

## **A language for dealing with emotions in product innovation: a proposal**

**Alaniz, Teresa<sup>1\*</sup>, Biazzo, Stefano<sup>1</sup>**

<sup>1</sup>University of Padova, Italy

### **Abstract**

The knowledge of emotions is essential in all designs created for the customer (e.g. product design, service design, graphic design, food design). The complexity of designing a product-service system to provoke intended emotions involves the need to formulate a

shareable, natural, and unambiguous language has emerged. This paper presents a language proposal to discuss emotions in product innovation, which is composed of three key concepts: the human-product emotional interactions, a framework of positive emotions and the emotional-jobs-to-be-done by a product. An exploratory survey with an international community of designers has been implemented in order to review the acceptance and understanding of this framework; the results of the exploratory survey have been the basis of the final refinement of the proposed language, which consists of 1) three categories of human-product emotional interaction, 2) 19 positive emotion types, and 3) 19 emotional jobs-to-done.

**Keywords:** emotional design, product innovation, emotion knowledge

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## 1. Introduction

The innovation of a product can be achieved from different perspectives and the application of emotion knowledge can be significant to attain this aim. But in the complexity of designing a product to provoke intended emotions, the need to formulate a shareable, natural, and unambiguous language has been emerged.

When people need to express an emotional state, it is easy to differentiate from a pleasant to an unpleasant experience. But, when the need is to express an emotional state in a refined way, usually, the vocabulary seems to be limited. Furthermore, people can understand “emotion” with different connotations and/or can have different understandings about the same emotion. In the activities of design and develop new products aimed to provoke pre-defined emotions, these circumstances need to be addressed. In addition, emotional experiences are easy to be related to people. We already know that a product can provoke emotions that are linked to another person (i.e. a person can feel proud at wearing a watch that had belonged to some beloved person) or can be related to a special event (i.e. a person can feel love of a pair of shoes that wore in an unforgettable trip). However, when designing a new product to stimulate pleasant emotional experiences, people involved in this activity need to comprehend the design conditions that work as trigger of emotions.

In the acknowledge that at designing a new product, different professionals are involved (designers, marketers, engineers, etc.) (Yoon, et al., 2016); the proposed language has been formulated in collaboration with a design community and a multidisciplinary review team. The review team was composed by one business consultant, one manager of open design innovation company, one manager of research and development in a manufacturing company and one professor of innovation management. The proposed language to discuss emotions in product innovation has been shaped in three main steps: 1) the generation of the key-concepts of the first version of the language; 2) the exploration of acceptance and understanding key-concepts with a design community through an exploratory survey; and 3) the refinement of the language with the review team.

## 2. Developing a language to discuss emotions in product innovation

This section presents the exploration of acceptance and understanding of a language to discuss emotions in product innovation. Our primary aim, when defining a language to envision new product ideas influenced by positive emotions, is to create an unambiguous, shareable and understandable vocabulary. Pursuing this objective, an exploratory survey has been conducted, with the aim to gain qualitative inputs from a design community about the proposed language. The language is composed of three key-concepts: the human-product emotional interactions, a framework of positive emotions and the emotional-jobs-to-be-done by a product.

It is already known that a product can provoke emotions by its appearance, by the way it performs its function, the symbolic meanings of the product and by the symbolic meanings of

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the brand/company that the product belong (Eisenman, 2013; Jordan, 1999; Kamp & Desmet, 2014; Norman, 2004 & Rampino, 2011). Dell'era & Verganti (2007) declared that every product has its own language, and the language is expressed by the tangible elements (like material, shapes, colours, etc.) and intangible elements of the product (i.e. symbols) (Verganti, 2009). The tangible elements are related to the appearance and functions of the product; where the intangible elements are related to the symbolic meanings of the product. Emotion-Driven Innovation is exclusively focused in the design elements that work as triggers of emotions. Within this context we define emotional design factors as the characteristics of the product that are designed, planned and executed in the process of design and development of new products; and such characteristics provoke emotions to people. And we proposed categorization of Human-Product Emotional Interactions.

