



Emotions as an Inspiration for Design

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Abstract. Emotions are fundamental in people’s lives. Both positive and negative emotions are important because they create complex and rich experiences. Several strategies for designing with emotions have been explored from designing for meaning, to designing for pleasure or for rich experiences. While there has been a great focus on tangible products in emotional design, our increasingly digital lives make engaging users in these contexts essential. Rich emotional experiences are relevant for digital contexts because they help create more immersive and realistic experiences. Design that considers emotions is a design that becomes more relevant, and this relevance is fundamental for better human-product/human-computer relationships that result in longer-lasting designs with which people want to engage. In this paper, we define emotion and offer a panorama on the work that has been developed in the design field surrounding this concept.

Keywords: Emotion · Emotional design · Positive design · Positive psychology

1 Introduction: Emotion

Emotion is a complex concept with many definitions, but generally understood as having three main features: a subjective experience, a physiological response, and a behavioral aspect [1]. Emotion is a subjective experience in the sense that different people, when faced with similar situations, often respond with different emotions [2]. Imagine a sporting event with an audience of fans – the winning side sees it as desirable and the losing side sees it was undesirable – however, they are observing the exact same event [3]. Emotions produce a physiological response, which Darwin called “expressions” [4, p. 28–29] – for example, laughter is the expression of joy or happiness – that are mostly innate and universal. Moreover, in connection to the event, (certain) emotions result in behaviors [2]; that is, *action tendencies* [3].

Kleinginna and Kleinginna [1] conducted a study in which they compared several definitions of the concept of *emotion*, having arrived at a proposal that covers most elements previously discussed: “Emotion is a complex set of interactions among subjective and objective factors, mediated by neural/hormonal systems, which can (a) give rise to affective experiences such as feelings of arousal, pleasure/displeasure; (b) generate cognitive processes such as emotionally relevant perceptual effects, appraisals, labeling processes; (c) activate widespread physiological adjustments to the arousing conditions;

and (d) lead to behavior that is often, but not always, expressive, goal-directed, and adaptive” (p. 355).

While emotional expressions may have a universal character [4] it is not that emotions are universal *per se*; however “if an individual conceptualizes a situation in a certain kind of way, then the potential for a particular type of emotion exists” [3, p. 2]. Nevertheless, it is important to point out that “the desirability and appropriateness of feeling certain emotions varies across cultures” [5, p. 4].

Emotions are affective states – distinct from other affective states such as moods, sentiments, and emotional traits [6, 7] – that are intentional, that is, oriented towards something: we are scared of-, in love with-, delighted by something. In addition, emotions are the result of judgments people make of the world and, together with reason, help people make decisions [8].

Emotions can be distinguished in two large types [8]. “Primary emotions” (p. 131) are those produced in the limbic system, which result from stimuli in our environment such as (e.g., repulse/fear of) size, motion, or large span, and which help us take certain actions to avoid or approach those stimuli. “Secondary emotions” (p. 134) are those that begin with “conscious, deliberate considerations (...) about a person or situation” (p. 136), such as embarrassment. The first type involves less cognition – or at a less conscious level [3] – whereas the second type involves a cognitive evaluation of the event [8]. From a cognitive perspective, emotions involve an assessment of how something benefits or harms a person – known as appraisal [6].

Scherer [9] found that several theories of appraisal converge in some points: “emotions are elicited and differentiated on the basis of a person’s subjective evaluation of the personal significance of a situation, object, or event on a number of dimensions or criteria” (p. 637). Furthermore, Scherer [9] described appraisal as a process that occurs in a sequence and that it is constantly operative, in a rapid succession.

