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Design and Emotional Experience

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INTRODUCTION

Emotion is one of the most significant, complex and interesting human factors to designers. While physical and cognitive human factors have an established body of recognized standards in measurement, theory and application, the acceptance of emotion as an aspect critical for the success of design has a much more recent history. Common human factors textbooks place primary emphasis on fit, safety, and comfort. Even the Human Factors and Ergonomics Society (HFES) only gestures toward making our products and systems "enjoyable," in addition to safe and efficient (Human Factors and Ergonomics Society, n.d.). In human–computer interaction (HCI) and interaction design, the primary emphasis has been on usability. *Design and emotion* addresses the complex layer of human nuance in response to encounters with designed artifacts, and presents a challenge to the narrow focus on usability alone, traditionally measured through cognitive and physical human factors.

It is well established that emotion plays a role in our perceptions, attitudes, motivations, and behaviors. Our emotional state can affect how we focus attention and expectations, with obvious ramifications for how we process information and interact with products, systems, or other people. In a behavioral sense, we are prewired to approach stimuli associated with positive affect, and avoid those associated with negative affect. Designers can manipulate stimulation, or "arousal," as a physiological dimension of emotion. "The more stimulated we are, the more motivated we are to take action and avoid or approach the thing that is stimulating us." (van Gorp and Adams, 2012, p. 70). In general, people who are relaxed, happy, and "feel good" are more capable of creative problem solving, with

implications for how they might figure out complex devices or interfaces, and even be forgiving of product shortcomings (Norman, 2004; van Gorp and Adams, 2012).

The premise of design and emotion is that a holistic view must be taken of people in order to design effectively for them. Emotion is not a separate entity from cognitive processing or even physical interaction. This integration of complex human layers is nicely illustrated in the proven "aesthetic-usability effect." Research has demonstrated that interactions deemed more aesthetically pleasing are rated as significantly easier to use, and are more likely to be used, than less aesthetic interactions, even when usability is, in fact, purposely compromised in research manipulations (Lidwell et al., 2010).

As an integrated layer of human understanding necessary for design, emotional response is difficult to predict, apply, and measure. While it is easy to identify products that engage us enjoyably through intriguing interfaces, pleasing colors, sensuous textures, and whimsical details, the human response to artifacts can be much more complex. For example, why do some people respond favorably to objects that are met with distaste by others? This phenomenon alone suggests a range of idiosyncratic interpretations of the product world. Human reactions to products are rooted in the combined considerations of design intent, and interpretation in the context of personal and cultural experience (Hanington, 2004).

There is lack of consensus to adequately define pleasure, or positive emotional response, even among experts. Definitions alternately offer vague references to any "positive experience," and to the "opposite of pain" (Tiger, 2000, p. 17). The opposing force to pain may in some measure convolute the understanding of the concept of pleasure. There are various things in individual experience that will reduce or eliminate "pain," or discomfort associated with physical or psychological stress. It is critical to realize in defining pleasure that the things people do may be sought out both to *seek* pleasure for purely positive effects, and to *reduce* the effects of boredom, depression, or other negative psychological or physical conditions (Hanington, 2004). Jordan (2000) indicates that pleasure is distinguished between "need pleasures," fulfilled by eliminating a state of discontentment, and "pleasures of appreciation," accrued because of inherent positive worth found in things or activities.

These complex factors explain to some degree various pleasure-seeking behaviors engaged in by people, often contradicting reasonable assumptions of health and safety, such as dangerous sporting activities, smoking, and substance abuse. The understanding of emotional experience has for designers both an intellectual and commercial appeal. To comprehend, and possibly predict, the emotional resonance that products and systems may have for the people using them and affected by them will make for better design, and by extension, improved human experience.

This chapter will provide an overview of design and emotion through its origins and key moments in history, evolving to its prominence as a critical element of design for human experience, and user experience (UX) design. Theoretical perspectives of design and emotion are presented, particularly as they challenge more traditional human factors in design practice. And finally, a section on emerging methods and approaches identifies several ways in which design and emotion can be understood through responsive research, field techniques, and design applications.

THE EVOLUTION OF EMOTION IN DESIGN AND HUMAN–COMPUTER INTERACTION

The explicit inclusion of an emotional component in design dates back at least to Vitruvius (c. 80–70 BC—c. 15 BC), in architecture. Vitruvius referenced three key components of building architecture: *Utilitas*—representing utility, commodity, and function; *Firmitas*—indicating the need for structural and technical soundness; and *Venutas*—the provision of delight, pleasure, or beauty in a pure experience of space beyond the aesthetic (Vitruvius, transl. 1960). A parallel to this triad of elements is evident in the common design mantra of *useful*, *usable*, *desirable*, first coined in 1992 (Sanders, 1992). Whether applied to the design of products, systems, interfaces, information, services, or environments, these three factors suggest a balanced emphasis. The things that we use need to fulfill their intended purposes and are instrumental in meeting our goals. They need to be usable in how they are interpreted, comprehended and navigated, ultimately the purview of usability testing. And they need to be desirable, resonating with people from an aesthetic, emotional, personal, or cultural standpoint. The notion of making something desirable has both a human and commercial incentive.

