

Pieter Desmet & Steven Fokkinga

Emotions **BY DESIGN**

*Using the **SCIENCE** of emotions to create
beloved **PRODUCTS & SERVICES***



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Preface

When was the last time a product sparked a deeply positive emotion in you?

Was it when that sleek countertop appliance transformed your kitchen into something magazine-worthy? Or when your new noise-canceling headphones finally silenced your chatty coworker? Or perhaps when you found your moldy old retainer in a box of keepsakes, unleashing a flood of childhood memories? While your example might differ, we'd be willing to bet that it involves a product that is extraordinary for its striking appearance, incredible functionality, or personal significance.

When we posed this question during one of our workshops, we received an answer we hadn't anticipated. A participant came forward, placed a black pencil on the table, and declared, "I feel deep admiration for this pencil." We looked at the pencil. Nothing happened. Sensing our confusion, he set down another pencil—identical in size and color, but with a round barrel instead of hexagonal. It promptly began to roll and tumbled off the table. When a pencil hits the ground, he explained, the lead core breaks and the pencil becomes useless. A hexagonal barrel is just as pleasant to hold—but it never tries to make a run for it. Since he used pencils for most of his writing and drawing, that minor difference mattered enormously.

This example, although simple and somewhat peculiar, is profoundly revealing. It illustrates two crucial insights about emotions and products. First, it shows how emotion is *subjective*: the same thing can evoke very different feelings in different people. What may be of great concern to one—the shape of a pencil—leaves another indifferent. The passionate euphoria of a young fan at her favorite band's concert stands in stark contrast to the boredom and mild despair experienced by her chaperoning dad. For anyone in product development, subjectivity presents what seems like a challenge at best, and, at worst, a dead end. How can anyone predict and influence how people will feel about products, if human emotions are so personal and unpredictable?

But the pencil example also reveals a second insight, which will take center stage throughout this book. Even if you do not personally identify with the pencil owner's emotions, at least you can follow his reasoning. If you worked at an angled desk every day, you would probably have similar feelings about the two designs. This shared recognition shows that emotions are not random or irrational: their causes and effects follow rules, and these rules are the same for every human. The rules have evolved over millennia to help us respond appropriately to what is happening around us.

Consider an emotion that is as relevant today as it was thousands of years ago: fear. Fear comes in many forms, but it is always induced by some kind of *danger*. The emotion of fear is subjective only in that people perceive different things as dangerous. For a little kid, that thing might be a mean-looking neighborhood dog. For his mother, it might be the towering stack of unpaid bills by the front door. But both will react in similar ways: by becoming more alert, seeking protection, or reaching out for help. In other words, even though the ingredients of the emotional stew might differ, the way they cook is always the same.

Science has provided us with an increasingly clear picture of what is going on in the kitchen. After a period of relative neglect in the first half of the twentieth century, when emotion was considered a topic unbecoming a serious scientist, emotion research began to flourish. In the 1980s, work in the fields of psychology, neuroscience, and anthropology joined together to unravel the mystery of what emotions are, how they work in our brains and bodies, and how they influence our behaviors and preferences.

So, what is an emotion, according to science?

*Emotions are functional states arising from cognitive appraisals of events in relation to personal needs and values, which generate specific action tendencies and physiological changes that prepare the organism for adaptive responses to environmental challenges and opportunities.*¹

Don't worry if that sentence doesn't make any sense right now. We'll unpack it throughout the book, showing how each part can be leveraged to design products people will love.

Emotional Design

It is perhaps most helpful to start with what emotional design is *not*. It is not a special class of products that stand out for their fanciness or exclusiveness. Every product evokes emotions. Some products have a greater chance of being beloved (or loathed) because they play a more prominent role in people's lives. But if a 30-cent pencil can arouse a profoundly positive emotion, any product can.