Emotions are “valenced reactions to events, agents or objects” [3, p. 13]. This is important because it means emotions are particularly interesting for design, in the sense that it is possible to purposefully design events – with their consequences (e.g., activities, experiences) –, agents – with their actions (e.g., products, interactions) –, and objects – with their properties –, which can elicit certain emotions [10]. Ortony et al. [3] distinguished emotions based on these three elements:

- Event-related emotions depend “on the implications of events to one’s goals” (p. 92) and have *desirability* as their central variable;
- Agent-related emotions relate to “the agent whom we take to have been instrumental in the event” (p. 134) and whose have *praiseworthiness* as a central variable; and,
- Object-related emotions are “those resulting from reacting to objects or aspects of objects” (p. 156) and have *appealingness* as a central variable.

There are many taxonomies of emotions (e.g., The Geneva Emotion Wheel, Plutchik’s Wheel of Emotions, the Circumplex of Emotions). Here we do not go into detail about the different emotions (and the *language* of emotions), but rather we focus on their importance in influencing people’s lives – and on the contribution they have to

the design discipline.¹ Most research on emotions has focused on the negative spectrum; however, positive emotions are just as important, being “critical to learning, curiosity and creative thought” [12, p. 2].

1.1 The Study of Positive and Negative Emotions

In psychology, the focus of study up until World War II had been on negative or maladaptive behaviors, and, mostly, on negative emotions [7, 13]. The world was suffering a human tragedy and funding was directed towards the understanding and resolution of negative mental states and mental illness, improving normal lives, and nurturing high talent [14]. Throughout the decades, however, there has been some research done on wellbeing, of which the work of Maslow and Fordyce are noticeable examples. Nevertheless, it was only in 2000 that a formal field called *positive psychology* emerged, a branch of psychology focusing on the study of wellbeing and positive emotions [13].

Research on positive emotions is prominent in this field. Past research found that positive emotions help build people’s personal and social resources and in recovering from adversity [7]. Furthermore, positive emotions “broaden attention, cognition, and behavioral repertoires” [7, p. 777]: “for example – an experience of contentment could lead to thoughts about new challenges to take on, leading quickly to experiences of pride or excitement” [7, p. 780].

Nonetheless, also negative or ambiguous emotions have been found to have a positive impact on people’s lives [15]. While there is a perspective that negative emotions “help people achieve survival and short-term material ends,” [7, p. 782], these can also “focus the mind, send important signals to other people, and lend a seriousness and profundity to life” [15, p. ix]. Anxiety, for example, can be an adaptive emotion, in the sense that it “facilitates the avoidance of threat and the assessment of risk” [16, p. 37] and, combined with high intelligence, can improve performance [16]. In design – as we will later discuss – negative and ambiguous emotions can provide inspiration for rich positive experiences [17] – such as thrill, adventure, or challenge.

The field of positive psychology operationalizes its knowledge on wellbeing and emotions by proposing and testing interventions “to build thriving in individuals, families, and communities” [13, p. 13]. The field explores and proposes certain activities that can contribute to people’s wellbeing like “expressing gratitude, practicing kindness, nurturing social relationships, savoring life’s joys (...), or practicing spirituality” [18, p. 14].²

This type of intervention can be a strong inspiration for new designs that aim to improve people’s lives. In this, we can consider that there is a connection between positive psychology and design insofar as both disciplines aim to bring individuals and communities from point A to point B (point B being a positive state) through a strategic and iterative process that results in concrete interventions [20].

¹ Several knowledge domains have produced theories of emotion – for a review see, e.g., [11].

² For examples and discussion on positive psychology interventions see, e.g., [19].

2 Emotions in Design

Historically, design has gone from focusing on bringing consumer goods to all people in a democratic way, with *usability* as a primary concern, to focusing on bringing meaning and relevance to people's lives [21]. "Having become used to usable products, (...) people will soon want something more: products (...) that are not merely tools but 'living objects' that people can relate to; products that bring not only functional benefits but also emotional ones" [21, p. 5].

Since the late 1990s, emotions have had a great deal of attention from the design field [22]: from international conferences dedicated to the subject to special issues in international journals (see [23]). In addition, many publications were released, which demonstrate the growing interest in the topic [21, 24, 25].