The recognition of emotion as a critical element of design has primary roots in industrial design, with quite a different history in human–computer interaction (HCI). The field of HCI is younger than industrial design, explaining part of the difference; however, there is also a difference of emphasis. While both disciplines were historically dominated by a fundamental stress on usefulness and usability, *desirability* was evident earlier in industrial design. Furthermore, the formal organization of *design and emotion* through an organized professional society grew naturally out of product (industrial) design and continues to be dominated by that field, whereas much of the subject matter was introduced into HCI circles as a reaction to limited functional views of technology.

In the 1980s prominent research in industrial design focused on aspects of product meaning, semantics and semiotics, with implicit references to emotion. Klaus Krippendorff and Reinhart Butter coined the term product

semantics in 1984 in an article titled, "Exploring the Symbolic Qualities of Form." Partially in response to functionalism, approaching design through a semantic filter attempted to provide meaning to product users through the elements of form, including shape, texture, materials and color, but extended this to include aspects of product identity (what is it), character (what kind is it), affordance (what benefit does it provide), and operation (how do I use it). While products typically provide function, semantics as an approach channeled away from the simple mantra of form follows function, with a focus on making products meaningful, easy to use, and enjoyable to experience (Krippendorff and Butter, 1984; Krippendorff, 2005).

In 1981, Csikszentmihalyi with Rochberg-Halton published their extensive studies of research on the symbolic meaning of things in the home. While originating in the social sciences and not from design, the book emerging from the study, *The Meaning of Things: Domestic Symbols and the Self*, was instrumental in guiding many designers toward explanations of product meaning, and influential in subsequent design research. It is also noteworthy that 10 years later, in 1991, a condensed version of the study was published as an article in *Design Issues*, under the title, *Design and Order in Everyday Life* (Csikszentmihalyi, 1991). The work has been extended to identify key attributes contributing to product meaning attainable by design, including interaction (personal engagement, accomplishment), satisfying experience (enjoyment, ongoing occasions, release), physical attributes (intrinsic object qualities, craftsmanship, and evidence of hand; material quality), style and utility (Disalvo et al., 2003).

The primary focus of early HCI was on workplace efficiency and measurable usability. The rise of complex consumer electronics in the home saw the emergence of interaction design as distinct from industrial design, and subsequent attention being paid to the emotional impact of technology products. Rosalind Picard's landmark book on *Affective Computing* was first published in 1997, extending her prior MIT technical report published in 1995. Picard's work recognized the critical role emotions play in decision-making, perception, and learning, advocating for why we must give computers the ability to recognize, understand, and even to have and express emotions (Picard, 1995, 1997). Kristina Höök (n.d.) explores the idea of involving users both cognitively and physically in an "affective loop," described in her own words as follows:

- The user first expresses his/her emotions through some physical interaction involving the body, for example, through gestures or manipulations of an artifact.
- The system (or another user through the system) then responds through generating affective expression, using for example, colors, animations, and haptics.

- This in turn affects the user (both mind and body) making the user respond and step-by-step feel more and more involved with the system.

In 2004, the book *Funology: From Usability to Enjoyment* was published, challenging the narrow focus of HCI on usability to incorporate fun, enjoyment, aesthetics, and the experience of users (Blythe, 2004). This reexamination of emphasis occurred particularly as technology products began to proliferate in the home and for personal use, providing a contrasting viewpoint to the task-based work applications more commonly associated with HCI research and design.

Similarly, in 2000, Patrick Jordan advocated for a "new human factors" in his book, *Designing Pleasurable Products: An Introduction to the New Human Factors* (Jordan, 2000). Jordan promoted a broad look at design, crafting a framework of experiential pleasures of human–product interaction based on the work of anthropologist Lionel Tiger (1992). The text was among the early works to recognize that usability had moved from being what marketing professionals call a "satisfier" to being a "dissatisfier." In other words, people are no longer pleasantly surprised when a product is usable, but are unpleasantly surprised by difficulty in use. Recognizing that the human response to products and systems is comprised of more than physical fit and information processing, the "new" human factors explicitly promoted the inclusion of an emotional component in design.

