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Issues and Emerging Research Directions**

Yoon, J.K.; Pohlmeier, A.E.; Desmet, P.M.A.; Kim, C

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Designing for Positive emotions: Issues and Emerging Research Directions

JungKyoonyoon¹, Anna E. Pohlmeier², Pieter M. A. Desmet², and Chajoong Kim³

¹Design and Environmental Analysis, Cornell University, Ithaca, the United States

²Faculty of Industrial Design Engineering, Delft University of Technology, the Netherlands

³Department of Industrial Design, UNIST, South Korea

JungKyoonyoon is Assistant professor in the Department of Design + Environmental Analysis at Cornell University. His research focuses on experience design with an emphasis on affective experiences, subjective well-being, and design-mediated behaviour change.

Anna E. Pohlmeier is Assistant Professor at Delft University of Technology and co-Director of the Delft Institute of Positive Design. With a background in psychology, engineering, and design, her research focuses on experience design, long-term user experience, and design-mediated subjective well-being.

Pieter M.A. Desmet is Professor at Delft University of Technology. His main research interests are in the fields of design, emotion, and subjective well-being. He is a board member of the International Design and Emotion Society and co-founder of the Delft Institute of Positive Design.

Chajoong Kim is Associate Professor in the Department of Industrial Design and the founder of Emotion Lab at UNIST. His main research interests are in user experience design, emotional design, sustainable design and design for behavioural change.

Designing for Positive Emotions: Issues and Emerging Research Directions

Central to the present paper is the question of how designers can be supported to deliberately facilitate positive emotional experiences. Related to this, the paper provides an overview of the research on design for positive emotions, its issues, and opportunities for further investigations. The practical relevance of transcending the notion of generalised pleasure is discussed, highlighting the benefits of developing and applying a nuanced understanding of positive emotions. Overarching challenges and opportunities that underlie in stimulating such understanding are delineated along with the review of characteristics of positive emotions. Ethical issues of designing for positive emotions are reflected regarding its implications for well-being with suggestions to resolve them. Besides, the paper discusses emerging research directions, ranging from design tools to distinguish diverse positive emotions, the added value of exploring expressive interaction qualities of positive emotions, to advantages of involving tool users (e.g., designers and project stakeholders) in the development process.

Keywords: design for emotion; emotional design; positive emotions; emotional granularity; user experience; experience design

Introduction

By any measure, the field ‘design for emotion’ has matured in the last decades that address emotional experiences in relation to interactions with products and services. Research that explores the possibilities to design with the explicit intention to influence users’ emotions and behaviours continue to emerge across numerous design domains such as consumer product food, and healthcare. With emerging realization of the contribution of emotional experiences in human-product interactions to well-being and behaviour change, it is clearly a time of unmatched excitement for the field of design for emotion. In particular, there is now an increasing emphasis on the unique functions of positive emotions in design research and Human-Computer Interaction (e.g., Desmet and Pohlmeier 2013, Calvo and Peters 2014). There are considerable

evidences that positive emotions play the critical roles in perception, thoughts, behaviour and, by extension, improved well-being (see Tugade, Shiota, and Kirby 2014, for an overview).

In human-product interactions, pleasure has many different shades. We can, for example, be proud of using an eco-friendly detergent, be aflutter in anticipation of a planned trip when looking at a scheduler or experience a feeling of relief when playing a mobile phone game. Although these experiences are all pleasurable, each is different from the other in terms of the feelings they engender, the conditions that evoke them and how they influence people's behaviours. Yoon, Desmet, and van der Helm (2012), for example, showed that fascination stimulates users to invest more time in exploring the product's features and discover more functions while compassion stimulates users to be engaged in prosocial behaviours during/after interacting with a product (Lee, Lim, and Suk 2011).

This paper focuses on the practice of designing for positive emotions with close attention to their diversity and nuances in human-product interactions¹: The activity of designing products with the deliberate intention to facilitate distinct positive emotions with their unique experiential impact in mind. Since positive emotions are highly diverse, designers can benefit from having a nuanced understanding of these differences in their practices. Yoon, Pohlmeier, and Desmet (2016) showed that the ability to recognise emotions with precision and specificity positively influences empathy, thereby facilitating a deep understanding of users' emotions, which can help

¹ In this paper, we focus specifically on the phenomenon of positive emotions, including the underlying conditions that elicit them and their expressive and behavioural manifestations. It embodies universal principles of emotions that are widely applicable without being restricted to particular types of stimuli and users (Frijda 2007). This means that the knowledge of positive emotions discussed in this paper is applicable to all kinds of design created for users, including products and product-service systems.

gain relevant user insights. Besides, being aware of nuances of positive emotions supports a precise determination of design intentions (e.g., design for pride or relaxation), which increases the chances that a design outcome will have the appropriate emotional impact. Articulating emotional states with fine-grained emotion terms provides a shared language of emotions that facilitates communication about the subjective qualities of the design and its experiential impact. These advantages have stimulated a need for tools and techniques that support designers in developing a nuanced understanding of positive emotions.