Human-product emotional interactions are defined as situations in which the appearance of the product (Aesthetic interaction), functions of the product (Behavioural Interaction) and symbolic meanings of the product and/or the brand that the product belongs (Symbolic Interactions) elicit emotions to people.

Regarding the framework of positive emotions, we initially adopted the well-known model developed by Pieter Desmet in the paper "Faces of product pleasure: 25 positive emotions in human product interactions". The list of positive emotion types was created with a componential analysis of 150 positive emotion words and it embodies a general collection of human positive emotions (Desmet, 2012). The framework was selected after the analysis of the state-of-the-art review on phase one of the PRM.

Pursuing to enhance understanding of the positive emotion types with people involved in the activities of design and develop new products, the concept of emotional-jobs-to-be-done was adopted. Emotional jobs define how users want to feel or avoid feeling (Ulwick & Osterwalder, 2016). The definition of every positive emotion type presented in the aforementioned framework was translated into emotional-job-to-be-done by the product.

The two major goals of the exploratory survey were:

- 1) To review the acceptance and understanding of the vocabulary of the 25 positive emotion types and the corresponding emotional jobs. Explicitly speaking the word of emotion (example, Joy) and the definition of emotion (Joy is the experience of being pleased about -or taking pleasure in- something or some desirable event) and the emotional job (the product should stimulate you to a rejoice situation).
- 2) To explore the relationship between the proposed categorization of human-product emotional interactions with the 25 positive emotion types. Objective two is aimed to identify the design conditions that elicit positive emotions, in order to be applicable to the process of designing and developing new products

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To address the objectives of the qualitative study, a questionnaire was created; it was a four steps format, to be filled out online and individually. The questionnaire was designed to be answered by a design community; this decision was driven in order to collaborate with people experienced in product design activities.

To ensure that the questionnaire was answered only by designers; it was launched to the Desall design community. Desall is an Italian open innovation and crowdsourcing platform that connects companies and private clients with a worldwide community of designers. The questionnaire was sent to the design community by a company email; and participants were informed about the objectives of the study. The questionnaire has been structured in four steps.

**Select a group.** The 25 positive emotion types were distributed randomly in five groups (brave, friendly, curious, charmed and playful). Participants were asked to select one of the five words that they like the most. This step was made to simplify the selection of emotions.

**Select a positive emotion type.** Participants were indicated to select one positive emotion type from the group/word that they had previously selected. The name of the emotion and the emotional-job-to-be-done by the product was the information given to the participants in step 2.

**Upload a picture of a product.** Participants were asked to upload a picture of the product that provokes the selected emotion. Step 3 displayed a card of the selected emotion; containing the word of the positive emotion type, a brief definition of the emotion and the emotional-job-to-be-done. This step was aimed to understand better the answers of designers.

**Describe.** Participants were asked to describe briefly the details of the product that elicit the selected emotion. Step 4 was structured with four spaces to write details: if the product provokes the emotions because 1) its appearance, 2) its function, 3) the symbolic meanings of the product, and 4) the symbolic meanings of its brand. It was not mandatory to give a description in the four spaces.

### 2.1 Results of the exploratory survey

The questionnaire was answered by designers from 27 different countries. This is a point to startle, since the experience of emotions can be influenced by culture and context. A total of 70 responses were received.