Much of the early work formally establishing *design and emotion* as a recognized force within design grew out of The Netherlands. The *Design and Emotion Society* was officially formed in The Netherlands in 1999, with biannual conferences beginning that same year. In 2002 at Delft University of Technology, Peter Desmet published his PhD dissertation, *Designing Emotions*, providing a framework for defining, measuring, and designing product emotions (Desmet, 2002). The daily board of the Design and Emotion Society continues to be based in the Netherlands. In 2001, the *Conference on Affective Human Factors Design* (CAHD), was held in Singapore, bringing together an international cohort of practitioners and academics from diverse fields of design, technology, sciences, and social sciences. This conference eventually morphed into *Designing Pleasurable Products and Interfaces* (DPPI), running biannually from 2003 through to the most recent occurrence at Newcastle in 2013. In 2014, the 9th International *Design and Emotion Conference* was held in Bogota, Columbia.

Based anecdotally on conference attendance and membership in the Design and Emotion Society, the field is dominated by an international group of professionals and academics in product design (industrial design), with smaller contingents of designers from UX and interaction design and HCI, as well as from graphic and communication design, architecture, and environmental design. Participants from various fields of media design are also active, as are those from the social and behavioral

sciences, and sciences. The subject matter of design and emotion is intentionally and sufficiently broad to be appealing and relevant to all design disciplines and related fields. As stated on the Design and Emotion Society site, "The network is used to exchange insights, research, tools and methods that support the involvement of emotional experience in product design. Although the initiative originated from the discipline of product design and design research, through the years practitioners from other design disciplines such as interaction design and branding design, contributed and benefited from the network and activities" (Design and Emotion Society, n.d.).

The holistic human view of design and emotion caused it to gradually become at least partially absorbed into the realm of "user experience," a term first coined by Donald Norman at a computer–human interaction (CHI) conference in 1995. This led to similarly accepted terms, such as experience design, design for experience, and ultimately the established shorthand of "UX" for user experience design, along with the popular company role of Chief Experience Officer (CXO). Affective aspects of design advocated under the term UX were intended to coexist with behavioral concerns more traditionally associated with product and system usability. Norman's connection of design experience to emotion became explicit in the publication of his book, *Emotional Design: Why We Love (and Hate) Everyday Things*, in 2004.

Kuru and Forlizzi (2015) present a concise history of UX design, with key elements of emotion noted throughout. Beginning as early as 1996, Alben (1996, in Kuru and Forlizzi, 2015) identifies factors of user experience to include "how people feel about a product, how well they understand its functions, how the product makes people feel when using it, and how it fits its purpose and context of its use." As the interest in design and emotion grew within the HCI community, this holistic view became more accepted, defining user experience to encompass all aspects of the experience of an interactive technology product, service, or system, including physical, emotional, sensual, cognitive, and aesthetic, before, during and after use (Hassenzahl, 2008, in Kuru and Forlizzi, 2015).

In 2004, John McCarthy and Peter Wright published *Technology as Experience*, building heavily on the premise of John Dewey's notion of lived experience, suggesting that we not only *use* technology, we *live* with it. It stands to reason that if we are to design according to the popularized term of "user experience" (UX), we must take into account the "emotional, intellectual, and sensual aspects" of the interactions we are creating. This aspect of felt human experience, viewing technology as creative, open and relational, again presented a challenge to traditional notions of HCI as merely fulfilling functional usability needs (McCarthy and Wright, 2004).

The fact that emotion is an integral component of UX design is addressed in the ISO definition for user experience, stated as a "person's

perceptions and responses that result from the use or anticipated use of a product, system or service. User experience includes all the users' emotions, beliefs, preferences, perceptions, physical and psychological responses, behaviors and accomplishments that occur before, during and after use." (International Organization for Standardization, 2010). The ISO lists three factors that influence user experience: system, user, and the context of use. "This has led to a shift away from usability engineering to a much richer scope of user experience, where users' feelings, motivations, and values are given as much, if not more, attention than efficiency, effectiveness and basic subjective satisfaction (i.e., the three traditional usability metrics)." ("User Experience," n.d.).

THEORETICAL PERSPECTIVES ON EMOTION IN DESIGN AND HUMAN–COMPUTER INTERACTION

The expanding literature on design and emotion, growing through both conference venues and publications, is a testament to the significance and status of the field. The diverse subject matter encompassed by the term is evident in conference tracks that address a range of topics, such as well-being, culture, experience, sensation, social implications, sustainable behaviors, relationships and patterns, and inclusive design. The number of designers interested in the field and claiming an aspect of design and emotion as part of their expertise, and the large membership of the Design and Emotion Society, further confirm that design and emotion is now a significant element of human factors in design research, theory and practice today.

Lidwell et al. (2010) identify several human principles that attempt to explain our emotional response to the designed world. For example, the "baby-face bias" is "a tendency to see people and things with baby-faced features as more naïve, helpless, and honest than those with mature features." Repeated exposure to stimuli for which people have neutral feelings will increase the likeability of the stimuli in a so-called "exposure effect." The "Veblen effect" suggests that people will tend to find a product desirable because it has a high price, and the phenomena of *scarcity* makes things more desirable when they are perceived to be in short supply or occur infrequently. And of course, the nuances of *color* choice are well known to produce emotional reactions, positive and negative, based on culture, experience, and subjective interpretation by people experiencing the designed world.