The theme ‘positive emotions’ or ‘positive experiences’ has already been incorporated into design theory and methodology by contributions, for example, Desmet and Pohlmeier (2013) on Positive Design, Hassenzahl (2010) on Experience Design, and Mekler and Hornbæk (2019) on experience of meaning. With this paper, we now want to advance our understanding of how designers can be supported to purposefully facilitate diverse and nuanced positive emotional experiences. As a starting point, this paper sheds light on overarching issues that underlie designing for diverse positive emotions and discuss how they could be resolved. Based upon the key findings of the recent studies on positive emotions and well-being, the paper ascertains current understandings, needs and examples, and points out areas for new development of research. This will offer broader and more practical insights into the topic of designing for positive emotions and new research opportunities for further investigations.

The paper begins by introducing the topic of designing for nuanced positive emotions. The following section discusses issues of developing design supports that help designers deal with a repertoire of diverse positive emotions in their practices. Next, the relationship between designing for positive emotions and its effect on well-being is discussed. And this is followed by

the section that reflects on ethical issues in designing for positive emotions. Lastly, the paper ends with implications for new directions of emotion-focused design research.

Design for nuanced positive emotions

With the intention to provide users with pleasurable experiences, both design researchers and practitioners have attempted to make the process of designing for positive emotions actionable and systematic. It was a common view that designers can benefit from knowing under what conditions different positive emotions arise to evoke certain positive emotions. Several theoretical frameworks have been introduced to provide an understanding of how products evoke positive emotions by integrating design knowledge with insights derived from multiple disciplines. For example, using the psychological pleasure framework, Jordan (2000) distinguished different sources of product pleasure. Desmet (2002) explained the process by which product emotions arise based on appraisal theory. In line with a neurobiological approach, Norman (2004) identified three levels of mental processing that give rise to product emotions. Hassenzahl (2010) introduced psychological needs associated with positive experience in human-product interactions.

Although these frameworks have different theoretical backgrounds and use different terminologies, they share the idea that few one-to-one relationships between product properties (e.g., appearance and material) and emotions exist, and personal values (i.e., needs and concerns) and emotions are interrelated; emotional responses are in fact based on personal meanings derived from the product. In most cases, the types of emotion are not determined by the product itself, but by the personal concerns and contexts in which the product is placed, how it is used, how it is talked about and what meanings the user allocates to it (Haddon 2007). Our emotions reveal what we value to the product we use and the people who use it. For example, a fitness

tracker that monitors one's activity may inspire a person with its sophisticated features today, but the same person may be frustrated by it tomorrow when realising that its obtrusive notification function often distracts her/him at work. When designers have the intention to facilitate certain emotions, they should have an overview of the users' values that can be influenced by the product. Because of this subjective character of emotions, the researchers addressed that emotion-focused design requires user-centred and participatory design techniques to ensure a proper understanding of the emotional experiences of the intended users and related needs. This would enable the designers to envision how users will emotionally respond to the design solutions.

The frameworks described above provide inspiring pathways to design for emotions by explaining how emotions arise in human-product interactions and how a design can affect users' emotions. However, they appear to be limited in informing a systematic process of eliciting diverse positive emotions because they mainly focus on general valance, experiences that are positive or pleasurable versus negative or unpleasant. In response, several design methods and tools have been recently proposed that help address positive emotions in a nuanced manner. For example, Desmet (2012) showed that people can experience at least 25 distinct positive emotions while interacting with products, and formulated a typology (see Table 1). Klapperich, Laschke, and Hassenzahl (2018) introduced a practice-oriented approach that guides the process of establishing design-mediated practices that facilitate positive experiences. The approach supports designers to gather structured information about users' practices in which diverse and mixed emotional experiences unfold in relation to certain psychological needs, and deliberately address them through specific products. Lu and Roto (2015) showed how positive emotions can be meaningfully facilitated in the work context by examining work tool designs through the lens of

two theoretical frameworks: Positive Design (Desmet and Pohlmeier 2013) and Mechanisms of Meaningful Work (Rosso, Dekas, and Wrzesniewski 2010). These approaches help designers address positive emotions in a more fine-grained manner than what is captured with a general valance dimension.