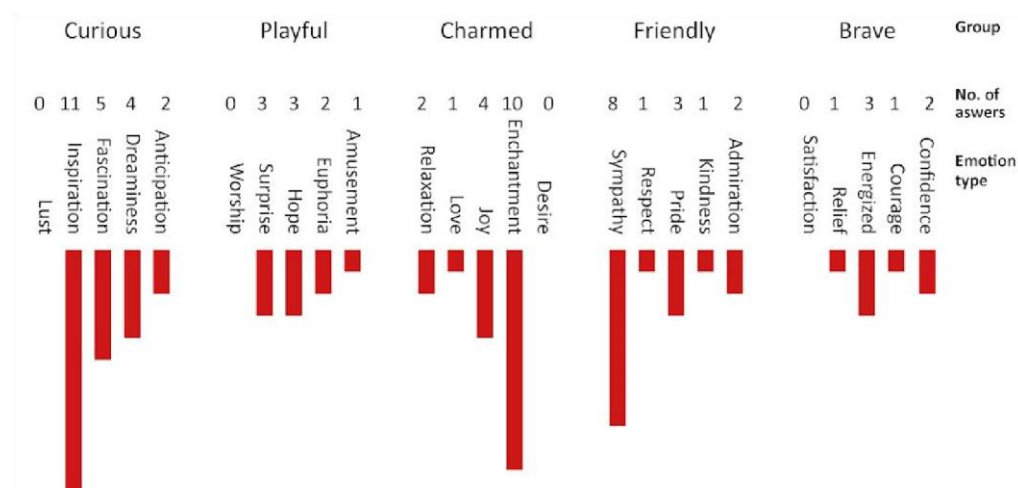
Regarding the first objective of the study, it can be asserted that designers feel more attracted towards emotions like Inspiration Enchantment and Sympathy. We assume that the attraction of these emotions is connected to the professional skills of designers. The emotion Inspiration involves creative desires; the emotion Enchantment is the experience to feel captivated by something that is seeing as delightful; and the emotion Sympathy involves feelings of identification with the state of someone else.

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On the other hand it was a surprise that the emotions like Desire and Satisfaction were not selected by designers. Comparing the results of the exploratory survey with the definitions of these emotions; we assume that designers did not feel interested on these emotions because both could be elicited in a secondary layer of experience by every product.

The emotion Desire involves feelings of strong attractions; a person can feel attracted about a product that provokes at first instance a relevant emotion to the person, like Pride (Pride is the experience of an enjoyable sense of self-worth or achievement). The emotion Satisfaction involves feelings of joy at pleasing a desire; people can feel satisfied towards a product that has helped them reach the state of pleasure they were looking for.

Figure 1 Number of answers per positive emotion type



The emotions Lust and Worship were not selected by designers. In the reflection with the review team about the results of the study, it was thought that designers did not choose Lust (Lust involves feelings of sexual appetite or sexual appeal) because the vocabulary may not appear suitable in a design context. And, the emotion Worship could not have interested to the designers since it involves feelings of devotion to something or someone: those feelings are mainly related to a religious context.

Regarding the second objective of the exploratory survey (To explore the relationship between the proposed categorization of human-product emotional interactions with the 25 positive emotion types) the qualitative observation started by analysing individually the answers given in step 4 of the questionnaire. First, the answers that were not aligned with the concept of emotional design factors were eliminated. Second, the descriptions given in the human-product emotional interactions were clustered by similarities. Each valid description was considered as one emotional design factor. The results indicate a predominance on emotional design factors related to the function of the product and the appearance of the product. We can assert that the

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positive experiences related to the tangible elements of the products were easy to identify and describe.

Descriptions from “write details: if the product provokes the emotion because 1) its appearance” (aesthetic interaction) were clustered in groups related to the senses of the human body. In the understanding that the emotional design factors on product appearance are linked to tangible elements of the product, the descriptions given by designers were clustered in four groups (Touch, Smell, Sight and Hearing). There was not any answer related to the sense of Taste. The outcome of these answers was that most emotions are elicited because the product is perceived by the sense of Touch (example of answer, when I first touched it, I was pleasantly surprised by the metal of its closure, which I did not expect to be so solid and cool to the touch).

