MOOD FOCUSED DESIGN

ZHUOCHAO PENG

Mood-Focused Design
An Integrative Exploration

Zhuochao Peng

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Mood-Focused Design
An Integrative Exploration

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PREFACE

From "The Power of a Smile" to "Mood-Focused Design: An Integrative Exploration"

Let me trace back to a coincidence from sixteen years ago. Back then, in a Chinese writing class, I wrote an essay titled "一张微笑的脸" (The Power of a Smile). Its message was simple: a smile—whether the resilient smile of someone facing adversity or the sincere smile of someone offering help—has the power to light up life, inspire hope, and soften hardships. Somehow, the essay was published, with editors praising it for showing "the author's deep reflections on life" (Peng, 2009). Looking back, I smile at such praise. At twelve, I was still largely shielded from life's difficulties, with only a budding sense of what resilience might mean. In truth, I was just trying to write a good essay. And yet, what feels serendipitous now is that even in that early exercise, I was drawn to the idea of mood, though I did not have the words for it. The smiles I described then were not simply facial expressions, but reflections of positive states of mind—moods that colored both individuals and their relationships with others.

That early curiosity never left me. During my bachelor's and master's studies, I became increasingly fascinated by emotional design: how products and services affect feelings, and how design can foster joy, comfort, or trust. That path eventually led me here, to my doctoral work, where I shifted my attention to the more subtle, enduring feeling states we call moods. Acting like the background music of our lives, moods rarely demand our attention. Yet they shape everything we do—how we think, how we decide, how we experience ordinary moments. My dissertation builds on this insight, seeking to develop a comprehensive understanding of mood-focused design. It explores how mood has been considered and approached by design researchers and practitioners, and how we, as researcher-designers, can better understand and address it in everyday contexts.

And so, what began as a youthful observation has grown into a deliberate inquiry. By tracing the thread from "The Power of a Smile" to "Mood-Focused Design: An Integrative Exploration," I hope this dissertation not only contributes to scholarly understanding of mood in design, but also reminds us of something simple yet profound: moods, like smiles, are small but powerful forces shaping how we live, connect, research, and design.

一张微笑的脸

◎湖南省平江县维夏中学初中 2008 级 189 班　彭卓超

编者推荐：标题中缀上「一张」二字，很有意味——文中两例，只能用一例；首段中有『万紫千红』和『坎坷不平』及其相关的句子，只能保留其中一个；给『微笑』定位，或写『不畏挫折』，或写『真诚热情』。从最后一自然段的意思看，本文应只就前例展开，描述独特的情节并做独到的分析。

漫漫人生路，花开花落都是最美丽动人的风景，我们既要张开双臂迎接万紫千红，又要笑对人生的坎坷不平。

张海迪的脸上就挂着这样的微笑。

张海迪五岁时因患脊髓病，高位截瘫。她从没上过学，靠自学掌握知识，她先后自学了小学、中学和大学的专业课程。张海迪十五岁随父母下放到聊城莘县的一个贫困村庄；面对这样艰苦的生活，张海迪姐姐没有气馁，而是坚强乐观微笑着面对生活。她还自学针灸医术，为当地的百姓服务。她自学多门外语，还当过无线电修理工……张海迪曾微笑着说："活着就要做一个对社会有用的人。"她的笑是那样灿烂，那样动人心弦。

人生如棋，难免会有一招之失；人生如路，难免会有一点坎坷不平；人生如峰，难免会有一点险峻、陡峭。是啊，在人生的道路上，谁会没有一点磕磕碰呢？面对这样的磕磕碰碰，你应该振作，像张海迪一样乐观。因为困难和失败是人生道路上谁也无法绕过的绊脚石，一帆风顺只是痴人说梦。面对失败，给自己一个微笑吧！在迷茫中找到希望的光芒。

困难是一笔诱人的财富，吸引你到宝岛上采撷智慧之珠；困难是一首成名的乐曲，让你在华美的舞台上唱出激情的旋律；困难是一颗耀眼的珍珠，引起你对河蚌的思索……

生活中不仅有不畏挫折的笑，还有真诚热情的笑。公共汽车上的李素丽就是个典型的例子。

李素丽于 1981 年参加工作。她根据乘客们的要求，做到最好：老幼病残孕，李素丽搀上扶下；"上班族"的时间紧，李素丽尽量让他们上车；外地乘客容易上错车或坐过站，李素丽就及时提醒；公共汽车上有不爱卫生，乱吐痰，乱扔果皮纸屑的人，李素丽就晓之以理……李素丽日复一日地给乘客们以真诚的微笑、热情的话语、细致的关怀。她的微笑温暖着人们的心田，滋润着人们的心田。

人生中有令人气馁也有令人兴奋的事，不管怎样，请微笑吧！人生也有失败，也有一个又一个的困难，更有无限美好、精彩的未来。鲁迅先生说过："路，就是从没有的地方践踏出来的，就是从有荆棘的地方开辟出来的。"朋友，不要在失败和困难的纸上画个大叉，让我们守得云开见月明，用微笑扫平困难，迎接万紫千红，创造更加美好、辉煌的明天！

[评点]

该文繁简有度，结构严谨，过度自然，叙议结合。逆境中张海迪的笑，日常生活中李素丽的笑，两张笑脸，互相辉映，收放有度。恰到好处的议论，既是作者对故事的挖掘，更是作者对人生的思考。文章还运用比喻句构成排比，散句与整句交相穿插，尽显文采。

[湖南省平江县维夏中学李丛元　荐，吴永红　评]

"The Power of a Smile" by 12-year-old Zhuochao (in Chinese), September 2009.

CHAPTER 1

Introduction

1.1. LIKE A CLOUD IN THE AIR: WHAT IS MOOD?

On a Tuesday morning, I sit in a quiet corner of the university library, staring at the same paragraph of my dissertation that I edited with ease yesterday. Today, however, the words feel heavier, the arguments seem more tangled, and even the coffee tastes weaker. I cannot point to a single reason, but everything feels harder. Just a week ago, in this very spot, I worked with energy and focus, feeling quite optimistic about my progress. What changed? Not the research. Not the space. Not my life circumstances. What changed was my *mood*. Like a cloud in the air, subtle and shifting, it was easy to overlook—yet it quietly and profoundly influenced how I thought, perceived, and engaged with my work.

Even when we do not notice it, we are always in some kind of mood. We might be cheerful, gloomy, and somewhere in between—vigorous, relaxed, anxious, grumpy, or sentimental (H. Xue et al., 2020). Moods ebb and flow, shaping our experience and constituting an integral part of everyday life. In psychology, moods are defined as low-intensity, diffuse feeling states that typically last for hours or days (Morris, 1989). To better understand this definition, it is helpful to compare mood with emotion. Mood is much like emotion: both are subjective experiences of pleasantness or unpleasantness, and both can be expressed and regulated (Larsen, 2000). In addition, both mood and emotion systems signal whether things are "going right" or "going wrong" for us through positive or negative feelings (Schwarz & Clore, 2003). They do, however, fundamentally differ in their experiential qualities and processes through which they arise (Beedie et al., 2005).

Emotions surge and fade within seconds or minutes, while moods are more sustained, persisting for hours or even days (Ekman, 1984, 1994). Unlike emotions, which are acute and have a clear onset and end, moods are less intense, continuously present, gradually evolving, and often lingering below our conscious awareness (Parkinson et al., 1996). Mood, in this sense, forms a background layer to our daily activities, while emotions are episodic foreground experiences that interrupt and stand out against this affective background (Davidson, 1994). An emotion is typically triggered by a particular object, person, or event, while a mood builds up through cumulative circumstances (Davidson, 1994; Parkinson et al., 1996). Thus, while we can often specify the causes of an emotion, we are less likely to identify the source of a mood (Ekman, 1994). Accordingly, emotions are more focused, while moods reflect a broader, more diffuse orientation toward our life or surroundings (Frijda, 1994).

To make these differences more tangible, let me turn to two airport experiences. When a passerby bumped into me, hurt my toes, and walked away without apology, I felt a surge of anger—an emotion directed at that person's behavior, which dissipated not long after the moment (and forgotten once my partner brought me ice cream). On another occasion, however, after oversleeping, getting stuck in traffic on a rainy morning, and waiting in an unusually long check-in line, I became irritable—a mood not tied to any single encounter but built up from a series of small frustrations. Unlike my anger, which vanished soon after the incident ended or when a new stimulus arose, this irritable mood lingered, pervading

everything from my interactions with fellow passengers to my impressions of the in-flight service until I finally fell asleep on the plane.

1.2. MOTIVATIONS FOR ADDRESSING MOOD IN DESIGN

Designers and design researchers have been increasingly intrigued by the phenomenon of mood (Desmet, 2015; Spillers, 2010), and there are *at least* three motivations for addressing mood in (or through) design.

First, mood can serve as a direct source of design inspiration. Many creative domains use mood to spark novel aesthetics, metaphors, and experiential qualities. Some restaurants, for instance, design their menus around the moods they want customers to experience, naming dishes "Feelin' Bougie" or "Get Messy" to signal that dining there is not simply about what to eat, but about how to feel (Ashton, 2025). In fashion, designers can communicate moods or "vibes" through their collections, as seen in the recent "dopamine dressing" trend, where bold colors and playful forms invite wearers to dress not just for appearance but for the mood they want to embody (Jackson, 2025). Likewise, digital artists and interaction designers experiment with translating moods into palettes, shapes, and movements in generative installations, such as *Mood Map* by E/B Office (Furuto, 2013) and *Ada* at the Microsoft Center (ATA, 2020).

Second, mood has a pervasive influence on people's perception and behavior. According to the dispositional theory of mood, moods are temporarily heightened dispositions that shape how individuals tend to interpret and respond to situations (Siemer, 2009). For instance, a cheerful person is disposed to find things funny, interpret events optimistically, and notice opportunities, whereas the same person in a gloomy mood is more likely to interpret the same events pessimistically and focus on losses (Desmet et al., 2019). These influences extend to user-product interactions: mood affects which products people choose to engage with (Djamasbi et al., 2010; Djamasbi & Strong, 2008), how they prefer to interact with them (Wensveen et al., 2002), the extent to which they are willing to explore new interaction possibilities (Venkatesh & Speier, 1999), and the type of information they notice or process during interaction (M. Zhang & Jansen, 2009). Designers can leverage these insights to enhance interaction quality and user experience (De Lera, 2015; Spillers, 2010). For instance, Rao (2008) found that Facebook fostered a playful mood that helped users experience the platform as a virtual "third place" for connection and relaxation, while Negandhi (2023) demonstrated how tailoring book recommendations to users' moods can improve reading experience and encourage exploration of new content. Beyond product interactions, mood also plays a central role in broader consumption and service contexts. Research shows that customer moods affect subjective assessments of new offerings and purchasing intentions (Gardner, 1985; Gorn et al., 1993), as well as post-purchase evaluations and satisfaction with the chosen product or service (Miniard et al., 1992; Westbrook, 1980). Designers have been actively harnessing

these effects: retail spaces employ techniques like lighting and augmented reality to put customers in a "buying" mood (Huang et al., 2023; Quartier et al., 2008), while airline services foster comfort, familiarity, and care through cabin atmospheres and crew interactions to enhance customer mood and satisfaction (Lin, 2015).

Third, mood influences physical, psychological, and social aspects of life, making it a determinant of overall well-being. For instance, persistent negative moods are a characteristic feature of mental health conditions such as depression (Mondimore, 2006), and are associated with increased risks of physical health problems like cardiovascular disease (Balon, 2006). Conversely, positive moods foster resilience (Egan et al., 2024) and healthier behaviors (Pressman et al., 2019). Mood also impacts subjective happiness: individuals in positive states are more likely to evaluate their lives as satisfying, remember positive experiences, and report greater fulfillment than those in negative states (Morris, 1999; Schwarz & Strack, 1999). Beyond health and happiness, mood affects productivity and performance by influencing motivation and task engagement (Gendolla et al., 2007), decision-making (Forgas, 1989), and creativity (Baas et al., 2008). Socially, mood shapes interpersonal dynamics: a bad mood can make one appear distant, impatient, or harsh (Desmet et al., 2019), while a good mood fosters patience and prosocial behaviors such as kindness and cooperation (Clark & Isen, 1982; Isen & Levin, 1972). Given these wide-ranging consequences, addressing mood represents an opportunity for promoting overall well-being, which has encouraged various design initiatives intended to mitigate negative moods and support or enhance positive ones (Desmet, 2015). Examples include a tactile fidget tool that fosters self-awareness and self-regulation of stress (Alonso et al., 2008) and an ambient lighting environment that supports meditation and relaxation in the workspace (van de Garde-Perik et al., 2016).

1.3. RESEARCH GAP IN MOOD-FOCUSED DESIGN

The growing recognition of mood's significance has led the design community to increasingly engage in *mood-focused design* (Desmet, 2015). However, research and practice in this area remain largely implicit, inconsistent, and fragmented. As in everyday language, where "feeling," "emotion," and "mood" are often used interchangeably, design researchers frequently conflate these constructs—describing their work as focusing on emotion when it is, in fact, concerned with mood. Similarly, design practitioners, particularly those working in human-centered contexts, may consider user or customer mood but tend to situate their efforts within the broader category of "experience-driven design" rather than explicitly identifying them as mood-focused.

As a result, mood-focused design remains ambiguous, especially when compared to more established domains such as emotion-driven design (Desmet et al., 2021) or design for meaning (Mekler & Hornbæk, 2019). There is no clear consensus on what constitutes mood-focused design, including its defining features, archetypes, methodological approaches, and strategies for effective implementation. This lack

of clarity creates two major challenges. First, it prevents both experienced scholars and newcomers from developing a coherent understanding of the topic, thereby hindering the identification of novel research directions and the advancement of the field. Second, it constrains practitioners' ability to engage with mood effectively, as they lack mood-specific design insights and often rely on strategies developed for emotion-driven or conventional user experience (UX) design, which tend to overlook the distinctive qualities of mood.

To address these challenges and propel the field forward, a more explicit and comprehensive understanding of mood-focused design is needed. Establishing such a foundation would enable researchers to build cumulative knowledge and support practitioners in addressing mood in a more systematic and impactful way.

1.4. RESEARCH AIM AND RESEARCH QUESTIONS

This dissertation aims to develop a comprehensive understanding of mood-focused design. To achieve this aim, it addresses three interconnected research questions:

Research question 1: How have *design researchers* understood and approached mood in their work?

Research question 2: How have *design practitioners* considered and incorporated user or customer mood in real-world projects?

Research question 3: How can *we, as researcher-designers*, understand and help address people's mood in everyday contexts?

1.5. RESEARCH APPROACH AND RESEARCH METHODS

This dissertation adopts an integrative approach to explore mood-focused design, here referred to as *integrative exploration* (see Figure 1). In this context, "integrative" denotes the use of multiple methods and data sources to capture diverse perspectives and experiences—including those of design researchers, design practitioners, and ourselves as researcher-designers. This approach seeks to bring these perspectives into a shared conceptual frame that makes visible both points of resonance and divergence, thereby enriching the understanding of this complex and often elusive topic.

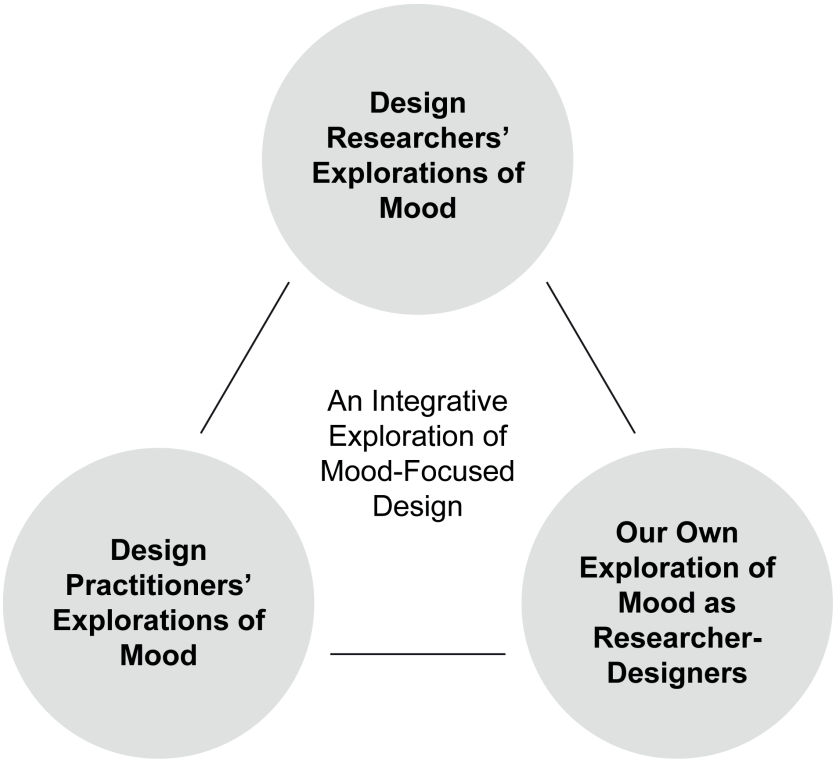


Figure 1. The integrative approach.

Guided by this approach, four studies were conducted, each employing methods suited to its specific focus (described in detail in the corresponding chapters). The first study involved *a scoping review* of mood-related literature in design, examining how mood has been addressed by design researchers, thereby responding to the first research question. In parallel, the second study comprised *retrospective interviews* with design practitioners, capturing their experiences and perspectives on working with mood in practice, in response to the second research question. The third and fourth studies represented our own practice-led exploration as researcher-designers, addressing the third research question. Study 3 applied a phenomenological lens through *focus groups* to investigate a specific mood phenomenon—the "Sunday Blues." Building on these findings, Study 4 translated them into user-centered insights and carried out three *research-through-design projects* to explore design interventions for mood regulation and to examine the challenges such interventions present.

1.6. STRUCTURE OF THE DISSERTATION

This dissertation is organized into six chapters. Table 1 provides an overview, mapping each chapter to its corresponding research question, sub-questions, study and method, and outcomes.

Chapter 1 (the current chapter) introduces the motivation, aim, and overall approach of the research.

Chapter 2 presents the first part of the integrative exploration, focusing on design researchers' explorations of mood. It examines and synthesizes mood-related literature in which design researchers have documented and reflected on their efforts to explore and address mood.

Chapter 3 forms the second part of the integrative exploration, turning attention to design practitioners' explorations of mood. It visits real-world practice or projects in which experienced designers have—explicitly or implicitly—worked with user or customer mood.

Chapters 4 and 5 constitute the final part of the integrative exploration: our own exploration of mood as researcher-designers. These chapters focus on understanding a specific mood phenomenon (the "Sunday Blues"), designing interventions to help prospective users address it, and reflecting on the lessons learned from these first-hand research and design experiences.

Chapter 6 synthesizes the contributions of the integrative exploration, acknowledges its limitations, considers its implications, and envisions the futures of mood-focused design.

Table 1. Dissertation overview.

