Faces of Product Pleasure: *25 Positive Emotions in Human-Product Interactions*

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The study of user emotions is hindered by the absence of a clear overview of what positive emotions can be experienced in human-product interactions. Existing typologies are either too concise or too comprehensive, including less than five or hundreds of positive emotions, respectively. To overcome this hindrance, this paper introduces a basic set of 25 positive emotion types that represent the general repertoire of positive human emotions. The set was developed with a componential analysis of 150 positive emotion words. A questionnaire study that explored how and when each of the 25 emotions are experienced in human-product interactions resulted in a collection of 729 example cases. On the basis of these cases, six main sources of positive emotions in human-product interactions are proposed. By providing a fine-grained yet concise vocabulary of positive emotions that people can experience in response to product design, the typology aims to facilitate both research and design activities. The implications and limitations of the set are discussed, and some future research steps are proposed.

Keywords – Emotion-Driven Design, Positive Emotions, Questionnaire Research.

Relevance to Design Practice – Positive emotions differ both in how they are evoked and in how they influence usage behaviour. Designers can use the set of 25 positive emotions to develop their emotional granularity and to specify design intentions in terms of emotional impact.

Introduction

Products can evoke a wide range of emotions, both negative and positive. On the negative side, the complicated interface of a high-end music player might evoke irritation or dissatisfaction, while on the positive side, the same complexity might evoke fascination or pride. In terms of behavioural impact, these positive and negative emotions are fundamentally different: Whereas negative emotions stimulate individuals to reject (or withdraw from) the object of their emotion, positive emotions stimulate individuals to accept (or approach) the object (Frijda, Kuipers, & Schure, 1989). In consumer research, effects of positive emotions have been found that are in line with this general tendency: Positive emotions stimulate product purchase intentions (Pham, 1998; Bitner, 1992), repurchase intentions (Westbrook & Oliver, 1991), and product attachment (Mugge, Schoormans, & Schifferstein, 2005). In the field of ergonomics, positive emotions have been demonstrated to have additional beneficial effects during product usage. When using complex technology, positive emotions decrease usage anxiety (Picard, 1997; Helander & Tham, 2003) and contribute to the experience of usage comfort (Vink, 2005) and to general usability (Tractinsky, Shoval-Katz, & Ikar, 2000). In other words, products that evoke positive emotions are bought more often, used more often, and are more pleasurable to use. It is therefore indisputably worthwhile to design products that evoke positive emotions – products that make users feel good.

All designed technology, products, services, and systems evoke emotions, and not considering these emotions in the design process is a missed opportunity at best. To this end, design theorists have produced various approaches and frameworks that

support designers in conceptualising positive product experiences. Jordan (2000) discussed four sources of product pleasure, Norman (2004) introduced three cognitive levels of pleasurable product experiences, and Desmet (2008) proposed nine sources of product appeal. In my view, a main limitation of these approaches is their focus on generalised pleasure: they do not differentiate experience beyond the basic positive-negative distinction. In reality, products can evoke a diverse palette of distinct (positive) emotions, for example, pride, contentment, admiration, desire, relief, or hope (Desmet, 2002; Desmet & Schifferstein, 2008). Although all positive, these emotions are essentially different – both in terms of the conditions that elicit them and in terms of their effects on human-product interaction. For example, whereas fascination encourages a focused interaction, joy encourages an interaction that is playful (Fredrickson & Cohn, 2008), and thus someone who is fascinated by a product will probably interact differently with it than someone who feels joyful in relation to the product.

The traditional focus on generalised pleasure in design research does injustice to this differentiated nature. An obstacle to a more nuanced study of user emotions, however, is the

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absence of a clear overview of what positive emotions design researchers should focus on. General emotion research does not offer much help because although it has a rich tradition in studying differences among emotions, this research is almost exclusively focused on negative emotions (Averill, 1980). The research of language scientists who study the nuances of emotion could be usable because it usually does not have this negativity bias. However, the affect taxonomies published in that domain are too extensive to be of practical use in design research, including as they do hundreds of words that do not necessarily refer to emotions. Given these considerations, the aim of this paper is to introduce a set of emotions that represents the general repertoire of positive human emotions and to propose how these emotions can be experienced in human-product interactions. By providing a fine-grained yet concise vocabulary of positive emotions that people can experience in response to product design, the typology aims to facilitate both research and design activities. The objective is to balance pragmatism and rigour: The set should be practical as a source of inspiration and a means for communication in design practice and education, and it should be built on the existing body of knowledge on emotion taxonomies and typologies in order to be a valid reference in design research.

First, existing emotion typologies are briefly reviewed. Next, the development of a set of 25 positive emotion types is reported, representing emotions that differ in terms of eliciting conditions, experiences, and manifestations. The main study presented in this paper explored how and when the 25 emotions are experienced in human-product interactions by using an online questionnaire. The implications and limitations of the set are discussed in the general discussion, and some future research steps are proposed.

Existing Emotion Typologies

Existing emotion typologies include either a mere handful or an extensive list of hundreds of words. This dichotomy can be explained with the concept of "emotion knowledge." This is the knowledge that people use to interpret their own and other people's emotional reactions, to predict emotions, and to share and talk about emotional reactions to past and present events (Jones & Pittman, 1982; Kelley, 1984). To clarify how emotion knowledge is organised, prototype theory is particularly useful (see Shaver, Schwartz, Kirson, & O'Connor, 1987; Fehr & Russell, 1984). Prototype theory proposes that emotions can best be seen as organised in a tree-like structure with three levels: the top (superordinate), the middle (basic), and the lowest

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(subordinate) level. The superordinate level represents the general distinction between pleasant and unpleasant emotions. The basic level represents emotion types such as anger, fear, joy, and surprise. The subordinate level represents finer distinctions, such as (for anger) fury, irritation, resentment, and rage. Most emotion researchers focus on the middle "basic" level because it represents the core repertoire of our emotions: They are learned first by children, during language acquisition, and they are used most often in everyday conversation in most languages. Table 1 gives an overview of some of the most referred to sets of basic emotions.

Table 1 illustrates that basic emotion sets typically include two or three positive emotions. These can be combined to give five basic positive emotions: Joy, Love, Interest, Anticipation, and Pleasant Surprise. Working with such small sets of basic emotions enables a shared research focus among academia, which supports comparisons among research initiatives. The disadvantage is that these sets are an oversimplified representation of the variety of human emotions. The emotion lexicon of most modern languages contains hundreds of emotion names (see Averill, 1975), and suggesting that all of these are mere variations of basic emotions marginalizes the richness of our emotional repertoire. Some researchers have been dissatisfied with the economy obtained with the basic emotion sets. For example, Ellsworth & Smith (1988) and Storm & Storm (1987) proposed that there is a richer variety of emotions than what is captured by the basic emotions and that more emotions should be included. In agreement with this critical stance, I propose that the small set is too rudimentary to be useful for explaining the variety of positive emotions experienced in human-product interactions. Each basic emotion encompasses various different emotions. For example, the basic emotion of joy encompasses: pride, satisfaction, relief, and inspiration. And love encompasses: sympathy, admiration, kindness, lust, and respect. These are clearly different emotions, with different eliciting conditions, different feelings, and different behavioural manifestations.

The alternative to the basic emotion sets is to work with the extensive semantic taxonomies on the subordinate level that have been developed by language researchers. Examples are the overview of 950 words by Johnson-Laird & Oatley (1989) and the set of 196 words collected by Fehr & Russell (1984). Although comprehensive, these taxonomies have the disadvantage that they lack overview. In their aim to be complete, they also include unusual words that are scarcely used in everyday conversation (like splenetic, covet, dudgeon, and titillate in Johnson-Laird & Oatley, 1989) or that are not emotions (like vanity, wound, fervent, and fire in Johnson-Laird & Oatley, 1989). The set of 25 positive emotion types was therefore assembled to function as a practical balance between the conciseness of basic emotion sets and the comprehensiveness of semantic emotion sets.

Typology of Positive Emotions

The typology of 25 positive emotions is shown in Figure 1. The emotion types are clustered into nine general categories. Each emotion type is represented by the main emotion word, a short definition, and two to four additional emotion words

Table 1. Basic emotions.

	Ekman, 1973	Izard, 1977	Plutchik, 1980	Tomkins, 1984	Epstein, 1984	Shaver et al., 1987	Frijda et al., 1995	Oatley & Johnson-Laird, 1987
Negative	Fear	Fear	Fear	Fear	Fear	Fear	Fear	Fear
	Anger	Anger	Anger	Anger	Anger	Anger	Anger	Anger
	Sadness	Distress	Sadness	Distress	Sadness	Sadness	Sadness	Sadness
	Disgust	Disgust	Disgust	Disgust	-	-	-	Disgust
	Contempt	-	Contempt	-	-	-	-	
	-	Shame	-	Shame	-	-	-	-
	-	Guilt	-	-	-	-	-	-
Positive or negative	Surprise	Surprise	Surprise	Surprise	-	Surprise	-	-
Positive	Happiness	Joy	Joy	Joy	Joy	Joy	Happiness / Joy	Happiness
	-	-	Acceptance	-	Love	Love	Love	-
	-	Interest	-	Interest	-	-	-	-
	-	-	Anticipation	-	-	-	-	-

that correspond with the type. For example, the emotion type "Worship" is defined as "to experience an urge to idolize, honour, and be devoted to someone," and represented emotion words are: adore, devotion, and reverence. The typology was developed in a two-staged procedure, which is described below. The first stage was to create a long list of 150 positive emotion words, and the second was to cluster these into 25 emotion types.

Stage 1: Assembling an Overview of Positive Emotion Words

The first step in this stage was to assemble an extensive overview of emotion words that have been reported in emotion studies. To ensure completeness, emotions were compiled from 24 peer-reviewed publications (see Appendix 1). The main source was (hierarchical) typologies reported in linguistic studies of the emotion lexicon. Additional sources were emotion sets used by appraisal psychologists, and specialist typologies developed to represent emotions experienced in specific domains, such as advertising, product design, fragrances, and food consumption.

The second step was to clean up the database by removing non-emotions. Most existing typologies include words that do not refer to emotions (Ortony, Clore, & Foss, 1987). Examples are "sleepy" (in Russell, 1980), "youthful" (in Aaker, Stayman, & Vezina, 1988), and "moral" (in Batra & Holbrook, 1990). These words were identified with the principled approach that was developed by Ortony et al. (1987). They first distinguished internal from external states. External states (e.g., sexy and abandoned) were eliminated because they are not directly related to the inner life of the person of whom they are predicated. Internal states are either mental or non-mental. Non-mental states (e.g., sleepy and hungry) were eliminated because they do not refer to emotions but to physical and bodily states. In short, all words that do not fall in the category of internal mental states have been excluded from the database.

The third step was to exclude negative emotions. Virtually all reported typologies of emotion include both negative and positive emotion words, often without specifying valence. Although the difference between positive and negative emotions may seem obvious (i.e., positive emotions feel good, and negative emotions feel bad), Averill (1980) demonstrated that the distinction is less straightforward because it involves at least two additional variables. The first is the behaviour that is stimulated by the emotion: Is this behaviour evaluated positively or negatively? Smug and Schadenfreude are examples of emotions that feel pleasurable but also have a negative connotation because the associated behaviours are evaluated as unfavourable. The second variable is the consequence of the emotion, which can be either beneficial or harmful. The emotion sympathy, for example, may not feel pleasant, but is often considered to be positive because the consequence of sharing the burden is considered beneficial. Another example is courage. Although elicited by a situation that is evaluated negatively (e.g., dangerous), courage is often considered a positive emotion because it often leads to beneficial outcomes. To filter out negative emotions without excluding emotions that have positive elements, the following criterion was used: Emotions were included if they were ones accompanied by pleasant feelings and/or favourable behaviour and/or beneficial consequences.