Descriptions from “write details: if the product provokes the emotion because 2) its functions” (behavioural interaction), were more divergent. The positive emotions are linked to the fact that the product communicates properly how it works and how the user can fix it. Emotions like Relief or Sympathy are elicited because the functions of the product allows the user to interact with other persons. It is considered as the main finding, that the experience of positive emotions is linked to the moments of the function of the product, that is; when the product starts to execute its function (example of answer, by unexpected gesture that is needed to operate it); when the product is been executing its function (example of answer, the separation in time from taking a photo and see the result. That gives more importance to preparation); and when the product has been executed its function (example of answer, by knowing how to fix it and where to set paper, push or pull compartments).



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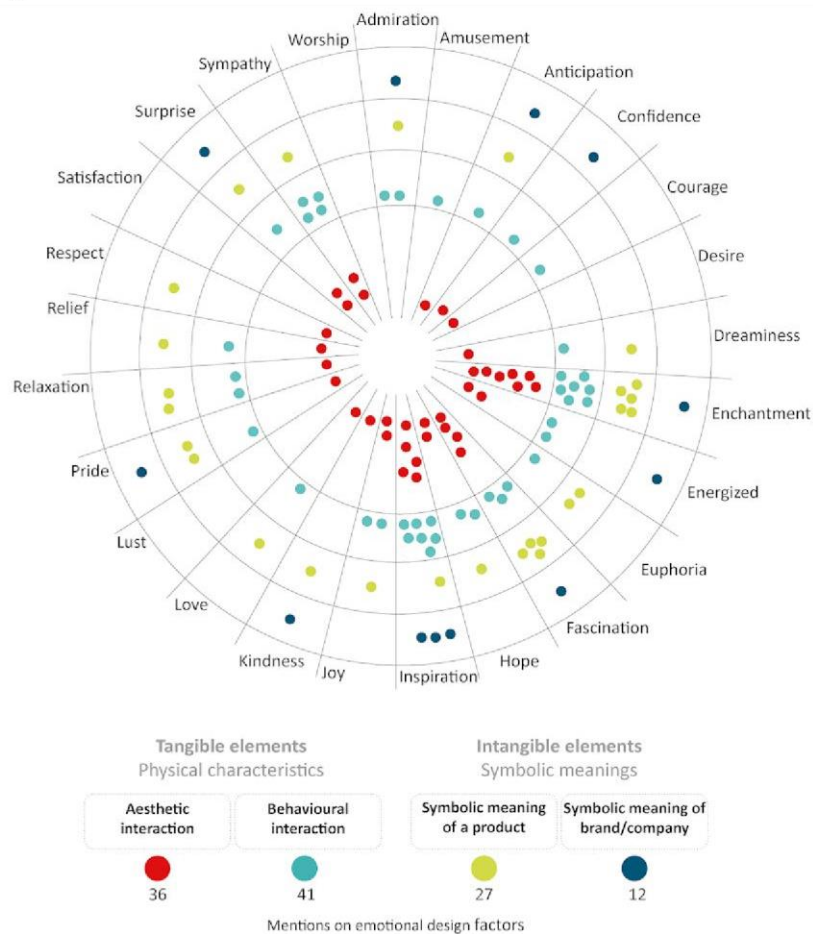


Figure 2 Relevance of the human-product emotional interactions in relation with the framework of positive emotion types

Descriptions from “write details: if the product provokes the emotion because 4) the symbolic meanings of the product” were vastly different. Descriptions related to the symbolic meaning of the product reveal that in order to the positive emotions arise people know very well the product. Emotions like Enchantment, Love and Pride were related to the fact that designers knew the history of the product, the sustainability concerns of the product and technological innovation of the product.

Emotions like Dreaminess, Euphoria and Fascination are elicited because the product provokes the imagination or curiosity of the designers; or because the product represents something else to them, like freedom. Designers mentioned the style of the product as emotional design factor. The positive emotions types Euphoria, Hope and Love were related to the style of the product, futurist, simple and classic style correspondingly.