The Yerkes–Dodson Law is informative in design and emotion. This law posits that increasing levels of stimulation or arousal can initially improve motivation and performance, yet then reach an optimum level before decreasing performance as stress becomes too high (Fig. 6.1). Stimulation
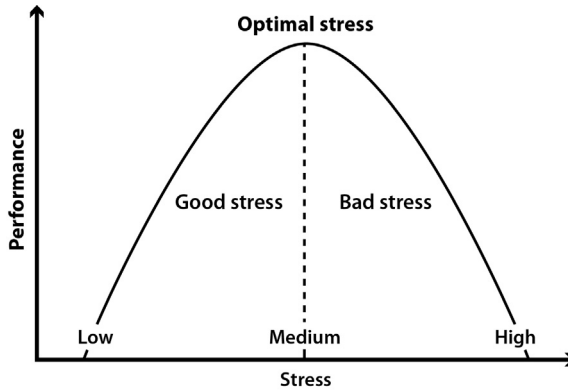
FIGURE 6.1   The Yerkes–Dodson law indicating performance as a function of stress (Yerkes and Dodson, 1908).

must be treated in balance by design, dependent on the context. For example, the use of negative stimuli, such as loud alarms is appropriate to evoke strong cognitive, emotional, and physiological responses in emergency situations. However, an illuminated status indicator, quietly telling us that an alarm system is powered and ready, provides calming reassurance (van Gorp and Adams, 2012).

Emotion itself can be viewed as a short-lived, reflexive response, most commonly associated with a commercial approach wherein products or services are advertised and sold on the basis of their fun and exciting allure, or presence. However important, this level of emotional appeal is often placed in contrast to a more sustained, reflective response, "emotional experience," or "mood" connected to long-term product relationships (DiSalvo et al., 2004).

DiSalvo, Forlizzi, and Hanington propose three ways in which products can essentially shape human emotional experience: *stimuli* for new experiences, *extenders* of ongoing experience, and *proxies* for past experiences (Fig. 6.2). As stimuli, products with specifically designed interactions or sensory stimulation can become catalysts for new emotional experience. For example, a walking aid can provide the catalyst for enhanced mobility, independence, and social access to a person formerly limited by physical constraints. Extenders offer ongoing product experiences of familiar objects, through particularly designed style, utility, and other sustaining qualities that make them more enjoyable or appealing to own and use. Proxies are products that provide associations with previous experiences, often through reminders of other times or people. Souvenirs, family heirlooms, and gifts are common proxies (Disalvo et al., 2003).

In a similar vein, Zimmerman (2009), in his work on "designing for the self," extracts insights from possession attachment theory to inform the

Emotional functions:
 Stimuli for new experience
 Extenders of current experience
 Proxles for past experience

Product characteristics:
 Action/interaction
 Sensory stimulation
 Enjoyment
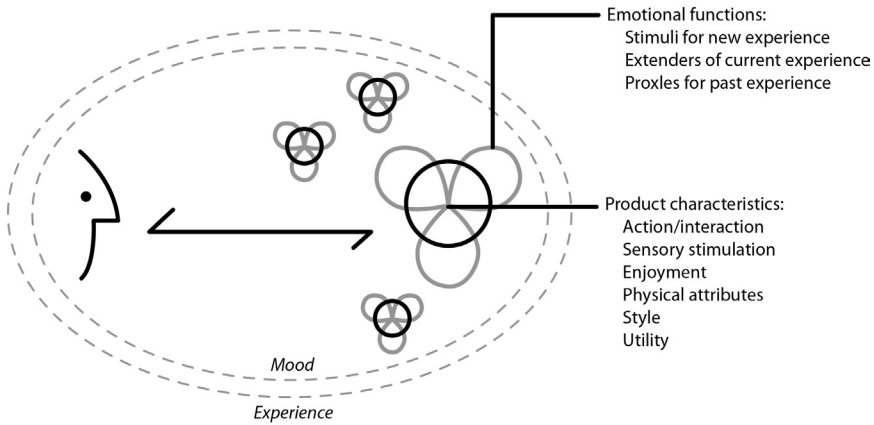 Physical attributes
 Style
 Utility

Mood

Experience

FIGURE 6.2 The shaping of emotional experiences through product characteristics (Disalvo et al., 2003; DiSalvo et al., 2004).

design of interactive products and services, thereby enhancing emotional experiences. Material possession attachment theory comes from consumer behavior research (Belk, 1988; Kleine et al., 1995; Kleine and Baker, 2004). It builds on concepts from identity theory (Belk, 1988; Goffman, 1959; James, 1890), life story theory (McAdams, 2001), and social identity theory (Tajfel and Turner, 1986) and attempts to explain how and why people love some of their material things. Zimmerman's work investigates two approaches to operationalizing product attachment theory around social role performance. Role enhancement includes products that help people become the person they desire to be in a specific social role, like a parent, romantic partner, or religious practitioner, for example. Role transition includes products that help people transition into a new social role, like when high school students shed their high school identity and reinvent themselves as a college student, or when a couple has a first child and invents themselves as parents.