In this paper, we aim to contribute to the growing body of research endeavours to design for positive emotions with an overview of overarching challenges and opportunities that underlie in the effective implementation of design process. In the following section, we point out some theoretical and methodological issues of designing for positive emotions.

Table 1. The typology of 25 positive emotions categorised into nine emotional types (Desmet 2012)

Category	Emotion	Definition
Empathy	Sympathy	Sympathy is feeling empathy for another person's suffering or misfortune and being motivated to support or comfort them.
	Kindness	Kindness is feeling the tendency to contribute or be sensitive to the wellbeing of someone we encounter or engage with.
	Respect	Respect is feeling the tendency to accept and regard someone or their beliefs as worthy or valuable.
Affection	Love	Love is feeling the tendency to be affectionate to someone and the urge to be close to and spend time with this person.
	Admiration	Admiration is the tendency to prize, look up to and highly estimate someone, as well as fostering the desire to be more like this person.
	Worship	Worship is the tendency to idolize, honor and be devoted to someone or something.
Aspiration	Dreaminess	Dreaminess is feeling absorbed in a soothing state of absent-mindedness that is pleasantly abstracted from immediate reality.
	Lust	Lust is feeling a sensual or sexual drive and being motivated to satisfy the appetite.
	Desire	Desire is experiencing a strong wish for something to happen or to enjoy and the urge to consume or own something.
Enjoyment	Euphoria	Euphoria is feeling elevated by an intense experience of joy and excitement, fully indulging in the situation at hand.
	Joy	Joy is taking pleasure in something good or favorable and having the urge to celebrate and share the joy with others.
	Amusement	Amusement is the enjoyable experience of being entertained and the tendency to share the enjoyment.
Optimism	Courage	Courage is the mental or moral strength to withstand risk, overcome difficulty or endure hardship.
	Hope	Hope is experiencing the belief that something good or wished for can possibly happen.
	Anticipation	Anticipation is the feeling of eagerly awaiting a desirable event that will happen in the future.
Animation	Surprise	Surprise is being delighted by something good that happens unexpectedly and suddenly.
	Being energetic	Being energetic is enjoying a high-spirited state of being lively and vitalized and the urge to be dynamic.
Assurance	Pride	Pride is enjoying a sense of self-worth or achievement and feeling vigorous.
	Confidence	Confidence is feeling powerful, resilient or effective and having a strong belief in our abilities or qualities.
Interest	Inspiration	Inspiration is feeling a sudden and overwhelming urge to express creatively, or to engage in new thoughts or actions to actualize new insights.
	Enchantment	Enchantment is feeling mesmerized by something delightful that captures our attention and being motivated to savor it.
	Fascination	Fascination is feeling an urge to explore or investigate something in order to find out more.
Gratification	Relief	Relief is enjoying a recent removal of stress or discomfort and the ability to take our mind off the source.
	Relaxation	Relaxation is enjoying a state of mental or physical calmness, slowing down and savoring the present moment.
	Satisfaction	Satisfaction is enjoying the recent fulfilment of a need, expectation, or desire.

Issues of designing for nuanced positive emotions

Being able to communicate nuanced positive emotions

Design research literature has shown that the ability to discern nuances between positive emotions is of value in constructing creative and systematic process of emotion-focused design project (e.g., Desmet 2012, Yoon, Pohlmeier, and Desmet 2016). The premise for this is that designers are well aware of nuances between positive emotions and communicate them with

specificity. However, not all people, including designers, are equally sensitive or perceivable to nuances between positive emotions. This individual difference is called Positive Emotional Granularity (PEG). PEG refers to ‘the tendency to communicate experiences of positive emotions with precision and specificity’ (Tugade, Fredrickson, and Barrett 2004, 1162). For example, an individual with high PEG articulates the distinctiveness of an emotional state (e.g., ‘I felt confident with a hint of pride’). In contrast, those lower in granularity tend to express their emotions with less distinct terminology (e.g., ‘I was feeling good’). This implies that designers with low PEG would have difficulty in determining and communicating particular positive emotions to address. Contrary to negative emotions, making distinctions between positive emotions can be more difficult than is often realised. Positive emotions are relatively less differentiated across the various components of the emotion process than negative emotions (Fredrickson and Cohn 2008). For instance, amusement and pride are not easily distinguishable from one another in terms of facial expressions because all result in a smile (Ekman 2003).