In the symbolic interaction of the product, answers expose that there is a strong bond between the product and the person in order to experience the positive emotion. Designers indicated that emotions like Admiration, Enchantment, Joy, Kindness, Pride and Relief arise because the product influences their self-esteem or because the product permits self-expression.

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Descriptions from “write details: if the product provokes the emotions because 3) the symbolic meanings of its brand” were few. The answers reveal that in order the emotion arise in the symbolic interaction of brand/company the person is well informed about the brand. The positive experiences were linked to the fact that the brand or company are well-known in their niche of business, or that the brand concerns about topics like sustainability.

The results of the exploratory survey were considered in the refinement of the proposed language. The next section presents the final version of the three key-concepts of a language to discuss emotions in product innovation.

### 3. Key-concepts to discuss emotions in product innovation

The *human-product emotional interactions* are grounded on five different approaches: 1) The pleasure approach to product affect of Patrick Jordan (Jordan, 1999), 2) The three levels of design of Donald Norman (Norman, 2004), 3) The innovation pyramid of Lucia Rampino (Rampino, 2011), 4) The strategic use of design in a context of technological production of Micki Eisenman (Eisenman, 2013), and 5) The theoretical model of product attributes by Kamp and Desmet (Kamp & Desmet, 2014). Taking into account the answers of the exploratory survey three categories of Human-Product Emotional Interactions are proposed: Aesthetic Interaction, Behavioural Interaction and Symbolic interaction.

Figure 3 Approaches to ground the Human-Product Emotional Interaction



Product appearance contents information to be perceived by the human senses; its aesthetics conditions support the action of being perceived via sensory (Eisenman, 2013). To this research project the concept of product appearance is defined as the physical attributes of the product that can be perceived by the senses of the human body (sight, smell, taste, hearing and touch).

To Norman the physical attributes take central part at the visceral level; visceral level is concerned with the immediate emotional impact caused by the appearance of the product



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(Norman, 2004). Hedonic attributes of a product can be perceived through the senses of the human body, they provoke a high emotional experience and the experience is immediate (Kamp & Desmet, 2014). Jordan defines the physio-pleasure as the situation in which the senses of the human body work as an interface to perceive an object (Jordan, 1999) but the pleasure experienced via sensory perceptions is not related to the utility of the product (Blijlevens, et al., 2017).

The attributes of the product are key elements in the differentiation of the product in the market; the attributes can be perceived without using the product or in some cases without understanding what the product is about (Rampino, 2011). As an example of this, we can bring out one of the answers of the exploratory survey; the designer described that he/she felt enchanted by the shape of the citrus-squeezer of Alessi designed by Philippe Starck “Shape is amazing, not immediately related to the use”.

Emotional impact in aesthetic interaction occurs when any of the senses of the human body perceives attributes of the appearance of the product. To provoke a positive reaction, in this case aesthetic pleasure the product must be seen as an artwork.

In the three levels of design by Norman, he writes explicitly that behavioural level refers to the use of the product, he points out four elements: function, understandability, usability and physical feel (Norman, 2004). But, thinking about two different products that are designed to execute the same function, we might wonder if these products provoke the same emotion. Thinking in emotional reactions in the behavioural level it is possible to translate the four elements in questions; i.e. how does the product execute its function? how does the product reacts to the user actions? does the product is intuitive? and how does it feel to use the product?

To answer one of the questions above, we can speak about the Alessi kettle (9093), it communicates that the water has boiled by the sound of a bird singing. The kettle communicates the execution of its function through a pleasant/particular sound. This level of interaction is related to three concepts: 1) pragmatic attributes, which are the attributes designed to accomplish the function of product (Kamp & Desmet, 2014); 2) functional information, which facilitates the user to understand what the function of the product is and how to use the product (Eisenman, 2013); and 3) innovation of use, it explains how a product modify or evolve its way to use in order to remark a differentiation in the market (Rampino, 2011). It can be asserted that the pleasure experienced at using a product is related to the cognitive and emotional responses that a person experiences (Jordan, 1999).