Chapter	Research question	Sub-questions	Study and method	Outcomes
Chapter 1. Introduction				
Chapter 2. Design Researchers' Explorations of Mood	**Research question 1.** How have design researchers understood and approached mood in their work?	(1) What facets of mood have been comprehended and explored by designers and design researchers? (2) What mood-focused design innovations have been developed? (3) What issues and considerations in the practice of mood-focused design have been identified? (4) What methods, tools, or techniques are available that can facilitate the design process?	**Study 1.** Scoping review of mood-related literature in experience design	(1) Synthesis of features and impacts of mood explored in design research (2) Mapping of design innovations for mood monitoring, expression, and regulation (3) Summary of issues and considerations in designing for mood monitoring, expression, and regulation (4) Overview of methodological resources supporting empathizing and ideation in mood-focused design
Chapter 3. Design Practitioners' Explorations of Mood	**Research question 2.** How have design practitioners considered and incorporated user or customer mood in real-world projects?	(1) In what ways have design practitioners considered and approached user or customer mood? (2) What challenges have designers encountered or perceived when focusing on mood in their work? (3) What knowledge do designers consider essential for undertaking mood-focused design activities?	**Study 2.** Retrospective interviews with practitioners working within experience design	(1) Mapping of practical approaches to treating mood as both a design goal and a design tool (2) Summary of common challenges in addressing mood through design (3) Outline of knowledge required for effective mood-focused design activity

Table 1. Continued.

Chapter	Research question	Sub-questions	Study and method	Outcomes
Chapter 4. Our Own Exploration of Mood as Researcher-Designers I: Unraveling the "Sunday Blues"	**Research Question 3.** How can we, as researcher-designers, understand and help address people's mood in everyday contexts?	(1) What does the "Sunday Blues" feel like to individuals? (2) What individual and contextual factors contribute to the "Sunday Blues"? (3) What coping strategies are commonly used to manage the "Sunday Blues"?	**Study 3.** Focus groups with employees experiencing the "Sunday Blues"	(1) Description of manifestations of the "Sunday Blues" (2) Identification of contributing factors of the "Sunday Blues" (3) Summary of coping strategies for the "Sunday Blues"
Chapter 5. Our Own Exploration of Mood as Researcher-Designers II: Designing Against the "Sunday Blues"		(1) What challenges and issues do people face when using mood-regulation interventions in everyday life? (2) What design considerations can support designers in addressing these issues when designing for mood regulation?	**Study 4.** Research-through-design projects addressing the "Sunday Blues"	(1) Identification of issues affecting the adoption and effective use of mood-regulation interventions (2) List of design considerations for mood-regulation design practice
Chapter 6. General Discussion and Conclusion				

CHAPTER 2

Design Researchers' Explorations of mood

This chapter is based on a published article:
Peng, Z., Desmet, P. M. A., & Xue, H. (2023). Mood in experience design: A scoping review. She Ji: The Journal of Design, Economics, and Innovation, 9(3), 330-378. The citation style has been adjusted to match the format used in this dissertation.

2.1. INTRODUCTION

Human experience is inherently multifaceted and diverse. Whether shedding tears over a poignant film, feeling content with a hot tea on a chilly day, or becoming frustrated by traffic, our daily experiences are characterized by a complex interplay of subtle yet profound ups and downs. Designers and design researchers have long been intrigued by these human experiences, recognizing their potential for design innovation. The late 1990s marked the start of the design discipline shifting its focus from object to human experience, providing people with an overall pleasant experience when using products or technology (e.g., Jordan, 1998; Norman et al., 1995). As this field matured, its research evolved to explore more specific and nuanced aspects of human experience (Roto et al., 2021). Aesthetic experience (Hekkert & Leder, 2008), experience of meaning (Hassenzahl et al., 2013), and emotions (Desmet et al., 2021) have all been deeply studied, forming foundations for the ongoing progression of experience design (Desmet & Hekkert, 2007).

More recently, human mood, another unique facet of human experience, has attracted scholarly attention (e.g., Desmet, 2015; Spillers, 2010). In academia, mood is recognized as a crucial phenomenon in design for (at least) two reasons. First, as moods are temporary dispositions (Siemer, 2005, 2009), they can serve as a foundation for dynamic user profiling that considers the temporal and conditional characteristics of users, i.e., mood-stimulated thought and action tendencies (Desmet et al., 2019). This can supplement traditional user profiling techniques like persona or usage scenarios, which rely on static traits. Zhao et al. (2019), for instance, used mood in a dynamic profiling model for smartphone users to improve user experience. Second, moods significantly affect health and well-being (Morris, 1999; Peeters et al., 2006), a fact highlighted during the Covid-19 pandemic (for discussion, see Đogaš et al., 2020; Santini & Koyanagi, 2021; W. Zhang et al., 2021). This realization has ignited a renewed sense of urgency in design research to study mood, sparking interest in developing design interventions that alleviate negative moods and enhance positive ones (Soto et al., 2022). One example is a smartphone-based game by Dietvorst et al. (2022), which monitors negative moods and provides advice to strengthen mood resilience.

Emphasis on mood in design research is relatively recent, but it has long been a source of inspiration in design practice. A well-known example is the Philips Hue smart lighting system, which enables users to modulate light settings, inducing different moods for different occasions—peacefulness after a working day or jubilation at a family gathering (Philips Hue, 2023). Another example is NetEase Cloud Music, a social music platform where users share personal anecdotes linked to song choices. Many of the stories shared were gloomy, and in response, NetEase launched a "healing clinic," offering free online consultations with licensed psychologists (Riddell, 2021).

Though research and practice in mood-focused design are expanding, conducting a systematic investigation into mood is inherently more challenging when compared to other aspects of experience like aesthetics or emotion. First, the concept of mood is ambiguous. In everyday conversation, terms

like "feelings," "emotions," and "moods" are used interchangeably. Similarly, in scientific research, "mood" is often studied under the names of "emotion" and "affect" (Beedie et al., 2005), obscuring its unique role in human-design interactions (for discussion, see H. Xue et al., 2020). Second, mood is elusive. It subtly influences how people tend to feel, think, and act over a period (Siemer, 2005, 2009), often below conscious awareness (Dreyfus, 1990). Hence, capturing and articulating one's current mood is more difficult compared to other affective experiences like emotion. Unsurprisingly, the terminological ambiguity and elusive nature of mood have led to fragmentation in academic and practical efforts in mood-focused design, hindering progress. Design researchers struggle to gain a comprehensive understanding of the field, missing potential areas for further exploration. Practitioners find it challenging to innovate based on systematic mood-related design knowledge, relying instead on technology-driven or intuition-based approaches that can limit the effectiveness of their mood-focused designs. We propose that a comparative synthesis of existing scholarly work can address these challenges, laying a foundation for advancements in the field.

To our knowledge, only two synthesis studies have explored design and mood. Highlighting mood as a design objective, Spillers (2010) identified mood-sensitive products that can detect, indicate, or induce mood. Desmet (2015) scrutinized mood-focused technologies in interaction design, which measure, express, adapt to, or influence mood. Although these studies offered initial insights into the landscape of mood-focused design, they did not fully capture the breadth and depth of the field.

To bridge this gap, we conducted a comprehensive literature review, delving into how mood is currently addressed by designers and design researchers in the context of experience-driven design. Our aim was twofold: (1) to advance our understanding of mood as a distinct facet of human experience in design; (2) to outline the current state of mood-focused design as an emerging field.

This manuscript presents our working definition of mood, followed by our review process and methods. We then report and interpret our findings and discuss their implications. In the final section, we reflect on key findings and propose avenues for future research, while also acknowledging the limitations of our review.

2.2. DEFINING MOOD

The term "mood" is frequently used in everyday conversations, such as when we say, "You're in a good mood today," or "I'm not in the mood for a party." These expressions convey a shared understanding: moods relate to good or bad feelings and reflect a particular mindset that favors (or prefers to avoid) certain activities or occasions (Parkinson et al., 1996).

To gain a deeper grasp of mood, it is useful to compare it with emotion. Both mood and emotion are subjective experiences—pleasant or unpleasant. They can be expressed, are associated with physiological

responses, can reflect and influence people's evaluations of what is happening, and can be subject to regulation (Larsen, 2000). However, there are essential distinctions between the two, delineated by eight key qualities (see Table 2).[1]

For this review, we adopt Morris's (1989) definition, stating that moods are low-intensity, diffuse (pleasant or unpleasant) feeling states that typically last for hours or days. This definition, aligning with the eight distinguishing qualities noted above, has enabled us to select and analyze mood-related design literature.

Table 2. Eight distinctions between mood and emotion.

No.	Quality	Emotion	Mood
1	Duration	Emotions are typically brief, lasting only seconds or minutes.	Moods can persist for hours, days, or even weeks.
2	Timing	Emotions have a clear beginning and end.	Moods are continuous, always present, gradually changing, and sometimes lingering in the background of our consciousness.
3	Intensity	Emotions are usually more intense than moods.	Moods can be experienced as weaker or milder versions of certain emotions. For example, an irritable mood can be a diluted version of the stronger emotion of anger.
4	Intentionality	Emotions are directed toward someone or something specific (i.e., they are intentional).	Moods are not directed at anything in particular but at the world as a whole, reflecting more global and diffuse states or conditions.
5	Cause	Emotions are evoked by an explicit event.	Moods build up because of cumulative events, making their origins harder to discern.
6	Function	Emotion signals the state of the world, directing our attention to environmental demands.	Mood signals the state of the self, signifying whether our personal resources are sufficient or lacking to meet these demands.
7	Consequence	Emotions disrupt current thoughts and behaviors with emotion-specific action tendencies, like flight or approach, to neutralize threats or seize opportunities.	Moods subtly color our cognitive and perceptual processes and influence our general (dis)inclination to undertake actions.
8	Expression	Basic emotions are associated with distinct facial expressions.	Moods are typically conveyed through physical gestures, postures, or vocal cues, although moods might be discerned through mild emotional expressions (e.g., subtle signs of anger in an irritable mood).

1 We summarized the mood-emotion distinctions based on a compositive book on the nature of emotion edited by Ekman and Davidson (1994), a book on the psychology of mood and mood regulation by Parkinson et al. (1996), and a synthesis article on differences between emotion and mood by Beedie et al (2005).

2.3. METHOD

For this study, we opted for a scoping review due to two reasons: our inquiry was broad and exploratory, and our aim was to comprehensively survey the current state of an emerging field.[2] Grounded in Arksey and O'Malley's (2005) methodological framework,[3] our review process included three stages: (1) formulating research questions; (2) identifying and selecting literature; and (3) analyzing data. To enhance our methodology, we incorporated recommendations from two additional guidance articles (Levac et al., 2010; Peters et al., 2020), which are further explained in subsequent sections.

2.3.1. Stage 1: Formulating Research Questions

Although a scoping review is inherently broad (Arksey & O'Malley, 2005), it is recommended to articulate the specific areas of interest from the outset (Levac et al., 2010). Our focus was on how designers and design researchers address mood in the context of experience-driven design. To specify what we mean by "address mood," we formulated four research questions: (1) Considering that mood is an elusive phenomenon, what facets of mood have been comprehended and explored by designers and design researchers? (2) Given that mood is not an alien concept in design, what mood-focused design innovations have been developed and documented in the literature? (3) In the practice of mood-focused design, what potential issues and considerations have been identified and reflected on in the literature? (4) When undertaking mood-focused design, what methods, tools, or techniques are available that can facilitate the design process?

2.3.2. Stage 2: Identifying and Selecting Literature

For literature identification, we used multiple search methods to ensure comprehensiveness (Arksey & O'Malley, 2005). Initially, we conducted searches in three databases: Scopus, Web of Science, and the ACM Digital Library. As mood is often studied under the names of emotion and affect, we used the terms "mood," "emotion," and "affect" in conjunction with "design," constituting our search string: (mood* OR emotion* OR affect*) AND (design*). To acquire a manageable volume of literature, we focused on article titles, limited the documents to English articles from journals and conference proceedings, and restricted the timeframe to 1999 onwards.[4]

2 On how to choose between systematic reviews and scoping reviews, see Zachary et al. (2018).

3 Arksey and O'Malley's (2005) methodological framework consists of five stages: (1) identifying the research question; (2) identifying relevant studies; (3) study selection; (4) charting the data; and (5) collating, summarizing, and reporting the results. We combined their second and third stages into one single stage as our process of literature identification and selection was not strictly linear. We also combined their fourth and fifth stages into one consolidated stage, aiming to streamline our analysis method.

4 In 1999, the International Design and Emotion Society was established, which demarcated emotion-focused design as an explicit research area (Desmet & Hekkert, 2009).

Recognizing that not all design-related studies include "design" in their titles, we searched twenty journals and nine conference proceedings in the design field (see Appendix A). Our search strategy was that at least one affect-related term (e.g., "mood," "emotion," "affect," or their derivatives) should appear in the article title. This search was done via Scopus, Google Scholar, and other specific search engines like the DRS Digital Library. In total, we identified 6,687 articles—5,555 from electronic databases and 1,132 from electronic journals and conference proceedings. Appendix A details our search strategies and results. After the removal of 2,350 duplicates, we had an initial dataset of 4,337 articles.

For literature selection, we chose articles that reported experience-driven design research in the domain of interaction design, particularly those that explore user or customer mood. Table 3 outlines four criteria that guided our screening activities (Arksey & O'Malley, 2005). To reduce bias, three researchers (i.e., the authors) were involved (Levac et al., 2010; Peters et al., 2020). We began by screening the 4,337 articles based on title and abstract. Using Rayyan,[5] Zhuochao Peng (ZP) excluded clearly irrelevant articles such as medical studies and those on the mood expressions of robots. Then, Haian Xue (HX) screened articles that ZP had approved or left undecided, using blind screening mode on Rayyan. Disagreements were discussed until consensus was reached. In this phase, we eliminated 4,080 articles out of the initial 4,337. Of these, 2,034 were not design research, 538 were not in the domain of interaction design, 1,216 did not focus on mood, and 292 did not address user mood.

Following the title and abstract screening, we screened the full text of the remaining 257 articles. EndNote was used to organize the articles and monitor the process. ZP determined if the articles met our selection criteria. Articles deemed eligible or left undecided were then examined by HX. Disagreements and uncertainties were addressed with Pieter M. A. Desmet (PMAD). When multiple articles featured the same design case, we included one in our review to avoid overlap. This situation typically arises when researchers publish updated or revised journal articles that originated as conference papers. In such instances, we prioritized the journal articles. In this phase, 207 articles were excluded: 41 were not in the domain of interaction design, 161 did not focus on mood, and 5 were duplicate design cases. Thus, we distilled our collection down to 50 high-relevance articles.

5 Rayyan is a web-based software for systematic and scoping reviews (Ouzzani et al., 2016). It supports manually choosing to include, exclude, or postpone the decision on one article, while noting down the inclusion or exclusion reason(s) with tags. It also enables blind-mode screening among multiple reviewers, increasing research reliability.

Table 3. Four selection criteria.

No.	Criterion	Note	Example
1	The article presents design research.	Mainstream design research includes research for design, research through design, research is design, and design methodology research (Stappers & Giaccardi, 2017).	We excluded articles discussing medical solutions for affective disorders or course designs considering students' affective experiences, as these fall under medical and educational research respectively.
2	The article presents experience-driven design research in the domain of interaction design.	Interaction design is the activity of designing interactive products or services that facilitate the way people work and interact in their everyday lives (Sharp et al., 2019).	We excluded articles within the domain of architecture design, urban design, fashion design, communication design, or tourism design.
3	The article focuses on the phenomenon of mood.	Moods are low intensity, diffuse (pleasant or unpleasant) feeling states that typically last for hours or days. Mood differs from emotion in terms of duration, timing, intensity, intentionality, cause, function, consequence, and expression.	We only included articles aligning with the definition of mood as provided in the section of Defining Mood, regardless of the specific terminology used such as "mood," "emotion," "affect," "emotional state," or "affective experience."
4	The article focuses on user or customer mood.	"User or customer mood" emphasizes that we focus on moods that are experienced by human users and customers.	We excluded articles exploring the design of mood expressions in social robots or conversational agents.

However, some relevant works, which we were aware of through previous research, were not included. Notable omissions included the stress-reduction products developed by Alonso et al. (2008) and Maclean et al. (2013). To rectify this and ensure that we did not omit other related articles, we performed a supplementary search using a backward and forward citation search method (Briscoe et al., 2020). ZP checked the references and citations from the 50 articles, selecting those meeting our criteria. Selections were examined and verified by HX. The process yielded 33 extra articles, raising our total to 83 highly relevant articles.

Because distinguishing between articles focusing on mood versus emotion proved challenging and susceptible to bias, we did a more meticulous second-round screening based on full text prior to the in-depth analysis. Guided by the mood definition and the eight mood-emotion distinctions noted earlier, we scrutinized whether the 83 articles focused on user moods instead of emotions. ZP undertook the task, HX examined the results, and disagreements were addressed with PMAD. In this phase, 15 articles were deemed not to focus on the mood phenomenon, and 2 duplicate design cases were found and excluded. This resulted in a final set of 66 articles (see Appendix B).

Our literature identification and selection process was not strictly linear,[6] especially when it involved a supplementary search after the initial full-text screening. Figure 2 is an adapted PRISMA-ScR flow diagram,[7] outlining the whole process and indicating the number of articles at each phase.

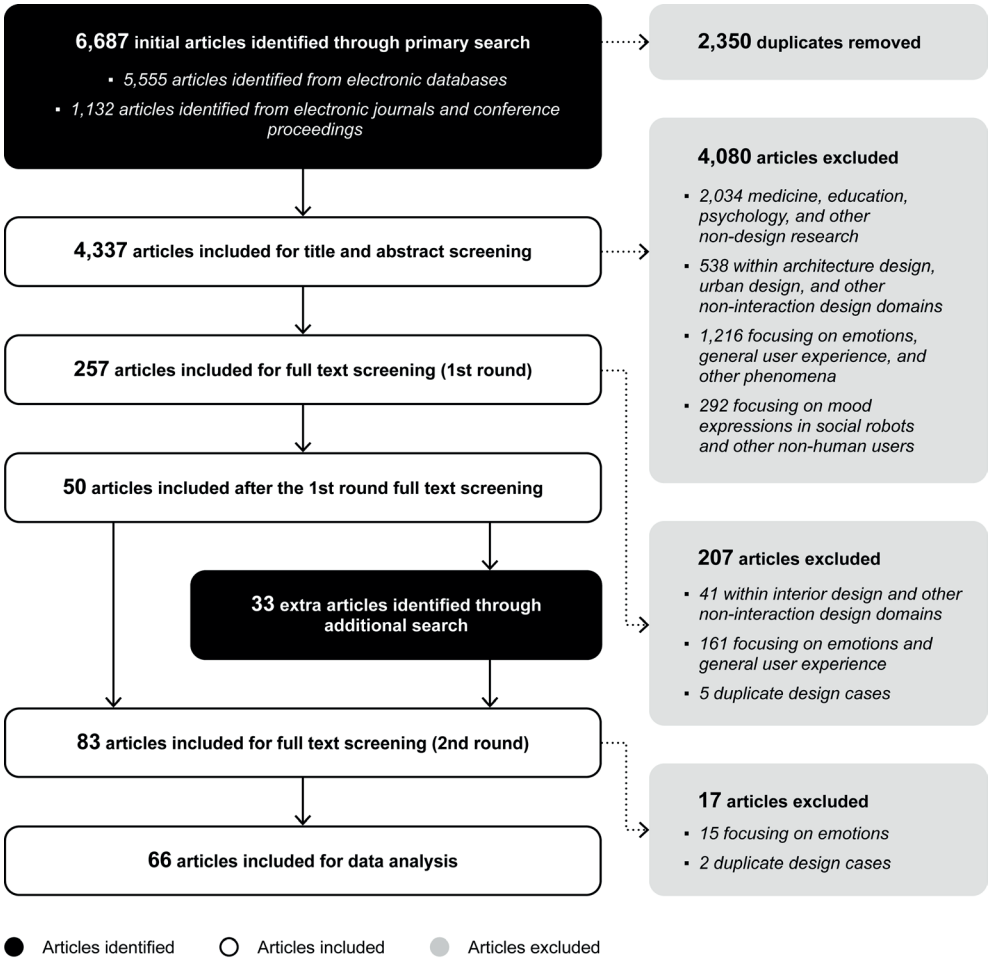


Figure 2. The process and results of literature identification and selection.