1. There are several schools of thought within emotion science. Some perspectives complement each other, while others fundamentally disagree on key points. Our models and approaches are grounded in the *functionalist perspective* of emotion, spearheaded by researchers like Magda Arnold (e.g., 1960), Richard Lazarus (e.g., 1991), Nico Frijda (e.g., 2007), and Ortony, Clore, and Collins (1988). The definition of emotion presented here is a distinct expression of this perspective. A related perspective describes *basic emotions*, which, while also rooted in functional thinking, maintains a stronger focus on biological universals (e.g., Ekman, 1999; Izard, 1977). Other influential perspectives are the *dimensional* (e.g., Russell, 1980; Watson & Tellegen, 1985), *constructionist* (e.g., Averill, 1980; Barrett, 2006), and *somatic* (e.g., Damasio, 1994; James, 1948; Lange, 1922) approaches. Each of these perspectives offer valuable insights into the nature of emotions, though they sometimes arrive at different conclusions about how emotions function and what they fundamentally are.

Emotional design is also not a specific aspect or feature of a product. It is not the icing that you add after all the serious cake requirements have been fulfilled. Instead, it is a set of guidelines that help you understand the kind of cake you are making and how you should balance the ingredients. Every aspect of a product, from its functionality and usability to its appearance and cultural meaning, is experienced by the human emotional system. This system evaluates to what extent these diverse elements, as a whole, fulfill or frustrate the user's needs. For example, a smartwatch might have the most advanced health sensors, but if its interface makes everyday tasks unreasonably complex, users will experience disappointment rather than delight. Similarly, a meal-planning app might offer impeccable functionality and ease of use, but if it fails to understand users' cultural food preferences or dietary values, it will create an emotional disconnect that undermines its practical benefits.

This brings us to what emotional design *is*: an *approach* that asks you to study, understand, and anticipate people's emotional responses so you can design products that make sense and are fantastic to use. This approach does not in any way devalue the importance of product aspects not traditionally associated with emotion, such as technology or usability, nor does it promote the practice of spuriously attaching emotions to a product through marketing or storytelling. Instead, it considers every significant event that occurs between product and person, from first look to final use, and offers concrete steps to produce the most effective and enjoyable results from each of those interactions.

The Focus of This Book

A pencil is the epitome of a mass-produced consumer product: inexpensive, widely available, deceptively simple—try making one yourself!—and something you pay little attention to (until you desperately need one and can't find one). Many of the cases presented in this book focus on consumer products, partly because they work well as concrete examples, partly because that is our domain of expertise. However, the approaches in this book apply to any designed object, service, or system that people use to fulfill a need or solve a problem—apps, packaged foods, government services, interiors, electronic devices, transportation systems, etcetera. Although each application comes with its own set of requirements and constraints, the fundamental link between emotions and design decisions is the same. Airports can be frustrating to navigate, and so can websites; cars can evoke nostalgia, as can hotel services; offices can inspire workers, but so can apps.

We have aimed to make this book both insightful and applicable to anyone involved in the development of products, services, and systems—whether

you are a designer, architect, engineer, market researcher, brand manager, or strategy consultant. We have seen time and again how an emotion-focused approach can create a shared language across disciplines that puts humans at the center of the conversation. The rudiments of this language are already known to each of us, thanks to our lifelong experience of emotion. This book aims to further develop this shared language by enriching it with scientific discourse and weaving it into the vocabulary of product development.

The structure of the book reflects our dual goal: to make the theory accessible and enjoyable to read, and to provide actionable methods, models, and examples that enable you to put the theory into practice. The body of the text is intended to be a casual read containing everyday examples and a minimum of jargon. We have interspersed the text with product case examples that bring the theory to life. These examples come from three complementary sources: existing products and services that showcase the principles of emotional design, inspiring student projects, and cases from our own consultancy practice in which we experienced first-hand how these principles translate into real-world impact.

Each chapter also provides what we call *design opportunities* or *research opportunities*. *Research opportunities* introduce practical methods for understanding users' emotional experiences that you can weave into user research and market research. *Design opportunities* demonstrate how to apply relevant insights in design and innovation work. Most chapters conclude with a *theoretical deep dive*, that provides a more detailed analysis of the chapter's underlying psychological concepts for those interested.