The resulting overview included 1,434 positive emotion words. These words were homogenised by lemmatisation. For example, admire, admiration, and admiring were all reformulated to admiration (in which the most often used variant was used as the basis). After this procedure, the result of Stage 1 was a set of 385 emotion words, representing the variety of positive emotions in the English emotion lexicon, shown in Appendix 2. The numbers in Appendix 2 indicate the number of original sources that included this emotion word. Most often mentioned emotions are love, joy, cheerfulness, happiness, pride, contentment, delight, excitement, and relief.

empathy

sympathy
To experience an urge to identify with someone's feelings of misfortune or distress
compassion / empathy / pity

kindness
To experience a tendency to protect or contribute to the well-being of someone
caring / friendly / tenderness / warm

respect
To experience a tendency to regard someone as worthy, good or valuable
appreciation / approval

affection

love
To experience an urge to be affectionate and care for someone
affection / intimacy / romance / infatuation

admiration
To experience an urge to prize and estimate someone for their worth or achievement
impressed / esteem

dreaminess
To enjoy a calm state of introspection and thoughtfulness
pensive / contemplative

aspiration

lust
To experience a sexual appeal or appetite
passion / sensual / horny / sexy

desire
To experience a strong attraction to enjoy or own something
attraction / yearn / crave

worship
To experience an urge to idolize, honour, and be devoted to someone
adore / devotion / reverence

enjoyment

euphoria
To be carried away by an overwhelming experience of intense joy
ecstasy / elation / exhilaration / jubilation

joy
To be pleased about (or taking pleasure in) something or some desirable event
happy / pleasure / delight / cheerful

amusement
To enjoy a playful state of humour or entertainment
entertained / gaiety / humorous / glee

optimism

hope
To experience the belief that something good or wished for can possibly happen
optimistic / encouraged / wishful

anticipation
To eagerly await an anticipated desirable event that is expected to happen
eager / expectant

animation

surprise
To be pleased by something that happened suddenly, and was unexpected or unusual
amazement / astonished / startled / dazzled

energized
To enjoy a high-spirited state of being energized or vitalized
exuberant / zest / excitement / stimulation

assurance

courage
To experience mental or moral strength to persevere and withstand danger or difficulties
brave / heartened

pride
To experience an enjoyable sense of self-worth or achievement
triumphant / self-satisfaction / smug

confidence
To experience faith in oneself or one's abilities to achieve or to act right
assurance / secure / trust

interest

inspiration
To experience a sudden and overwhelming feeling of creative impulse
enthusiasm / determination / challenged / zeal

enchantment
To be captivated by something that is experienced as delightful or extraordinary
awe / charmed / moved / touched

fascination
To experience an urge to explore, investigate, or to understand something
curious / attentive / interest / engrossed

gratification

relief
To enjoy the recent removal of stress or discomfort
reassured / soothed / gratitude

relaxation
To enjoy a calm state of being free from mental or physical tension or concern
comfortable / carefree / serene / tranquillity

satisfaction
To enjoy the recent fulfilment of a need or desire
gratified / pleased / contentment / fulfillment

Figure 1. General typology of 25 positive emotions.

Stage 2: Clustering Emotion Words under Emotion Types

In the second stage, clusters of emotion types were defined with the use of a semi-structured componential analysis. This analysis was focused on the 150 words that were mentioned in three or more of the original sources (see Appendix 2). In a componential analysis, the meaning of words is examined through sets of discriminating features (for examples, see Goodenough, 1956; Ortony et al., 1987). For the present analysis, three discriminating features were drawn from the componential theories of Frijda (1986), Russell (2003), Scherer (2005), and Fredrickson and Branigan (2005): (1) appraisal, (2) arousal, and (3) thought-action tendency.

Appraisal

The first feature, the underlying appraisal, is the cognitive component of the emotion. Emotions are always responses to stimuli (i.e., something happens) that have some personal relevance. This personal relevance is determined in an appraisal or sense evaluation of the extent to which the stimulus has an impact on one's well-being (Arnold, 1960). Different emotions are evoked by different appraisals. Sadness, for example, is evoked by an appraised "irrevocable loss," and anger is evoked by an appraised "demeaning offence against me and mine" (Lazarus, 1991, p. 122).

Arousal

The second feature is arousal, which is the bodily component of the emotion (Scherer, 2005). Arousal can best be seen as the level of physical activation associated with the emotion. Different emotions are associated with different arousal levels (Watson & Tellegen, 1985). Some emotions are active, such as surprise and euphoria, and others are calm, such as relaxation and dreaminess.

Thought-action tendency

The third feature, the thought-action tendency, is the motivational component of the emotion. Emotions come with an urge or tendency to act and think in a particular way in reaction to the situation that evokes the emotion (Frijda, 1986; Fredrickson, 1998). Different emotions stimulate different tendencies. Examples are the urge to explore in the case of fascination, the urge to flee in the case of fear, the urge to play in the case of joy, or the urge to constantly think about the other person when seriously in love (Frijda, 1986).

In the componential analysis, emotions were considered different if they are associated with (1) different appraisals, (2) different levels of arousal, or (3) different thought-action tendencies. For all 150 emotions, an overview was made of available knowledge on the three features, from the original sources, the semantic analysis of Johnson-Laird and Oatley (1989), the classifications of Ortony et al. (1988), Frijda et al. (1989),

and Storm and Storm (1987), the Van Dale dictionary (2009), and the online dictionary of Merriam-Webster. The classification gradually emerged by studying these structural features. The aim of the procedure was to find a balance between granularity and economy: to minimize the variance between emotions within the classes, and to maximize the variance between the classes.

The underlying appraisal was used as the leading feature: Emotions that are evoked by similar appraisals were clustered unless there was evidence that they differ in terms of arousal or in terms of associated thought-action tendencies. For example, sympathy and compassion were clustered because they are both evoked by an appraised suffering, distress, or misfortune of another person. Moreover, both are accompanied by a tendency to share the feelings of the other person and the wish to relieve the suffering, and no proof was found that they differ in terms of arousal. Jubilation and joy have not been placed in the same cluster. They are evoked by similar appraisals (i.e., an appraised success or good fortune) but differ, however, in terms of arousal: Jubilation is associated with higher levels of arousal than joy. Confidence and assurance were clustered because their underlying appraisals are similar: Confidence is evoked by an appraised consciousness of one's powers or of reliance on one's circumstances, and assurance is evoked by an appraised faith in oneself or one's abilities. Courage, however, was not clustered with confidence and assurance: Courage is evoked by an appraised mental or moral strength to venture, persevere, and withstand danger, fear, or difficulty. Contrary to confidence and assurance, courage does not require an appraised awareness of one's powers or capacities. These considerations led to the classification of the 25 main emotion types, shown in Table 2.

The componential approach to emotion illustrates that some emotions are more similar than others: Some emotions differ in terms of all three discriminating features, and some only in terms of one or two. For example, love and sympathy are more similar than love and pride because the first two both stimulate nurturing behaviour (thought-action tendency), whereas pride does not. Relaxation is more similar to relief than to joy because both relaxation and relief are accompanied by an experienced low level of activation (arousal). Emotions were classified into classes that are similar with regard to the three features. These classes represent emotion types, or what Ekman (1992) called emotion families. An emotion family is a set of related emotional responses that are characterized by a common theme plus variations on that theme. Within the common theme, the members of a family can show slight variations in intensity, eliciting conditions, and manifestations. The emotion type Pride, for instance, represents

Table 2. Emotion clusters representing 25 positive emotion types.

Emotion type	Emotion words (drawn from the list in Appendix 2)
Admiration	Admiration, impressed, esteem
Amusement	Amused, entertained, gaiety, merry, playful, humorous, glee, funny, laughing, jolly
Anticipation	Anticipation, eager, expectant
Confidence	Confident, assurance, secure, trust
Courage	Courageous, brave, heartened
Desire	Desire, attracted, ardent, longing, craving, yearning, nostalgic
Dreaminess	Dreamy, contemplative, pensive
Enchantment	Enchanted, awe, charmed, moved, touched, enthrallment, wonder
Energized	Energetic, exuberant, zest, active, excited, stimulated
Euphoria	Euphoric, rapture, ecstasy, exaltation, thrilled, elated, high, exhilaration, exultation, jubilant, enraptured
Fascination	Fascinated, interest, curious, inquisitive, attentive, engrossed
Hope	Hope, optimistic, encouraged, wishful
Inspiration	Inspiration, enthusiasm, tempted, determined, challenged, zeal
Joy	Joy, bliss, overjoyed, pleasure, happy, good, delighted, wonderful, rejoice, smile, cheerful, enjoyment
Kindness	Kind, caring, friendly, tenderness, warm
Love	Love, romantic, infatuation, sentimental, fondness, in love, liking, affection, intimate
Lust	Lust, horny, passion, aroused, sensual, sexy
Pride	Pride, triumphant, self-satisfaction, smug
Relaxation	Relaxed, at peace, at ease, comfortable, peaceful, lighthearted, carefree, placid, serene, tranquil, easygoing, calm
Relief	Relief, reassured, gratitude, soothed, thankful
Respect	Respect, appreciating, approve
Satisfaction	Satisfaction, gratified, pleased, contentment, fulfilled, glad
Surprise	Surprise, amazement, astonished, startled, dazzled
Sympathy	Sympathy, compassion, empathy, pity, understanding, forgiving
Worship	Worship, adoration, devotion, reverence

a family of emotions that share the "experience of an enjoyable sense of self-worth or achievement," including self-satisfaction, smugness, and triumph. Each emotion type represents three to twelve of the 150 emotion words, see Table 2.

Stage 3: Categorising Emotion Types

The 25 positive emotion types have been clustered in nine categories: Enjoyment, Gratification, Empathy, Affection, Interest, Aspiration, Optimism, Assurance, and Animation. These categories were created using a study in which respondents rated similarity between emotion types in pairs.

Respondents

Nineteen respondents participated in the study; they represented eight nationalities (Dutch, Chinese, Italian, Indonesian, German, Norwegian, Russian, and Spanish). Ages ranged between 22 and 33 (M = 24.4; SD = 2.8), and 63.2% of the participants were female. Respondents were design students who were recruited at the university and were not paid for their contribution.

Questionnaire

All emotions in the set of 25 were paired with each other, resulting in 300 emotion pairs. A questionnaire was developed in which respondents rated the similarity of each pair. The questionnaire started with a short introduction that explained that the general aim of the study was to learn how similar various emotions are. Next, the rating procedure was explained. Each pair was rated on a four-point scale (very different; different; similar; very similar). A fifth point on the scale represented "I don't know" and was used when the respondent was not familiar with one or both emotion words in the pair. In the introduction it was explained that emotion pairs can differ in various aspects: "Emotions can be different in terms of what causes them, how we experience them, and how they influence our behaviour." The emotions anger, sadness, and fear were used as an example to illustrate these three aspects of emotions. Next it was explained that the study focused on positive emotions, and therefore all emotion pairs would consist of two positive emotions.

Procedure

The questionnaire was divided into six parts of 50 pairs each. Respondents were given the questionnaire over the course of six weeks, filling out one part each week. It was filled out online and individually (at a time and location decided by the respondent). The emotion pairs were shown individually on the screen; after the pair was rated, the next pair appeared. Filling out the questionnaire each week took between 20 and 30 minutes.