Odom et al. (2011, 2012) significantly extended Zimmerman's work in his research investigating how people perceive value in their immaterial (virtual) possessions and how changes to the form and behavior of virtual things can increase perceptions of personal and economic value. For example, in a study of teens and their virtual possessions, it was determined that social media affords flexibility in personalization and a place to curate and share current interests in the experimentation with a sense of self and the portrayal of identity presented to others, while risking "self obsession" stemming from peer pressure to create multiple selves. Virtual possessions can increase a sense of social connectedness, but can also work to amplify differences and reinforce cliques, with obvious emotional outcomes.

In Jordan's theory of four pleasures, physical, psychological, sociological, and ideological factors can all contribute to emotional experience of the designed world. For example, the tactile sensation and response of a laptop keyboard provide *physio* pleasures; the status of owning a Philippe Starke designed juicer or the nonstigmatizing success of personal diabetes monitors constitute *socio* pleasures; appropriate sound levels in domestic appliances and the right level of challenge in game design are means of achieving *psycho* pleasure through design; and the communicative function of aesthetics corresponding to individual values represent *ideo* pleasures. Product features are broken into "formal" and "experiential" properties to define objective and subjective aspects of design. Similarly, people are described by their physical attributes and abilities, their sociological status, self-image and lifestyle, psychological traits of personality, confidence, skills and knowledge, and ideological beliefs, values, and aspirations (Jordan, 2000).

Donald Norman posits that experiences are colored by emotional responses that operate on three levels: visceral, behavioral, and reflective (Norman, 2004). Pleasure and emotional design are linked in a holistic assessment of user experience (van Gorp and Adams, 2012). Visceral design concerns appearances (e.g., colors, aesthetics), relates to physio-pleasures and provides hedonic benefits. Behavioral design relates to effectiveness of use (e.g., functionality, usability), links to psycho-pleasures and relates to practical benefits. Reflective design considers interpretation and understanding over time (e.g., experience, personal story), concerns ideo-pleasures and socio-pleasures and relates to emotional benefits (Scupelli and Hanington, 2014; Table 6.1).

Pleasure, or satisfaction, particularly in the psychological realm, can be achieved as an aspect of balancing challenge and skill building. In

TABLE 6.1   A Holistic Assessment of User Experience (Scupelli and Hanington, 2014)

Emotional response (Norman, 2004)	Design concerns	Pleasure (Jordan, 2000)	Benefits
Visceral	*Design qualities, appearance* Color Aesthetics	*Physio* Physiological	*Hedonic*
Behavioral	*Effectiveness and ease of use* Function Usability	*Psycho* Psychological	*Practical*
Reflective	*Interpretation* *Understanding* Personal experience Story	*Ideo* Ideological, values, aspirations *Socio* Social relationships	*Emotional*
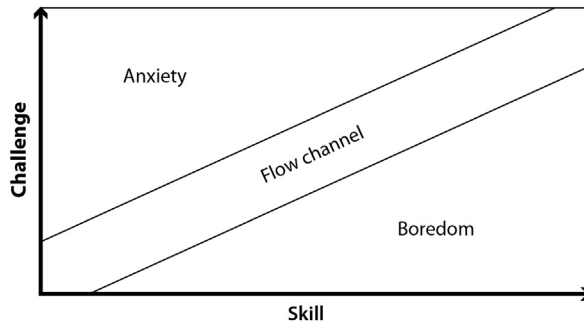
FIGURE 6.3 **A balance of incremental challenge and skill building to achieve a state of "flow."** *Source: Adapted from Csikszentmihalyi, M., 1990. Flow: The psychology of Optimal Experience. Harper and Row, New York.*

the theory of "flow," a state of intense immersion occurs when progressively developing skills are met with increasing challenge, and vice versa (Csikszentmihalyi, 1990). If skills are overchallenged, a person ends up in a state of anxiety; if skills develop beyond the challenge, boredom may occur (Fig. 6.3). This is evident in the tiered structure of game design, for example, whereby successively complex challenge levels are presented to gamers as goals are achieved. Flow is similar to the effect of *immersion* used in experiential exhibit design, movies, and amusement park attractions, creating a state of mental focus so intense that conscious awareness of the "real world" is temporarily suspended (Lidwell et al., 2010).