This book is divided into eight chapters; each introduces an approach to emotional design. We have been developing them over the past twenty-five years, during our research and teaching at Delft University of Technology, the Netherlands, as well as through our Rotterdam-based consultancy, Emotion Studio. The chapters are largely self-sufficient and can be read separately from one another. However, since the earlier chapters introduce some concepts that reappear later in the book, we recommend reading the book from beginning to end for a more comfortable reading experience.

The book includes a section called *Tools & Techniques*, which brings together the instruments, measurement scales, and step-by-step guides referenced throughout the book. Think of it as a practical toolkit you can revisit whenever you put these approaches into practice.

Pieter Desmet & Steven Fokkinga



1

FUNDAMENTAL

Needs

For over twenty years, we have been teaching an industrial design graduate course titled *Design & Emotion*. We begin each course by asking the new students to bring a product that fills them with joy. The classroom is pretty small, so this assignment invariably makes it look like a design exhibition—or a garage sale, depending on who you ask. The products are as diverse as the reasons that students bring them. Piyali brought a potato peeler that was so comfortable to use that she bought a second one for her mother back home. G-Young brought her beloved Polaroid camera, which allowed her to share photographs instantly with the people she met on her travels through Africa. Maurizio displayed a Lego brick that transported him back to his childhood bedroom. And Chi brought a nose-shaped pencil sharpener that never failed to spark conversations when she used it in public.

We assign this task to encourage our students to ponder the link between products and emotions. Over the years, the exercise has provided us with hundreds of product examples and the stories behind them. We began to wonder whether this massive set of carefully chosen, joy-inducing products might reveal some of the secrets of good product design. Just as a medical researcher studies a large sample of healthy individuals to identify commonalities in their lifestyles or habits, could we discover universal qualities that make these products so delightful? Might there be a discernable pattern in their forms, colors, or materials that produces joy? Could we find similarities in usability, functionality, or character?

The answer to these questions was a resounding no. The dataset includes as much of the ugly as it does the beautiful. We found durable products as well as disposable goods, one-of-a-kind gems, and mass-produced commodities. Some products solve unique problems, while others seemingly have no purpose whatsoever. Apparently, very diverse (even opposing) product qualities can elicit positive emotions in people.

How solid is this finding? Our data collection method wasn't exactly scientific. For one thing, design students are hardly your typical product users. They are often drawn to odd or extraordinary products. And they also perceive everyday things differently because they understand what goes into making them.

Yet, we have repeatedly encountered identical findings in our scientific research with the broader population. There is no fixed set of product attributes that universally triggers positive emotions. For instance, in a study that measured the emotions of Japanese and Dutch consumers as they viewed images of different car models, we found that the same car model could evoke completely different emotions in the two groups. The Fiat Multipla, infamous for its rather unique design (see image 1.2), exemplifies this phenomenon. Some of our participants found the car repulsive and outrageous; others found it delightful and even



1.1 What joy looks like, one product at a time

inspiring. Even more strikingly, these differences did not follow any apparent logic. They cut across genders, age groups, and cultures—a female Japanese



1.2 *An acquired taste*

octogenarian was just as likely to love (or hate) the Multipla as a 25-year-old Dutch man.¹

This apparent lack of structure presents us with a significant challenge. The ultimate goal of our research is to help practitioners create products that evoke positive emotions. To do this effectively, we need to predict which design decisions—materials, shapes, colors,

features, and so on—will trigger specific emotions. But how do we make such predictions when there is no way to detect any systematic relationship between emotions and existing products? This seeming absence of underlying structure in our findings was deeply unsettling—enough to make even the most dedicated researcher question their career choice.

Fortunately, there is a structure underlying these emotions. We were just looking for it in the wrong place. The structure doesn't reside in a product's outward physical properties but rather in the inner life of the users who experience them. To reveal that structure, we must turn away from products for a moment and focus on what truly gives people joy.