Several design tools have been developed to help designers to consider differences between positive emotions (see Figure 1). For example, the need of designers to assess user emotions about products led to the development of refined assessment tools such as PrEmo that contains seven animated characters, each portraying a distinct positive emotion (Laurans and Desmet 2017). The Positive Emotional Granularity Card-set developed by Yoon, Desmet, and Pohlmeier (2016) helps designers communicate differences between positive emotions by depicting definitions of emotions, underlying causes, and visuals of expressive manifestations. By incorporating social practice theory (Shove, Pantzar, and Watson 2012), Klapperich, Laschke, and Hassenzahl (2018) developed the Positive Practice Canvas, a design tool that helps designers systematically gather nuanced insights about everyday positive experiences and design

for them. Similarly, to support designers to deliberately determine emotional intentions and analyse positive experiences, Zeiner et al. (2018) introduced 17 positive experience categories that describe their patterns of eliciting conditions.

Recent studies in psychology have started exploring interventions targeting emotion differentiation. One example is the study of Brackett et al. (2012), which showed the effectiveness of long-term training in which school-aged children and young adults were taught to extend their use of emotion words and link descriptions of the changes occurring in their emotions. The training was found to be effective in helping them to use differentiated emotion words in a contextualised manner and improving their social behaviour. This indicates that with a long-term intervention, people's PEG can be improved. Given this possibility it would be worthwhile further refining the currently available design tools and their usage guidelines so that they can be made suitable for the long-term training of designers' PEG, and subsequently examining whether and how they affect designers' performance. Doing so may also provide an opportunity to explore the impact of PEG on designers' performance from a broader perspective. Note that beyond an in-depth understanding of diverse positive emotions, designers should be supported to deliberately evoke them through design. In addition to the design tools mentioned above, the methods for designing for nuanced positive emotions have been extensively discussed (e.g., Desmet et al. 2016) along with publications on design strategies to elicit distinct emotions (e.g., design for pride: Lu and Roto 2016). In the following, we take a closer look at some of underlying challenges in addressing nuanced positive emotions.

Finding the balance between 'too many' and 'too few'

As exemplified in the previous section, various design tools that provide designers with a wide palette of emotions to choose from. Their usefulness in the design process aside, the

varying numbers of positive emotions included in the tools raise another question. For example, how many positive emotions should be incorporated into a design tool? In other words, would it be always advantageous for designers to consider as many positive emotions as possible? Perhaps there might be a ceiling effect or counter-effect of increasing the number of positive-negative emotions.

In the use of design tools (e.g., Lucero and Arrasvuori 2013, Yoon, Desmet, and Pohlmeier 2016), some designers pointed out that the level of granularity should be adapted to suit the design activity at hand (e.g., user research, idea generation, and comparison of designs). As discussed in Jaeger and Cardello (2016), in a design process, a higher number of emotions does not guarantee that people make use of the diversity and benefit from it. The contexts and the ways in which the emotions are presented influence the number and type of associated emotions being utilised. In some situations, a heightened granularity could be counter-effective; one could get bogged down in too many nuances. Such situations mentioned by designers included, for example, when meeting a client or when involving end-users. In those situations, using a reduced set of emotions (i.e., superordinate categories of positive emotions) might be more appropriate.