Extending the structure and success of games into the motivational realm, researcher and game expert Jesse Schell states that, "if we want to understand how to get people to engage more with our ideas, games, and products, we need to look at what games do very well: motivate us to play them." (Lefebvre, 2011). The concept of "gamification" applies the mechanics and techniques of game design to engage and motivate people in other realms, for example, learning tasks or losing weight, or simply captivating an audience to engage with an interface, product, or system. By adding game-like elements, such as competition, status, achievement, and a state of "flow" as described previously, nongame applications can be made more fun and engaging, thereby enhancing the motivation to interact.

Maslow's theory of human motivation has also been influential in design and emotion. As the central premise of the theory, a hierarchy of needs suggests that self-actualization is reliant on the prior satisfaction of esteem, belongingness, safety, and physiological needs. In similar fashion, a theory of design suggests that functional needs and usability criteria must be met before successfully fulfilling emotional benefits (Jordan, 2000). Lidwell et al. (2010) similarly concur that design must satisfy basic needs,

such as functionality, reliability, and usability, before succeeding on merits of human empowerment or fostering creativity.

Several examples of design and emotion work have challenged the narrow focus on just efficiency and error reduction, or measured usability. The "slow movement" that began as slow food and other forms of advocated living also inspired some to examine the role of technology in our everyday lives, and propose slow technology "aimed at reflection and moments of mental rest rather than efficiency in performance." (Hallnäs and Redström, 2001). Similarly, work by Odom et al. (2014) on "Designing for Slowness" performed a long-term study of the "Photobox," "a domestic technology that prints four or five randomly selected photos from the owner's Flickr collection at random intervals each month." The research suggested "several opportunities, such as designing for anticipation, better supporting reflection on the past, and, more generally, expanding the slow technology research program within the HCI community."

Subsequently, Bill Gaver's work on "ludic interaction" focused on interaction that is playful and often has no specific task or goal. This challenged the traditional focus by HCI on task completion time and the strict fit between what people want and what designers make. For example, the "Drift Table" is "an electronic coffee table that displays slowly moving aerial photography controlled by the distribution of weight on its surface, designed to investigate ideas about how technologies for the home could support activities motivated by curiosity, exploration, and reflection rather than externally-defined tasks." (Gaver et al., 2004).

New trends are constantly extending design and emotion into other areas of investigation and application. For example, Lalande and Racine (2006) and Lalande et al. (2010) have examined how longevity of product relationships and emotional connection can be fostered through rapid prototyping repairability and transformation of obsolete objects into new functionalities, in turn fostering environmentally sound behaviors and product sustainability.

Design and emotion is inherently connected to design for social innovation, or enhancing the social good, in areas, such as health care and well-being. Recognizing the new global focus on happiness, including measures of gross national happiness (GNH), a special issue of the *International Journal of Design* in 2013 promotes the idea of *Design for Subjective Well-Being*. The editors propose a positive design framework for "designing with the explicit intention to support people in their pursuit of a pleasurable and satisfying life, and, even more important, in their desire to flourish. It aims at designing products that contribute positively to the experienced quality of life, in making things that are useful, usable, enjoyable, purposeful, desirable, and even virtuous and ethical." Themes of the special issue examine the topic through lenses of daily life, work, leisure, fun, and health, with the intention of appealing to a broad audience in the private, public, social, and health-care sectors (Desmet et al., 2013).

EMERGING METHODS IN DESIGN AND EMOTION

The multitude of theories and research presented here represent a sample of moments in a field that gradually emerged yet quite suddenly burgeoned. As a core feature of design, research and theory typically coexist in parallel with action, or practical application. To that end, various design methods and approaches have been associated with design and emotion.

As a methodology of design, Sanders and Stappers (2012) position design and emotion as a design-led approach, situated between a "participatory" and "expert" mindset in how users are viewed (Fig. 6.4). This positioning suggests that design and emotion grew primarily out of the design community itself, in contrast to traditional human factors, ergonomics and usability testing emerging from a dominantly research-based professional practice. Human factors, ergonomics, and usability testing professions, including HCI, have also been traditionally aligned with the expert mindset, viewing users as reactive informers or subjects. Design and emotion is more closely aligned with a participatory mindset, seeing users somewhat more as partners or cocreators in their contribution to
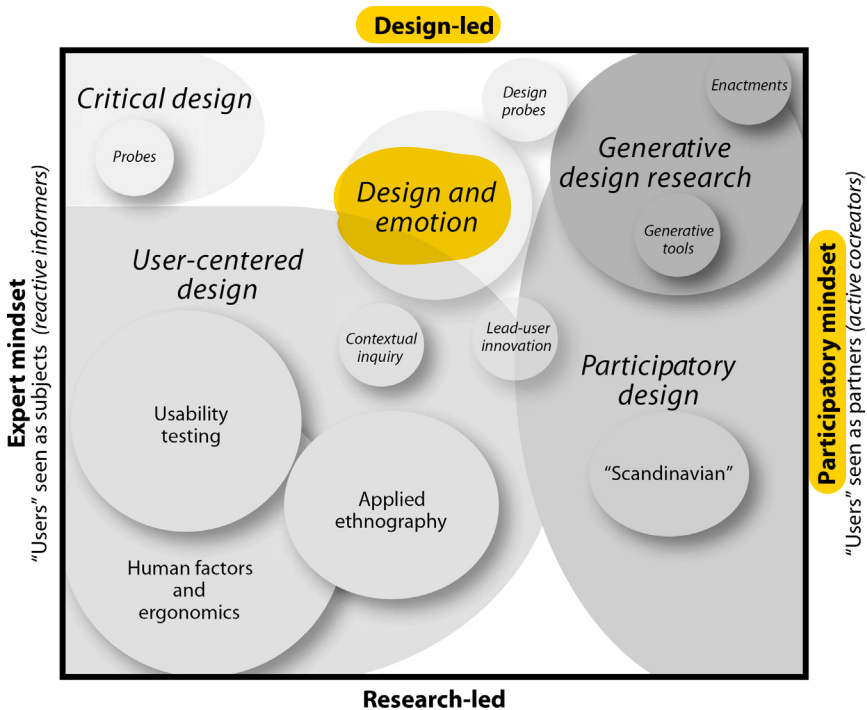