Results

To explore similarities and create categories, a multidimensional scaling (MDS) analysis was performed (SPSS Proxscal; see Borg & Groenen, 2005). Figure 2 shows the two-dimensional MDS

Figure 2. Two-dimensional MDS solution with proposed emotion categories.

solution. The distances between emotion types visualise similarity ratings: The more similar the types are, the smaller the distance between them. Surprise, for example, is more similar to Energized (small distance) than to Pride (large distance). Circles and verbal labels were added by the author to propose categories.

Emotion categories that are positioned close to each other in Figure 2 are similar because they share particular features. For example, Optimism and Aspiration are similar in the sense that they both are experienced in relation to future events and thus include some level of uncertainty, whereas Animation and Enjoyment are similar in the sense that they both involve high arousal types of pleasure.

Main Study

The aim of the main study was to investigate whether the 25 emotions can be experienced in human-product interaction, and to explore the conditions under which people might experience these emotions in relation to products. To this end, a questionnaire was designed in which respondents reported examples of personal experiences of the given emotions in the context of product usage.

Respondents

Participating in the main study were 221 respondents, representing 22 different nationalities. Ages ranged between 18 and 65 (M = 26.2; SD = 6.9), and 52.8% of the participants were male. Respondents were recruited with posters at Delft University and through social networks, and they were not paid for their contribution. As compensation, a design book (retail price 46 euros) was awarded to 50 randomly selected participants.

Questionnaire

The questionnaire started with a short introduction that explained the general aim of the study. The first part of the study sensitized respondents to reporting emotional information. They were presented one emotion that was randomly selected from the set of 25 positive emotions. Besides the emotion word, a description was provided that explained the emotion (based on the definitions in Figure 1). This was done because it was assumed that people differ in how well they can distinguish between emotion words (see also the discussion on "emotional granularity" in the general discussion section). Providing this description ensured that all respondents had a basic understanding of what particular emotion was represented by the emotion word. Respondents first reported how often they experienced this emotion in their daily lives, recording their answer on a 5-point scale, from "never" to "very often." Next (if the answer was not "never"), they were asked to give a typical example of a situation in which they had experienced this emotion in the last six months. They were instructed to describe the situation in as detailed a way as possible: Where and when the emotion was experienced, what happened, who and/ or what was involved, and why they thought the situation made them feel this emotion. The second part of the study focused on

emotions experienced in response to (using) consumer products. Before the procedure started, it was explained that the word "product" used in the questions referred to any kind of consumer product. Six collages were shown that represented a wide variety of consumer products (following the procedure of Desmet, 2002) to give an idea of the possibilities that they might consider. After looking at the collages, five randomly selected emotions were presented. For each emotion, respondents filled out a series of questions. First, they rated how often they experienced the given emotion in response to products (or using products) in their daily lives; this was done using a 5-point scale, from "never" to "very often." Next (if the answer was not "never"), they were asked to report a personal example of when a product (or using a product) evoked this emotion. They were instructed to describe the product, the situation (where / when / what happened / who was involved, etc.), and why they thought they felt the emotion in relation to the product. Next, they were asked to report for how many types of products they thought it would be appropriate for designers to aim to evoke the given emotion, using a 5-point scale, from "for no product types" to "for all product types." Last of all, they were asked to give examples (as many as they wanted) of products for which they thought this emotion would be appropriate.

Procedure

The questionnaire was filled out online and individually, at a time and location decided by the respondent. Filling out the questionnaire took between 20 and 30 minutes. Respondents could select one of four languages (Dutch, English, Korean, or Italian) at the start of the study: 39.3% filled out the questionnaire in Dutch; 29.3% in English, 18.9% in Korean, and 12.4% in Italian.

Results

All responses were translated into English. Results of the sensitizing part of the questionnaire are not reported in this paper. Table 3 gives an overview of the rest of the results. The second column reports the number of respondents, the third and fourth show how often the emotion was reported to be experienced in human-product interactions (on a five-point scale), the fifth and sixth columns show for how many product types the emotion was reported by respondents as appropriate as an aim to design for (on a five-point scale), and the seventh column gives the number of example cases that were reported in which the emotion was experienced.

For each emotion, a t-test was performed (with the scale midpoint as the test value), to determine which emotions rated either significantly lower or higher ($p < .05$) than the scale midpoint. Those emotions are coded with a * in the table. Emotions that were reported as experienced most often were: Joy, Satisfaction, Amusement, Relaxation, Love, Confidence, and Desire. Those that were reported as experienced least often were: Worship, Lust, Dreaminess, Relief, Euphoria, Courage, and Enchantment.

Table 3. Degree to which people experience emotions in human-product interaction.

Emotion	N	How often experienced		For how many product types appropriate		Number of reported cases
		Mean	SD	Mean	SD	
Joy*	38	3.74	1.22	3.37	.81	33
Satisfaction*	32	3.59	1.13	3.41	.95	30
Amusement*	42	3.55	.86	3.17	.99	38
Relaxation*	40	3.43	.75	2.90	.75	38
Love*	28	3.39	1.20	3.08	.98	24
Confidence*	34	3.35	1.1	3.37	.85	28
Desire*	35	3.31	.83	3.29	.96	35
Energized	32	3.19	.90	2.89	.88	25
Fascination	37	3.16	1.09	3.11	1.55	34
Kindness	33	3.03	1.13	2.69	.85	28
Inspiration	39	3.00	.92	2.97	.98	29
Pleasant surprise	42	2.98	.78	2.81	1.05	34
Anticipation	37	2.97	.87	2.84	1.01	36
Respect	38	2.92	1.15	2.84	1.04	28
Sympathy	34	2.85	1.40	2.23	.95	21
Pride	38	2.84	.72	2.81	.86	34
Admiration	49	2.76	.95	2.79	.98	38
Hope	38	2.76	1.17	2.38	.86	26
Enchantment*	37	2.73	.93	3.09	1.44	29
Courage*	35	2.69	.93	2.17	.60	26
Euphoria*	37	2.65	.95	2.77	.90	29
Relief*	25	2.60	.96	2.41	.73	20
Dreaminess*	37	2.59	1.24	2.48	.87	24
Lust*	31	2.29	1.07	2.36	.66	20
Worship*	36	2.11	1.01	2.29	.86	22

Note: * indicates emotions rated significantly (p < .05).

The part of the questionnaire in which respondents were asked to report a personal example of when a product (or using a product) evoked this emotion resulted in a database of 729 examples of positive product emotions. The last column of Table 3 shows that the number of cases that were reported for each emotion ranged between 20 (Relief and Lust) and 38 (Amusement, Relaxation, and Admiration). The provided cases were clustered under "sources," according to the particular situation that was described in the human-product interaction. This was done for each emotion separately. Table 4 provides a summary of these sources. A full overview with example cases and respondent quotes is reported in Appendix 3.

Six Sources of Emotions in Human-Product Interactions

The collected 729 examples illustrate that products can evoke emotions in various ways. Emotions are not only evoked by the product as such, but also, for example, by the activity of using the product, or by people who are involved in the interaction. The analysis revealed six basic sources of positive emotions in human-product interactions: emotions evoked by (1) the object, (2) the meaning of the object, (3) the interaction with the object, (4) the activity that is facilitated by this interaction, (5) ourselves, and

Table 4. Manifestations of positive emotions in human-product interactions.

Emotion	Definition & manifestation in human-product interaction
Sympathy	• Sympathy is the experience of an urge to identify with the feelings or state of someone (or something) that is suffering from misfortune or distress. This emotion is accompanied by feelings of compassion and mildness. Sympathy is an altruistic emotion because it involves a genuine concern for the welfare of others. • People can feel sympathy for products that are broken or damaged, that are "struggling to function," or that are discarded. Products can also facilitate feelings of sympathy for other people, by representing people who are suffering or by facilitating interactions with people who are suffering. People can also feel sympathy for themselves when having to use badly designed products.

Kindness	• Kindness is the tendency to protect or to contribute to the well-being of someone (or something). Like sympathy, kindness involves empathy and benevolence, but the difference is that kindness is not related to someone's misfortune. Like love, it involves warmth and affection, but it does not necessarily involve intimacy, attraction, or romantic feelings. • People can be kind to a product itself or use a product to be kind to someone. The product can be kind because it responds in a kind way, eases a difficult task, or because it has a nurturing function. Products can also symbolize kind people or enable other people to do kind things for us.
Love	• Love is the experience of an urge to be affectionate and to care for someone (or something). This emotion is accompanied by feelings of attraction and affection, and it can include romantic feelings. Love involves an approachable attitude, intimacy and nurturance towards the object of love. • People can love products that are beautiful or provide pleasurable sensory stimulation, or products in which they have personally invested time and effort. People can also love using a product. And products can facilitate interpersonal love: They can represent someone we love or someone's love for us, and they can enable us to express our love, or others to express their love to us.
Respect	• Respect is the experience of regarding someone (or something) as worthy, good or valuable. This emotion is accompanied by feelings of acceptance and approval. It comes with the tendency to accept, recognize, and endorse the object of respect. • People can respect a product, the designer of a product, or the user of a product. Someone can also feel respected, either by a product or by someone else in a situation in which a product plays a facilitating role in the interaction. Moreover, someone can also express respect to someone else with the use of a product, and a product can represent or remind us of someone whom we have respect for.
Admiration	• Admiration is the experience of an urge to prize or estimate someone (or something) highly. This can be because of their worth, character, or achievement. Admiration is accompanied by feelings of esteem and amazement, and of being impressed. It elevates the object of emotion and creates a distance between this object and the admiring person. It comes with the tendency to praise or applaud the object of admiration, but it does not necessarily involve feelings of warmth or affection. • People can admire a product itself or someone who is associated with a product, such as the designer or a user of the product. Qualities that are admired are craftsmanship, a sense of a product being well-thought-through, integrity (in producing a product), and inventiveness (for example, in surpassing the average or the expectations of a product). People can also admire someone for their skills in using a product.
Worship	• Worship is the experience of an urge to idolize and honour someone (or something). This emotion is accompanied by feelings of loyalty and devotion. Worship is more distant than love because it comes with the tendency to idolize the object of emotion. Moreover, a typical feature of worship is that it implies subordination to the object of emotion. • People can experience worship in response to something that is perceived as extraordinary. In the case of human-product interaction, this can be an object, an activity (that is facilitated by an object), or a person. Something is extraordinary because it is unique, of very high quality, scarce (e.g., one of a kind), very complex (e.g., not comprehendible), or not accessible (e.g., too expensive).
Surprise	• Surprise is experienced in response to a sudden event that was unexpected or is unusual because it violates an expectation or belief. In the case of pleasant surprise, the unexpected event is desirable or pleasurable. Surprise comes with feelings of amazement and the tendency to interrupt current activities. • Surprise is evoked by products that surpass implicit or explicit expectations (expectations based on previous experiences with the same or similar products). People can be surprised by what products are, what they do (how they respond during interaction), what they can do with them, or what other people can do with them. An interesting finding is that surprise can be stimulated when the product itself lowers user expectations (e.g., by initially not functioning very well, but increasing in quality of performance during usage).
Enchantment	• To be enchanted is to be captivated by something that is experienced as delightful or extraordinary. It is similar to surprise but requires a violation of an expectation or a belief in a manner that is beyond easy comprehension. • People can be enchanted by a product that triggers the imagination because of a story associated with the product, or because the product has a "magical" function. Also the activity of using the product can be enchanting because it involves overwhelming experiences, or because it stimulates flow experiences in which the user forgets about him/herself or about time (as in the case of games, musical instruments, sports equipment, and books).
Fascination	• Fascination is the experience of an urge to explore or investigate something. This emotion is driven by an eagerness to increase one's understanding of the object of fascination, and it stimulates focused attention and explorative behaviour. • People can be fascinated by novel products or products of which the purpose or meaning is not directly clear. They can also be fascinated by the craftsmanship expressed by a product or the richness or complexity of a product. When using a product they can be fascinated by the possibilities of the product, by the act of exploring the functionalities of the product, or by the sensory experiences of using the product. They can also be fascinated by what they can achieve with a product or by what other people can do with a product.
Inspiration	• Inspiration is the experience of a sudden and overwhelming feeling of creative impulse. This emotion comes with feelings of being motivated, of enthusiasm and eagerness. • People can be inspired by products that stimulate creative thought or activity. Using a product can also be inspiring when it stimulates creative interactions, and a product can enable or symbolize activities that are inspiring.