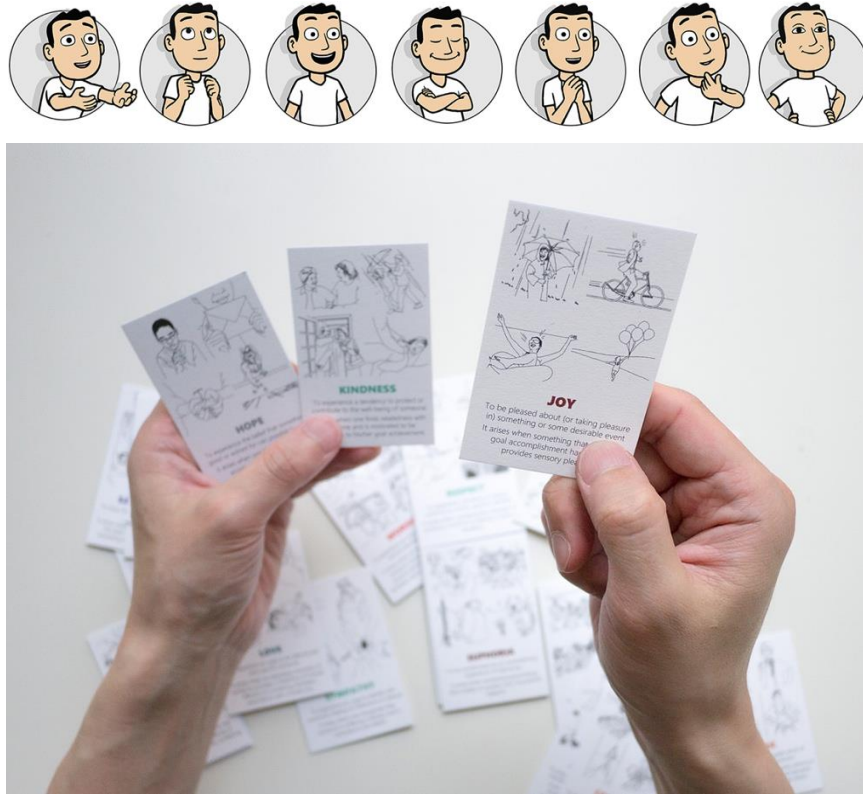


Figure 1. Top: PrEmo with seven animated characters (Laurans and Desmet 2017), bottom: Positive Emotional Granularity cards that represent behavioural manifestations of positive emotions (Yoon, Desmet, and Pohlmeier 2016)

Obviously, it is possible to have both ‘too many’ and ‘too few’ scenarios, but to our knowledge neither the optimal level of granularity nor the undesired counter-effects of increased granularity has been studied in psychology or design research. While emotion researchers agree on the benefits of stimulating higher emotional granularity, they have not addressed the questions of how many emotions should be taught and what these should be in supporting certain design activities. Therefore, it would be interesting to explore whether and how a suitable balance can be found for design practice. At the same time, design tools should be also developed that are sufficiently flexible to enable designers to adjust the level of granularity. This will help them set appropriate levels of granularity in varying design activities, and in turn, consider positive emotions effectively.

Use of design supports in different cultures

Literature on tools for design for positive emotions reports a variety of occasions of tool applications and evaluations (e.g., Hanington 2017). What is noticeable is that the researchers, i.e., tool developers, tend to acknowledge the difficulty of using their tools in international and cross-cultural contexts. In general, the researchers note that while their tools were well received by designers, the feedback oftentimes indicated that a few contents, e.g., verbal descriptions and related visuals of emotions, needed to be optimised to better convey the concepts of certain emotions in different cultures. This observation raises the question: How can design tools be made useful across different cultures? This question entails issues about not only the appropriateness of the contents but also the cultural nuances of positive emotions.

The fundamental challenge is that apart from studies of basic emotions, there has been little empirical study of the characteristics of distinct positive emotions across different cultures (Sauter 2010). This means that some of the positive emotions may not be perceived as positive in certain cultures, because the categorization of emotions as positive or negative depends on cultural differences. For instance, pride is perceived less positively in Eastern than in Western cultures (Kitayama, Mesquita, and Karasawa 2006). There are, moreover, a number of untranslatable positive emotions in different cultures that have no direct equivalent English term that captures their subtleties (Lomas 2015). For example, ‘Uitwaaien’ is a Dutch expression that encapsulates the revitalizing effects of going out into nature (e.g., taking a walk in the wind) and ‘Jeong’, a Korean expression, refers to a deep affinity and connectedness that may or may not be romantic. These experiences often depend on very particular circumstances shaped by their own culture.

Given these complex and subtle cultural differences in the interpretation of emotion expressions in different cultures, it appears to remain difficult to offer culturally nuanced design tools to designers that include distinct universal positive emotions. Instead, in practice, it would be more practicable and feasible for designers to focus on the mechanisms of emotions beyond expressions. Although the emotional responses are, by nature, subjective, the process in which emotions arise is universal (Frijda 2007). The emotional responses people ascribe to products are affected by their concerns, values, and beliefs largely shaped by the culture in which they live (Demirbilek and Sener 2003). This implies that all positive emotional responses can be tenable entry points to understand what people really care about and need in the situation and, by extension, the culture. These real-life concerns can serve as input in emotion-driven design processes. Therefore, tools should not only guide designers to focus on the users' emotional responses but also help them holistically probe for underlying users' concerns and contextual factors associated with the culture (for a discussion on related methods and tools, see Desmet et al. 2016). So far, we have discussed some issues associated with the characteristics of positive emotions and their implications for design. In the following section, we turn to the experiential impact of positive emotions evoked by design.