FIGURE 6.4   **The landscape of design research and practice.** *Source: Adapted and used with permission of Elizabeth B.-N. Sanders. Versions of this figure appear in* Sanders (2006) *and* Sanders and Stappers (2012).

design. However, design and emotion has been influenced by, and continues to influence, other realms of research within this landscape of methods and approaches.

For example, elements of design ethnography, or the immersive tools adapted from anthropology, attempt to forge a sympathetic and empathic sense of the stakeholder (user, research participant), to positively influence the design process and outcomes such that emerging products resonate with people on all levels, including emotional. Forms of contextual inquiry and observation are key to understanding people in their lives of work and play. Design probes or cultural probes provide creative, sometimes provocative self-report tools to participants through which they may expressively communicate their personal thoughts and feelings in response to subject matter prompts (Gaver et al., 1999; Hanington and Martin, 2012).

Similarly, generative tools and methods associated with participatory design are empathically based, aspiring to engage and involve those affected by design in a process that results in emotionally resonant products, systems and services, and ultimately bettering the lives of those who use them. Design workshops and codesign tools, such as flexible modeling and collage allow participants to project emotions onto physical materials to express their thoughts and desires (Hanington and Martin, 2012). Most designers operating in the sphere of design and emotion would agree that a human-centered design process, placing users and stakeholders at the forefront of a research-based approach to design, is critical to its success.

Some would argue that elements of critical design and cultural probes are also squarely within the realm of design and emotion. Critical design, and counterpart movements, such as speculative design, situates provocative designs—often counter functional—in the world to challenge our thinking about products and the ways that we live. However, experiments noted previously, such as the slow movement examples challenging our conceptions and reliance on the speed of technology, and the Drift Table motivating curiosity, exploration and reflection, certainly have an emotional overtone in the subject matter itself, the design approach, and the audience reaction intended. Many of these examples also serve to advance the legitimacy of *research through design*, which recognizes reflective processes of design thinking and making as research activity, bridging theory, and building knowledge to enhance design practice (Hanington and Martin, 2012).

While there is not a specifically prescribed approach or methodology associated with design and emotion, various tools have emerged that represent a positive fit with the goals and intentions of the field. The Design and Emotion Society website features an interactive section on tools and methods, allowing researchers and practitioners to parse methods on the basis of intended application and category. Selections can be made

according to phase of the project, whether looking for radical or incremental change; purposes including collection, exploration, or measurement; and subaspects of emotion, such as sensory characteristics or expression (Design and Emotion Society, n.d.).

While many methods are common to design practice, others have been developed for specific purposes within design and emotion. For example, *personas* are fictional yet representative users developed as a convergence of human elements extracted from research with real people; *scenarios* offer realistic situations of task or goal completion including positive and negative interactions. These are methods widely used in design, yet have particular value in design and emotion. A variant on personas is designing for *extreme* characters, with exaggerated emotional attitudes, to expand creative possibilities in considering the aesthetics of interaction design. For example, Djajadiningrat et al. (2000), describe projects targeting a drug dealer or "the fictitious Pope."

Bodystorming, likewise used for various design purposes, has resonance with design and emotion as a form of physical brainstorming, whereby scenarios are quickly set up using low-fidelity props at hand, and acted out for quick understanding and feedback on a proposed situation. Bodystorming contains elements of role-playing, also a familiar method to many designers as an empathic tool for understanding users and their needs, and assessing ideas.

