposed or discussed in this report are based on western philosophy, western social science and western design theory. Several sources suggest that emotions and emotional experiences differ according to culture (e.g. [15]), so the claims made in this article might not be universal. There are some reasons to believe that in Asian culture mixed emotions and rich experience are already a more accepted and integral part of people's lives [12]. More research into cultural differences and their backgrounds may yield new and interesting conclusions about rich experience and its application.

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