6 Literature identification and selection may be iterative in a scoping review (Levac et al., 2010).

7 PRISMA is an effective way to illustrate the literature identification and selection process and present results (Peters et al., 2020; Tricco et al., 2018).

2.3.3. Stage 3: Analyzing Data

We used thematic analysis on the 66 articles,[8] enabling a dual form of analysis that encompassed deductive and inductive techniques. While we followed our predefined research questions, we also allowed ourselves the flexibility to discover recurring patterns of meaning within each thematic area (Braun & Clarke, 2021a). Our process, guided by the framework outlined by Braun and Clarke (2006), involved the following steps: (1) familiarization; (2) coding; (3) generating initial themes; (4) reviewing and developing themes; (5) refining themes; and (6) reporting results.

Three researchers (i.e., the authors) collaborated on the analysis. ZP conducted the tasks of familiarization,[9] coding, and initial theme generation in ATLAS.ti, following Saldaña's (2015) suggestion to allow themes to naturally emerge from data. For instance, after coding several design functionalities as "triggering mood-influencing conversations," "improving coping ability," and "offering strategies for mood management," the theme "providing mood-regulating interventions" emerged. During coding and initial thematization, the research team met to review ZP's results, with code and theme revisions made iteratively.[10] For instance, the aforementioned codes were revised to "mood-sensitive interactions," "competence development," and "recommendations," while the theme was refined to "(mechanisms for) supporting mood regulation." Additionally, new codes "self-awareness or self-reflection," "system adjustments," and "mood regulation technologies" were added.

Having created an initial collection of well-defined codes and themes, ZP and HX held a half-day refinement session. HX scrutinized all codes and themes along with their definitions and examples, placing paper cards on the wall for discussion. The codes and themes were then discussed, refined, and recategorized until we reached consensus. For instance, to improve thematic consistency, "detecting moods," "self-tracking moods," and "analyzing moods" were consolidated into "monitoring moods," while "displaying moods" and "sharing moods" merged into "expressing moods." The refined themes, including "supporting mood regulation," constituted a consistent set of themes for design functionalities. As a last step, PMAD verified and further refined the updated codes and themes. Appendix C provides our final collection of codes and themes, along with data exemplars and references.

8 Instead of using the charting technique to extract and analyze data, we used thematic analysis following recommendations from Levac et al (2010) and Peters et al (2020).

9 In this study, the work of familiarization with the literature data was conducted simultaneously with the work of full-text screening in literature selection.

10 Thematic analysis is not a linear process, where movement back and forth is needed (Braun & Clarke, 2006).

2.4. RESULTS AND DISCUSSION

Based on 66 articles, we investigated how mood has been addressed by designers and design researchers in the context of experience-driven design. In this section, we report the review results based on our research questions (see Table 4 for an overview), followed by our reflections on the findings and their implications.

Table 4. An overview of the review results.

No.	Research question	Key findings
1	What facets of mood have been comprehended and explored?	Four features of mood have been comprehended and explored, including (1) long duration, (2) diffuseness, (3) dynamics, and (4) social relevance; three types of impacts of mood have been recognized and considered in design, including those on (1) health and subjective well-being, (2) individual and group performance, and (3) social relationships.
2	What mood-focused design innovations have been developed?	Three types of mood-focused design innovations have been reported, including those that can support (1) mood monitoring, (2) mood expression, and (3) mood regulation.
3	What issues related to mood-focused design have been discussed?	Eight issues have been discussed, distributed across three categories: (1) issues related to mood-monitoring designs (i.e., lack of reliability, lack of granularity, and system surveillance); (2) issues related to mood-expressing designs (i.e., misinterpretation and mood privacy); and (3) issues related to mood-regulating designs (i.e., negative effects of introspection, individual preferences, and system intrusiveness).
4	What methods for mood-focused design are available?	Two main types of methodological resources are available that can support (1) empathizing and (2) ideation respectively in a mood-focused experience design process.

2.4.1. What Facets of Mood Have Been Comprehended and Explored?

Of the 66 articles, 10 (15%) explicitly claimed to focus on continuous moods rather than momentary emotions. Three articles (5%) acknowledged the distinction between mood and emotion, considering it irrelevant due to the applicability of their research to both. Fifteen articles (23%) focused on specific mood states, most commonly stress and relaxation. The remaining 57% used indirect expressions like "emotional climate" or "affective tone" interchangeably with "mood," "emotion," and "affect." Despite diverse terminology, multiple features and impacts of mood have been commonly comprehended and explored in design.

2.4.1.1. Features of Mood

Thirteen articles highlighted that moods are relatively long-lasting affects, persisting for hours or days (Desmet, 2015; Desmet et al., 2019; Esnaf-Uslu et al., 2022; Huldtgren et al., 2015; Janssen et al., 2012; LiKamWa et al., 2013; Lutchyn et al., 2015; Rivera-Pelayo et al., 2017; Sánchez et al., 2005; Spillers, 2010; Wagener & Niess, 2021; H. Xue et al., 2020; J. Zhao et al., 2014). Xue and Desmet et al. (2020) contended that people always start interactions with a pre-existing mood state, which could be favorable or

unfavorable. This explains why Esnaf-Uslu et al. (2022) found service providers consciously adjust their moods prior to professional work. Several design researchers have worked with the enduring nature of moods, such as Yoon et al. (2014), who aimed to induce a "well-prepared" mood in flight attendants before serving passengers, and Wu et al. (2021), who explored interventions to relieve drivers' stressful moods before long trips. Mood duration is, however, relative to fleeting emotions. Compared to longer-lasting sentiments or dispositions, moods are temporary (Desmet et al., 2019; Sánchez et al., 2005; J. Zhao et al., 2014). The term "momentary moods" has been used to articulate this (Desmet et al., 2019; Esnaf-Uslu et al., 2022).

In thirteen articles, moods were described as diffuse states that often lack a specific cause or trigger (Desmet, 2015; Esnaf-Uslu et al., 2022; Janssen et al., 2012; Y. Kim et al., 2015; LiKamWa et al., 2013; Lutchyn et al., 2015; Rivera-Pelayo et al., 2017; Sánchez et al., 2005; Sönmez et al., 2022; Spillers, 2010; Wagener & Niess, 2021; H. Xue et al., 2020; J. Zhao et al., 2014). This diffuseness positions mood as a background element that underlies ongoing experiences and events (Spillers, 2010; H. Xue et al., 2020). Consequently, moods are complex to observe or measure (Spillers, 2010). To tackle this, researchers have adopted a componential approach to unpack the experiential qualities of mood, yielding typologies of individual moods (H. Xue et al., 2020) and group moods (Sönmez et al., 2022). Spillers (2010) suggested a systemic approach to capture moods, factoring both internal and external causes. Some explored various contextual factors, like weather, location, sleep, diet, or past events, to enhance understanding of moods (Bentley et al., 2013; Hollis et al., 2017; Yamashita et al., 2017).

Seventeen articles mentioned that moods are dynamic, changing from one type to another over time (Balta & Read, 2016; Benke et al., 2020; Boehner et al., 2005; Cernea et al., 2014; Church et al., 2010; De Lera, 2015; Desmet, 2015; Desmet et al., 2019; Esnaf-Uslu et al., 2022; Huldtgren et al., 2015; Janssen et al., 2012; Jiang et al., 2020; Lutchyn et al., 2015; Sánchez et al., 2005; Sönmez et al., 2022; Wu et al., 2021; H. Xue et al., 2020). In addition to types, mood dynamics can manifest in varying intensities (e.g., mild, neutral, strong; Balaam et al., 2010; Desmet, 2015; Sönmez et al., 2022), as seen in designs asking users to rate their mood strength (Church et al., 2010; Krøger et al., 2015). In collective settings, Sönmez et al. (2022) found mood dynamics can also be denoted by the uniformity of group moods, indicating diverse moods can coexist within a group. Moods constantly evolve without a clear beginning or end, often unnoticed by individuals (H. Xue et al., 2020). Considering this, Janssen et al. (2012) developed a music player that subtly alters music to induce or enhance user moods without disruption. The dynamic nature of moods determines user characteristics—people in varying moods tend to have different motivations and preferences for interaction styles (Desmet et al., 2019). Desmet et al. (2019) proposed user profiling based on mood-stimulated tendencies, and De Lera (2015) suggested designing interactions aligned with current user moods.

Moods are considered socially relevant that can be experienced in both one-to-one interpersonal interactions (Esnaf-Uslu et al., 2022) and group contexts (Sönmez et al., 2022). Articles in our dataset

explored mood in interactions between individuals and their close ones (e.g., partners, family, or friends; Balta & Read, 2016; Boehner et al., 2005; Chang et al., 2001; Church et al., 2010; Gluhak et al., 2007; Liu et al., 2019; Pradana & Buchanan, 2017; Sánchez et al., 2005; Snyder et al., 2015; Sundström et al., 2007), strangers (Hansson & Skog, 2001; Lee et al., 2014), service providers and clients (Esnaf-Uslu et al., 2022; Krøger et al., 2015; Yamashita et al., 2017), employees and managers (Lutchyn et al., 2015; Rivera-Pelayo et al., 2017), and educators and students (Balaam et al., 2010). People can simultaneously experience multiple "layered" moods, like a personal and a professional mood in service provider-client interactions (Esnaf-Uslu et al., 2022), or a concealed and a shared mood in employee-manager interactions (Rivera-Pelayo et al., 2017). Beyond one-to-one interactions, design researchers also investigated mood in group activities like virtual meetings (Benke et al., 2020) and collaborative tasks (Cernea et al., 2014; Mora et al., 2011), and in group environments like online communities (Adams et al., 2014), classrooms (Balaam et al., 2010), homes (Stangl et al., 2012), workspaces (Ashoori et al., 2015; Boehner et al., 2005; Carneiro et al., 2013; Lutchyn et al., 2015; Rivera-Pelayo et al., 2017; Sundström et al., 2009; M. Xue et al., 2019), and other public spaces (Guo et al., 2016; Y. Kim et al., 2015; Pammer, 2015). Mood contagion, where group members influence each other's moods, can occur in group contexts, such as the spread of cheerfulness or stress (Guo et al., 2016; Lee et al., 2014; M. Xue et al., 2019).

2.4.1.2. Impacts of Mood

Moods are recognized to impact health and subjective well-being. Persistent negative moods can lead to mental health issues like depression and mood disorders (Baños et al., 2012; Bentley et al., 2013; Carneiro et al., 2013; Cavanagh et al., 2021; Hollis et al., 2017; L. Wang et al., 2018) and physical health problems such as weakened immunity and increased heart disease risk (Cavanagh et al., 2021; MacLean et al., 2013; L. Wang et al., 2018). Moods also directly impact subjective well-being, with positive moods promoting a focus on the brighter aspects of ambiguous situations, enhancing life satisfaction and fulfillment (Desmet, 2015; H. Xue et al., 2020). Design researchers have explored how to support individuals in maintaining "healthy" moods or recovering from "unhealthy" ones (Alonso et al., 2008; Cavanagh et al., 2021; Desmet, 2015; Hollis et al., 2017; Janssen et al., 2012; Jiang et al., 2020), with designs like a laughing dress to cheer people up (Lee et al., 2014), a smart pen to alleviate stress (Alonso et al., 2008), and a fit mirror to counter a lethargic morning mood (Besserer et al., 2016).

Moods are acknowledged to impact people's performance. Negative moods can impair individual perception and judgment (Ashoori et al., 2015; Baños et al., 2012; Desmet, 2015; Desmet et al., 2019; Janssen et al., 2012; Roseway et al., 2015; H. Xue et al., 2020), motivation (Balaam et al., 2010; Desmet, 2015; Esnaf-Uslu et al., 2022; Rivera-Pelayo et al., 2017), attitude (Ashoori et al., 2015; Esnaf-Uslu et al., 2022; Lutchyn et al., 2015; Sönmez et al., 2022; H. Xue et al., 2020; M. Xue et al., 2019), attention (Ashoori et al., 2015; Balaam et al., 2010; Baños et al., 2012; De Luca et al., 2018), decision-making (Ashoori et al., 2015; Benke et al., 2020; Desmet, 2015; Janssen et al., 2012; Jiang et al., 2020; Lutchyn et al., 2015; McDuff et al., 2012; Roseway et al., 2015; H. Xue et al., 2020), creativity (Cernea et al., 2014; Janssen et al., 2012; Lutchyn et al., 2015; MacLean et al., 2013; Rivera-Pelayo et al., 2017; Sönmez et

al., 2022), and productivity (Balaam et al., 2010; Carneiro et al., 2013; Cernea et al., 2014). This can lead to poor performance in contexts such as work (Rivera-Pelayo et al., 2017), learning (Balaam et al., 2010), or onstage (De Luca et al., 2018). In groups, moods can affect individual cognitive and behavioral aspects, ultimately influencing group performance (Benke et al., 2020; Carneiro et al., 2013; Lutchyn et al., 2015; Sönmez et al., 2022; M. Xue et al., 2019). In addition, moods impact team communication flow, creativity, cohesion, and satisfaction—all crucial to effective group performance (Benke et al., 2020; Lutchyn et al., 2015; Sönmez et al., 2022). Due to the influence of moods on performance, various design interventions have been explored. For example, a smart wristband that monitors driver stress levels to enhance driving performance (Wu et al., 2021), and a virtual agent that moderates group member moods to improve overall group function and atmosphere (Benke et al., 2020).

Moods are thought to impact social relationships in four ways. First, they affect people's motivation to interact with others (Church et al., 2010; Desmet, 2015; H. Xue et al., 2020)—people are more likely to socialize when cheerful rather than gloomy (Desmet et al., 2019). Second, moods influence interaction behaviors (Ashoori et al., 2015; Roseway et al., 2015; Wensveen et al., 2002), with positive moods fostering kinder, more generous behaviors (Desmet, 2015; Esnaf-Uslu et al., 2022; Rivera-Pelayo et al., 2017). Third, moods impact the quality and effectiveness of communication, affecting both what people communicate and interpretation and evaluation (Esnaf-Uslu et al., 2022). Last, moods often form a central topic in daily conversations, highlighting their roles in social relationships (Church et al., 2010). Recognizing these impacts, researchers have explored designs like a smart scarf that displays mood and triggers mood regulation during group communication (Guo et al., 2016), and a web-based application for caregivers to track patient mood variations, improving communication and coping strategies (Yamashita et al., 2017).

2.4.1.3. Summary and Discussion

Mood remains an elusive topic in design. Over half the literature we examined conflated emotion and other affective phenomena with mood. Our review identified four frequently recognized experiential features of mood in design literature: moods are long-lasting, diffuse, dynamic, and socially relevant. We also discerned three acknowledged impacts of mood: on health and subjective well-being, individual and group performance, and social relationships. These findings disclose the design field's current understanding of mood as a distinct aspect of human experience: (1) it is inherently multifaceted; (2) it impacts humans in multifarious aspects on individual, interpersonal, and collective levels. However, not all facets of mood are fully comprehended in design. For instance, mood functions as a system signaling the (in)sufficiency of personal resources to meet perceived environmental challenges (Morris, 1992), which in turn directs self-regulatory behaviors like investing in, protecting, or replenishing these resources in response to external demands (Nowlis & Nowlis, 1956; Thayer et al., 1994). While Desmet (2015) introduced the knowledge of mood functionality to the design field, its practical implications for design and research remain ambiguous.

Our review indicates that designers and design researchers have incorporated mood features into their work, such as products that adjust to user mood fluctuations (i.e., dynamics) or services that promote or mitigate mood contagion (i.e., social relevance). This suggests that mood features can inform certain design characteristics. We advocate that these mood features are viewed as opportunities for developing more effective mood-focused designs. For example, because moods tend to be long-lasting, designs that influence moods should focus on the overall cumulative effect of the entire human-design interaction journey, rather than momentary events within it. Our research also identified design endeavors aimed at alleviating negative moods or amplifying positive ones, with the goal of enhancing health and well-being, performance, and social relationships. We therefore view mood-focused design as a promising approach to advance the Positive Design initiative, which aims to facilitate human flourishing (Desmet & Pohlmeyer, 2013; Pohlmeyer, 2017).

2.4.2. What Mood-Focused Design Innovations Have Been Developed?

In the 66 articles, 69 design innovations were reported (see Appendix D). Design fidelity ranges from low (conceptual visuals, 23%), mid (prototypes for initial evaluation, 34%), and high (systems for field trials, 42%), to finalized (open-access products, 1%). They are (to be) implemented through diverse hardware platforms, predominantly computers (19%) and mobile phones (17%), followed by ambient or public installations (14%), smart mirrors or screens (13%), wearables (12%), handheld objects (9%), and other mediums (3%). Some designs (13%) incorporate multiple platforms for multi-modal operation or multiple user engagement. In our analysis, three types of design functionality emerged, which we used to classify mood-focused design innovations: (1) designs that support mood monitoring; (2) designs that support mood expression; and (3) designs that support mood regulation.[11]

2.4.2.1. Designs That Support Mood Monitoring

A total of 50 designs that support mood monitoring were reported, including those that support (1) detecting moods, (2) self-tracking moods, and (3) analyzing moods.

The first category includes designs that can autonomously detect user moods. In our dataset, most use physiological or behavioral indicators to detect moods. The used physiological signals include skin activity or temperature (Ashoori et al., 2015; Gluhak et al., 2007; Guo et al., 2016; Janssen et al., 2012; Jiang et al., 2020; MacLean et al., 2013; McDuff et al., 2012; Roseway et al., 2015; Snyder et al., 2015; Ståhl et al., 2009), heart activity (Ashoori et al., 2015; Guo et al., 2016; Liu et al., 2019; MacLean et al., 2013; M. Xue et al., 2019), and scalp activity (Cernea et al., 2014), while behavioral signals include facial or verbal expressions (Dang et al., 2019; Rajcic & McCormack, 2020; Stangl et al., 2012; Tsujita & Rekimoto, 2011), gestural or bodily movements (Alonso et al., 2008; Boehner et al., 2005; Ståhl et al.,

11 It is worth noting that these themes are not mutually exclusive because many of the reviewed design innovations have multiple functionalities.

2009), and user-product interaction behaviors (Alonso et al., 2008; Carneiro et al., 2013; LiKamWa et al., 2013; Wensveen et al., 2002). An alternative approach to detecting mood is to use sentiment analysis (see Figure 3 for an example), which infers moods from texts posted on social media (Adams et al., 2014; Mora et al., 2011; J. Zhao et al., 2014), communicated in distributed teams (Benke et al., 2020) or chat windows (Sánchez et al., 2005), or expressed in personal journaling tools (L. Wang et al., 2018). In addition, several designs enable the detection of mood-related contextual data, such as date and time, locations, or weather (Bentley et al., 2013; Church et al., 2010; Ghandeharioun et al., 2019; LiKamWa et al., 2013; McDuff et al., 2012; Ståhl et al., 2009; Stangl et al., 2012).