Energized	• To be energized is to enjoy a high-spirited state of having energy or vitality. It stimulates general energetic thoughts and behaviour. • People can feel energized by products that stimulate or enable physical activity (like sports or exercise) or that are mentally refreshing. They can also be energized by products that enable them to have a good rest. A special category is energizing food and stimulants (like coffee).
Amusement	• Amusement is the enjoyment of a high-spirited state of playfulness, humour, or entertainment. • People can be amused by products that have funny or playful designs, or have playful functions (i.e., are playful in interaction). Moreover, they can be amused by activities in which they use products (like games).
Hope	• Hope is the experience of the belief that something good or wished for can possibly happen. The difference between hope and anticipation is that in the case of hope, there is uncertainty as to whether the good or wished for thing will happen. • People can be hopeful about the anticipated (but uncertain) consequences of using a product, and they can hope that a product will function properly or that they will be able to use the product. Products can also evoke hope because they represent past or future success or because they represent certain (e.g., religious) beliefs.
Anticipation	• Anticipation is the experience of eagerly awaiting a desirable event that is expected to happen. Unlike hope, anticipation does not require uncertainty about the future event. It is the pleasure derived from knowing that something pleasing will take place. • People can anticipate buying or owning a product, they can anticipate the beneficial effects of using a product, or they can anticipate an event that a product might remind them of (or that it might represent).
Courage	• Courage is the experience of the moral or mental strength to persevere and withstand danger, fear, or difficulties. The related emotions are feeling heroic, faith or trust in oneself or one's abilities, and the related tendencies are to persist, face, or endure the situation at hand. • Products can make people confident because they help in uncertain situations, because they are trustworthy, or because they represent something empowering (like mascots or religious objects). A product can also require confidence to use (as in the case of dangerous products), or enable people to engage in activities that require confidence (as in dangerous activities).
Lust	• Lust is the experience of sexual appeal or sexual appetite. It involves an explicitly sexual element, such as erotic or sensual sensations. Related tendencies are to seduce or charm the object of lust. • Products can evoke sexual appetite through fantasy (as in the case of erotic images or products that represent erotic interactions) or physical stimulation (as with products that can be used to stimulate erogenic zones). Products can also evoke lust because they are used to stimulate sexual appeal (e.g., lingerie) or facilitate sexual interactions (e.g., a lubricant) or because they remind people of past erotic encounters.
Desire	• Desire is the experience of a strong attraction. This can be to own something or to engage in some activity. Desire is similar to lust, but it differs in the sense that the involved attraction is not necessarily erotic or sexual. • People can desire to own a product or to use a product, or they can desire the activity that will be facilitated by using a product. In many cases, there is something that prevents their satisfaction, such as practical, moral, legal, or safety issues – for example, buying or using the product is not allowed, is too expensive, is irresponsible, or takes too much time. Also, some examples were reported in which something prevented the user from using all of the (attractive) functions of a product (for example, not being able to drive a car to its top speed because the law does not allow it).
Confidence	• Confidence is the experience of faith in oneself or in one's ability to achieve something or to act in the right way. The related feelings are self-assurance, security and certainty, and the related tendencies are control, competence, resolution, determination, and being free from doubt. • People can feel confident about products that are trustworthy or easy to use. Products can make people confident because they support independence or because they help them look good. Moreover, products that prevent injury or damage and products that support one's expertise or profession also provide confidence.
Pride	• Pride is the experience of an enjoyable sense of self-worth or achievement. The unique feature of this emotion is that the object of emotion is oneself. Pride is experienced in response to one's own achievements or qualities. It can be considered self-love or self-admiration. • People are proud of their achievements. In human-product interaction, the achievement can be owning a unique product, or it can involve achieving something that a product facilitates, or being able to use a complex or difficult product (such as a musical instrument). Receiving positive feedback or praise from others about a product one owns, or about one's ability to use a product can also strengthen the pride experience.
Euphoria	• Euphoria is an emotion that is felt when one is carried away by an overwhelming experience of intense joy. • People can be euphoric about activities that are facilitated by products (e.g., watching a football game on TV), about the experience of using a product, or about owning a product. Products can also represent certain euphoric experiences.
Joy	• Joy is the experience of being pleased about (or taking pleasure in) something or some desirable event. • People can experience joy when a product is pleasurable to use, fulfils its function well, or facilitates a joyful activity. In addition, a product can also represent or remind someone of a (past) joyful activity.

Satisfaction	• Satisfaction is the experience of enjoying the recent fulfilment of a need or desire. The experience of joy is the experience that is specifically caused by this fulfilment. • People can feel satisfied when a product basically performs its function well, or when it combines functionality with beauty or with economy (good value for money). People can also be satisfied with the results of an activity in which a product plays a facilitating role. A factor that can stimulate satisfaction is receiving positive feedback from other people about a product.
Relief	• Relief is the experience of enjoying the recent removal of stress or discomfort. It is similar to feeling relaxed but with the specific antecedent of previous distress that has been taken away. • People can feel relieved when they find a lost product, when they discover they are able to use a difficult or complex product, or when they are able to fulfil a difficult task by using a product. Products can also evoke relief by relieving people from physical or mental stress or discomfort.
Relaxation	• Relaxation is the experience of enjoying a calm state of being, free from mental or physical tension or concern. • People can use comfortable products as "tools" for relaxation. Examples of such products are a fireplace, a bed, a pillow, a bathtub, a comfortable chair and a massage tool. People also can feel relaxed when using products that support activities that set them free from daily worries or from work (such as skating in the park, listening to music, or doing sports); these activities can also be little moments, such as drinking a cup of tea. A special category are products that force the user to slow down because they take time to use (like a coffee brewing machine).
Dreaminess	• To be dreamy is to enjoy a calm state of introspection and thoughtfulness. This emotion combines being relaxed and stimulated, as it involves undirected cognitive activity. • People can experience dreaminess when seeing a product that evokes a memory, or when using a product (such as a book) that stimulates a fantasy. It can also be experienced with a product that can be used without much thinking (such as driving a car or riding a bicycle) or that can create mental or physical isolation (such as headphones).

(6) others involved in the interaction. Table 5 gives an overview of these sources with illustrative examples drawn from the case database in the form of respondents' quotes.

(1) Object-focus

Products are objects that we perceive – see, touch, taste, hear, and feel. Because perceiving an object is an event in itself, products as such can elicit emotions. In this case, the emotion is evoked by the product's appearance. Appearance is used here in the broad sense of the word, involving not only visual appearance but also taste, tactile quality, sound, and fragrance. An individual can, for example, love a product for its beautiful design. Or one can

be curious about a novel product, fascinated by a complicated product, or feel sympathetic towards a broken-down product.

(2) Meaning-focus

Emotions can also be experienced in response to some object, person, or event that is associated with or symbolized by a product. Examples are: admiring the designer of an innovative product (in this case the object of the emotion is the designer), or loving a product because it reminds you of someone you love (in this case the object of the emotion is the loved one). Designed objects often represent or symbolise intangible values or beliefs. Some products are deliberately designed with that intention, such

Table 5. Six basic sources of positive emotions in human-product interactions.

Focus	Source	Example
Object	Positive emotions experienced in response to the material qualities of the product.	MACBOOK AIR (fascination): "First time I saw a MacBook Air, I was fascinated because there is no other laptop like it; it is ground-breaking different."
Meaning	Positive emotions experienced in response to meanings associated with the product.	MAP (anticipation): "Looking at the map makes me think of my planned vacation."
Interaction	Positive emotions experienced in response to interactive qualities when using the product.	BOTTLE OPENER (admiration): "Opening a bottle of wine is very smooth and effortless. The product worked so well (perhaps even better than expected) that I felt admiration for it."
Activity	Positive emotions experienced in response to the activity enabled or facilitated by the product.	SKATES (relaxation): "With my skates, I am skating through the fields, with the wind and sun. They enable me to relax and give me a sense of freedom."
Self	Positive emotions experienced in response to ourselves; the effects of using or owning the product on others.	SHOES (confidence): "I feel confident when I wear my stiletto heels. They are beautiful, and when I wear them, I feel tall, skinny, sexy, and confident. They make me feel awesome."
Other	Positive emotions evoked by the effects of other people's activities on us, in which the product plays some role.	BAND-AIDS (love): "Like all children I fell down a lot and scratched my knees many times. When I was in the first grade, my teacher always brought band-aids for my knees. It showed that she cared and I felt really loved."

as spiritual and religious objects, tokens, mementos, souvenirs, keepsakes, talismans, and mascots. In other cases, products are not intentionally designed to represent values or beliefs, but acquire their symbolic value during the course of user-product interactions. Products can become symbols during their lifespan. Examples are a backpack that has been used for many journeys, a gift from a loved one, or something that was inherited from a family member.

(3) Interaction-focus

We interact with products with the purpose of fulfilling needs or achieving goals. This could be to drill a hole in a wall, to listen to music, to cook a meal, etc. The interaction (e.g., with the drill or the music player) can evoke positive emotions. In this case, the emotion is evoked by how the product responds to the user when he/she is using it. For example, the product might be easy to use or complicated and challenging. It can behave unexpectedly or predictably. This "quality of interaction" can evoke all kinds of emotions. For example, one can become energized by using a product that requires physical effort, one can experience joy when a product is unexpectedly easy to use, or one can feel pride by being able to operate a complicated product.

(4) Activity-focus

Products are used to enable or facilitate all kinds of activities. Products are instruments that are used to "get something done" in some situation. Individuals will respond emotionally to these activities because they have concerns related to the activities. The emotion is not directed toward the product, but the product does play a role because it enables the individual to engage in the activity that evokes the emotion. For example, one can be excited about making a hiking trip in the snow (which is facilitated by a warm coat), one can enjoy making drawings (which is facilitated by a pen), or one can be satisfied with a stack of clean laundry (which is facilitated by a washing machine).

In many cases, users do not have deliberate emotional intentions when using a product. In these cases, the emotions are "side-effects." In other cases, users do have a deliberate intention to affect their emotions by using a product. Examples are computer games, massage chairs, and motorcycles. We use computer games because they amuse us, sit in massage chairs because they relax us, ride motorcycles because they excite us. Note that a special type of emotions are those that are related to *anticipated* usage or anticipated consequences of usage. When seeing a product, people anticipate what it will be like to use or own the product. One can therefore desire a sailboat because one anticipates that it will provide pleasurable Sunday afternoons of sailing. Or one can experience hope in response to a mobile phone because one anticipates that it will support one's social life.

(5) Self-focus

Products are used in a social context. We use products in our interactions with other people (e.g., communication devices and gifts), and the products that we use and own are part of our social identity. We can be emotional about ourselves; our identity or behaviour is affected by owning or using products. As was proposed by Belk (1988), products are extensions of their owners, and they affect an individual's self-perception and how he or she is perceived by others. People are emotional about who they are and how others perceive them, and thus also about the effects of their products on their identity. For example, a high-quality baby buggy enables someone to be a good parent, crayons enable someone to be a creative person, and a sports car enables someone to be free-spirited.