The Jars of Joy

What is the essence of joy?² Although this familiar feeling may seem quite basic, at second glance, it harbors an enormous richness. Consider how diversely it is expressed. Joy can make a person listen intently to a story, jump around uncontrollably, or quietly sit back in an armchair. Sometimes, joyful moments are carefully planned; other times, joy takes us by surprise. Joy can be experienced alone in a room or at a stadium with thousands of others. And there is as much variety in the causes of joy. It can be sparked by receiving a long-awaited promotion, parachuting out of an airplane, being visited by a childhood friend, or taking the first sip of beer on a hot day. Joy is found in major achievements, social engagements, and simple pleasures. Essentially, we are faced with the same question as before: what is the common factor underlying these diverse events? Why do *all* these situations make people feel good?

1. Desmet (2003).

2. For the time being, we are using “joy” as a synonym for “positive emotion” or “feeling good.” In Chapter 6, we unpack positive emotion and reveal its many variations.

This time, the answer is simple. These things bring joy because they fulfill our needs.³ Sometimes, the need is concrete and conscious, as when you want to have lunch and are glad you've found a good sandwich shop. At other times, needs are subconscious and not actively pursued, as when you bump into a childhood friend, have a nice chat about old times, and walk away feeling uplifted. In each case, those feelings of joy tell you that something about the situation has fulfilled some relevant and important need you have—whether you are aware of that need or not.

Basically, we say that people enjoy things because they want them. You would be excused for finding this explanation so obvious as to be practically meaningless. Are we just substituting “want” for “need”?

No, because it helps us understand something new. Saying that “people enjoy getting what they need” shifts your attention away from the outside world, the realm of objects and events, to people's inner worlds, the realm of goals and wishes. Unlike outside—where there is an endless jumble of things that can evoke joy—on the inside, there is structure and clarity. People need many different things in life, but these needs can be identified and clustered. Furthermore, although people may have different goals and wishes on the surface, deep down everybody wants the same things.

Let's imagine the spectrum of human needs as a collection of jars. The fullness of each jar represents how well the corresponding need is satisfied at the moment. Some experiences drain the jars; others fill them up. Consider the universal need for meaningful human connection. A businesswoman traveling alone for weeks may notice that the contents of her “human connection jar” are getting unpleasantly low. But if she returns home and spends the whole weekend with her family and friends, the jar can be refilled to the brim.

If you picture needs as jars, emotions are the level gauges of the jars. An emotion signals how full a particular need jar is at that moment. Positive emotions indicate that a relevant need jar is adequately filled; negative emotions alert you when a jar is running low. Emotions are especially sensitive to sudden changes in a jar's level. Running into an old friend, for example, might abruptly fill your friendship jar, causing you to feel joy. Saying goodbye to a good friend who is moving abroad might drain that jar, making you feel sad. These emotional signals are essential because, although you have many needs, you can only be aware of a few needs at a time. Without emotions, you would have to consciously check the level of all your jars all the time—an impossible feat.

3. Throughout this book, we will use the word “need” to refer to any concrete or abstract thing a person may need, want, desire, or pursue. In Chapter 3, we will home in on the differences between types of needs.



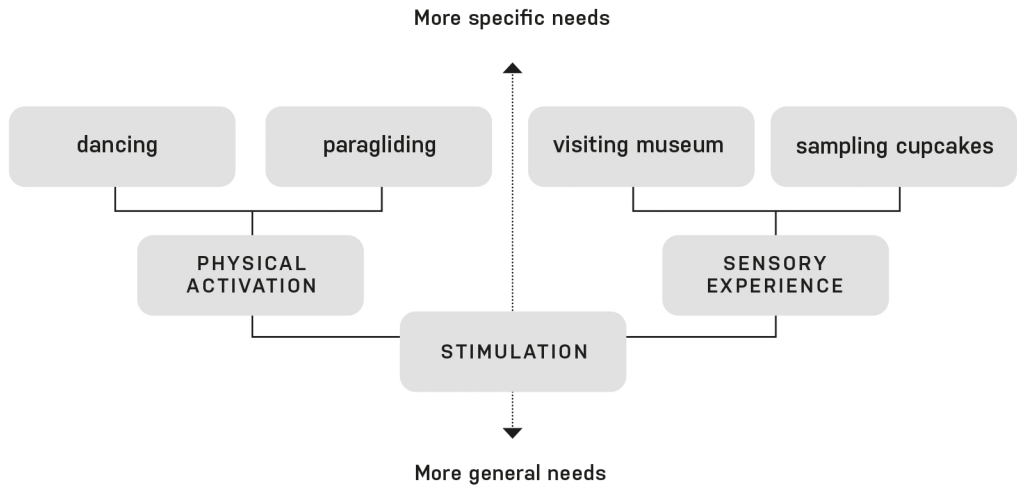
1.3 How full are your jars?