Design for positive emotions as a means of fostering user well-being

A considerable amount of the literature on positive psychology has proven that positive emotions are inherently associated with people's well-being (e.g., Kirby et al. 2014, Cohn et al. 2009, Seligman 2011). In line with this, positive emotions are also considered an important factor when designing for users' well-being. Nonetheless, it is of importance to note that evoking positive emotions does not always lead to increased well-being. Even if the design is intended to evoke positive emotions, the consequences for user experience may not necessarily be

favourable. With this concern in mind, this section discusses some challenges and opportunities relevant to designing for positive emotions as a means of fostering well-being.

Reconciling contradictory contribution of positive emotions to well-being

In general, the sum of enjoyable moments is seen as contributing to one's well-being. However, positive emotions are not the same in their contribution to well-being. Gilbert and Choden (2014), for example, describes positive emotions with two physiological systems: (1) the excitement and drive system and (2) the affiliative and soothing system. The first system is associated with emotional states that urge achievement, consumption, and ownership (e.g., pride and desire). The latter is associated with states that induce to prevent harm to and care for others (e.g., love and kindness). The affiliative system enables several well-being factors such as self-compassion and resilience. Besides, the affiliative system is crucial for down regulating negative emotions (e.g., fear and disappointment), and for holding excessive drive system in check; without the affiliative system activated, the drive system can result in selfish determination and deconstructive pleasure seeking, e.g., greed and addiction.

It appears that in design, the excitement and drive system has been deliberately addressed in combination with marketing strategies to promote product uptake (e.g., sensorial delight stimulated by surprise and desire) (Libert and Tynski 2013). In this context, while emotions served as a source of competitive advantage that can bring about economic profits, it is of importance to note that it could inadvertently influence people to mainly focus on the acquisition of a product rather than being appreciative of its experiential values. In fact, the pleasure sparked by material possession or accumulation wears off quickly, failing to make people happier; Well-being is much less determined by what we own than by what we do (Van Boven and Gilovich 2003). For example, several studies have shown that spending money on experiences (e.g.,

travel) as opposed to material possessions provides more long-lasting happiness (e.g., Van Boven and Gilovich 2003, Li, Hao, and Yoon 2020). In this view, researchers assert that positive emotions should not be commoditised as a manipulative marketing tool because it could endanger user well-being in the long run.

In line with the studies in psychology, design researchers suggest that a stronger emphasis in the design be placed on evoking positive emotions that facilitate meaningful experiences beyond immediate gratification. In particular, as was proposed by Hassenzahl (2010), experiences need to be more about the ‘doing’ and ‘being’ than the ‘having.’ Likewise, many companies are currently adapting to the emerging realization that narrowly focusing on the moment of purchase does not guarantee market success. Products that can provide positive emotional experiences in the entire cycle of the user-product relationship can have greater and longer-lasting economic impact (Magids, Zorfas, and Leemon 2015). We expect that considering every life activity that involves the product (e.g., commuting to work and dropping children off at school), and making those activities meaningful by means of positive emotions, could help designers address users’ well-being. While short-lived, the positive emotions embodied in meaningful experiences would build up, leading users to improved well-being.

Eliciting diverse positive emotions to deaccelerate hedonic adaptation

There is substantial evidence that less intense but more frequent positive emotions are more strongly associated with well-being than are more intense but less frequent positive emotions (Lyubomirsky, King, and Diener 2005). This suggests that the frequent evocation of pleasant experiences by a product would lead to users’ increased well-being. However, if the focus of the design is on eliciting only a small set of positive emotions and increasing their frequency, users’ appreciation of the design would soon fade with time. When users quickly

become accustomed to the pleasure elicited by a design they eventually find it mundane, an occurrence that is often referred to as ‘hedonic adaptation’ (Lyubomirsky 2011). In other words, users make the positive experiences for granted and its effect wears off before long. Once the effect disappears, they tend to be left to pursue the next thing, forever chasing the same result.

To reduce the chance of hedonic adaptation occurring, eliciting a diversity of positive emotions has been suggested. Various empirical studies have shown that elicitation of several positive emotions can help to forestall the diminution of positivity and enhance people’s well-being (e.g., Sheldon, Boehm, and Lyubomirsky 2013). It is expected that by designing for a wide diversity of positive emotions, as opposed to one single emotion, users’ emotional experiences may become more dynamic and richer. We propose that it would be interesting to explore whether and how designers’ PEG can be used to create products that evoke a series of positive emotions during an unfolding usage episode. If this is possible, it may help to produce design that is not only pleasurable in its own right, but also contributes to users’ well-being.