(6) Other-focus

In this case, the emotion is evoked by other people. Interactions with other people are influenced or facilitated by products. We are emotional about the things that people do and the things that they do to us. For example, we can admire someone for their skill in using a complicated product or solving a complex puzzle. Or, we can enjoy talking to a friend (facilitated by a phone), be surprised by a kind birthday message (facilitated by a birthday card), or be relieved when someone helps us find the way (facilitated by a foldable city map).

Discussion

The manifestations of 25 positive emotions (in Table 4) and the six basic sources of positive emotions in human-product interactions (Table 5) have been developed on the basis of self-reported data of recalled emotional experiences. This approach builds on the assumption that participants are able to fairly reliably recall emotional experiences from the past. It should be noted that recall-based procedures suffer from methodological problems, such as effects of memory. At the same time, this approach is preferred over alternatives because it offers quite a number of important advantages (for a discussion, see Wallbott & Scherer, 1989). The best available alternative would have been to measure or assess emotional responses evoked by real products. An important shortcoming of this approach is that the (frequency of) reported emotions depend on the selection of products included in the study. Thus, this approach would prevent us from gaining further insight into what emotions are experienced and how often they are experienced in real life human-product interactions. A second shortcoming is that the laboratory, and even more real-life settings, are generally fairly artificial social contexts with their own special norms and expectations. As a result, this approach would not help us in understanding the role or influence of the social context on emotions experienced in human-product interactions.

General Discussion

This paper has introduced 25 positive emotion types and six basic sources of positive emotions in user-product interactions. It was found that people can experience diverse positive emotions in response to products. Although some are experienced often (e.g., joy, satisfaction, and amusement), and others are experienced not so often (e.g., worship, lust, and dreaminess), the reported study clearly indicates that all 25 positive emotions can be experienced.

We also have seen that products can evoke positive emotions in various ways. Emotions are evoked by the object, the meaning of the object, the interaction with the object, the activity that is facilitated by this interaction, ourselves, and by others involved in the interaction. These various sources of emotion represent a palette of opportunities for designers. When aiming to design a product that evokes a particular positive emotion, the designer can look beyond the object and explore opportunities to design for particular human-product interactions or for activities or human-human interactions that are facilitated or stimulated by the product. An interesting question is whether the six emotion sources also apply to negative emotions. Intuitively, it seems they would, but additional studies could reveal to what extent these six sources are also appropriate for the negative spectrum of human emotions. If so, the six sources could also be useful for analysing causes that underlie negative user responses. Moreover, it should be noted that negative emotions are not less interesting or less relevant for design than positive ones. Fokkinga and Desmet (2012) recently demonstrated how negative usage emotions can contribute to rich and meaningful experiences, illustrating that in some cases it may even be desirable to design for negative emotions. An important next step in this research is, therefore, to develop a similar typology of negative emotions.

In design research, the 25 positive emotions can be used as scale items in questionnaires that measure positive emotions evoked by existing or new products or user-product interactions. The diversity within the set offers an opportunity to formulate an "emotional fingerprint" for a brand, service, or product, which specifies the intended emotional response of users or consumers. Such an emotional fingerprint can help to improve the emotional consistency of a design. For example, Desmet & Schifferstein (2012) described a design case in which the aim was to optimize the emotional consistency of a fabric conditioner product. The client had recently redesigned the product packaging, and wanted to develop a fragrance that, in terms of emotional impact, fit with the package design. A study in which the emotional responses to the new package design were measured, revealed that the new design evoked significantly higher levels of inspiration than the previous design. On the basis of this result, inspiration was selected as the emotional fingerprint of the product and as the target emotion for developing an appropriate fragrance. Several fragrance alternatives were developed, and the one that was found to evoke the highest levels of inspiration was selected. Besides in such quantitative applications, the set of emotion types can also be used in qualitative studies to help respondents in specifying a specific emotion they experience. For this purpose, a sheet with the 25 emotion types (similar to Figure 1 or 2) could be used as an informal resource during the interview, and respondents could point out the emotion(s) that they experience or have experienced.

Why should we invest time and energy in specifying target emotions or emotional intentions in design processes? The main reason is that different emotions have been shown to have different effects on behaviour. According to the "broaden and build" theory, introduced by Fredrickson (2003), positive emotions are characterised by distinct and specific behavioural effects: Joy

creates the urge to play and be playful in the broadest sense of the word, encompassing not only physical and social play, but also intellectual and artistic play (Fredrickson, 1998). Fascination creates the urge to explore, which is aimed at increasing knowledge of the target of interest (Silvia, 2005). Contentment prompts individuals to savour their current life circumstances and recent successes (Lyubomirsky, Sheldon, & Schkade, 2005). It is to be expected that these general behavioural effects also influence human-product interactions. A next step in this research is therefore to increase our understanding of what specific effects different positive emotions have on human-product interaction. Resulting insights can help designers to select target emotions as a means for stimulating intended or appropriate usage behaviour.

Besides being potentially useful as a resource in design research, the set of 25 positive emotion types could also be used as an aid for design students to develop their emotional granularity. Emotional granularity is the ability to characterize one's emotional state with specificity, using discrete emotion labels rather than referring to global feeling states. People with a developed emotional granularity have the ability to characterize complex emotional responses (Tugade, Fredrickson, & Feldman Barrett, 2004). In preparing this manuscript, a pilot study was conducted in which 20 master's-level design students were asked to write down as many positive emotions as they could in ten minutes. The results indicated substantial differences in emotional granularity among the students: Some were able to produce lists of up to 20 emotions, whereas others were not able to produce more than three. Moreover, almost half of the reported words did not actually refer to distinct emotions, but instead to only the positive nature of the emotion (e.g., good, fine, pleasant, up, great, and nice), or to expressions or behaviour (e.g., smiling, laughing, getting goose bumps), which is in line with the findings of Storm and Storm (1987). This indicates that it is important to be aware of the fact that not all design students have a developed emotional granularity, and thus will not be able to have an explicit notion of what emotion to design for. We are currently exploring how tools can be developed for training the emotional granularity of designers. For example, we are developing short movie clips that feature people who are interacting with everyday products for each of the 25 emotions, and we are developing a collection of images that express the different emotions. These kinds of tools can also be used to stimulate creativity. In an explorative workshop, design students were given a design brief and a stack of cards, each card representing one of the 25 emotions. They were instructed to pick one card and to create design ideas for the represented emotion. As soon as they felt that they could not generate any more ideas for an emotion, they picked another card and continued generating ideas for that emotion. In an open discussion after the workshop, the students mentioned that the set of cards stimulated their creative process because different emotions pointed them towards different solution directions. Although preliminary, this result stimulates us to continue exploring how the emotion types can be used to stimulate creativity in design processes.

Note that some of the words in the typology are not only used to describe emotions in daily conversation, but also to

describe moods or interpersonal traits. The words energized, relaxation, and dreaminess, for example, are often used to refer to moods. Moods are diffuse states that usually do not have clear antecedents, are not directed at a particular object, and can last for hours or days (Fogras, 1992; Tellegen, 1985). The words courage, confidence, and kindness are often used to describe interpersonal traits. These words are nonetheless in place in the typology because in the context of product experience, they are used to describe emotional responses: feeling energized or confident in response to (or because of) a product. Moreover, emotion is only one aspect of user experience. Other kinds of experiences, such as aesthetic experience and experience of meaning (see Desmet & Hekkert, 2007), are also relevant and should be taken into consideration during the design process. Future research can explore the possibilities of incorporating these other experiences in design-oriented research. Note, however, that although emotion may represent only one aspect of user experience, it is a pivotal one. Contrary to what is sometimes assumed, emotions are not only experienced in response to the aesthetics or cultural meaning of design. Instead, all aspects of (using) products can evoke emotions, and thus emotion-driven design requires a holistic design approach in which the designer gives form to an envisioned meaningful user-product relationship – stimulating hope, pride, inspiration, amusement, admiration, or any of the other 20 positive emotions.

Acknowledgements

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Appendixes

Appendix 1. References for the long emotion word list

Semantic analyses-based typologies

Clore, Ortony, & Foss (1987); Clore & Ortony (1988); Fehr & Russel (1984); Van Goozen & Frijda (1993); Johnson-Laird & Oatley (1989); Morgan & Heise (1988); Ortony, Clore, & Foss (1987); Shaver, Schwartz, Kirson, & O'Connor (1987); Storm & Jones (1996); Storm & Storm (1987); Storm & Storm (2005).

Domain specific typologies

Advertising: Aaker, Stayman, & Vezina (1988); Batra & Holbrook (1990); consumption situations: Derbaix & Pham (1991); product design: Desmet (2002); fragrances: Desmet (2006); food experience: Desmet & Schifferstein (2008); consumption experience: Richins (1997).

Appraisal-theory based typologies

Ellsworth & Smith (1988); Frijda, Kuipers, & Ter Schure (1989); Roseman, Spindel, & Jose (1990); Scherer (2005); Schimmack & Reisenzein (1997); Shields (1984).

Appendix 2.

385 positive emotions

List drawn from 24 published typologies. Number represents how many typologies included the particular emotion word.

love - 24	compassion - 11
joy - 21	passion - 11
cheerful - 19	amazement - 10
happy - 19	euphoric - 10
pride - 19	glad - 10
contentment - 18	jubilant - 10
delighted - 18	pleased - 10
excited - 18	pleasure - 10
relief - 18	relaxed - 10
hope - 17	serene - 10
satisfaction - 17	tenderness - 10
surprise - 15	appreciation - 9
admiration - 14	eager - 9
affection - 14	lust - 9
amused - 14	peaceful - 9
elated - 14	sympathy - 9
ecstasy - 13	adoration - 8
enjoyment - 13	astonished - 8
enthusiasm - 13	comfortable - 8
warm - 13	confident - 8
awe - 12	fondness - 8
desire - 12	gaiety - 8
attracted - 11	gratitude - 8
calm - 11	liking - 8

wonder - 8	inspiration - 4
devotion - 7	intimate - 4
empathy - 7	kind - 4
expectant - 7	lighthearted - 4
fascinated - 7	moved - 4
optimistic - 7	pity - 4
respect - 7	placid - 4
thrilled - 7	secure - 4
triumphant - 7	sexy - 4
anticipation - 6	smug - 4
bliss - 6	touched - 4
caring - 6	worship - 4
encouraged - 6	active - 3
fulfilled - 6	ardent - 3
glee - 6	assurance - 3
good - 6	at peace - 3
gratified - 6	brave - 3
in love - 6	contemplative - 3
interest - 6	courageous - 3
merry - 6	craving - 3
overjoyed - 6	dazzled - 3
romantic - 6	easygoing - 3
sentimental - 6	energetic - 3
soothed - 6	engrossed - 3
thankful - 6	enraptured - 3
aroused - 5	enthrallment - 3
carefree - 5	exaltation - 3
determined - 5	exuberant - 3
enchanted - 5	exultation - 3
friendly - 5	forgiving - 3
high - 5	funny - 3
laughing - 5	heartened - 3
longing - 5	horny - 3
playful - 5	impressed - 3
rapture - 5	inquisitive - 3
reassured - 5	jolly - 3
reverence - 5	nostalgic - 3
self-satisfaction - 5	pensive - 3
sensual - 5	rejoice - 3
stimulated - 5	smile - 3
tranquil - 5	startled - 3
trust - 5	tempted - 3
yearning - 5	understanding - 3
approve - 4	wishful - 3
at ease - 4	wonderful - 3
attentive - 4	zeal - 3
challenged - 4	zest - 3
charmed - 4	agreeable - 2
curious - 4	alert - 2
dreamy - 4	alleviation - 2
entertained - 4	amorousness - 2
esteem - 4	apprehensive - 2
exhilaration - 4	attachment - 2
humorous - 4	belonging - 2
infatuation - 4	benevolent - 2