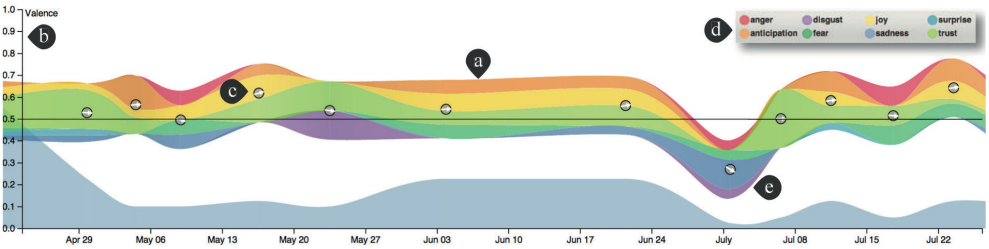


Figure 3. Pearl monitors user mood variations over time using sentiment analysis of their tweets (J. Zhao et al., 2014). © 2014 IEEE. Reprinted with permission.

Designs can also support self-tracking moods. This function is predominantly achieved with web or smartphone applications (Balta & Read, 2016; Bentley et al., 2013; Church et al., 2010; F. Davis et al., 2013; Hollis et al., 2017; Isaacs et al., 2013; Y. Kim et al., 2015; Lutchyn et al., 2015; Mora et al., 2011; Rivera-Pelayo et al., 2017; Sánchez et al., 2005; Sundström et al., 2007, 2009; L. Wang et al., 2018; Yamashita et al., 2017). To enable active input from users, many adopt pictorial scales, in which moods are represented by emoticons (Balta & Read, 2016; Lutchyn et al., 2015; Sánchez et al., 2005), metaphorical graphics (Church et al., 2010; Y. Kim et al., 2015; Sundström et al., 2009; L. Wang et al., 2018), or color spectra (Rivera-Pelayo et al., 2017; Sundström et al., 2007). Other designs do this through dialogues with virtual agents (Ashoori et al., 2015) or interactions with tangible objects (Balaam et al., 2010; Hansson & Skog, 2001; Krøger et al., 2015; Sundström et al., 2007, 2009) and virtual reality devices (Wagener & Niess, 2021). Similar to mood detection, mood self-tracking collects contextual data, but it relies more on qualitative, user-input-required data, like events, activities, or personal thoughts (Bentley et al., 2013; Church et al., 2010; Hollis et al., 2017; Isaacs et al., 2013; Krøger et al., 2015; Mora et al., 2011; Rivera-Pelayo et al., 2017; Yamashita et al., 2017). For instance, EmotiCal (see Figure 4; Hollis et al., 2017) prompts users to reflect on events and write mood descriptions. Although mood detection and self-tracking can operate independently, there is a trend toward their combination for increased accuracy (Ashoori et al., 2015; Bentley et al., 2013; Church et al., 2010).

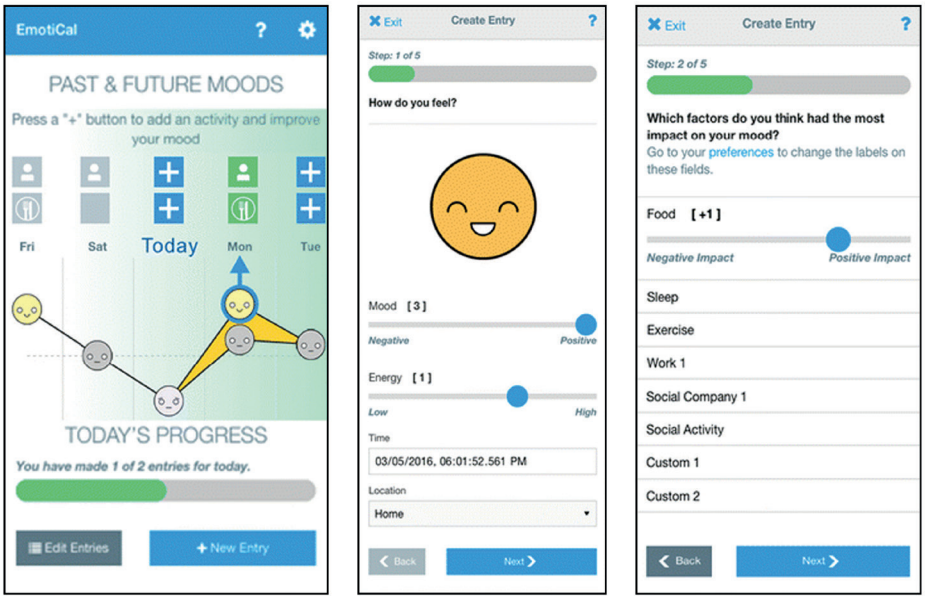


Figure 4. EmotiCal allows users to report moods and contextual data and to see historical mood variations and mood forecasts (Hollis et al., 2017). Reprinted by permission of the publisher Taylor & Francis Ltd., http://www.tandfonline.com.

Some designs can support mood data analysis. For instance, Health Mashups (Bentley et al., 2013) evaluates the correlation between moods and contextual data like sleep, providing feedback such as "You tend to be happier on days when you sleep more." Another example is EmotiCal (see Figure 4; Hollis et al., 2017), which analyzes mood patterns and forecasts potential moods for the subsequent two days. It also assesses the connection between moods and activities, and based on this analysis, includes mood regulation suggestions.

2.4.2.2. Designs That Support Mood Expression

A total of 49 designs that support mood expression were reported, varying in modality and form. Most frequently, moods are visualized through multifarious graphs (Adams et al., 2014; Balaam et al., 2010; Balta & Read, 2016; Benke et al., 2020; Bentley et al., 2013; Boehner et al., 2005; Cernea et al., 2014; Church et al., 2010; Hollis et al., 2017; Krøger et al., 2015; Lutchyn et al., 2015; McDuff et al., 2012; Mora et al., 2011; Rivera-Pelayo et al., 2017; Sánchez et al., 2005; Ståhl et al., 2009; Stangl et al., 2012; Sundström et al., 2007, 2009; Tsujita & Rekimoto, 2011; Wagener & Niess, 2021; L. Wang et al., 2018; M. Xue et al., 2019; Yamashita et al., 2017; J. Zhao et al., 2014) or colored lights (Ashoori et al., 2015; Chang et al., 2001; Dang et al., 2019; Jiang et al., 2020; Y. Kim et al., 2015; Mora et al., 2011; Roseway et al., 2015; Snyder et al., 2015). Other visual means include animations (Boehner et al., 2005; Liu et al., 2019), object or material motion (F. Davis et al., 2013; MacLean et al., 2013; Mora et al., 2011), and metaphorical poems (Rajcic & McCormack, 2020). Some designs use tactile modalities like friction

(Alonso et al., 2008) and vibration (Hansson & Skog, 2001; Jiang et al., 2020; Liu et al., 2019). Only one design uses sound for mood expression (Tsujita & Rekimoto, 2011). Most expressions are in an abstract or ambiguous form to allow for open interpretation (Balaam et al., 2010; Boehner et al., 2005; Chang et al., 2001; Y. Kim et al., 2015; Liu et al., 2019; McDuff et al., 2012; Rajcic & McCormack, 2020; Ståhl et al., 2009; Sundström et al., 2007, 2009) or to ensure privacy (Balaam et al., 2010; Boehner et al., 2005; Pradana & Buchanan, 2017). Many depict mood dynamics in a historical or diachronic form to enhance understanding of user moods (Bentley et al., 2013; Church et al., 2010; Hollis et al., 2017; Isaacs et al., 2013; McDuff et al., 2012; Mora et al., 2011; Rivera-Pelayo et al., 2017; Tsujita & Rekimoto, 2011; L. Wang et al., 2018; M. Xue et al., 2019; Yamashita et al., 2017). Some mood expressions are interactive, allowing for exploring the detail (Bentley et al., 2013; Church et al., 2010; Hollis et al., 2017; McDuff et al., 2012; Rivera-Pelayo et al., 2017; Tsujita & Rekimoto, 2011; Yamashita et al., 2017; J. Zhao et al., 2014). Additionally, several designs offer a customization function for users to enrich the meaning of their expressions (Balta & Read, 2016; Sundström et al., 2007, 2009; Wagener & Niess, 2021; Yamashita et al., 2017).

We subdivided designs that support mood expression into two categories based on user activeness in the process: (1) designs that display moods and (2) designs that enable users to share moods. The first category includes designs displaying user moods to increase mood awareness. Half of these focus on individual mood awareness, like MoodWings (see Figure 5; MacLean et al., 2013), which communicates real-time stress levels through butterfly wing motion, and AffectAura (McDuff et al., 2012), which shows hourly mood changes for self-knowledge, among others (Alonso et al., 2008; Balaam et al., 2010; Bentley et al., 2013; Dang et al., 2019; F. Davis et al., 2013; Hollis et al., 2017; Isaacs et al., 2013; LiKamWa et al., 2013; Rajcic & McCormack, 2020; Rivera-Pelayo et al., 2017; Snyder et al., 2015; Ståhl et al., 2009; Tsujita & Rekimoto, 2011; Wagener & Niess, 2021; L. Wang et al., 2018). Some designs foster collective mood awareness, like MoodTracker (Lutchyn et al., 2015) and AffectiveWall (M. Xue et al., 2019), which display group mood data in workspaces. Further examples exist in both workplaces (Ashoori et al., 2015; Benke et al., 2020; Boehner et al., 2005; Cernea et al., 2014; Mora et al., 2011; Rivera-Pelayo et al., 2017; Sundström et al., 2009) and other group contexts (e.g., classrooms or homes; Adams et al., 2014; Balaam et al., 2010; Y. Kim et al., 2015; Stangl et al., 2012). Several designs display moods to enhance mutual awareness in one-to-one communication, in both virtual (Boehner et al., 2005; Gluhak et al., 2007; Sánchez et al., 2005) and physical environments (Balaam et al., 2010; Chang et al., 2001; Roseway et al., 2015; Snyder et al., 2015). A unique set of designs display mood data for educators (Balaam et al., 2010), caregivers (Krøger et al., 2015; Yamashita et al., 2017), and managers (Lutchyn et al., 2015; Rivera-Pelayo et al., 2017) to help them better understand client moods.

The second category encompasses designs that support users in expressing and sharing their moods. These designs require more user effort than those in the first category. An early example from 2001 is LumiTouch (Chang et al., 2001)—interactive picture frames that enable users to convey moods to loved ones, enhancing remote presence awareness and strengthening affective connections. Another example

is mood-sharing social applications (Balta & Read, 2016; Church et al., 2010; Liu et al., 2019; Pradana & Buchanan, 2017; Sundström et al., 2007), which allow friends to share their moods. Some user tests revealed that sharing improved mutual mood awareness and fostered peer support (Balta & Read, 2016; Church et al., 2010; Liu et al., 2019; Sundström et al., 2007). Beyond private interactions, users can also communicate moods with colleagues or strangers in public spaces (Balaam et al., 2010; Guo et al., 2016; Hansson & Skog, 2001; Roseway et al., 2015; Sundström et al., 2009). Additionally, some designs have incorporated mood sharing as an auxiliary function (LiKamWa et al., 2013; Tsujita & Rekimoto, 2011; Wagener & Niess, 2021).

Figure 5. MoodWings displays real-time mood states through butterfly wing motion (MacLean et al., 2013). Used with permission of ACM (Association for Computing Machinery).

2.4.2.3. Designs That Support Mood Regulation

The review found 57 designs that can support mood regulation, based on one or more of the following six mechanisms: (1) self-awareness or self-reflection; (2) mood-sensitive interactions; (3) recommendations; (4) competence development; (5) system adjustments; and (6) mood regulation technologies.

Self-awareness or self-reflection (mechanism 1) can be initiated when users report moods or when the system displays them, leading to proactive mood regulation actions (Alonso et al., 2008). For instance, Alonso et al. (2008) designed a smart pen for stress recognition via tactile feedback, prompting users

to consciously change their behaviors to regulate their stressful mood. Similar designs include Textile Mirror (F. Davis et al., 2013) and MoodWings (MacLean et al., 2013) for individual use, BioCrystal (Roseway et al., 2015) and Moodlight (Snyder et al., 2015) for interpersonal use, and Pogat (Cernea et al., 2014) and AffectiveWall (M. Xue et al., 2019) for collective use. As self-awareness is usually ephemeral (yet a precondition of self-reflection; Mora et al., 2011; Pammer, 2015), designs like Mirror Ritual (see Figure 6; Rajcic & McCormack, 2020) and an affective mirror (Dang et al., 2019) were developed to support prolonged self-reflection for effective self-regulation. User tests indicated that mood reflection was useful, for instance, to prepare a mood before starting the day (Rajcic & McCormack, 2020), or to optimize mood impacts on others (Dang et al., 2019). Other designs facilitating self-awareness or self-reflection for mood regulation have been reported (Balaam et al., 2010; Bentley et al., 2013; Church et al., 2010; Isaacs et al., 2013; McDuff et al., 2012; Pammer, 2015; Rivera-Pelayo et al., 2017; Roseway et al., 2015; Ståhl et al., 2009; Wagener & Niess, 2021; L. Wang et al., 2018; M. Xue et al., 2019). In addition, system reminders or notifications proved effective in raising mood awareness and triggering self-reflection (Bentley et al., 2013; Church et al., 2010; Isaacs et al., 2013; Mora et al., 2011; Ståhl et al., 2009).

Figure 6. Mirror Ritual displays user mood states through metaphorical poems and invites users to reflect on their moods (Rajcic & McCormack, 2020). Used with permission of ACM (Association for Computing Machinery).

Mood-sensitive interactions (mechanism 2) involve designs that support mood expression and social sharing. These designs sensitize users to each other's moods, which can foster mutual empathy and trigger interpersonal mood regulation. For instance, Human Tamagotchi (Pradana & Buchanan, 2017) allows users to share current moods with close ones via a smartwatch, potentially initiating mood-regulating conversations when one detects their partner's negative moods. Additional examples of interactions with close ones exist in our dataset (Balta & Read, 2016; Liu et al., 2019; Tsujita & Rekimoto, 2011; Wagener & Niess, 2021). Some designs encourage mood-sensitive interactions among colleagues or team members, fostering mutual support (Adams et al., 2014; Guo et al., 2016; Lutchyn et al., 2015; Mora et al., 2011; Rivera-Pelayo et al., 2017; M. Xue et al., 2019). Esnaf-Uslu et al. (2022) found that service providers, when more sensitive to client negativity, tend to offer help by employing regulation strategies. This also applies to caregiver-patient (Krøger et al., 2015; Yamashita et al., 2017), manager-

employee (Lutchyn et al., 2015; Rivera-Pelayo et al., 2017), and teacher-student interactions (Balaam et al., 2010).

Recommendations (mechanism 3) involve designs that provide actionable mood regulation suggestions. For instance, the chatbots developed by Benke et al. (2020) can intervene in group interaction and recommend breaks when sensing a dissonant group vibe. Similarly, EmotiCal (see Figure 4; Hollis et al., 2017) generates analytic reports suggesting mood-regulating actions, which were selected from previous user behavioral patterns and mood regulation literature. Two other examples in our dataset also offer recommendations, typically provided following the monitoring of negative user moods (Carneiro et al., 2013; Ghandeharioun et al., 2019).

Competence development (mechanism 4) involves designs that allow users to acquire or enhance coping skills through learning and practice. In the game Journey (see Figure 7; Agrawal et al., 2018), players guide a character out of a melancholic mood using actions like gardening and aiding strangers or animals, introducing users to mood regulation strategies from positive psychology. Another example is UpStage (De Luca et al., 2018), an educational toolkit for performers coping with pre-performance anxiety, incorporating training exercises in videos and booklets for stress management. Murphy Miserable Robot (Ullrich et al., 2016) was developed for children in hospital waiting rooms, prompting skills in reflection and self-regulation by embodying a patient role, activating children's empathy, and encouraging support for "a miserable peer."

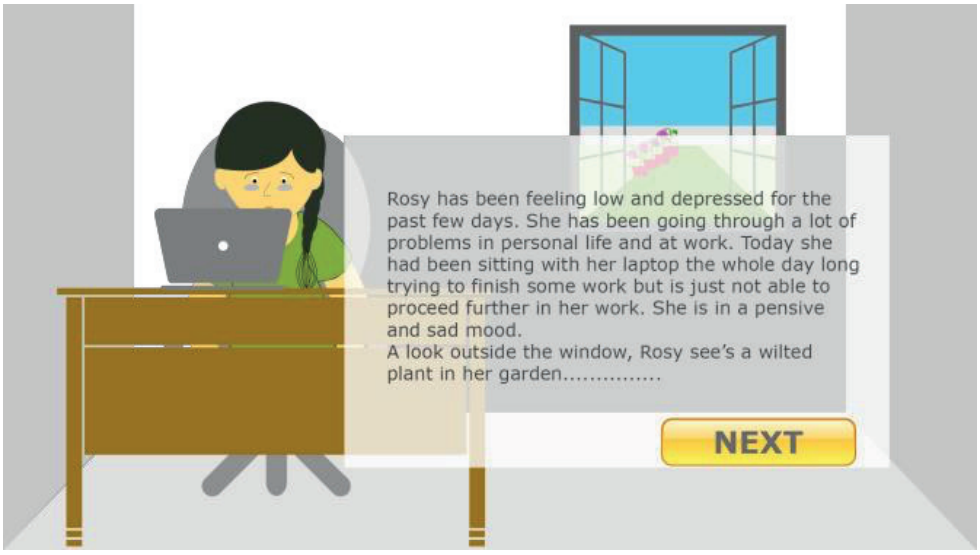


Figure 7. Journey introduces users to mood regulation strategies and improves their coping abilities (Agrawal et al., 2018). Used with permission of ACM (Association for Computing Machinery).

System adjustments (mechanism 5) involve designs that adapt to user mood changes, aiming to sustain mood balance. These designs use mood-monitoring technologies and come in various forms, from small objects to large-scale environments. Personalized affective music players (Janssen et al., 2012) autonomously generate mood-matched playlists, while an adaptive alarm clock (Wensveen et al., 2002) uses historical mood data to select optimal wake-up sounds. Other designs employ adaptive lights to affect moods, like an interior lighting system for the elderly (Huldtgren et al., 2015), a smart scarf for group members (Guo et al., 2016), and a biofeedback crystal for partners (Roseway et al., 2015). Intelligent workspaces exemplify large-scale environment designs (Ashoori et al., 2015; Carneiro et al., 2013), detecting employee mood shifts and adjusting environmental conditions like luminosity and background sound to enhance or alter moods.

Mood regulation technologies (mechanism 6) are designs that directly affect moods, often requiring self-motivation and sustained effort from users. The Getting a GRIP project (see Figure 8; van de Garde-Perik et al., 2016) exemplifies this, enabling relaxation through interactive lights and objects. Our dataset includes five categories of mood regulation technologies: (1) relaxation technologies that facilitate venting, resting, or meditating (Ashoori et al., 2015; Baños et al., 2012; Cavanagh et al., 2021; Desmet, 2015; van de Garde-Perik et al., 2016); (2) distraction technologies that divert attention from stressors (Jiang et al., 2020; Ullrich et al., 2016); (3) energizing technologies that guide users in exercises to counter lethargy (Besserer et al., 2016) or work fatigue (Desmet, 2015); (4) playful technologies that induce cheerfulness (Baños et al., 2012; Lee et al., 2014; Tsujita & Rekimoto, 2011); and (5) *r*itual-performing technologies that aid users in achieving suitable moods before demanding interactions or events, such as driving (Wu et al., 2021) or serving customers (Yoon et al., 2014).