Emotional design, also named "design for emotion" [26, p. 168], "hedonic design, affective design, affective human factors design, human-centered design, and empathetic design" [11, p. 66], emerged with the objective of developing designs capable of eliciting emotions in people [25]. It is a prevalent concept in many design-related fields, such as human-computer interaction, product design, branding, web design, and game design.

One of the pioneers in the field, Desmet [6], proposed the concept of *product emotions*, stating that these "have the same qualities as the emotions we experience towards people and events" (p. 17), which are "emotions experienced in response to, or elicited by, seeing, using, owning, or thinking about consumer products" [27, p. 379]. In addition, he distinguished between two types of product emotions: A-emotions – which have "real objects" and are directed towards products themselves and their characteristics –, and R-emotions – which are "imaginative" and directed towards the meanings behind products [6, p. 17].

Desmet [27] proposed a model that explains how people appraise products as being (potentially) beneficial, harmful, or not relevant for wellbeing, based on the appraisal theory. These outcomes result in positive emotions, negative emotions, or the absence of emotions, respectively. Emotions occur after an appraisal process, to which two points of reference contribute: the person's concerns – that is, attitudes, goals, and/or standards – and the stimulus (object) – which refers not only to the product itself but also to events related to the product, or the consequence of using/engaging with it [27]. "The basic model indicates that an emotion is not elicited by the product as such, but by an appraised concern match or mismatch, and that the study of product emotions requires an understanding of the concerns that underlie them" [27, p. 389].

In regards to responses to products, Jordan [21] proposed that emotion – and in particular *pleasure* – is the ultimate goal for user experience, developing a structured approach that aimed to inform the design of emotionally charged products:

- Physio-pleasure – the physicality and sensorial aspects of products (e.g., the way they are handled, carried around, used);
- Socio-pleasure – how a product is perceived in a social context (e.g., conferring status, not causing disturbance to others; facilitating social interactions);
- Psycho-pleasure – the cognitive aspects of using a product like efficiency and effectiveness in performance (e.g., being easy and simple to understand); and,

- Ideo-pleasure – personal taste, values, and aspirations (e.g., giving aesthetic pleasure, reflecting the user’s image and values).

These different perspectives aimed to inform the design of the product’s experiential and formal properties (“product” here refers to both physical and digital designs). Jordan [21] called this a “new approach to human factors” (p. 181), one that accounts for the relationship between people and products in a holistic way that goes beyond usability. Jordan did not intend this to be a theory on product emotions, but rather a practical tool to apply in the design of more relevant products [27].

From a cognitive perspective, Norman [25] proposed three different processing levels of functionality and aesthetics in design that produce emotional effects on people:

- The visceral level – an automatic focus on the appearance of the design (e.g., entertaining, delightful, repulsive, dangerous);
- The behavioral level – a focus on the use experience (function, performance, and usability; e.g., pleasurable, effective, difficult, frustrating); and,
- The reflective level – the symbolic values and the “intellectualization” of the design (e.g., intriguing, stimulating) (p. 5).

These different processing levels inform three different strategies for design: design for appearance (or visceral design), design for comfort/ease of use (behavioral design) or design for meaning (reflective design); however, Norman [25] proposed that all three should be taken into account when designing.

While there has been a great focus on emotional design since the late 1990s, it was only in 2013 that Desmet and Pohlmeier [28] formally proposed the field of *positive design*. This discipline stems from the knowledge advanced in positive psychology and aims for the development of experiences, products, services, and other design interventions that directly influence people and their wellbeing, a proposal of which emotions are a central part [29, 30]. With an approach directed towards wellbeing, design becomes no longer just about resolving negative situations (through a problem-driven approach) towards a problem-free state – but rather to enhance and improve people’s happiness (through an possibility-driven approach), which aims to bring a neutral state into a positive one [31].