bold - 2
buoyant - 2
closeness - 2
complacent - 2
composed - 2
concentrated - 2
condescending - 2
consoled - 2
dazed - 2
dumbfounded - 2
erotic - 2
fantastic - 2
felicitous - 2
fine - 2
giving - 2
great - 2
helpful - 2
impulsive - 2
informed - 2
involved - 2
joviality - 2
keen - 2
light-headed - 2
marvellous - 2
mischievous - 2
patriotism - 2
persuaded - 2
positive - 2
powerful - 2
protective - 2
quiet - 2
ravish - 2
reflective - 2
schadenfreude - 2
seductive - 2
self-confident - 2
silly - 2
sociable - 2
strong - 2
stunned - 2
super - 2
superior - 2
thoughtful - 2
transported - 2
vigorous - 2
want - 2
absorbed - 1
acceptance - 1
accepted - 1
accomplished - 1
admired - 1
adventurous - 1
affinity - 1
animated - 1
appease - 1
appetizing - 1
appreciated - 1

aspiration - 1
assertive - 1
assuage - 1
assured - 1
avaricious - 1
avid - 1
beautiful - 1
beguile - 1
bewitch - 1
blessed - 1
blithe - 1
buck up - 1
captivated - 1
carnal - 1
carried away - 1
casual - 1
certain - 1
charged - 1
cherished - 1
climax - 1
cocky - 1
comforting - 1
commiserate - 1
communion - 1
competent - 1
conceited - 1
concern - 1
conscious - 1
considerate - 1
convivial - 1
cosy - 1
crush - 1
dash - 1
daydreaming - 1
decided - 1
deference - 1
delectable - 1
delectation - 1
detached - 1
devilish - 1
electric - 1
enamour - 1
encouraging - 1
endear - 1
engaging - 1
enterprising - 1
entice - 1
entrance - 1
equanimity - 1
even temper - 1
excellent - 1
expansiveness - 1
faith - 1
fancy - 1
favour - 1
fearless - 1
feel for - 1

fervour - 1
fired up - 1
firm - 1
flabbergast - 1
flushing - 1
forceful - 1
fraternity - 1
freedom - 1
fun (having) - 1
generous - 1
gentle - 1
giggly - 1
gloating - 1
glowing - 1
good-humoured - 1
good-tempered - 1
gusto - 1
hanker - 1
happy for - 1
harmony - 1
hilarious - 1
hopes realized - 1
humility - 1
hyper - 1
idolise - 1
in control - 1
incredible - 1
indebted - 1
independent - 1
insouciant - 1
intense - 1
intrigued - 1
jocund - 1
kick - 1
laid-back - 1
languor - 1
lecherous - 1
leisurely - 1
libidinous - 1
listening - 1
lively - 1
livid - 1
looking forward to - 1
loyalty - 1
mature - 1
mediation - 1
mesmerized - 1
mirthful - 1
moral - 1
motivated - 1
nice - 1
nosy - 1
obsession - 1
orgasmic - 1
outgoing - 1
partial - 1
patient - 1
perfect - 1

perky - 1
perplexed - 1
pine - 1
pleased for - 1
poise - 1
possessed - 1
prefer - 1
punchy - 1
pure - 1
purposeful - 1
puzzled - 1
queer - 1
radiant - 1
regale - 1
regard - 1
relish - 1
responsible - 1
restful - 1
revel - 1
rollick - 1
sanguine - 1
sensational - 1
sensitive - 1
sincere - 1
sceptical - 1
smart - 1
softened - 1
sorry for - 1
special - 1
spellbound - 1
spiritual - 1
spontaneous - 1
spunky - 1
stirred up - 1
stupefied - 1
sulk - 1
tantalized - 1
terrific - 1
thunderstruck - 1
tingly - 1
titillated - 1
togetherness - 1
treasured - 1
unruffled - 1
unworried - 1
up - 1
useful - 1
venerated - 1
victorious - 1
virtuous - 1
well-being - 1
wise - 1
witty - 1
youthful - 1
zany - 1

Appendix 3. Sources of positive emotions in human-product interactions

In Tables 6 to 30, examples of how products evoke each of the 25 positive emotions are provided. The examples are in the form of quotes from respondents that, in some cases, have been translated and/or shortened.

Table 6. Sources of love in human-product interaction.

LOVE		
Basic sources	**Subordinate sources**	**Examples**
The product evokes love.	The product is beautiful or provides pleasurable sensorial stimulation.	IMAC: "In particular, the texture was very impressive. It was like human skin, and this aspect made me like it even more."
	I have invested time and energy in the product.	TABLE: "I found this table in a second-hand store. It was broken down, and I repaired it, and I started to love it from that moment."
Using the product evokes love.	Using the product is a loving interaction.	PIANO: "I play my piano when I am alone in my room. It feels like I am intimate with my piano – loving."
The product symbolizes a loved one or enables the expression of love.	The product represents (reminds me of) someone I love.	WATCH: "It was my grandfather's. From when I received it till now, I still feel the same emotion. It reminds me of my grandfather, my grandmother, and my childhood."
	I use the product to express love to someone.	POST-IT: "I use post-its to leave small messages of affection for my girlfriend."
The product symbolizes someone else's love for you.	The product represents (reminds me of) someone's love for me.	POSTCARD: "Eight months ago my uncle gave me a postcard with pictures of my most loved relatives. I think that I feel that emotion because I can link immediately the picture of a specific person with some affective memories."
	Someone uses the product to express love to me.	BAND-AIDS: "Like all children I fell down a lot and scratched my knees many times. When I was in the first grade, my teacher always brought band-aids for my knees. It showed that she cared and I felt really loved."

Table 7. Sources of sympathy in human-product interaction.

SYMPATHY		
Basic sources	**Subordinate sources**	**Examples**
The product evokes sympathy.	The product is broken or damaged.	LAUNDRY HAMPER: "A laundry hamper that was made of felt got damaged by a cat. It was pitiful to see the torn laundry hamper."
	The product is struggling to function.	PEN: "When writing with a pen that is barely hanging on, yet still performs, I feel sympathy for it as I get the feeling that it still wants to help me out despite its own discomfort."
	The product is discarded.	RICE BOWL: "One day, my brother found a damaged rice bowl and threw it away. I feel a bit sad that someone took advantage of it and just disposed of it because its value had been lowered."
The product symbolizes or enables sympathy.	The product facilitates interaction with someone who is suffering.	SKYPE: "This morning, I was chatting with a friend through Skype. He lives in China and is a little heartbroken lately. We talked about it. I believe I could feel his broken heart through my computer."
	The product represents someone (perhaps the user) who is suffering.	CAR: "Sometimes I see an old car that has been damaged. The owner has fixed it with glue or tape. The owners do not seem to have enough money to properly repair the car. I imagine how difficult their life is and feel sympathy."
Use of the product evokes sympathy for oneself.	I have to use a badly designed product.	MOBILE PHONE: "I hate my cell phone because of everything it has. One day, I jumped into the car with my family to go somewhere for a holiday. We lost our way and I said, "My mobile phone has navigation." It didn't work; couldn't find the satellite, etc. In the end we had to ask someone on the street."

Table 8. Sources of kindness in human-product interaction.

KINDNESS		
Basic sources	**Subordinate sources**	**Examples**
The product enables or inspires kindness.	The product enables me to be kind to someone.	SMART PHONE: "A couple of days ago, I helped a guy find his way by using the map application on my smart phone."
	I am kind to the product.	SCALE MODEL: "When I cleaned up my room, I saw many of my things are dusty. I attach great importance to certain products, including this model. It is also my first model so I am very careful, and I treat it with kindness."
The product is kind.	During usage, the product responds in a kind way.	COMPUTER: "Mac OS has a kind help function that enables me to easily finish a task. I feel like someone is helping me out and doesn't mind my stupid mistakes."
	The product has a nurturing function.	BLANKET: "The blanket I sleep with at night makes we feel warm and safe. The temperature of the blanket is warm. I feel covered and safe, and it is soft and fuzzy and nurturing. It feels like it's kind to me."
	The product eases a difficult task.	SCRUB TOWEL: "I found a scrub towel that I can scrub my back with. It enables me to finish an activity that used to be very hard. Using it was enjoyable and I felt kindness since I no longer have to go through the inconvenience."
The product symbolizes or enables kindness in others.	The product represents (reminds me of) a kind person.	CANE: "My granny is very kind in my eyes; she always uses a cane; that's why I think a cane reminds me of kindness."
		CAR: "I was very late for an appointment, and a friend offered to take me there in his car. He was busy himself, so that was very kind of him."

Table 9. Sources of admiration in human-product interaction.

ADMIRATION		
Basic sources	**Subordinate sources**	**Examples**
The (designer of) the product evokes admiration.	I admire how easy it is to use the product.	BOTTLE OPENER: "Opening a bottle of wine in the presence of family and friends is very smooth and effortless. The product worked so well (perhaps even better than expected) that I felt admiration for it. Previous experiences with other, similar products probably set the level of expectations."
	I admire the skills or craftsmanship of the designer.	TABLET PC: "I admire the tablet that my acquaintances recently purchased. When it comes to the complexity of the product development process, I really admire the developers' abilities to imagine and implement their ideas."
	I admire the impact that the product has had.	RECYCLABLE PRODUCT: "When I see a product that is made of recyclable materials, or does not contain environmentally harmful things. I also respect the designer who developed the eco-friendly product."
Other users of the product evoke admiration.	I admire people who can use a difficult-to-use product.	CRUTCHES: "Because it is not easy; just getting out of the house on crutches takes courage, and I admire that."
	I admire what people are able to accomplish with a product.	TAJINE: "My friend prepared a wonderful meal with his tajine. I admired his cooking skills; without the tajine he would not have been able to prepare the meal."

Table 10. Sources of worship in human-product interaction.

WORSHIP		
Basic sources	**Subordinate sources**	**Examples**
The product evokes worship.	The product is of high quality (beautiful or well-designed).	MOTORCYCLE: "Unlike an ordinary mass-produced product, it was unique in terms of its aesthetic quality and features. It was also mass produced though. I could directly recognize what the vision of the designer was when I saw it."
	The interaction with the product is of high quality.	IPHONE: "Since I started using Apps on iPhone, I've been astonished very often. This repetitive positive experiences has made me feel I worship the Apple brand."
	The product represents something I worship.	BIBLE: "As a Christian, I still believe it is a thing that should not be carelessly treated. Since the Bible contains the words of God, I idolize and venerate it."
The product enables an activity that evokes worship.	The product facilitates a worshipped activity.	BATHTUB: "When I am at my parents' place, I sometimes take a bath. This is an unusual experience for me, and therefore I idolize it."
The product symbolizes someone that is worshipped.	The product represents (reminds me of) someone I worship.	POSTER: "When I look at the poster of my favourite band I feel I worship them for their creativity."

Table 11. Sources of respect in human-product interaction.