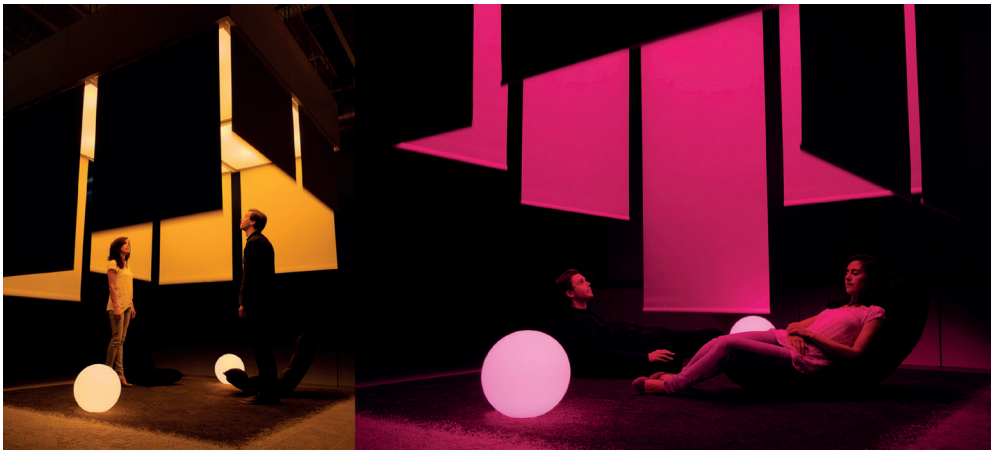


Figure 8. The relaxation space from the Getting a GRIP project allows relaxation through interactive lights and objects (van de Garde-Perik et al., 2016). Used with permission of Inderscience Enterprises Limited (UK).

2.4.2.4. Summary and Discussion

What can design do to—or for—moods? Our review indicates that different designs can monitor moods via mood detection and self-tracking, consistent with findings by Desmet (2015) and Spillers (2010). Our study offers two novel insights. First, beyond physiological and behavioral measures, sentiment analysis emerges as a third mood detection method. Second, available technologies can analyze mood patterns using detected or reported moods and their contextual data. This advancement can enhance the quality of mood-monitoring designs, enriching self-information and improving self-knowledge.

Once moods are monitored, they can be expressed through designs. We identified two modes of mood expression: users actively sharing their moods, and designs autonomously expressing moods without requiring active user involvement. Each mode offers specific application possibilities. Designs that autonomously display moods excel at enhancing individual mood awareness and prompting self-reflection, while designs that enable users to share moods are better suited for enhancing mutual awareness and triggering interpersonal communications.

Our study found six mechanisms by which designs can support mood regulation. We posit that these mechanisms offer two general ways to design for mood regulation: (1) developing designs that support people in attaining mood-regulating abilities, and (2) developing designs that enable people to take mood-regulating actions. Our findings resonate with the overview of Slovak et al. (2022) on emotion-regulating intervention mechanisms, including emotional awareness, regulatory instructions, and relaxation exercises. We recognize mood and emotion regulation strategies often converge (Koole, 2010), with tactics like venting or embracing bad feelings (Desmet, 2015; Yoon et al., 2019). Nonetheless, we suggest that future design (research) should be mindful of the differences. First, as emotions typically refer to the relationship between the person and a particular object or event (Manstead & Fischer, 2000), design-supported emotion regulation can directly address this relationship. Conversely, moods are not object-related (Larsen, 2000), and design-supported mood regulation should thus support mood-regulating activities. Second, since moods persist longer than emotions, designs should aim for enduring mood effects over momentary emotional ones. Potential approaches include regular mood checks, nudging people to engage in routine mood-regulating activities, and promoting mood regulation as a human skill.

2.4.3. What Issues Related to Mood-Focused Design Have Been Discussed?

Our study identified eight critical issues, which we classified into the following categories: (1) issues related to mood-monitoring designs, (2) issues related to mood-expressing designs, and (3) issues related to mood-regulating designs. Additionally, we found suggestions on how to address each issue in the literature. Table 5 provides a summary of those issues and corresponding design suggestions.

Table 5. Issues and design suggestions.

Issue	Design suggestion
Issues related to mood-monitoring designs	
Lack of reliability	• To combine mood detection and self-tracking • To request user confirmation • To combine multiple mood signals
Lack of granularity	• To optimize the computational model • To provide abundant mood choices • To provide a customization function
System surveillance	• To request user authorization • To add a turn-off function • To strengthen data management
Issues related to mood-expressing designs	
Misinterpretation	• To provide rich interactions • To provide rich contextual information • To provide a hierarchical interaction mode
Mood privacy	• To anonymize personal information • To provide private versus public modes • To provide private indications
Issues related to mood-regulating designs	
Negative effects of introspection	• To moderate exposure to negative content • To encourage positive recordings
Individual preferences	• To expand recommendations • To personalize recommendations
System intrusiveness	• To explore unobtrusive interventions • To design with people's routines or workflows • To provide user autonomy

2.4.3.1. Issues Related to Mood-Monitoring Designs

The lack of reliability of mood monitoring—via either mood detection or self-tracking—is highlighted in the literature. Instability of physiological signals due to factors like user age (Huldtgren et al., 2015), sensor invasiveness (Carneiro et al., 2013; De Lera, 2015; LiKamWa et al., 2013), and environmental conditions (De Luca et al., 2018) hinders reliable mood detection. Detection through behavioral signals is also unreliable, given the difficulty in filtering the signals (Krøger et al., 2015; Mora et al., 2011; Roseway et al., 2015) and the potential discordance between user expressions and true feelings (LiKamWa et al., 2013). Moreover, the relationship between physiological or behavioral signals and moods remains unclear (De Lera, 2015; LiKamWa et al., 2013). Mood self-tracking suffers from its subjective nature (De Lera, 2015; De Luca et al., 2018); users may inaccurately recall or misrepresent their feelings (Carneiro et al., 2013; Krøger et al., 2015). An often-made recommendation to increase reliability is by combining automated mood detection and user self-tracking (Ashoori et al., 2015; Balaam et al., 2010; Bentley et al., 2013; Church et al., 2010; Pammer, 2015). Additional suggestions involve allowing users to manually adjust or confirm results (LiKamWa et al., 2013; Mora et al., 2011), and combining the measurement of

multiple mood signals, like physiological or behavioral signals and contextual data (Bentley et al., 2013; Hollis et al., 2017; Huldtgren et al., 2015; Janssen et al., 2012; LiKamWa et al., 2013; M. Xue et al., 2019).

The lack of granularity is also discussed in the literature. Many mood-monitoring designs fail to detect or allow users to report nuanced mood states. For instance, physiological measures like electrodermal activity (EDA) cannot discern subtle variations in arousal (Snyder et al., 2015). Janssen et al. (2012) noted that their computation model is limited to extremely positive or negative moods. Some user studies revealed dissatisfaction with restricted choices in self-reporting, with users desiring to report subtler, more neutral, or mixed moods (Balaam et al., 2010; Sánchez et al., 2005). To improve granularity, one suggestion is to develop sophisticated models for differentiating mood dimensions, such as valence, energy, and tension (Janssen et al., 2012). Another suggestion is to provide a larger array of mood choices for self-tracking (Lutchyn et al., 2015; Sánchez et al., 2005). However, this needs to balance with the simplicity of reporting interfaces (Sánchez et al., 2005). In addition, researchers suggested providing a customization function (Church et al., 2010; Krøger et al., 2015; Rivera-Pelayo et al., 2017).

Another raised concern is system surveillance, where users feel monitored by "always-on" mood-monitoring designs, leading to perceived privacy invasion and judgment (Benke et al., 2020; Dang et al., 2019; Huldtgren et al., 2015; Mora et al., 2011; Pammer, 2015; Snyder et al., 2015; M. Xue et al., 2019; Yamashita et al., 2017). In a test of mood-managing chatbots, participants reported feeling uneasy, comparing their experience to "a surveilling micromanager who keeps looking over your shoulder" (Benke et al., 2020, p. 24). Additionally, users expressed worries about their mood data security, fearing hacker access and potential misuse of health-related information (Dang et al., 2019). Several resolutions have been suggested, including requesting user authorization and providing informed consent prior to use (Adams et al., 2014; Benke et al., 2020; Huldtgren et al., 2015; Pammer, 2015; Stangl et al., 2012; M. Xue et al., 2019), adding a turn-off function (Adams et al., 2014), and fortifying mood data management via encryption (Dang et al., 2019), data deletion after analysis (Dang et al., 2019), or data storage optimization (Krøger et al., 2015; Pammer, 2015).

2.4.3.2. Issues Related to Mood-Expressing Designs

Misinterpretation, where users may misconstrue their own or other people's moods, poses a significant issue. Mood-expressing designs employing ambiguous expressions may lead to confusion due to individual and cultural differences in interpreting mood representations, such as colors, icons, and metaphors (Adams et al., 2014; Balaam et al., 2010; Guo et al., 2016; Krøger et al., 2015; Rajcic & McCormack, 2020; Snyder et al., 2015; Stangl et al., 2012; L. Wang et al., 2018). Another risk of ambiguous mood expression is that it can lead to incorrect interpretations about what causes the mood (Church et al., 2010; Liu et al., 2019; Ståhl et al., 2009). One suggested solution involves providing rich interactions through rich mood-expressing modalities like mixed visual representations (Adams et al., 2014; Liu et al., 2019; J. Zhao et al., 2014) and multimodal feedback (Church et al., 2010; Jiang et al., 2020), or through rich mood-expressing functionalities like customization (Church et al., 2010; Sundström et

al., 2007, 2009; Wagener & Niess, 2021), detail description (Balta & Read, 2016; Church et al., 2010; Yamashita et al., 2017), or interactive examination (Liu et al., 2019; J. Zhao et al., 2014). Additionally, providing rich contextual details has been suggested to guide interpretation (Benke et al., 2020; Boehner et al., 2005; Church et al., 2010; Huldtgren et al., 2015; Liu et al., 2019; McDuff et al., 2012; Mora et al., 2011; Rivera-Pelayo et al., 2017; Ståhl et al., 2009; Stangl et al., 2012; Sundström et al., 2007; Yamashita et al., 2017; J. Zhao et al., 2014). This should be done with caution because while providing insufficient context impedes interpretation (Church et al., 2010; McDuff et al., 2012), too much context can lead to cognitive overload (Hollis et al., 2017; McDuff et al., 2012). This can be solved with a hierarchical interaction mode, enabling users to quickly view moods and delve into details as needed (Bentley et al., 2013; Church et al., 2010; McDuff et al., 2012; Rivera-Pelayo et al., 2017; L. Wang et al., 2018; M. Xue et al., 2019; Yamashita et al., 2017; J. Zhao et al., 2014).

Mood privacy is a prevalent concern. Users—especially when publicly expressing moods—may want to avoid the display of personal, particularly negative, moods to prevent unwanted attention or judgment (Alonso et al., 2008; Ashoori et al., 2015; Guo et al., 2016; Hansson & Skog, 2001; Isaacs et al., 2013; MacLean et al., 2013; Stangl et al., 2012). Privacy concerns vary by audience (Mora et al., 2011) and situation (MacLean et al., 2013). In some user studies teenagers resist sharing moods with strangers (Balta & Read, 2016; Church et al., 2010), students hesitate to share moods with unfamiliar classmates (Balaam et al., 2010), and employees avoid revealing negative moods in professional settings (Mora et al., 2011; Rivera-Pelayo et al., 2017; Roseway et al., 2015; Sundström et al., 2009). Some intricacies were reported—privacy needs differ among individuals, with some desiring absolute mood privacy, while others value openness that helps acquire support (Balaam et al., 2010; Mora et al., 2011; Rivera-Pelayo et al., 2017; Roseway et al., 2015; M. Xue et al., 2019). Strategies to address mood privacy include anonymizing personal information and/or aggregating group mood data (Cernea et al., 2014; Hansson & Skog, 2001; LiKamWa et al., 2013; Lutchyn et al., 2015; Mora et al., 2011; Pammer, 2015; Rivera-Pelayo et al., 2017; Wagener & Niess, 2021; M. Xue et al., 2019), providing a toggle between private or public modes or turn on-off function based on contexts and preferences (Balaam et al., 2010; Balta & Read, 2016; Hansson & Skog, 2001; Jiang et al., 2020; Lutchyn et al., 2015; Mora et al., 2011; Roseway et al., 2015; Snyder et al., 2015; Sundström et al., 2009), and providing private mood indications like tactile feedback (Alonso et al., 2008; Ashoori et al., 2015; Guo et al., 2016; Jiang et al., 2020; Liu et al., 2019; MacLean et al., 2013).

2.4.3.3. Issues Related to Mood-Regulating Designs

The potential adverse effects of reflecting on negative moods is one issue. While such reflection can improve one's ability to analyze information and create remedial plans (Hollis et al., 2017), several potential risks were identified. Recalling negative experiences can reignite uncomfortable feelings and may not always contribute to personal growth (Isaacs et al., 2013). Moreover, dwelling introspectively on intensely negative past experiences has the potential to undermine subjective well-being (Hollis et al., 2017). To address this, researchers suggested moderating user exposure to negative content, such

as filtering extremely negative records or displaying such content only during positive moods (Hollis et al., 2017; Isaacs et al., 2013). Given the evident effects of reflecting on positive content (Yamashita et al., 2017), encouraging users to document more positive content before entering the reflection stage has been suggested, through strategies like adding timely textual reminders (L. Wang et al., 2018) or semi-structured checklists guiding positive reflections (Yamashita et al., 2017).

Another issue lies in the challenge of catering to individual preferences for system recommendations, including aspects like difficulty, intensity, and duration of suggested mood-regulating activities (Besserer et al., 2016; Ghandeharioun et al., 2019; Hollis et al., 2017; Jiang et al., 2020). To address this, designs can expand the recommendations by building an extensive dataset of diverse activities (Ghandeharioun et al., 2019) and adopting strategies that transcend habitual actions of users (Hollis et al., 2017). This approach can enhance motivation and reduce habituation (Ghandeharioun et al., 2019; Hollis et al., 2017). Additionally, recommendations can be personalized through machine-learning technologies (Bentley et al., 2013), identifying patterns across user subgroups through clustering (Hollis et al., 2017), or tailoring activities to personal contexts or current tasks (Ghandeharioun et al., 2019; MacLean et al., 2013).

System intrusiveness, referring to the feelings of disturbance or interruption caused by mood-regulating designs, is a concern too. Designs that facilitate self-awareness or self-reflection often use attention-grabbing signals, potentially causing distraction (Balaam et al., 2010). Instances were also observed, where overactive chatbot interventions disrupted group discussions and impeded engagement (Benke et al., 2020). Furthermore, mood-enhancing exercises have the potential to annoy users who are already in a pleasant mood (Ghandeharioun et al., 2019). In addition, abrupt system adjustments to user moods can disrupt ongoing tasks and compromise their performance (Janssen et al., 2012). Suggested solutions include the exploration of unobtrusive interventions (Alonso et al., 2008; Benke et al., 2020; Bentley et al., 2013; Janssen et al., 2012; Liu et al., 2019; Mora et al., 2011; Pradana & Buchanan, 2017; Roseway et al., 2015; Stangl et al., 2012; van de Garde-Perik et al., 2016), seamless integration of designs into daily routines or workflows (Benke et al., 2020; Besserer et al., 2016; Dang et al., 2019; Lutchyn et al., 2015; MacLean et al., 2013; Rajcic & McCormack, 2020; Rivera-Pelayo et al., 2017; Snyder et al., 2015; Stangl et al., 2012; Tsujita & Rekimoto, 2011; M. Xue et al., 2019), and affording user autonomy in initiating and modifying the interaction (Besserer et al., 2016; Desmet, 2015; Huldtgren et al., 2015; van de Garde-Perik et al., 2016).

2.4.3.4. Summary and Discussion

In the practice of mood-focused design, ethical concerns related to design-supported mood monitoring, expression, and regulation hold significant prominence. Issues like system surveillance, mood privacy, and system intrusiveness come to the forefront. Indeed, given the advancements in artificial intelligence and social robotics, ethical considerations now have a central role in the realm of design. For instance, ethical issues in the design of affective health interventions (Sanches et al., 2019) and personal informatics systems (Epstein et al., 2020) have also been identified by other review studies. To address the ethical

dimensions of mood-focused design, some articles in our dataset suggest the provision of user autonomy as a viable solution. To illustrate, designs might allow users to deactivate mood monitoring if they feel surveilled, to deactivate public expression for their privacy, or to have full control of mood-regulating interventions. These suggestions align with research that emphasizes autonomy as a critical principle for technology and design ethics, recognizing it as a fundamental human need that significantly influences user experience and well-being (Calvo et al., 2020).

The articles in our dataset revealed that the accuracy of mood monitoring is currently below optimal levels. There is an ongoing ambiguity regarding the more promising approach between autonomous detection and self-tracking too. This observation is in line with the belief of Desmet et al. (2016) that psychological, behavioral, and self-report measures each have their own strengths and limitations. A promising avenue is the combination of mood detection with self-tracking, which has shown encouraging initial results (Ashoori et al., 2015; Bentley et al., 2013; Church et al., 2010). There is also momentum toward expanding the scope of mood signals (Y. Wang et al., 2022), exemplified by innovations such as the model proposed by Alibasa et al. (2023) predicting mood based on a user's "digital footprints" such as search history and social media activity. Our analysis also indicates a limited granularity in the types of mood that can be effectively monitored. While we found two promising typologies encompassing diverse and fine-grained mood types (Sönmez et al., 2022; H. Xue et al., 2020), no studies have yet employed them. We recommend the adaptation of these typologies for the development of new mood detection techniques or the enhancement of self-reporting functions.

2.4.4. What Methods for Mood-Focused Design Are Available?

Few articles addressed this topic, from which we identified two categories of methodological resources. The first category supports empathizing with users, while the second category supports ideation in a mood-focused design process.[12]

2.4.4.1. Resources That Support Empathizing

Our dataset encompasses two mood typologies that facilitate a granular understanding of the mood phenomenon. Xue and Desmet et al. (2020) provided a typology of twenty distinct moods (see Figure 9), including positive moods like "relaxed" and "cheerful," negative moods like "miserable" and "anxious," and ambiguous moods like "sentimental" and "rebellious." This typology offers rich descriptions of subjective feelings, perceptions, reactions, tendencies, likes, and dislikes, accompanied by illustrations and narratives for each mood. Sönmez et al. (2022), on the other hand, introduced a typology of eight group moods, such as "chill flow," "fiery," and "jolly," determined by four experiential factors: feelings, interpersonal communication, workflow, and motivation. These mood typologies can support

12 To categorize the codes in this section, we referred to the d.school's design thinking process (empathize, define, ideate, prototype, and test; Dam, 2023) and IDEO's human-centered design model (inspiration, ideation, and implementation; IDEO, 2023).

empathizing in design by providing a nuanced vocabulary for understanding and discussing moods. In user research, like surveys or interviews, they can assist users in articulating their desired (or undesired) mood experiences (Sönmez et al., 2022). Additionally, they can facilitate nuanced communication about user moods within the design team, helping to reach a consensus and clarify design intentions (H. Xue et al., 2020).