How many jars do you need to attend to? We stated that each moment of joy reveals that a certain need was fulfilled. Does that mean you have a uniquely corresponding need jar for every single activity that brings you joy? If so, your need pantry would be stocked with thousands of jars. There would have to be one for dancing, one for visiting museums, one for paragliding, one for sampling cupcakes, and so on. That’s a lot of jars to keep track of!

Fortunately, this is not the case. Your collection of need jars fits neatly onto a single shelf, because it represents needs that are more general than the activities that fulfill them. For example, dancing and paragliding can both satisfy the *need for physical activation*: the need to energize the body through movement or physical activity. In the same vein, visiting museums and sampling cupcakes can both fulfill the *need for sensory experience*: the need to engage the senses with rich or pleasurable stimuli. And these needs can be further grouped. Both physical excitement and sensory experience be clustered under the broader *need for stimulation*: the need to seek out new and extraordinary experiences (see diagram 1.4).

Clustering cannot go on indefinitely. If you clustered all human needs into a single “superneed”—a *need for good things*, for example—you would lose all nuance and usefulness. Therefore, we stop clustering at the level where needs are not tied to any particular context or activity, but which still captures the essential variety of things that people need in life. We have dubbed the needs at this level *the fundamental human needs*.

All specific needs can ultimately be clustered into the fundamental needs. There are two important implications here. First, the set of fundamental needs is *finite*. Unlike the limitless number of specific needs that people have—the need for a chocolate sundae or the need to have a good discussion with Marie—it is possible to list, discuss, and evaluate all the fundamental needs. This is especially helpful in the design process, as it allows the designer to understand all the things a user might want in a situation and, therefore, how to improve that



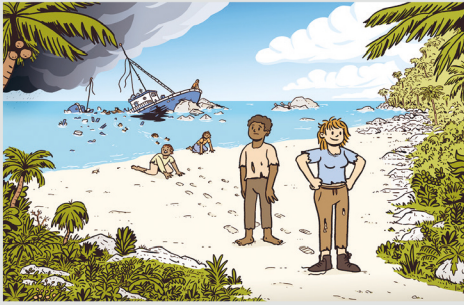
1.4 An example of need clustering

situation. Second, these fundamental needs are *universal*. Regardless of culture, age, or lifestyle, every human ultimately wants the same things. This doesn't mean that everyone fulfills their fundamental needs in the same way, of course. One person may satisfy their need for stimulation by jumping out of an airplane, while another might get that stimulation by solving the Sunday crossword. The universality lies in the fact that every person needs *some* kind of stimulation.

What, then, are these things that every person requires and desires? While there may not be a consensus among psychologists, there is considerable overlap in what are considered the most common human needs. After studying the literature and applying different sets of universal needs in several research projects, we have compiled a list of thirteen fundamental needs that hits the sweet spot between comprehensiveness, detail, and applicability for design. Thirteen jars every person needs to attend to. At the end of this chapter, we discuss the theoretical underpinnings of our overview of needs. But for now, let us explore these universal needs through a thought experiment.