Methods specifically created for design and emotion attempt to ascertain emotional aspects of human motivation or behavior, and inspire design outcomes. For example, *Emofaces* allows participants to express their emotional reactions using eight illustrated cards, each depicting emotions along high to low dimensions of arousal and pleasant–unpleasant, based on the "circumplex model of affect" (Fig. 6.5). The [product & emotion] navigator provides an anecdotal database of product images and the emotional reactions they have evoked, along with reasons behind these reactions (Design and Emotion Society, n.d.). *Desirability testing* uses card-based adjectives and descriptive phrases to aid participants in their expression of emotional responses to design prototypes or products (Hanington and Martin, 2012).

In the totality of product experience encompassing emotion, the *Experience Sampling Method* (ESM) gathers snapshots of people's lives, including feelings, through mechanisms like diaries or participant-generated photos and notes. Likewise, *experience prototyping* facilitates active, subjective engagement with convincing prototypes of products or systems, to assess early functional and emotional resonance with potential users (Hanington and Martin, 2012).

van Gorp and Adams (2012) propose a model designed to help ensure that the design process addresses the three levels of useful, usable and desirable attributes, and their associated variables. Using the acronym
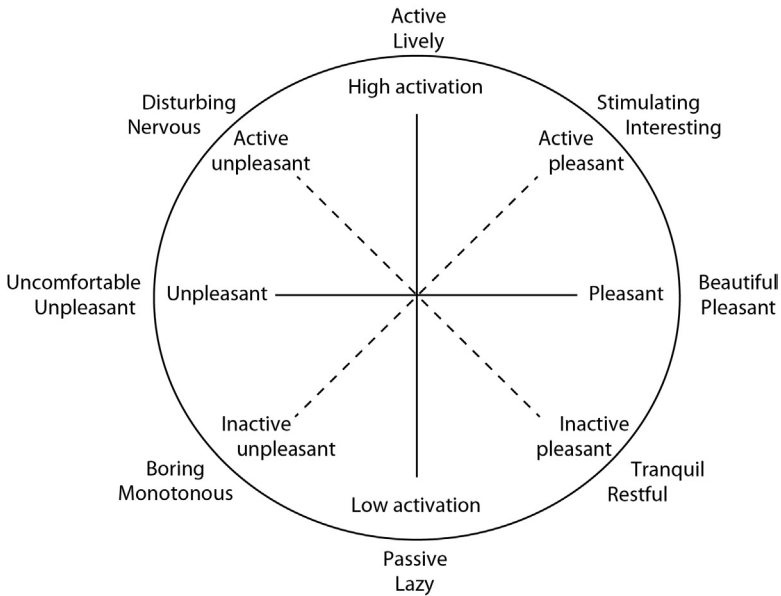
FIGURE 6.5 **A circumplex model of affect.** *Source: Reprinted from Russell, J.A., 1980. A circumplex model of affect. J. Pers. Soc. Psychol. 39 (6), 1161–1178. With permission of SAGE.*

ACT for *Attract*, *Converse*, and *Transact*, the model suggests that there first needs to be a motivation to interact with a product or service, through some form of *attraction*, typically through aesthetic appeal to the senses. We then need to ensure a positive *conversation* with the product, forming a relationship through feedback and dialog, or an engaging narrative flow to the experience of product use. And finally, a *transaction* is necessary, or a decision to act and thereby commit to a product or service, by purchasing a product or signing a service agreement, for example. A positive transaction is reliant on feelings of trust and credibility determined through attraction and conversation (van Gorp and Adams, 2012).

Scientist B.J. Fogg of the Persuasion Technology Lab at Stanford is known for creating systems to change human behavior through self-proclaimed "behavior design." Using the psychology of persuasion to describe a three-step process, the so-called "Fogg Method" advocates first specifying the desired behavior you want as an outcome, then simplifying to make the behavior easy to do, and finally triggering the behavior either naturally or through design (Fogg, 2013).

While the Persuasion Technology Lab and Fogg himself work primarily through mobile devices on specific topics, such as improving health, the notion of design for behavior change has become a generally prominent theme within design and emotion. Very public examples have emerged through projects, such as the VW Fun Theory, "dedicated to the thought

that something as simple as fun is the easiest way to change people's behaviour for the better." (Thefuntheory.com). Among several examples are the "Piano Stairs," motivating people to take stairs rather than an escalator by embedding musical electronics in the steps, clad as giant piano keys, and activated in correct musical notation when treaded upon. The option for lower energy consumption and a moment of exercise is spontaneously presented to commuters, following the premise of a simple and emotionally rewarding act to seamlessly change an everyday behavior.

Much of what we design and encounter as consumers, customers, or "users" has a direct influence on our mental and emotional state of being. While the necessity for functional usability and efficiency cannot be overlooked, a holistic view of people encompasses how we emotionally resonate with the things we use and the experiences we have in the material and natural world. Human factors is fortunately moving to address this totality, accounting for the complexity of interactions that make up our human experience, physically, cognitively, and emotionally.

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