Ethics of designing for positive emotions

Is it ethical to influence people’s emotions and behaviours intentionally? Many questions arise regarding the ethics of designing for emotions. Indeed, emotion evoked by a product is not value-neutral. All products inevitably influence the emotions of users because they are always situated in particular contexts (Gaver 1999). Design that sets out to influence user emotion has unavoidable ethical ramifications for user experience, and this applies to designing for positive emotions too.

The beneficial effects of positive emotions on users have been the main motivation behind designing for positive emotions. But it is important to note that in certain situations, positive emotions can produce adverse effects. Chambers and Windschitl (2004), for example,

showed that positive emotions are often associated with optimism bias, in which awareness of a risky situation is skewed to unrealistic expectations. For instance, if an activity tracker frequently signals the user is doing well, this might lead the user to be overconfident about her/his health condition and pay less attention to it.

The appropriateness of positive emotions evoked by design is highly dependent on the balance between personal and moral values (Desmet et al. 2016). Not all personal values (e.g., freedom to pursue personal interests) are necessarily moral values (e.g., equal opportunities for all), and in certain situations, some personal value can even be morally unacceptable. Think of a portable speaker that generates immersive and rich sound at home, providing its user with joy because it matches her/his personal values (“stimulating vitality and appreciating aesthetic experience”). And yet using the same speaker, playing music out loud in public might make others frown because they may feel that it is inappropriate. Aiming only at facilitating positive emotions based on personal values, without holistically considering moral values, can potentially hinder the user’s well-being or the well-being of others who are present at the time.

These considerations suggest that intentions to design for positive emotions should be formulated with ethical sensitivity and an awareness of possible unwanted side-effects. In fact, in a design process, the positive emotions and personal values of the users or other stakeholders (e.g., clients) might be morally conflicting, or they might not be aware of the potential ethical consequences affected by using a product. Therefore, it is necessary to examine the values that are affected by products and ensure that they are morally acceptable. For this, it is important to carry out ongoing and iterative critical examinations of how the emotional impact can be seen as ethically legitimate. One strategy for this could be to include recurring cycles of ethical reflection in the design process, in which the personal and moral values of users and other

stakeholders are made explicit, thereby foreseeing possible risks and what needs to be done to reconcile them in both the short and long term, as well as from individual and collective perspectives.

In design research, several methods have been introduced to encourage reflection on design (e.g., Boenink, Swierstra, and Stemerding 2010). These methods typically use narratives that describe situations in which product use gives rise to moral considerations. While useful for considering the ethical acceptability of a product, they appear to be limited in terms of helping designers take a detailed view of user emotions and their possible experiential impact. Taking this as an additional opportunity for design for positive emotions, it is suggested that further research be undertaken to develop design methods and tools that can aid designers in reflecting on the emotional implications of a product in a forward-looking sense. This could help create an ethically responsible approach to emotion-driven design.

Topics of note and future directions

As argued by Hassenzahl (2010), most of approaches in design research and HCI have followed the ‘disease model of human technology use’ that primarily focuses on ‘curing diseases,’ that is, avoiding negative experiences—for example, resolving physical discomfort in product use instead of explicitly addressing what makes users happy. Minimising negative experiences does not necessarily equal facilitating positive experiences. On the question of how designers can be enabled to facilitate positive emotional experiences of users, this paper emphasised the importance of acknowledging multifaceted aspects of emotions beyond a pleasure versus displeasure distinction. In this section, we further discuss how design approaches to facilitating positive user experiences can be potentially corroborated with some of new research topics.

Exploring expressive interaction qualities of positive emotions

Positive emotions are characterised by distinct behavioural tendencies (Fredrickson and Cohn 2008). We postulate that having an awareness of behavioural tendencies expressed in interactions with products can support designers to influence users' experiences in a favourable way. As demonstrated by Diefenbach et al. (2016) and Kim, Self, and Bae (2018), an interaction carefully designed to fit the intended behaviour can enrich the users' experience (e.g., gentle and focused interaction to reinforce the behaviour of revealing a secret puzzle such as unpacking a birthday gift). It is therefore probable that having a structured overview of specific positive emotions and related expressive interaction qualities can be useful when detailing the interactions. More specifically, designers could deliberately target certain interaction qualities by means of certain positive emotions (e.g., playful interaction stimulated by joy, careful interaction stimulated by love, and persistent and focused interaction stimulated by fascination).