Emotional impact in the behavioural interaction occurs when the product is used as a tool to perform an activity. The emotional reaction can be experienced in three different moments: 1) before using the product (moment related to functional information), 2) during the usage of the product (moment related to pragmatic attributes of the product), and 3) after using the product (moment related to functional information and innovation of use). The moments of behavioural interaction are also based on the descriptions given by designers in the exploratory study presented in the previous part of this paper.

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The concept of symbolic meanings of the product is used here to refer to the set of beliefs associated to a specific product; it is created by the tangible and intangible elements related to it (i.e. material, price, advertising, product history, product's designer, brand of the product, etcetera).

The symbolic meaning of a product goes beyond product's utility, it is the channel of the values that a product epitomizes; these values provide ideo-pleasure when they are related to people's values. When this situation happens, it is created a bond between the product and the person (Jordan, 1999).

However, to this relation exists, it is necessary a cognitive process; in which a person can give a meaning to a product through semantic interpretations or symbolic associations; here culture and context come into play (Desmet & Hekkert, 2007) (Norman, 2004) (Eisenman, 2013).

Product's semantic and symbolic associations are interpreted through the lenses of the socio-cultural context in which the product has been placed (Rampino, 2011). Products are designed to help people to achieve goals, but meaningful goals are achieved through cognitive-affective appreciation; the result is a strong relationship between a person with a product (Kamp & Desmet, 2014).

Emotional impact in the symbolic interaction is provoked when the product is perceived as a symbol of "something else": a concept, an idea, a value, a belief, a quality, etc. (for example, youth, intelligence, prestige, freedom, etc.) The symbolic meanings can be communicated by the tangible and intangible elements related to the product (i.e. material, price, advertising, product history, product's designer, product communication, packaging, etc.).

In collaboration with the review team, the *framework of 25 positive emotion types* was discussed and analysed. The framework and the corresponding emotional-jobs-to-be-done were modified in response to the feedback of the members of the review team and the results of the exploratory survey presented in the previous section.

The words of the emotions Respect and Worship were excluded. First because these two emotions were not in the interest of the designers in the exploratory survey; the emotion respect was selected one time, while the emotion Worship was not selected even once. Second, the emotions Respect, Worship and Admiration involved similar actions like to regard, to estimate or to honour someone or something, because it is seen as valuable or worthy; and to honour, is linked to experience of high respect. The review team agreed that the emotional job of Admiration could express the same meaning of the excluded emotions.

Even though the emotion Anticipation was selected from some designers in the exploratory survey; the review team decided to exclude the word of the emotion from the list. The emotions Anticipation and Hope contain similar behaviours. Both emotions are related to an event in the future. In agreement with the review team, it was decided to keep the word Hope in the list,

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since it is considered more common in the vocabulary; but, integrating the understanding of the emotion Anticipation in the emotional-job-to-be-done of Hope.

The emotions Desire and Satisfaction were excluded from the list. Both emotions must be provoked by every product. The emotion desire was considered as an emotion to be provoked by every product before being used or acquired; while the emotion satisfaction was considered as an emotion that every product must provoke after using or purchasing the product.

Part of the feedback of the review team was focused in to have a vocabulary of emotions easy to remember, natural to talk and unambiguous in the understanding of emotions.

Following this objective, the words of Energized, Lust and Sympathy were changed to Vitality, Sensuality and Empathy, correspondingly.

The word Energized was changed to Vitality; it as considered right that the word Vitality expresses in a better way the definition of emotion Energized. Vitality is the experience of being active and strong. (Vitality, 2008). Members of the review team agreed that at listening the word Energized they tend to think only in physical activities; when the intention of feeling Energized is to feel active with thoughts and behaviours.