The Island of Needs

You are part of a small group of people who get shipwrecked on a desert island. After the initial shock has worn off, the new islanders unanimously point to you as their leader. In return for this “privilege”, you are responsible for organizing all the resources and activities on the island, and ensuring every person's needs are fulfilled. As you look into the throng of hopeful faces and receive some questioning looks, you wonder, “Which essential things do I have to provide to turn this bunch of washed-up survivors into a happy and thriving community?”



1. Security – First you must ensure your islanders are safe from harm. When a potential food source is discovered, you must determine that it isn't poisonous. Anyone who climbs a tree or a cliff has to be extremely careful, as a broken limb or nasty cut can mean a death sentence now. More than just *being* safe, people also need to *feel* safe. To achieve this, you keep fires burning through the night as a mental safeguard against the sinister shadows and strange sounds coming from the jungle.



In the “real” world, humans need to protect themselves from a lot more than just physical threats. They want financial security – a dependable job, a predictable cost of living, and a thriving economy. They want to live in a safe neighborhood and in a country that is free from political unrest. Those who enjoy these securities tend to take

them for granted; take any of them away, however, and they will inevitably experience worry, sleepless nights, or worse.

2. Stimulation – The need for Security prompts you to become a very protective leader, so you decide that everyone should stay in the camp unless doing otherwise is strictly necessary; food choices should be restricted to the handful of items that are undoubtedly safe; and swimming, running, and climbing are prohibited. Almost immediately, your citizens feel smothered and bored. They want to explore the island, experiment with new food combinations, and compete to see who can climb the highest tree. In short, they need stimulation, variety, and fun.



In our world, there are entire industries devoted to quenching our never-ending thirst for stimulation: films, books, restaurants, holiday resorts, and amusement parks are different formats that address this common, basic need. But stimulation doesn't need to be served on a platter—it can just as easily be found in jobs, hobbies, and personal relationships.

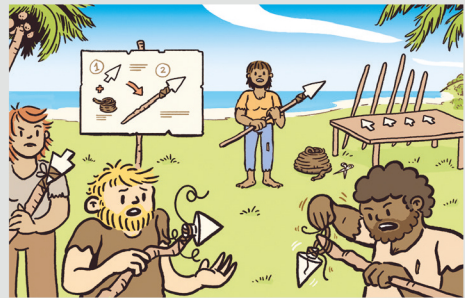
3. Fitness – Every person has a body that needs to be fed, exercised, and rested. This means your islanders need food and water for nutrition, shelter against the scorching sun and tropical storms, and a daily regime of physical activity to keep fit. After physical effort, people need rest and recovery, so you have the group make beds and chairs.



Physical well-being has become one of humanity's most vigorously pursued goals. People follow healthy diets, join gyms, hire personal trainers, and make multi-day visits to retreat centers, all to achieve and maintain their fitness. As much as this has to do with being and looking healthy, it also has to do with *feeling* healthy—healthy enough to tackle the challenges that life presents and the goals we set for ourselves.

4. Competence – Much labor is required to survive on a desert island, and because you want everyone to do their fair share, your islanders need to be put to work! But there is another reason to give every person something to do. In the Middle Ages, some European poets and painters portrayed a utopian land of plenty in which roasted partridges flew straight into people's mouths, the skies

rained fine wine, and no one ever had to work. To the toiling peasants at the time, this may indeed have sounded like a perfect world. However, as most people nowadays recognize, the pleasure of doing nothing will eventually run out at the end of a long, lazy holiday. People naturally want to test their skills, exercise their abilities, master challenges, and accomplish things.



In modern society, people can experience competence when they perform a function, such as doing their job or maintaining their space. They can also satisfy this need in their free time by playing games, engaging in sports, and pursuing their hobbies.

5. Autonomy – Although you are the undisputed leader of the island, you should not assume you have the license to dictate every action and decision your followers make. Throughout childhood, every person develops the need to make their own decisions and find their own way of doing things. This means your islanders will be significantly happier if they can choose their tasks and how they carry them out. Autonomy is ultimately also about identity—people want the freedom to be themselves and