RESPECT		
Basic sources	**Subordinate sources**	**Examples**
The product (or its designer) evokes respect.	I respect the product for being special.	GLASSWARE: "We use these glasses just on special occasions like dinners. I felt this emotion because they look delicate and the material is glass. Even when I need to wash them I try to be very careful."
	I respect the product for its functionality or effects.	WHEELCHAIR: "Respecting wheelchairs that can lift the user to have a conversation with people who are standing."
	I respect the designer of the product.	UMBRELLA: "When I was using my umbrella I noticed how well it worked, and I respected the designer for that."
The product makes the user feel respected.	I feel respected by the product.	CAR LIGHT: "The light in the car doesn't go off until after 10 seconds, which enables me to check if I forgot anything. I experience that as respectful."
	Someone shows respect to a product I use or own.	COAT: "A friend was very respectful toward my expressive coat and how I wear it."
	A product is used by someone in showing respect to me.	SHOES: "My father gave me shoes as a graduation present and told me that I deserve to have nice shoes as I was preparing to enter society."
Use of the product inspires respect for others.	I respect people for their skill in using a product.	BEER BARREL: "When carrying a beer barrel, I realized that movers have to carry these kinds of heavy things every day."
	I respect people for their decision to use a product.	BICYCLE: "I have a friend who uses a folding bicycle. I respect him for taking the effort to travel in a simple and healthy way that is good for the environment."
	My decision to use a product is respectful.	TOASTER: "I thought of making some toast using the oven, but then I realized the toaster consumes less energy. So I used the toaster and I felt respectful toward the planet."

Table 12. Sources of surprise in human-product interaction.

PLEASANT SURPRISE		
Basic sources	**Subordinate sources**	**Examples**
The product evokes surprise.	I am surprised by novel or unexpected functions of a product.	NOISE CANCELLNG HEADPHONES: "I was surprised that it became so silent. I would never have guessed that headphones can take away so much sound."
	I am surprised by products that are not what they appear to be.	TELEPHONE COVER: "I saw someone who was holding a tape, but then it turned out to be a beautifully made phone cover."
	I am surprised by an unexpected use of materials in a product.	TRAIN: "Its exterior was different from ordinary trains. It looked luxurious. The material used for the exterior was plastic and it looked like a home appliance."
Using the product evokes surprise.	I am surprised when a product functions better than expected.	DUSTBUSTER: "I bought it, and found that after two months of using it, the performance increased considerably. I was originally disappointed with the performance, and was surprised that it actually gets better."
	I am surprised by a product's unexpected ease of use.	IPHONE: "The reaction of the user interface of my iPhone in response to input actions. When I realized that I can use such a complex product without any learning process."
Someone else's actions in relation to the product evoke surprise.	I am surprised by the behaviour of someone using the product.	POSTCARD: "My grandparents had sent me a postcard. I didn't expect them to do so, so I was pleasantly surprised."

Table 13. Sources of enchantment in human-product interaction.

ENCHANTMENT		
Basic sources	**Subordinate sources**	**Examples**
The product evokes enchantment.	The product stimulates the imagination.	JEWELRY: "Looking at the art piece made me think about the symbolism and possible stories behind it. Thinking about stories behind the product carried me away in my imagination."
	The product does things that are magical or thought to be impossible.	BALL: "I won a ball at the amusement park. It appeared to be a special ball. When you threw it in the air, parts changed in a way that made the ball change colour. I was so enchanted that I wanted to show it to all my friends, and we spent a lot of time in amazement trying to figure out how it worked."
	The product represents (reminds me of) an enchanting memory.	PEN: "I found a fountain pen that I used to use when I was a child. Using it now enchants me because it reminds me of those times; it is nostalgic."
Using the product evokes enchantment.	I become absorbed by an activity that is enabled by the product.	FOOTBALL: "I can play for hours, either by myself or with others – and I forget about the time."
	I feel transported to another (fictional) world by using the product.	BOOK: "I was enchanted by the story and could not stop reading until I finished the book."
Someone else's use of the product evokes enchantment.	I feel enchanted by the skill of someone using the product.	RUBIK'S CUBE: "I was enchanted by how fast my friend was able to solve the puzzle. I felt this because I thought it was very special that there is so much 'logic' in this puzzle."

Table 14. Sources of fascination in human-product interaction.

FASCINATION		
Basic sources	**Subordinate sources**	**Examples**
The (designer of the) product evokes fascination.	I am fascinated when a product's meaning or purpose is not directly clear.	SCULPTURE: "At an exhibition, an abstract sculpture drew my attention. Its meaning, function or purpose wasn't immediately clear and the urge came to find out and uncover that."
	I am fascinated when I see a novel product for the first time.	MACBOOK AIR: "First time I saw a MacBook Air: I was fascinated because there is no other laptop like it; it is ground-breaking different."
	I am fascinated by the craftsmanship of a product.	LENS: "The lens expresses an amazing quality by the way it has been produced, the materials that have been used, and the perfection of the mechanical components. It shows craftsmanship and good production techniques."
	I am fascinated by the complexity or richness of a product.	MOBILE PHONE: "I have had the phone for a while, but it feels like I have completely no idea what amazing things it can actually do."
	I am fascinated by how a product works.	LAWN MOWER: "I was at a friend's watching them mow the lawn, then was curious as to how the catcher system worked on this mower. He proceeded to dismantle the mower and began to rave on about how 'awesome' certain features were."
	I am fascinated by the company that produced the product.	NESPRESSO CUPS: "Fascinated that Nespresso only sells these coffee cups and can survive doing that in a very distinctive way."
Using the product evokes fascination.	I am fascinated when I discover the functions of a product.	SMART PHONE: "I tend to search for all possible functions when I first use a new device. I just wondered if there were new things and how new functions could help me."
	I am fascinated by the sensory experiences involved when using the product.	LAVA LAMP: "I could stare at the lamp forever because each time something different happened."
	I am fascinated by what I can do with the product.	FRENCH CURVES: "Something this small and simple can achieve something this hard to do by hand; that's fascinating."
What someone else does in relation to the product evokes fascination.	I am fascinated by what someone does with a product.	RUBIKS CUBE: "I was with a friend and I was fascinated that he was able to solve the puzzle very fast. It is fascinating that solving the puzzle is about learning some algorithms by heart."

Table 15. Sources of lust in human-product interaction.

LUST		
Basic sources	**Subordinate sources**	**Examples**
The product evokes lust.	The product can be used to stimulate erotic zones.	TOOTHBRUSH: "I was brushing my teeth this morning. I imagined how the vibration of the toothbrush could make people feel different things if it was placed in different areas of the body."
	The product evokes sexual appetite.	LAPTOP: "A porn video on my laptop: because of the depicted scenes."
Someone else's use of the product evokes lust.	The product emphasizes sexual appeal.	CLOTHING: "The feeling when I see my girlfriend in the right outfit; it accentuates her body."
Using the product evokes lust.	The product is used in erotic interactions.	LUBRICANT: "Using this product allows you to have a more pleasurable experience during intercourse."
	The product represents (reminds me of) a sexual interaction.	CUP OF TEA: "Drinking mint tea at a café. It reminded me of a similar situation in which I was with a friend of mine, where this emotion was also present."

Table 16. Sources of desire in human-product interaction.

DESIRE		
Basic sources	**Subordinate sources**	**Examples**
Desire is evoked in wanting to own the product.	I see a desirable product.	JEANS: "I found one pair of jeans that suits me very well. First, the material was unique, and it fits my body. Besides the quality of the material, the sewing was excellent for the price."
	I see someone else using a desirable product.	IPAD: "I was looking at my friend's new iPad. I liked the idea of Skyping with somebody anywhere with a handy tool such as the iPad."
	A desirable product is out of reach.	BICYCLE: "The styling of the Dutch bikes attracted me so much when I was a little girl. I wanted one but it's impossible to carry it back to China."
Desire is evoked in wanting to use the product.	I desire to use the functions of a product.	NISSAN TURBO: "I drove this car for a day, and although I was not in a hurry and by myself, I felt the desire to go racing. I really wanted to experience the top speed, but it is not allowed by Dutch law (so I didn't do it)."
	I desire the effect of using the product.	FILMS: "They always give me the time to relax, which I enjoy and thus desire. Desire is a feeling to do something, thus seeing a product (like my laptop on which I watch movies) can evoke such desire."
	I desire to interact with the product.	CHINA: "I use it whenever I am cooking a nice meal. It is pure, white, glossy, clean, and beautifully shaped – I desire it because it is so sexy and sophisticated to me."

Table 17. Sources of hope in human-product interaction.

HOPE		
Basic sources	**Subordinate sources**	**Examples**
Hope is evoked by the product.	The product represents something that gives hope.	BIBLE: "When I feel depressed, I read the Bible. While reading it, I usually find wisdom and reflect on my life. Sometimes this experience leads me to change my attitude in a personal way."
	The product represents past or future success.	PEN: "I always use my pen when I make a plan or initiate an action. I feel my work performance gets better when I make notes or doodle with a pen. It facilitates concentration, and organized work. Writing down ideas assures me that I will successfully solve a complex problem."
Hope is evoked by using the product.	I hope I can master the skill needed to use the product.	GUITAR: "I bought a second-hand guitar. I'm a novice and need to practice. Someday, I hope to play the guitar in front of many people."
	I am uncertain, but I hope the product will function properly.	RACING BIKE: "I was about to ride 40 km after work in the late afternoon, for leisure. I had not used the bike for a while, was uncertain whether it would still function properly, and hoped for the best."
	I am uncertain, but I hope I will be able to use the product.	DJ MIXING TABLE: "The product is complex, so I did not know if I would be able to use it; I took a risk when buying it."
Hope is evoked for something the product will enable to happen.	I feel hope for the anticipated consequences of using the product.	LAMP: "Since the lamp would help me write notes at night, not worrying about distracting my roommate, I was very happy. Also, I felt hope in that this lantern could stimulate me to write even more."
	I feel hope for some event in which the product plays a facilitating role.	LAPTOP: "Looking at my grades; hoping that the results will be good. The product facilitated the possibility of seeing my grades."

Table 18. Sources of anticipation in human-product interaction.

ANTICIPATION		
Basic sources	**Subordinate sources**	**Examples**
Expected ownership of the product evokes anticipation.	I feel anticipation while waiting for an ordered product to arrive.	BICYCLE: "I finally ordered a new bicycle, and have to wait two weeks for it to arrive."
Expected beneficial effects of using the product evoke anticipation.	I feel anticipation when first using a product.	HELMET: "Last year, I was buying some accessories for riding a motorcycle. I could anticipate how the accessories would improve the experience of riding."
	I experience anticipation when it takes time for a product to deliver beneficial effects.	HAIR STRAIGHTENER: "I was putting a lot of effort into looking nice and pretty for a special occasion and decided to make my hair straight. While I was using the product I was really looking forward to seeing the final result because I anticipated that I would look nice."
A future event symbolized by the product evokes anticipation.	I feel anticipation when a product symbolizes a future event.	MAP: "Looking at the map makes me think of my planned vacation."
	I feel anticipation knowing that a product will be used in a future event.	WAKEBOARD: "I was looking forward to using the professional equipment for wakeboarding in New Zealand."

Table 19. Sources of courage in human-product interaction.

COURAGE		
Basic sources	**Subordinate sources**	**Examples**
The product symbolizes courage.	The product represents (reminds me of) a past courageous act.	SKATE SHOES: "I was timid when I was a child. My father tried to teach me to skate. I was really afraid at first. But after practicing and falling down many times, I became gradually more courageous."
	The product represents (reminds me of) something that gives me courage.	STONE: "My mother used to believe that stones have some special energy. So every time there is a difficult situation I keep the stone in my hand and I feel more courageous."
Using the product enables courage.	The product helps me in difficult or dangerous situations.	PHONE: "I called my father to confront him with some issues. I didn't dare to talk to him, but by using the phone I could have direct contact while having some distance, which gave me the courage to tell him what I had to."
Using the product requires courage.	Using the product is dangerous.	MILLING MACHINE: "When I was a freshman, I used a milling machine to make a mock-up model. I already knew that I could get injured using it. It was a bit scary. I decided to use it for my work, and took a training course."
	Using (or buying) the product is not well-accepted.	SEX TOY: "Since this society places a taboo on sex-related products, I needed to be more courageous to buy a sex toy."
	The product is used in risky activities.	MICROPHONE: "Singing in front of unfamiliar people. Because the microphone makes me eager to sing, once I sing loudly, I feel confident and courageous."