Even though the emotion Lust was not selected in the exploratory survey. The review team expressed that this fact maybe was driven because the vocabulary could have different cognations to the intended at speaking about products. However, the review team made strong suggestions to keep the emotion, due it can offer interesting approaches at designing products. But looking to have a vocabulary natural to talk between the members of the team that are designing the new product.

About Sympathy, according to the Oxford dictionary (2008) Sympathy is the experience of feelings of sorrow for someone else's misfortune. The word of the emotion Sympathy was changed to Empathy. Empathy is defined as the ability to understand and share feelings of another (Empathy, 2008). Both definitions Sympathy and Empathy share behaviours of understandings; but the word Empathy seems to be more suitable at designing a new product to influence positive estates on people.

In order to create a link between the knowledge of emotions and the activities of designing and developing new products, the *concept of Emotional-Job-to-be-done* was adopted.

The configuration of a product embodies physical attributes, like colours, sounds, technology, materials, shapes, among others, that all together facilitate the achievement of the job for what the product was designed. For instance, the job of a wireless speaker system is to convert audio signals into corresponding sounds using radio frequency waves, this type of job is a functional job; but, to arouse an emotion products must affect in some way the person (Coppin & Sander, 2016) so, let's consider the example of BeoSound of Bang & Olufsen, its physical attributes permit to place the system in the wall of any room, the shape of the speaker is made to be modular, facilitating the customization of shapes in the wall and the distribution

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of the sound in the spaces; this outstanding configuration can provoke inspiration by stimulating people's creativity; this type of job is an emotional job.

The emotional job statements are used to help inform decisions that lead to the creation of value proposition of design of a new product (Ulwick & Osterwalder, 2016). Table 1 presents the final list of positive emotions and the corresponding emotional-jobs-to-be-done by the product.

*Table 1 Final list of positive emotions and emotional-jobs-to-be-done*

<i>Emotion word</i>	<i>Emotional-job-to-be-done</i>
Admiration	The product stimulates the emergence of feeling of admiration.
Amusement	The product gives a feeling of intense playfulness and fun.
Confidence	The product gives a feeling of security and absence of anxiety (in relation to risks and uncertainties).
Courage	The product must make me feel that I am able to do difficult or dangerous things, to face uncertainty and to be able to trust and believe in my abilities.
Dreaminess	The product frees the mind and helps to fantasize.
Empathy	The product stimulates feelings of understanding and closeness towards other people.
Enchantment	The product astonishes me and leaves me speechless.
Euphoria	The product provokes a state of excitement.
Hope	The product arouses a sense of expectation and hope that something good is about to happen.
Inspiration	The product ignites a creative impulse.
Joy	The product arouses a state of happiness and cheerfulness.
Kindness	The product stimulates feelings of delicacy and tenderness.
Love	The product stimulates a feeling of profound affection towards someone or something.
Pride	The product stimulates feelings of pride.
Relaxation	The product stimulates a state of peace and serenity.
Relief	The product helps to get rid of a state of physical or mental stress.
Sensuality	The product stimulates sensuality.
Surprise	The product amazes with something unexpected causing a state of pleasure.
Vitality	The product makes me feel vital and full of physical and mental energy.

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#### **4. Conclusions**

Even though "emotion and design" are now considered an established research area, it is crucial to expose the outputs and materialize the knowledge in the real contexts of designing and developing new products. The key concepts of the proposed language have been tested, refined and validated. It is important to underline the usefulness of the emotional-jobs-to-be-done concept in improving the understanding of emotions and avoiding ambiguity in operationalizing the emotion knowledge in product innovation; also, the emotional-jobs-to-be-done stimulates the imagination of designers at generating new ideas. The human-product-emotional interactions support the generation of a new idea visualizing the product in a holistic way. The proposed language is aimed to be useful and satisfied the need to connect the knowledge of emotions to the professional practices of designing new products.



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