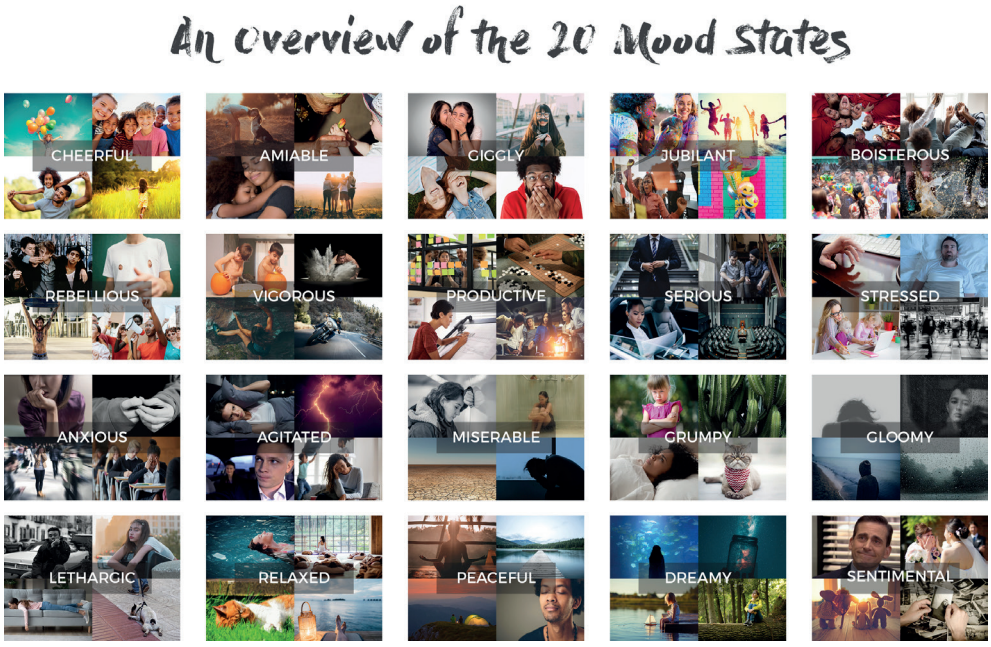


Figure 9. A typology of twenty moods (Desmet et al., 2020). © 2020 Pieter M. A. Desmet, Steven F. Fokkinga, and Haian Xue.

Our dataset includes a mood tendency space with 68 mood-stimulated tendencies (see Figure 10), which offers an additional dimension for understanding mood manifestations (Desmet et al., 2019). It is based on the suggestion that individuals are constantly moving around in that space, with their moods influencing their thoughts and interactions with others and their environments (Desmet et al., 2019). Consistent with this, De Lera (2015) proposed that designers should consider multiple distinct interaction paths for a single user at any given time. The mood tendency space can support empathizing in design by facilitating mood-related user profiling (e.g., stressed individuals tend to behave impatiently), which can further inform design intentions (e.g., accommodating a lack of patience; Desmet et al., 2019). It can also be used to cultivate empathy amongst designers. Desmet et al. (2019) introduced a "Mood-Empathy Game" that engages designers in a role-playing activity to explore how mood affects motivations and behaviors, thus familiarizing them with mood-stimulated tendencies and building their empathy with potential users.

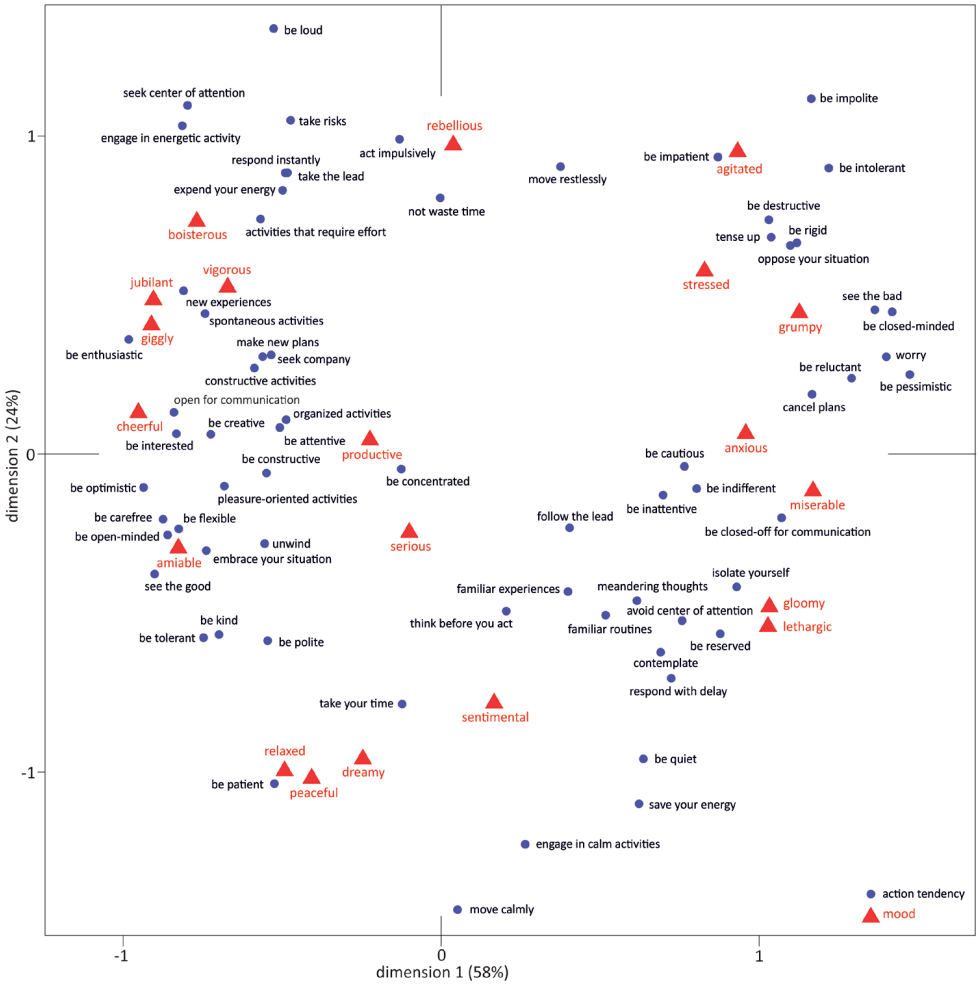


Figure 10. The mood tendency space (Desmet et al., 2019). © 2019 Pieter M. A. Desmet, Haian Xue, and Steven F. Fokkinga.

2.4.4.2. Resources That Support Ideation

In our dataset, resources supporting ideation mainly involve mood regulation strategies and patterns. Desmet (2015) introduced twenty activity-based mood regulation strategies distributed across three categories representing different foci: seek relief (e.g., "seeking distraction," "venting"), restore balance (e.g., "seeking relaxation," "seeking social support"), and build resilience (e.g., "rationalizing," "embracing"). Some studies identified the daily mood-regulating patterns of individuals (De Luca et al., 2018; Jiang et al., 2020; Wu et al., 2021), with many aligning with Desmet's (2015) framework. Notably, several patterns are new, such as performing rituals (Wu et al., 2021) or maintaining the beneficial

part of stress (De Luca et al., 2018). Esnaf-Uslu et al. (2022) identified nine interpersonal mood regulation strategies in service encounters like "calming" or "apologetic," while Pradana and Buchanan (2017) discovered five mood-regulating patterns in mobile-mediated communications like "experience sharing" or "gift giving." While not all these strategies necessitate design interventions, they can serve as a source of design inspiration (Desmet, 2015). Examples include a trumpet-like public installation for shouting burdens, using the "venting" strategy, and a stretching game for office relaxation, using the strategy of "seeking relaxation" (Desmet, 2015). Esnaf-Uslu et al. (2022) also suggested creating virtual skylights to reduce patient stress in dental practices, based on the "calming" strategy.

2.4.4.3. Summary and Discussion

For mood-focused design, we identified two categories of methodological resources: one for empathizing with users and the other for design ideation. These categories align with Stolterman's (2021) two design improvement approaches: preparation and inspiration. The first category offers mood typologies and knowledge on its relation to the thoughts or action tendencies of individuals, facilitating nuanced understanding of mood from designers for greater empathy. This aligns with the preparation approach, which seeks to enhance the ability of designers to make judgments and develop innovative ideas (Stolterman, 2021). The second category encompasses a diverse range of mood-regulation strategies that can inform design ideation. This aligns with the inspiration approach, which aims to provide designers with concrete designs, abstract ideas, concepts, theories, and metaphors (Stolterman, 2021). While these resources to some extent inform mood-focused design processes, they do not yet offer a unified methodology, remaining as distinct components.

2.5. GENERAL DISCUSSION

Mood, ubiquitous and influential in people's everyday lives, is a phenomenon that has consistently intrigued designers and design researchers. However, the current landscape of mood-focused design endeavors remains fragmented, presenting a notable challenge to its progression. To offer an overview, we conducted a scoping review of 66 relevant articles in the field, delving into how mood is addressed by designers and design researchers in the context of experience-driven design. Although mood is elusive, its multifaceted nature, including its long duration and its impacts on social relationships, has been partially comprehended in design. Designers and design researchers, despite a limited understanding of mood, have explored mood-focused design possibilities, developing innovations for mood monitoring, expression, or regulation. During these activities, various challenges of mood-focused design have emerged, such as concerns related to mood privacy and the intrusiveness of mood-regulating interventions. As the interest in mood-focused design continues to grow, researchers have provided preliminary tools to enhance mood empathy amongst designers and facilitate design ideation. However, these tools are currently limited in their comprehensiveness and systematic approach.

Our review offers several benefits to the field of mood-focused design. First, it deepens our comprehension of mood as a distinct facet of human experience that can both be studied (as a topic of design research) and designed for (as a design intention). While mood often gets confused with emotion in design research and practice, the reviewed articles highlight its unique position within experience design, calling for more deliberate and systematic investigations into mood. Second, by presenting the current landscape of mood-focused design, researchers can use our review to enhance their understanding of mood, assisting them in identifying research gaps for further exploration. Additionally, this review can serve as a reservoir of references to mood-related design knowledge for practitioners, promoting a shift from intuition-based to evidence-based designing. As an example, our findings could offer guidance to design teams in making design decisions, such as whether they should focus on mood or emotion, what type of mood-focused design they aim to develop, and what to be cautious about when designing a mood-regulating intervention.

2.5.1. Avenues for Future Research on Mood-Focused Design

While current work in mood-focused design is enlightening, it is important to acknowledge that this field is currently in its early stages of development. To guide our contemplation on its future trajectory, we referred to Wobbrock and Kientz's (2016) classification of seven research contributions within human-computer interaction (HCI).[13] Their theoretical, artifact, opinion, and methodological contributions resonated with our inquiries and stimulated our reflections on potential contributions to mood-focused design. Consequently, we propose four avenues for further exploration, including initiatives to expand the theoretical comprehension of mood, create innovative artifacts, share informed opinions, and advance method development within this domain.

2.5.1.1. Expanding Theoretical Understanding of Mood in Design

Currently, the theoretical understanding of mood in design remains limited. To enrich understanding, we suggest three primary research avenues. First, there is a need to develop a practical understanding of mood functionality. This involves investigating how the signaling function of the mood system manifests in human-design interactions, enabling a more systematic analysis and comprehensive measurement of the experiential qualities and impacts of mood. Second, future research can deepen our understanding of mood as an emergent background experience during an individual's interactions with people, products, and environments. Such insights can inform designers when and how design might intervene in user moods, thereby opening new space for mood-focused design innovations. Last,

13 Wobbrock and Kientz (2016) identified seven research contribution types in the HCI field: (1) empirical research contributions that offer knowledge from findings based on observations, experiments, or interviews; (2) artifact contributions that manifest knowledge in novel artifacts from generative design-driven activities; (3) methodological contributions that create methods, measures, or instruments informing how research or practice can be conducted; (4) theoretical contributions that provide new or improved concepts, principles, models, or frameworks; (5) dataset contributions that offer new and useful corpora for research; (6) survey contributions that provide syntheses of work done on a certain topic; and (7) opinion contributions that provide arguments seeking to compel reflections and discussions.

research can delve into the sources or factors that contribute to specific positive or negative moods. This may seem counterintuitive, given that moods often result from a sequence of events, making their origins challenging to identify. Nevertheless, we propose that compiling an overview of potential mood sources, including both internal factors like self-consciousness and external factors like the weather, can bring clarity to the mood phenomenon and serve as inspiration for designers.

2.5.1.2. Exploring New Mood-Focused Design Possibilities

We propose the continuation of explorations with real-world design examples, such as mood-tracking apps,[14] to enrich our understanding of mood-focused design possibilities. Future studies could leverage technologies like artificial intelligence or ambient intelligence for their potential in capturing and storing prolonged mood-related data, with or without user introspection. Moreover, there is a need to explore novel design features that can induce specific mood experiences or support mood regulation. Research-through-design projects have the potential to investigate how diverse interaction qualities, like physicality, slowness, or temporary disconnection from the digital world,[15] may influence user mood experience and self-awareness of mood.

2.5.1.3. Probing Practical Mood-Related Design Experiences

The design literature has documented diverse perspectives, beliefs, and challenges concerning mood-focused design. Future studies can investigate how industry practitioners address mood, including their understanding of mood, their attitudes toward incorporating user or customer mood in experience-driven design, their approaches to mood-focused design, and the obstacles they encounter. We propose two research paths for approaching this subject. The first involves gaining insights from individuals who directly work with mood, such as designers working on products like the Philips Hue mood lighting system. The second is to explore the implicit design experiences of practitioners that pertain to mood. Experienced practitioners in fields like experience, service, or strategic design might subconsciously consider user or customer mood in their practice, even if they do not explicitly label their design projects as "mood-focused" or "mood-centric." Assessing their experiences and viewpoints could inform the development of design methods or tools tailored to mood-related challenges.

2.5.1.4. Developing Both Prescriptive and Descriptive Design Methods

Given the current limitations in mood-focused design methods, we propose two directions for the development of new methods or tools. First, we recommend creating prescriptive design methods, such as a systematic mood-focused design framework. This would provide designers a comprehensive overview of strategies to address user mood across various design scenarios, along with implementation

14 Various mood-tracking apps are available in Google Play and the App Store (Caldeira et al., 2017).

15 For instance, researchers have explored traditional mood self-tracking methods (i.e., physical paper bullet journals) as an effective way to facilitate self-reflection (Abtahi et al., 2020).

guidelines. Second, there is potential for developing descriptive design methods. Future research could explore tools to support designers in building mood empathy, especially in the early stages of mood-focused design projects. These tools could range from heuristic cards that foster project-specific mood awareness within a design team to self-development training materials that support enhanced mood sensitivity.

2.5.2. Limitations of This Scoping Review

We acknowledge several limitations in our scoping review. First, despite conducting searches in Scopus, Web of Science, and the ACM Digital Library, it is possible that we have missed relevant articles from databases like ScienceDirect or IEEE Xplore. Additionally, we did not include search terms of specific mood states like "stress," "anxiety," and "relaxation." Second, our literature selection process might have introduced bias due to the interchangeable use of terms like "mood," "emotion," and "affect" in many articles. To address this, we employed psychological definitions of mood and emotion to guide our selection process. We ensured that the articles were screened collaboratively for intersubjective consensus too. Third, our focus was primarily on interaction design, which led us to exclude broader interdisciplinary fields like architecture or marketing, where mood is also considered. Exploring these fields can provide additional insights for mood-focused design or research. Last, our review aimed to provide a comprehensive overview of the field, which might have resulted in the omission of more niche topics. Nevertheless, this presents an opportunity for more targeted future studies, as scoping reviews often serve as valuable preliminary steps to systematic reviews (Munn et al., 2018). Research could be conducted, for instance, to scrutinize the influencing factors of mood or the ethical issues of mood-monitoring designs.

2.6. CONCLUSION

This chapter presents the findings of a scoping review investigating how mood is currently addressed in the context of experience-driven design. Our review underscores that, although the understanding of mood in design is still evolving, designers and design researchers have ventured into mood-focused design, tackling a range of challenges along the way. To our knowledge, this review stands as the first comprehensive overview of the field of mood-focused design. It aids researchers in identifying potential areas for further explorations and provides practitioners with empirically grounded design insights. Ideally, this review can serve as a step toward systematically integrating mood into the design discipline. We propose that future research could prioritize enhancing the theoretical understanding of mood in design, exploring additional mood-focused design possibilities, investigating practical design experiences, and developing both prescriptive and descriptive design methods.

CHAPTER 3

Design Practitioners' Explorations of mood

This chapter is based on an article in press:
Peng, Z., Xue, H., Joseph, A. W., Roto, V., & Desmet, P. M. A. (2026). Mood as a means versus an end: Unraveling how experienced practitioners address mood in experience design. International Journal of Design.

3.1. INTRODUCTION

We might find ourselves somewhat grumpy one day, yet calm the next. Similarly, there are days when we feel full of energy, contrasted with days when lethargy seems to prevail. These shifting inner states are what we commonly describe as our "moods."

Moods are low-intensity, diffuse feeling states that typically last for hours or days (Morris, 1989). Distinct from fleeting emotions, moods are more enduring and gradually evolving, often below our conscious awareness (Parkinson et al., 1996). A mood builds up through cumulative circumstances rather than a single incident, making its origins often elusive (Ekman, 1994). Moreover, unlike focused emotions, moods are not directed toward a particular object, person, or event, but toward the surroundings in general, reflecting more global and diffuse conditions (Frijda, 1994). For example, while we might feel a surge of anger (an emotion) directed at someone or their behavior, we can remain irritable (a mood state) toward ourselves, others, and our environment for an entire day without knowing exactly why.

Despite their subtlety, moods are always present and constantly shape our daily experiences, providing a fertile ground for experience design (research). There are at least three reasons why addressing mood in design is meaningful. First, everyday mood fluctuations are closely tied to health and well-being (Morris, 1999; Peeters et al., 2006), inspiring design initiatives that seek to alleviate negative moods and enhance positive ones (Desmet, 2015). Second, the mood of a user or customer significantly affects their attitudes and behaviors, their subjective evaluations, and ultimately, their level of satisfaction with a product or service (Gardner, 1985; Westbrook, 1980). This has encouraged design researchers to incorporate mood considerations into their work, aiming to enhance user experience and satisfaction across various domains, such as retail (e.g., Quartier et al., 2008), social media (e.g., Rao, 2008), and airline services (e.g., Lin, 2015). Third, moods, as temporary dispositions, provide insights into how individuals are likely to behave or react (Siemer, 2009). They can thus serve as resources for profiling users' or customers' dynamic characteristics, guiding more informed and effective design decisions (Desmet et al., 2019). For instance, Zhao et al. (2019) leveraged mood in a dynamic profiling model to deepen understanding of smartphone users and identify opportunities to enhance mobile applications and services.

Within the experience design community, the significance of mood is increasingly recognized, fueling a growing body of mood-focused research and practice (Desmet, 2015). However, compared to more established areas like emotion-driven design (Desmet et al., 2021) or design for meaning (Mekler & Hornbæk, 2019), mood-focused design remains largely ambiguous. Its defining features, archetypes, methodological approaches, and effective strategies for implementation are still unclear. As a result, current research and practice often rely on implicit or intuitive conceptions of mood-focused design, which have negative consequences. In research, this ambiguity can hinder researchers from articulating mood-focused contributions and misguide the identification of future directions. In practice, it can lead designers to default to strategies more appropriate for emotional design or conventional user experience

(UX) design, resulting in less effective outcomes. To overcome these challenges and advance the field, a deeper and more explicit understanding of mood-focused design is needed.