Given these potential benefits, developing design tools that delineate diverse interaction qualities associated with positive emotions could benefit emotion-focused design processes. In line with this idea, Yoon, Pohlmeier, and Desmet (2017) formulated a collection of movie-sets that represents 25 positive emotions in dynamic hand-object interactions and explain associated interaction qualities. It is expected that the tools that address nuanced interaction qualities in relation to emotions would help designers envision what kinds of interactions would be appropriate to incite and select a set of relevant positive emotions accordingly. In future investigations, the further study of specific effects of different positive emotions on interactions, and the development design tools in a design process would be worthwhile. The resulting insights would help designers take a more holistic view of emotions and thereby improve their performance in emotion-focused design processes.

Development of design tools for facilitating positive emotions

Human emotion is a holistic experience that involves a wide range of behavioural, psychological and physiological aspects. We cannot fully appreciate it when reducing such a sophisticated phenomenon to simplified emotion terms or pictures. When targeted emotions are communicated overly simplistically in a design process, design decisions may inadvertently overlook their dynamics and subtleties. This implies that future design tools that incorporate emotions should acknowledge these different aspects of emotion. In particular, provision of multiple entry points to compare positive emotions seems to be crucial. In one of our previous studies (Yoon, Pohlmeier, and Desmet 2016), designers expressed a need for being able to browse through and compare the similarity between positive emotions based on various criteria to deliberately determine emotional impact of the product (e.g., feelings, expression, behavioural tendency, and eliciting conditions). This provision would support designers to make a better-informed design decision based on a systematic understanding of positive emotions.

In design research, a multitude of design tools that address subjective experiences have been introduced. Although design researchers have aimed to improve design processes through these new tools, their overall uptake in both design practice and education is disappointingly low (Andreasen 2011, Dorst 2008). One of the reasons would be that in many cases the emphasis when developing the tools has been primarily on their systematic and scientific nature. This is because researchers tended to want them to be independent of product type and design context, in order to make them more widely applicable (Jensen and Andreasen 2010). Consequently, the resulting tools often became irrelevant to the situational needs of designers and the design context, thereby hindering their uptake (Dorst 2008).

Therefore, the process of developing design tools should involve designers and other stakeholders who will use the tools at all stages, which would enable researchers (i.e., tool

developers) to methodically address needs and expectations of those who will actually use them in practice. In particular, Yoon, Desmet, and Pohlmeier (2016) showed the advantage of learning how designers use and creatively appropriate a tool rather than relying on the vision of the design researcher. Taken together, we believe that active involvement of tool users can considerably enhance the development of design tools that they are compelled to use. A tool and its related techniques developed from the perspective of the designers will hopefully have a higher chance of being accepted and used by designers. This, in turn, will help designers create more emotionally innovative design solutions.

Towards purposeful positive emotional experiences

This paper sought to provide an overview of the current research on design for positive emotions, its relevance, and emerging research challenges. The critical roles that different positive emotions play in perception, thoughts, behaviour and, by extension, improved well-being, support the argument that designing for nuanced positive emotions is important and that the traditional unitary concept of pleasure needs to be avoided. In line with this idea, we proposed that we need to rethink our approaches to designing for emotions. To this end, we discussed recent research showing how designers can benefit from developing and applying a systematic understanding of nuanced positive emotions, practical issues, ethical implications, each broadening and extending the ways we design for emotions. Note that the present paper does not intend to cover all theories and all issues to tackle but to offer a useful and robust guide to designing for emotions through an overview of relevant challenges, and a discussion of its opportunities and the way forward in the available literature. The contributions of the paper include: (1) a critical review of the topic of design for positive emotions, including current approaches and examples of design supports, benefits and challenges to their implementations,

(2) a set of recommendations for new research. With this paper, we hope that it could provide inspiration and practical knowledge to design researchers and practitioners who want to become more emotionally adept in their efforts to create positive user experiences.

Table 1. The typology of 25 positive emotions categorised into nine emotional types (Desmet 2012)

Figure 1. Top: PrEmo with seven animated characters (Laurans and Desmet 2017), bottom: Positive Emotional Granularity cards that represent behavioural manifestations of positive emotions (Yoon, Desmet, and Pohlmeier 2016)

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