Table 20. Energizing sources in human-product interaction.

ENERGIZED		
Basic sources	**Subordinate sources**	**Examples**
Using the product is energizing.	The product requires physical activity to use.	BICYCLE: "On my way back from work I ride fast; back home I feel energetic."
	The product is mentally energizing.	CAR: "Driving the car exhilarates me and gives me a sense of freedom (with open windows)."
	The product (e.g., food or coffee) provides energy or stimulation.	FOOD: "When I was starving. When I found food, I was revitalized."
	The product enables rest.	BED: "Because of my work I need to sleep in different beds. My own bed is the best, and gives me energy. A good night's rest makes me feel energetic, and my bed is essential for this."

Table 21. Sources of amusement in human-product interaction.

AMUSEMENT		
Basic sources	**Subordinate sources**	**Examples**
The product is amusing.	The product has an amusing or playful design.	ORANGE BUCKET: "The combination of shape and colour, the fact that a bucket can be so playful, imagining me washing my clothes and feeling relieved, the fact that it could bend, everything made me happy like a child."
	The product represents (reminds me of) an amusing activity.	VOLLEYBALL: "I feel amused every time I train with my volleyball team mates. A volleyball represents to me a way to release stress."
Using the product is amusing.	The product has an amusing function.	DISHWASHING BRUSH: "Discovering the function that it can be plugged to the kitchen tiles. I kept plugging it to the tiles to experience it again and again."
	The product enables or facilitates an amusing activity.	MOBILE PHONE: "I amuse myself with playing games on my phone."

Table 22. Sources of inspiration in human-product interaction

INSPIRATION		
Basic sources	**Subordinate sources**	**Examples**
The product is inspiring.	Seeing the product is inspiring.	BRACELET: "I saw a bracelet which was too expensive for me to buy. Then I realized that it was not difficult to make it myself. So I went to the bead shop and made it myself. The bracelet inspired me."
	Using the product is inspiring.	CORRECTION TAPE: "I had a lot of inspirational thoughts the first time I used correction tape. If it was coloured, I could do different shapes, if it was an adhesive tape….. All these ideas came to my mind and I thought that multiple products or things could come out of it."
The product enables an activity that is inspiring.	The product enables or supports creative activity.	INK BOTTLE: "The ink bottle represents drawing with ink, which I really like. It inspires the activity."

Table 23. Sources of euphoria in human-product interaction.

EUPHORIA		
Basic sources	**Subordinate sources**	**Examples**
The product enables an activity that evokes euphoria.	The product facilitates an extraordinary experience.	TV: "The Dutch soccer team won an important game in the World Cup tournament. With the product I could enjoy the victory and share it with my friends."
The product evokes euphoria.	The product represents (reminds me of) an extraordinary experience.	STEREO: "I was with friends that I met in Thailand; we had a reunion. We put on the music that we danced to in Thailand, and it made me euphoric, from the memory of the visit to Thailand."
	I feel very good about owning an extraordinary product.	SMART PHONE: "I selected this model since I did not want to buy a popular model like the iPhone. It makes me feel distinct from others since this model is a valuable rarity; many people do not know this model."
Using the product evokes euphoria.	The product enables me to challenge my boundaries.	SPORT BICYCLE: "When I had to ride against the wind and in the end I made it. I had to push myself, and it worked."
	Using the product stimulates flow experience.	RENAULT MEGANE: "All the perceptions involved were so strong and intense. The sound of the engine, the acceleration, the traction and the g-force during the turns, the breaking force and the belts that kept me attached to the seat… it was amazing… I felt euphoric because I experienced all these great emotions all together."

Table 24. Sources of joy in human-product interaction.

JOY		
Basic sources	**Subordinate sources**	**Examples**
The product evokes joy.	The product represents (reminds me of) a joyful activity.	DIGITAL CAMERA: "Looking at the pictures of the holiday; because of the camera all kinds of memories emerged."
Using the product evokes joy.	The product performs its functions well.	COOKING KNIFE: "I have to cut a lot of vegetables when cooking. I felt joy when I used the sharp knife because it is a pleasure to cut vegetables with this knife; it makes the job much easier."
	Using the product provides sensory pleasure.	MOUTH GUARD: "To use it I needed to put it in hot water and then form it in my mouth to my own teeth. It was a new experience, and joyful to experience how the material changed. This was a new experience which created a feeling of joy."
The product enables an activity that evokes joy.	Using the product facilitates a joyful activity.	LOUNGE CHAIR: "Alone on the beach in sunny weather, a gentle wind, and the sound of ocean waves. Doing nothing else is very calming yet pleasurable, a precious situation that brings you away from a hectic life."

Table 25. Sources of satisfaction in human-product interaction.

SATISFACTION		
Basic sources	**Subordinate sources**	**Examples**
The product evokes satisfaction.	The product fulfils its function well.	MOBILE PHONE: "When I reached a destination I had never visited, by using a map application on my mobile phone. I was satisfied with its function: Its wireless internet function enables me to easily find any information."
	The product combines functionality and beauty.	FAN: "It helped me to avoid the heat and, at the same time, it was very pleasurable to look at."
	I get positive feedback from others about the product.	WATCH: "I bought a nice watch. It had cost me only 10 euros, but I thought the mechanism was interesting. I got a lot of reactions of others that they liked the watch, and I believe that is important to be satisfied. You are satisfied when you are appreciated by others."
The product enables results that evoke satisfaction.	The product enables me in activities that satisfy me.	WORKBOOK: "I was writing in my workbook and was trying to reach a goal and succeeded. I was satisfied with my results."

Table 26. Sources of pride in human-product interaction.

PRIDE		
Basic sources	**Subordinate sources**	**Examples**
Owning the product induces pride.	I am proud of owning an exclusive or unique product.	CASSETTE PLAYER: "I am proud of my vintage cassette player because it is unique."
	I feel proud when I receive positive feedback from others about the product.	GLASSESS: "I wear horn-rimmed glasses. Last year, when I visited Japan for an exhibition, one of the staff highly praised their aesthetic quality."
Using the product induces pride.	I am proud of being skilled in using a product.	KEYBOARD: "I like to type fast; when I can manage to write a text as fast as I can without spelling or grammar mistakes I feel very proud of my skills, and my keyboard can support my achievement."
	I am proud of being able to use the functions of a product.	MOBILE PHONE: "When I got familiar with all the functions of a new mobile phone."
The product enables results that induce pride.	A product facilitates me in doing something that I feel proud of.	PANS: "I don't like to cook, but I used my pans to cook a nice meal for my friends, and they gave me a lot of compliments."

Table 27. Sources of confidence in human-product interaction.

CONFIDENCE		
Basic sources	**Subordinate sources**	**Examples**
The product inspires confidence.	The product appears to be trustworthy.	BLOOD PRESSURE GAUGE: "Because the product appears to be trustworthy you are confident about the measured values."
	The product has proven to be trustworthy.	BICYCLE: "Because I know my bicycle well and I feel safe on it. I know, if something breaks, I can repair it myself."
	The product is easy to use or understand.	MACBOOK PRO: "It's quite easy to understand how to use and you get used to it very fast. I feel confident of controlling it."
	The product supports my independence.	IPHONE: "Most of the time, all the functions I can use by myself, so that I don't need to bother someone else."
Using the product inspires or allows confidence.	The product supports me in a challenging task.	TEFLON PAN: "Because the product is made of Teflon, which can prevent food sticking onto the pan when cooking."
	Using the product prevents injury or damage.	MOUTH GUARD (FOR KICKBOXING): "I bought the best mouth guard you can buy; I trust the product will perform its function excellently. Especially because I like having teeth!"
	The product makes me look good.	SHOES: "I feel confident when I wear my stiletto heels. They are beautiful, and when I wear them, I feel tall, skinny, sexy, and confident. They make me feel awesome."

Table 28. Sources of relaxation in human-product interaction.

RELAXATION		
Basic sources	**Subordinate sources**	**Examples**
Using the product is relaxing.	The product enables a relaxing activity.	SKATES: "With my skates, I am skating through the fields, with the wind and sun. It enables me to relax and gives me a sense of freedom."
	The product provides physical comfort.	SOFT LEATHER COUCH: "I drove through the heavy rain for two hours, and was totally exhausted. After arriving home, I sat on a new couch that was very soft and comfortable. The qualities of the couch comforted and relaxed me: the soft cushion, silky texture of the leather, proper angle of the back, spacious seat, etc."
	Using the product takes time.	COFFEE FILTER: "Every morning I make myself a cup of coffee, just with a ceramic filter on top of my cup. It takes time for the water to boil, and then I still have to pour it. Then I am looking at the filter, how the water vanishes and my coffee gets done. I like that process, because it is slow. Like meditation."
The product symbolizes relaxation.	Using the product represents (reminds me of) a relaxing activity.	FAVOURITE TEA CUP: "Whenever in the evening, after a long day of work I am having a cup of tea, it is my moment of relaxing. It is like a symbol of relaxation. The cup itself does not relax me, but the associations I have with it."

Table 29. Sources of relief in human-product interaction.

RELIEF		
Basic sources	**Subordinate sources**	**Examples**
The product relieves discomfort.	The product relieves physical discomfort.	BLANKET: "While on the bus, the air conditioner made me feel so chilly; even had a stomach ache due to the low temperature. I covered my belly with a blanket and felt warmer, then I felt relaxed. The blanket relieved my pain."
	The product relieves anxiety or mental discomfort.	BAG HOOK: "I could put my belongings away safely using the bag hook that was attached to the bar, and felt relieved, not having to worry about it getting damaged or stolen."
The product enables completing a difficult task.	I feel relief when I discover I can use a (complex) product.	CABINET: "I had to assemble this cabinet, and was a bit worried that I would not be able to do it by myself. I was relieved when I managed without asking for help."
	Using a product brings relief when it enables a difficult task to be finished.	COMPUTER: "When I meet a big deadline, then I feel very relieved."
Finding the product brings relief.	I feel relief when I find a product that was lost.	MEMORY CARD: "I lost my memory card. I couldn't find it. It was very frustrating. The next day, my colleague found it by accident, and handed it to me. Instantly, the stress went away, and I felt relieved."

Table 30. Sources of dreaminess in human-product interaction.

DREAMINESS		
Basic sources	**Subordinate sources**	**Examples**
Using the product stimulates dreaminess.	The product enables physical or mental isolation.	SWIMMING GOGGLES: "While deep diving, I isolate myself from the world, and only hear the sound of my breath and the water. It becomes a perfect environment to reflect on my life. Swimming goggles help in seeing beautiful underwater scenes and creatures. Seeing such things facilitates being dreamy."
	The product transports me to another (fictional) world.	BOOK: "I enjoyed reading the book. I imagined what the life of the writer would be like."
	The product can be used without thinking.	BICYCLE: "I was riding the bike for leisure, in a natural environment, and I was thinking back of school, etc. I could ride the bicycle without having to think about it."
Seeing the product stimulates dreaminess.	The product represents or symbolizes something that brings on dreaminess.	WINTER COAT: "When it was raining a lot I put on my winter coat for the first time (in a long time) because it is waterproof. It made me dreamy because it brought me back to the last time I wore that coat, the feeling of winter and snow. I love winter, so it was nice to be back for a moment in that winter-dream."