Peng et al. (2023) recently offered a comprehensive overview of mood-focused design, synthesizing insights from a broad range of mood-related design studies. Their review showed that design researchers have recognized and explored various facets of mood, such as its long duration and its impacts on both individual and group performance. Design researchers have also developed interventions aimed at supporting mood monitoring, expression, and/or regulation, while navigating design challenges like ensuring privacy around mood-related data. Despite these insights, little is known about how design practitioners consider and approach mood in real-world projects and the specific challenges they face. To address this gap, we conducted an empirical study into practitioners' experiences, aiming to provide new perspectives on mood-focused design. Our research focused on three questions: (1) In what ways have design practitioners considered and approached user or customer mood? (2) What challenges have designers encountered or perceived when focusing on mood in their work? (3) What knowledge do designers consider essential for undertaking mood-focused design activities?

3.2. METHOD

A central methodological challenge for our study was identifying actual mood-focused design practice and, consequently, mood-focused design practitioners. This challenge arose for two main reasons. First, the terms "mood," "emotion," and "feeling" are often used interchangeably in both everyday language and scientific research (Beedie et al., 2005). As a result, designers may describe their work as focusing on users' emotions when they are in fact addressing users' moods, and vice versa (Desmet, 2015). Second, mood is typically a subtle, continuous background experience that does not always enter conscious awareness (H. Xue et al., 2020). Designers may therefore take mood into account without explicitly identifying their efforts as mood-focused. For instance, they might consider users' moods before, during, and after a service encounter—such as the sense of relaxation experienced while dining at a restaurant—but frame their work more generally as "experience-driven design" or "user-centered design" (for example, see Cai, 2015).

To address this challenge, we conducted in-depth, retrospective interviews with practitioners working broadly within the realm of experience design. This pragmatic approach allowed us to explore their experiences without being constrained by terminology or by the elusive nature of mood.

3.2.1. Participants

Participants were selected according to three criteria: (1) they have at least five years of professional experience in designing for user or customer experience in industry; (2) they have worked on a wide range of design projects, giving them opportunities to explore diverse aspects of human experience; and (3) they are able and willing to engage in reflective thinking, including recalling and analyzing, about design experiences related to mood.

Recruitment began with convenience sampling within our professional networks, including former collaborators and alumni. The pool was then expanded through snowball sampling, where our initial participants recommended other eligible designers. In total, 20 practitioners participated: 11 based in Finland and 9 in the Netherlands. Both countries have a strong tradition of human-centered design and play crucial roles in the domain of experience design and research (Roto et al., 2021). Table 6 provides an overview of participants, including their job titles, sectors, and years of industry work experience. Notably, while many participants did not hold the specific titles of "Experience Designer" or "UX Designer," enhancing user or customer experience formed the core of their professional roles.

Ethical approval for this study was obtained from the Human Research Ethics Committee of Delft University of Technology (TU Delft, the Netherlands), and all participants provided informed consent prior to the interviews.

Table 6. Overview of participants.

Participant code	Job title	Sector	Years of industry work experience*
P1	Design Lead	Banking company	7+
P2	Design Director	Design consultancy	5+
P3	Freelancer	Diverse	5+
P4	Design Lead	Elevator company	8+
P5	Lead Designer	Design consultancy	8+
P6	Freelancer	Diverse	15+
P7	Senior UX Specialist	Elevator company	7+
P8	Innovation Manager	Banking company	13+
P9	Freelancer	Diverse	5+
P10	Senior Service Designer	Crane company	6+
P11	Design Research Lead	Design consultancy	6+
P12	Designer	Retailing company	5+
P13	Freelancer	Diverse	5+
P14	CEO (Founder)	Design consultancy	9+
P15	Senior Service Designer	Telecommunication company	9+
P16	Freelancer	Diverse	20+
P17	Product Expert	Broadcasting company	6+
P18	CEO (Founder)	Robotics company	7+
P19	Innovation Lead	Design consultancy	10+
P20	CEO (Founder)	Design consultancy	10+

* Participants' years of experience were as of the date when they were interviewed.

3.2.2. Procedure and Research Materials

Each interview was structured into three main stages: sensitization, retrospection, and envisioning (see Appendix E for the interview guide).

The sensitization stage consisted of three steps. First, participants were asked to share their understanding of mood. During this, we paid particular attention to how they differentiated mood from other affective phenomena such as emotion—a distinction often considered challenging in design research (Desmet, 2015; H. Xue et al., 2020). Second, participants were shown a conceptual video presenting our definition of mood, including its features, manifestations, and impacts (Ekman & Davidson, 1994; Morris, 1989; Parkinson et al., 1996). Figure 11 shows selected stills; the full video is available at https://doi.org/10.6084/m9.figshare.30219013.v1. Any confusion about the video content and questions about the concept of mood were addressed immediately through verbal explanation. Finally, participants were asked to reflect on the relevance of mood, as a distinctive phenomenon, in design.

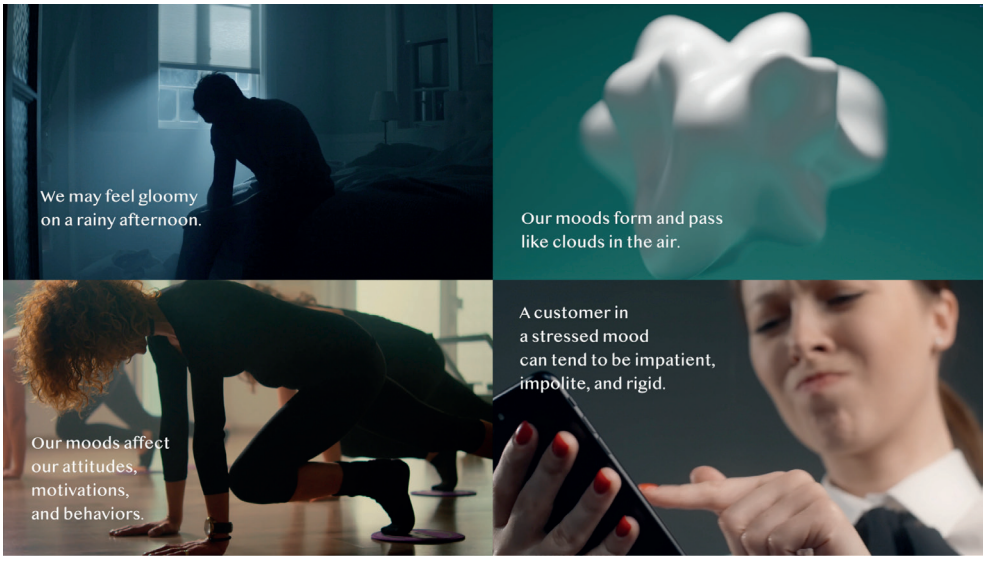


Figure 11. Stills from the conceptual video on mood. The video was composed using clips obtained from copyright-free footage banks.

Once participants had an explicit understanding of mood as defined in this study, they were asked to reflect on whether they had considered or approached user or customer mood in any of their design projects. For those reporting relevant experiences, we probed further into project details, particularly how mood considerations influenced their design decisions and outcomes, and what mood-related challenges they encountered. Project briefs or reports were collected, when available, to support a more

comprehensive understanding and accurate transcription. For participants who reported no relevant experiences, we asked about the difficulties they anticipated when incorporating mood into their experience-driven design practice. Because mood in design remains an ambiguous topic, all participants were asked what knowledge they deemed essential for enabling mood-focused design activities.

All interviews were conducted by the first author, either in person (n = 10) or online via Zoom (n = 10), according to participant preference. Interviews lasted an average of 75 minutes and were audio-recorded. Data collection took place over a two-month period.

3.2.3. Data Analysis

All interview recordings were transcribed, and thematic analysis was conducted following Braun and Clarke's (2006) six-step framework: (1) familiarization, (2) coding, (3) generating initial themes, (4) reviewing and developing themes, (5) refining themes, and (6) reporting. Our analytic approach was primarily reflexive, involving iterative engagement with the data and an evolving coding process, rather than seeking reliability across coders (Braun & Clarke, 2021b, 2021a). At the same time, we incorporated selected practices from the codebook approach—particularly team-based coding discussions—within our reflexive analysis (Haan & Venema, 2025). This adaptation was intended to enhance analytic depth and rigor in a collaborative context, especially given the complexities of our research focus on mood and mood-focused design.

Familiarization began during data collection and continued throughout transcription. The first author then undertook coding and initial theme generation in ATLAS.ti, following Saldaña's (2015) guidance to let themes naturally emerge from the data. During this phase, the research team met regularly to review the developing analysis, providing feedback and collaboratively improving candidate codes and themes. Once a preliminary set of codes and themes had been developed, the first author convened a four-hour discussion with two senior researchers. This session involved a detailed examination of codes, themes, and supporting data extracts, during which categories were debated and refined. The revised set was then reviewed once more by all authors during the reporting stage. Appendix F presents the final set of codes and themes, along with illustrative quotes.

3.3. RESULTS

In this section, we first share observations from the sensitization session on how designers understand mood and its relevance in design. We then present findings on how designers approach mood in their practices, the challenges they encounter or perceive, and the knowledge they deem essential for addressing mood in design. Finally, we report additional findings, focusing on obstacles to applying mood-focused design in practice.

3.3.1. Understanding Mood and Its Relevance in Design

Before being introduced to our definition of mood, participants had varied interpretations. Nine equated mood with other affective phenomena, such as the emotional response to certain stimuli, the overall impression of a brand or product, the atmosphere an environment creates, or the temperament of a person or product. The rest showed an understanding closer to our definition, with most recognizing mood as a general state of mind. Four participants were able to identify specific qualities of mood, like its long duration, diffuseness, and dynamic nature. They also noted mood's impact on aspects like perception, decision-making, and behavior.

After watching the conceptual video and gaining a better understanding of the mood phenomenon, participants shared diverse perspectives on mood's relevance in design, informed by their professional experiences. Some suggested that understanding mood could provide insights into user contexts, dilemmas, or preferences. Others viewed mood as a source of innovation, mentioning that stimulating certain mood experiences, like mindfulness, could be valuable. Several participants highlighted mood's potential monetary value, recognizing its impact on customer purchasing decisions, while others saw mood as a means of brand differentiation by enhancing customer centricity. Additionally, many emphasized the importance of catering to user or customer moods in communication. Others, instead, identified mood's relevance beyond the user context, particularly in design teamwork, where understanding team members' and clients' moods was seen as crucial for effective collaboration.

3.3.2. Approaches to Addressing Mood in Design

After sensitization and acquiring a clear understanding of mood, twelve participants described project experiences in which mood played a role. Most noted that these projects were not explicitly framed as "mood-centric" or "mood-focused," and mood was rarely an intentional consideration in their design process. An exception was participant P17, who explicitly used the term "mood-regulatory need" to guide their design goal. From these participants' accounts, five main approaches to addressing mood emerged: treating mood as (1) an end in itself, (2) a means to enhance engagement, (3) a means to enrich experience, (4) a means to create differentiation or advantage, and (5) a means to facilitate user research (see Table 7 for an overview).

Table 7. Approaches to addressing mood in design.

Approach	Description	Example
Mood as an end in itself	Mood is the ultimate design goal, pursued for its own sake rather than to serve other outcomes.	Mental healthcare environments designed to reduce anxiety and promote calm.
Mood as a means to enhance engagement	Mood is improved to strengthen user engagement with services or products.	Consulting services lifting moods to encourage open sharing; medical robots fostering upbeat moods to increase adherence.
Mood as a means to enrich experience	Mood is shaped to create memorable experiences and enhance overall satisfaction.	Streaming services curating content around specific moods; travel environments incorporating playful interactions.
Mood as a means to create differentiation or advantage	Mood is positioned as a competitive differentiator, adding distinctive qualities that help a product or service stand out.	Lifestyle products using mood-boosting features; retail services appealing to seasonal moods.
Mood as a means to facilitate user research	Mood is used as a research tool, either to improve interactions with participants or to interpret user experiences.	Research sessions adapting communication to participants' moods; mood check-ins before and after sessions to assess product experience.

3.3.2.1. Mood as an End in Itself

Here, mood is the ultimate design goal: designs are created to induce positive mood experiences without being tied to other functional or experiential outcomes. For instance, P20 described a project in a mental healthcare facility where the aim was simply to help patients "feel better." To achieve this, they incorporated aromatic wooden wall panels and artistic installations in entrances and elevators to reduce anxiety and promote calm. They also created a dedicated space featuring biophilic elements, allowing patients to withdraw socially and relax. Although only one participant shared such an example, it represents a distinct and valuable case in which mood is pursued as an end in itself rather than as a means to other design goals.

3.3.2.2. Mood as a Means to Enhance Engagement

In this approach, mood is improved to foster stronger user engagement with services or products. P5, for instance, redesigned a consulting service for out-of-school or unemployed youth by introducing multi-channel communication and training consultants in empathetic communication. These interventions aimed to improve participants' often low moods, building trust in consultants and encouraging more open sharing. Similarly, P18 developed a dementia care robot with mood-lifting behaviors, such as giving compliments, to increase patients' adherence to medical guidance. P6 applied this principle to an interactive learning space, embedding playful elements that improved children's mood and, in turn, supported greater focus and absorption of educational content. In a comparable case, P3 designed a corporate workshop experience by aligning groups based on personality compatibility, delivering

reassuring statements, and offering surprise snacks—measures that sustained positive moods and strengthened both collaboration and performance.

3.3.2.3. Mood as a Means to Enrich Experience

This approach treats mood as a pathway to create more unique, memorable experiences and boost overall user satisfaction. P17 exemplified this by embedding "mood-regulatory needs" directly into the design of their streaming platform experience. They curated TV dramas around goals such as "relaxing," "getting cheered up," or "feeling content," complementing other desired experiences like self-fulfillment and social connection. In another case, P14 sought to enrich the train travel experience by integrating three playful interior features: a bouncing cushion, a shared water sofa, and a water floor simulating a surfing experience. These designs increased passengers' cheerfulness and excitement, resulting in a more memorable and satisfying journey.

3.3.2.4. Mood as a Means to Create Differentiation or Advantage

In this approach, mood is leveraged as a competitive differentiator: designers incorporate mood-influencing features to make products or services stand out in crowded markets. For example, P12 worked on a food e-commerce platform targeting customers experiencing "winter gloom." Their idea was to send notifications featuring curated gourmet foods as solutions for harsh weather, appealing to customers' desire for comfort and increasing sales. Similarly, P16 embedded a conversational agent into a wireless charger that greets users with caring messages, aiming to differentiate the product through its mood-boosting qualities. Along the same lines, P7 and P6 designed lighting products—an adaptive dining room system that mimics candlelight and a lamp that adjusts brightness and color temperature throughout the day—both intended to create calming or intimate atmospheres and positioned as distinctive selling points to enhance product appeal.

3.3.2.5. Mood as a Means to Facilitate User Research

In this final approach, mood is employed as a methodological tool in user research, either to improve researchers' interactions with participants or to interpret user experiences. Two participants described adapting their methods in response to users' moods during interviews. P10 reported adjusting communication style and questioning depth based on interviewees' moods, which led to more effective data collection. Similarly, P13 attuned their own mood to that of participants, particularly when negativity was present, which helped elicit deeper insights. In addition, P13 included simple mood-related questions at the beginning and end of usability testing sessions, providing a structured way to capture mood fluctuations and use them as an indicator of the product's experiential impact.

3.3.3. Challenges Related to Addressing Mood in Design

Participants reported thirteen design challenges when addressing mood, which we grouped into four categories based on their relation to different design stages: (1) challenges related to understanding,

(2) challenges related to goal setting, (3) challenges related to designing, and (4) challenges related to evaluation (see Table 8 for an overview).

Table 8. Challenges related to addressing mood in design.

Design stage	Challenge	Description
Understanding	Difficulty of discussing moods	Conversations about moods can be difficult for designers and users due to a limited vocabulary.
	Difficulty of identifying moods	Pinpointing user moods is challenging due to their subtle and multifaceted nature.
	Difficulty of identifying mood causes	Determining the exact causes of moods is difficult because they are diverse and often unclear.
	Difficulty of documenting moods	Integrating moods into user profiles is challenging because moods fluctuate over time.
	Difficulty of empathizing with moods	Without continuous access to users' feelings, it is difficult to deeply empathize with their moods.
Goal setting	Difficulty of determining mood effects	Users struggle to express desired moods, making it difficult to determine intended mood effects in design plans.
	Difficulty of exclusively targeting a certain mood	Focusing solely on a specific mood in design practice is difficult due to broader problem-solving goals.
Designing	Difficulty of affecting moods	Influencing mood through design is challenging due to its complex causes and contextual dependency.
	Difficulty of catering to various moods	Accommodating the dynamic moods of individual users and the diverse moods within a group is challenging.
	Difficulty of addressing diverse mood-regulation needs	Meeting the different mood-regulation needs within a target group is difficult.
Evaluation	Difficulty of guaranteeing mood effects	Ensuring that mood-influencing designs achieve the intended outcomes is challenging.
	Difficulty of measuring moods	Accurately measuring user moods, as opposed to emotions, is a challenge.
	Difficulty of validating mood effects	Isolating and verifying the unique impact of mood-influencing designs is difficult.

3.3.3.1. Challenges Related to Understanding

Five challenges in understanding moods were identified: (1) difficulty of discussing moods, (2) difficulty of identifying moods, (3) difficulty of identifying mood causes, (4) difficulty of documenting moods, and (5) difficulty of empathizing with moods.

Discussing moods was seen as challenging for both designers and users. Designers often rely on a limited vocabulary, typically broad terms like "good" or "bad." This makes it difficult for them to label nuanced mood states or articulate the intended mood of a design. Similarly, users struggle to describe their moods beyond simple words, hindering designers' ability to fully grasp their (desired) experiences.

Accurately identifying moods was considered difficult for three reasons. First, users may be unaware of their moods, as these are often subtle or subconscious. Second, users may experience multiple, overlapping moods, which can obscure which one most influences them. Third, one participant observed that negative moods may reduce users' willingness to share feelings, further complicating identification.

Participants emphasized that identifying the causes of moods is also challenging. Users often struggle to recall or explain what triggered their mood, and mood causes are typically diverse and interwoven, making them difficult to pinpoint.

Documenting moods within user research presents another difficulty. Mood cannot be readily integrated into established profiling tools like personas, as it is not a stable characteristic but varies with each interaction. Furthermore, the wide variety of moods that can be experienced within a target group makes it difficult to aggregate or generalize mood data.

Additionally, empathizing deeply with user moods was identified as a challenge. Participants noted that in practice, they rarely have continuous access to users' lived experiences of mood, limiting their ability to build strong empathetic connections.

3.3.3.2. Challenges Related to Goal Setting

Two challenges in goal setting were identified: (1) difficulty of determining mood effects and (2) difficulty of exclusively targeting a certain mood.

Formulating mood-related design intentions is difficult because users often cannot clearly express their desired mood states, often due to limited knowledge or vocabulary. Participants also expressed uncertainty about accurately interpreting users' mood-related needs from research data, given the complexity of mood experiences.