Positive design proposes not just the focus on positive emotions, but also on negative or ambiguous emotions, which can contribute to rich and complex positive experiences [17]. Certain activities like exercising or gaming involve negative emotions such as frustration and distress, however, “people do not just enjoy these activities despite these emotions, but *because* of them” [17, p. 2]. Rich experiences can “empower action and motivate” people [32, p. 198]. As a practical example of this, Hassenzahl and Laschke [33] proposed the concept of “pleasurable troublemakers” – products that have an “attitude” (p. 168), which aim to help people change and stick to their goals. That is, to forgo immediate gratification for the sake of long-term goals. This approach introduced “pleasurable friction” as a way to make subtle interventions that result in better choices.

2.1 Emotions in Immersive Environments

However great the focus on tangible products concerning emotional design has been, we see ourselves increasingly living digital lives. Many of our daily activities – such as communication, shopping, learning, gaming, or dating – have shifted to the digital world [34]. This increased particularly from the year 2020, due to the Covid-19 pandemic. Engaging users in these contexts is, therefore, essential.

Rich emotional experiences are relevant for digital contexts, and particularly for extended reality (XR) contexts (think of gaming, for example), because they help create more immersive and realistic experiences [35]. XR contexts are created by interactions between humans and computers that in some way alter, enhance, or amplify what is physically possible through sensory experiences and computer-generated perceptual information. There is a great deal of potential for emotional design in these immersive environments, namely in virtual and augmented reality. These fields are rapidly expanding and using emotions as the foundation for rich and engaging experiences [36], so it is expected that research on emotions and wellbeing in these contexts will grow.

“Immersive computing represents an entirely new and enormous complex user interface paradigm and is way different from the way how we have interacted with computers so far” [34, p. 14]. Now that we have reached the sophistication needed for technologies like virtual reality or augmented reality to operate [34] we need to make them come to life with narratives – and that is where emotional design can have a role. There are additional advantages to using emotions in human-computer interactions: by imitating human emotions in computers, we can better understand their resulting behavior [24]. Also, “we have a new opportunity to teach a computer to recognize the basic affective responses of its user” [24, p. 250], which will improve the user experience. So, not only can computers be affective (that is, express affect), making us relate to and understand them better, they can also recognize in us affective states that improve the user experience [24].

3 Consequences of Emotional Design

We all share a need for a material world that enhances “the experiential quality of daily life” [37, p. 19]. Yet, our material and digital environment is overloaded with products that promise similar benefits: products with similar technology, similar functions, and similar design languages. Emotional design presents advantages to these products, resulting in a competitive edge [6].

This massive supply and demand has resulted in the rise of sustainability concerns. Over the last five or six decades, several strategies for sustainable design have been advanced, many of which focusing on specific stages of a product’s life cycle like design for disassembly or design for recycling [37]. These approaches are insufficient if they do not generate relevance for the users. Design must account, therefore, for the human perspective and human emotions, becoming thusly more significant [38]. This relevance is fundamental for better human-product/human-computer relationships that result in longer-lasting designs that people want to care for and engage with, repair, reuse, repurpose, and (eventually) discard with respect [37]. Chapman [37] called it “emotionally durable design.”

Emotional design has consequences for companies – giving products a competitive edge, an emotional benefit that can lead to better adherence to brands, more loyalty, and overall more satisfaction. In addition, it offers benefits to users/consumers by rendering products more relevant and therefore capable of fostering deeper relationships that make them be taken care of and engaged with for longer. For designers, emotional design offers a more complete view of human needs and values. It ensures a more complete profile of the designer – who can resort to the many tools available from research on emotions and emotional design.

Current research and practice on emotional design not only considers the design of tangible and digital products, but it also focuses on ethical issues surrounding designing with emotions [39]; it considers designing for conflicting concerns people have [40]; it considers artificial intelligence (AI) and its ability to convey and recognize emotions [41]; among other topics.

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