Another challenge lies in the difficulty of targeting a specific mood exclusively. One participant emphasized that even when mood is recognized as an important consideration, design work often centers around broader product or service issues. As a result, mood-related goals can be difficult to integrate seamlessly with overarching project objectives.

3.3.3.3. Challenges Related to Designing

Three challenges when designing were reported: (1) difficulty of affecting moods, (2) difficulty of catering to various moods, and (3) difficulty of addressing diverse mood-regulation needs.

Influencing mood through design was considered challenging for three reasons. First, the ambiguous and multifaceted causes of mood make it difficult to identify specific triggers. Second, users' negative moods may stem from issues outside the scope of design solutions, such as personal or professional crises.

Third, mood change often requires sustained exposure to an environment, which is rarely achievable when interaction with a design is brief. By contrast, environments with longer user engagement, such as restaurants, were seen as more conducive to affecting mood because designers could exert greater control over contextual factors.

Catering to dynamic user moods was reported as another difficulty. Participants noted that static, mood-specific designs may not remain effective as moods change over time. In addition, within-group diversity introduces further challenges: for instance, while hospital designs can target common moods like anxiety, such a focused approach would not work for travel-related designs, where moods vary widely depending on purpose (e.g., business versus leisure).

A third challenge is addressing diverse mood-regulation needs within a target group. Even with shared contexts like air travel, users may seek different mood experiences (e.g., relaxation versus stimulation). Designing solutions that effectively satisfy all of these needs was considered especially difficult.

3.3.3.4. Challenges Related to Evaluation

Three evaluation-related challenges were identified: (1) difficulty of guaranteeing mood effects, (2) difficulty of measuring moods, and (3) difficulty of validating mood effects.

Ensuring that mood-influencing designs achieve their intended effects was reported as a challenge. Two issues were highlighted: designs may induce unexpected moods, and different users may experience different moods from the same design, making it difficult to establish clear success criteria.

Accurately measuring user moods was considered challenging. One participant described using tools such as "Pick-A-Mood" (a visual mood scale, see Desmet et al., 2016) to assess moods before and after product use, but expressed reservations about accuracy. They noted that such evaluations are often brief and may capture transient emotions rather than more enduring moods.

Finally, validating mood effects was described as difficult. Because moods are influenced by many external factors, isolating the unique contribution of design is challenging. This makes it difficult to confirm whether observed effects stem directly from the design intervention.

3.3.4. Essential Knowledge for Addressing Mood in Design

Participants were asked to imagine engaging in a design activity focused on mood and identified various types of knowledge needed for this task. These were grouped into three categories based on their focus: (1) general knowledge, (2) general design-focused knowledge, and (3) design project-specific knowledge (see Table 9 for an overview).

Table 9. Knowledge essential for addressing mood in design.

Focus	Knowledge	Description
General knowledge	The concept of mood	What mood is, how it differs from emotion, and the relationships between the two.
	The landscape of mood	The range and specific types of moods that individuals can experience.
	The causes of mood	The processes behind mood states and the internal and external factors that affect them.
	The manifestations of mood	What different moods mean or represent to individuals.
	The impacts of mood	The impacts of mood on various aspects of an individual's life.
General design-focused knowledge	Influencing mood through design	How design can influence and alter user moods, along with the conditions required for such changes.
	Triggering mood's impacts through design	How design can be purposefully used to create specific mood impacts on users.
	Utilizing mood in the design process	How designers can consider moods in user research to guide and inform design choices.
Design project-specific knowledge	Tools for understanding	Tools that support understanding user moods by improving mood communication, identification, or empathy.
	Tools for goal setting	Tools that support designers in analyzing ideal mood experiences or prioritizing mood-related needs.
	Tools for designing	Tools that enable designers to explore mood-focused design exemplars or collaborate by sharing design experiences.
	Tools for evaluation	Tools that assist in measuring user moods accurately or validating the mood effects of design.
	Tools for self-development	Tools that foster designers' ability to be more sensitive to moods or enhance their mood regulation skills.

3.3.4.1. General Knowledge

Participants expressed the need to understand five aspects of mood: (1) concept, (2) landscape, (3) causes, (4) manifestations, and (5) impacts.

Clarifying the concept of mood was mentioned frequently, especially in relation to emotion. While designers may sense that mood is broader and more enduring than emotion, they lack a precise understanding of their difference and relationship. Two participants, who are non-native English speakers, noted that their native terms—"Mieliala" versus "Tunne" in Finnish and "心情 (xīnqíng)" versus "情绪 (qíngxù)" in Chinese—capture these differences more clearly, suggesting that cultural and linguistic contexts can inform interpretation.

Participants were also interested in the landscape of moods, referring to the breadth and types of moods people experience. One participant proposed a "Wheel of Moods," analogous to Plutchik's "Wheel of Emotions," to visualize how moods connect and differ from one another.

The causes of mood were mentioned as another area of interest. Participants wanted to understand the processes behind mood states and the internal (e.g., need satisfaction, personal health) and external (e.g., weather, time of day, social interactions) factors that shape them.

The manifestations of mood were noted as well. Beyond understanding the variety of moods, participants wanted to know what each mood represents to individuals, how they are likely to behave in different states, and what needs may emerge from them.

Additionally, participants expressed interest in understanding how mood impacts various aspects of life, including thoughts, behaviors, experiences, and interactions with others and the environment.

3.3.4.2. General Design-Focused Knowledge

Participants identified three areas of knowledge for incorporating mood into design: (1) influencing mood through design, (2) triggering mood's impacts through design, and (3) utilizing mood in the design process.

First, participants asked for theoretical frameworks describing how products, services, or environments can affect mood states, and under what conditions such effects occur. They also mentioned principles for how specific design choices, such as product qualities or service interactions, can shape particular moods or guide users toward these states.

Second, participants wanted to know how design can trigger mood-related impacts. They noted that such knowledge could help refine design intentions and achieve more effective outcomes, such as deliberately inducing certain moods to encourage meaningful behavior changes.

Third, participants pointed to knowledge about how to use mood within the design process. They mentioned ways of integrating mood into user research, such as mood-sensitive interviews or mood diaries. They also noted the role of mood in shaping user preferences and behaviors, and how this information could inform design qualities and business strategies.

3.3.4.3. Design Project-Specific Knowledge

Participants expressed the need for tools to support different stages of a design project, grouped into five categories: (1) tools for understanding, (2) tools for goal setting, (3) tools for designing, (4) tools for evaluation, and (5) tools for self-development. These categories reflected the design challenges they described, making it natural for them to propose corresponding supports.

For understanding, participants wanted tools that facilitate communication about moods with users and team members, reducing misunderstandings. They also envisioned tools to help identify moods accurately, such as systematic guides for interpreting moods during interviews and self-report tools for users. Moreover, they sought tools that foster empathy, enabling designers to immerse themselves in users' lived mood experiences.

For goal setting, participants mentioned tools that support determining or prioritizing mood-related aims. Some envisioned AI-driven systems capable of analyzing user data to suggest desirable mood experiences or to help navigate trade-offs when multiple mood-regulation needs exist.

In the designing stage, participants called for tools that enable exploration of various mood-focused design exemplars and provide inspiration from prior projects. They also saw value in tools for sharing mood-related design experiences within teams to encourage collective learning and foster creativity.

For evaluation, participants asked for tools to measure user moods before and after a design intervention, as well as tools to validate whether observed effects are due to the design intervention rather than external influences.

Finally, participants mentioned tools for self-development to become more mood-sensitive designers. These tools could allow them to experience and internalize a range of moods, improving their ability to capture, understand, and empathize with user moods. They also wanted tools to enhance mood-regulation skills to manage participant negativity, often present when working with vulnerable groups or sensitive topics.

3.3.5. Obstacles to Applying Mood-Focused Design in Practice

During the interviews, participants expressed mixed feelings about applying mood-focused design in real-world projects. On the one hand, they showed a positive attitude toward the idea and even discussed potential applications for future projects. On the other hand, their actual motivation to implement mood-focused design remained low due to four main obstacles.

First, a foundational gap in understanding mood and mood-focused design, and a lack of concrete methodological approaches were seen as major barriers. As one participant remarked:

> As a designer, if I'm aware [that] there's a certain [desired] mood or my user is in a certain mood, [but] it's not operational, like how to influence it or deal with it, I think I still wouldn't use it in the design process. (P18)

Second, collaborative efforts face hurdles, since design teams often consist of members with diverse educational and professional backgrounds. This diversity makes it difficult to build a shared understanding of the relevance of mood. A design team leader emphasized the difficulty of raising awareness:

> I already have put a lot of effort into having people talk about emotions. … If you also put mood in the mix, I'll only have a difficult time explaining the difference between emotion and mood and telling it's important to focus on mood. (P19)

Third, participants pointed out that although designers increasingly recognize mood's relevance, its societal and economic benefits remain unconvincing to clients and decision-makers. As one participant explained:

> Since COVID, I think more people are aware that this is important, but still, there are a lot of people, clients or decision-makers, who are not. They think, "We can just make it [work], and it doesn't matter how people want to feel." For these people, [the topic] is still a bit too "fake." (P20)

Lastly, some participants noted that their companies, still new to emotional design, remain anchored to conventional user experience (UX) design paradigms. Mood-focused design introduces additional complexities their teams are not yet prepared to handle. One participant stated:

> In my current company, [we] wouldn't do it right now. We're just starting with the emotions; taking customer moods into account would be too much of a next layer. (P15)

3.4. DISCUSSION

This study explored how design practitioners consider and approach user or customer mood in real-world projects, the challenges they encounter or perceive, and the areas of knowledge they regard as essential for mood-focused design. In this section, we first reflect on practitioners' experiences in addressing mood and discuss the broader implications of these findings for advancing understanding of mood-focused design. We then turn to the challenges and knowledge gaps identified, highlighting research and educational opportunities that could better support future practice in this area.

3.4.1. Advanced Understanding of Mood-Focused Design

We found that many designers address mood implicitly, even when their projects are not explicitly framed as mood-focused. This implicit engagement took several forms. Some used expressions like "better feeling" or "well-being" instead of naming mood directly, while others folded mood into broader objectives such as enhancing customer experience or satisfaction. Because mood often operates as a background experience below conscious awareness, it was sometimes incorporated into user profiles as part of personality traits rather than treated as a distinct consideration. Designers also drew on past experiences influenced by mood, recognizing, for instance, that "happier users" achieve better outcomes, and striving to uplift them without explicitly framing it as a mood-related goal. In projects with vulnerable groups, inherent user negativity often prompted designers to respond to mood-related issues without

consciously acknowledging mood as part of their approach. We reflect that such implicit engagement may be enabled by empathy developed through years of user-centered practice (Kouprie & Visser, 2009), the accumulation of tacit knowledge (Thoring et al., 2022), and the adoption of holistic approaches to experience design (e.g., Desmet & Hekkert, 2007; Hassenzahl, 2010; Norman, 2004), all of which appear to foster the natural integration of mood into design. By making these implicit efforts explicit, our study deepens understanding of how mood is embedded in design work and extends prior research that has documented more deliberate efforts to influence users' or customers' moods (Peng et al., 2023).

Our study identified five approaches that practitioners use to address mood in design, either valuing it as an end in itself or leveraging it as a means to enhance engagement, enrich experience, create differentiation or advantage, and facilitate user research. The first approach treats positive mood as intrinsically valuable—a legitimate design goal in itself, independent of external aims. This view resonates with perspectives in happiness and well-being studies (e.g., Fredrickson, 2003; Haybron, 2008), where the state of feeling good is regarded as a fundamental life goal. The other four approaches emphasize the instrumental value of mood, positioning mood improvement as a useful tool to achieve other desirable outcomes. This framing echoes perspectives on mood's role in healthcare, where positive mood improves recovery and treatment adherence (e.g., Jamison et al., 1987); in marketing, where it influences consumers' purchasing behavior (e.g., Spies et al., 1997); and in organizational management, where it shapes collaboration and performance (e.g., Totterdell, 2000). Notably, in our dataset, designers most often pursued mood's instrumental value in real-world projects, especially when it was tied to commercial success, such as increasing adoption and boosting sales. Conversely, treating mood as an end in itself was less common and appeared more often in initiatives where individuals and teams sought to embed social good into their missions. This differs from design research, which shows a stronger and more explicit orientation toward mood's intrinsic value, often framed as an indicator of well-being in its own right (Desmet, 2015). By highlighting the more pragmatic considerations of mood in design practice, in comparison with those in design research, our study enriches understanding of mood-focused design across contexts.

To translate our findings into concrete insights for design practice, we propose a nuanced addition to Desmet's (2015) conceptualization of mood-focused design. We suggest that designers can not only design *for* mood (DfM) but also design *with* mood (DwM). While DfM seeks to influence mood directly (e.g., easing anxiety or fostering relaxation), DwM leverages mood and its effects to achieve other outcomes (e.g., product adoption, user engagement, or satisfaction).

Distinguishing between DfM and DwM at the outset of a project can facilitate the design process and support more effective design outcomes. First, it helps set clear design goals and success metrics: DfM's success is measured by the extent of mood improvement, whereas DwM's success is measured by how well broader objectives are met. Second, it guides the choice of tailored design strategies. DfM targets specific moods, requiring strategies that directly link design features to desired moods, such as creating

nature-inspired experiences for relaxation (C. M. Kim et al., 2022) or laughter cues to induce a playful mood (Lee et al., 2014). DwM, by contrast, seeks to foster an overall positive mood in a broader context, relying on strategies that improve moods from a general perspective, such as transforming customer negativity during service encounters (Esnaf-Uslu et al., 2022). Third, it informs collaboration with the right expertise. DfM is particularly relevant in healthcare and wellness, where psychologists and well-being specialists play a central role, whereas DwM is more applicable in corporate and educational settings, where business strategists and behavior experts are critical.

Although their primary goals differ, both DfM and DwM center on mood regulation: in DfM, mood regulation is the ultimate design goal, while in DwM, it is the key design method. This shared foundation makes them closely intertwined in practice. For instance, following DfM, a mental healthcare institution may design to maintain patient positivity (e.g., Hung et al., 2019; Yan et al., 2024), while also achieving DwM outcomes such as greater adherence to medical advice and healthier behaviors. Conversely, managing group mood to enhance collaboration exemplifies DwM (e.g., Ashoori et al., 2015; Benke et al., 2020), yet the resulting successful teamwork may also elevate group members' moods, aligning with DfM goals. Recognizing the interplay between DfM and DwM—while maintaining their conceptual distinction—is therefore important. It allows designers to be explicit about intentions, select appropriate strategies, and better harness the synergies between the two. In doing so, mood-focused design can more effectively support both intrinsic well-being benefits and broader experiential or commercial outcomes.

3.4.2. Research and Educational Opportunities for Mood-Focused Design

Our study uncovered challenges at every stage of mood-focused design, ranging from the difficulty of precisely communicating about moods to the complexity of validating their effects. These findings underscore that mood-focused design remains a demanding and underdeveloped area in need of more deliberate inquiry. Confronting those challenges has also amplified designers' need for deeper knowledge of mood, theories for integrating it into design, and practical tools to support the process. Each of these gaps represents a promising direction for research to advance the field. In what follows, we highlight research and educational opportunities that we see as particularly relevant and actionable in the near term, with potential to strengthen mood-focused design practice.

One opportunity lies in developing mood typology-informed resources. Designers currently lack a shared vocabulary for describing mood, and a comprehensive typology could help address this gap. Although recent work has mapped both individual and group moods (e.g., Sönmez et al., 2022; H. Xue et al., 2020), these typologies remain difficult to apply directly in practice. Future research could build on them to create resources that support user expression and strengthen designers' empathy and evaluation skills. For example, self-report tools could help users articulate their current and desired moods while also supporting subjective mood measurement. Beyond visual materials (e.g., Desmet et al., 2020), these tools might emphasize more embodied experiences, such as hand-held objects (e.g., H. Xue et al., 2023) or multimodal interactions. In parallel, self-cultivation tools could enable designers to experience and

internalize different mood states themselves, thereby enhancing their mood sensitivity and empathy. Existing interventions such as sensitizing movies (e.g., Sönmez, 2024) and role-playing games (e.g., Desmet et al., 2019) illustrate this potential, but more technology-driven approaches, like mood-themed virtual environments, present further possibilities.

Another opportunity is building a repository of mood-focused design exemplars. Such a repository could be assembled from literature, company reports, and student projects, much like existing Design Research Observatories (https://observatory.designresearch.works/) or curated collections of mood-sensitive design (https://www.trendhunter.com/slideshow/mood-sensitive-design). The repository would allow designers to reflect on their own implicit mood experiences and make these insights more explicit. Engaging with exemplars can deepen awareness of how mood manifests and how it can be addressed in design. Exemplars can also clarify intentions, strengthen communication within teams, and guide method selection by offering concrete references from prior work. Importantly, well-documented exemplars can broaden practitioners' scope of design possibilities and provide inspiration for ideation and prototyping (Zimmerman et al., 2010).

A third opportunity lies in developing intermediate-level knowledge. The current lack of effective methods and strategies presents a key challenge to mood-focused design. Because this field is still evolving, it is premature to pursue a unified, systematic methodology. Instead, following Höök and Löwgren (2012), we propose that strong concepts—abstract yet practical design ideas distilled from successful projects—could be valuable at this stage. They bridge theory and practice by capturing essential qualities of interaction and making them transferable across contexts. Mood-focused design has few explicit strong concepts to date, though prior work on playful mood induction demonstrates the potential of this approach (Hobye & Löwgren, 2011). Research-through-design offers a way to develop and refine such concepts iteratively (Koskinen et al., 2011; Stappers & Giaccardi, 2017). We envision mood-focused strong concepts serving as generative design strategies that support design rationales and decision-making while advancing both theoretical and practical understanding of mood in design.

Finally, there is a distinct opportunity to expand design education and training related to mood. The limited knowledge designers currently have for engaging with mood reflects its absence in most design education. Rather than proposing stand-alone courses at this early stage, we suggest weaving mood into existing curricula in three complementary ways. First, introductory courses on human-centered or experience-driven design could foreground mood as a crucial dimension of human experience, enabling students to develop sensitivity to users' subtle and multifaceted lived experiences. Second, emotion-centric courses could incorporate mood as complementary content through lightweight workshops that invite students to reflect on their own and others' moods. While emotions are already complex to teach, we believe that considering mood alongside them enriches rather than complicates understanding, as the two concepts offer fresh perspectives on one another. Third, mood regulation could be integrated into specialized courses on design for well-being or health, where mood-regulating design examples

illustrate intervention possibilities and provide a concrete, relatable context for students' design exercises. Embedding mood in these courses could, in turn, strengthen undergraduate and graduate designers' awareness and ability to engage with mood more effectively in future practice.

3.4.3. Limitations of This Study

This study has several limitations. First, we recruited twenty participants, but only twelve reported mood-related design experiences. While the diverse design projects described by these participants allowed us to identify five key approaches, these may not represent the entire spectrum of current practices in mood-focused design. Further research with a larger sample is needed to confirm and extend these findings. Second, our participants were all designers working in the Netherlands and Finland. Because design practice varies across cultural and regional contexts, our findings may not be fully generalizable. Future studies involving designers from other regions with strong human-centered design traditions—such as the US, the UK, or Japan—could offer a more comprehensive picture of how mood is incorporated into practice. Third, our exploration focused on practitioners working broadly within experience design, where mood was often addressed indirectly or implicitly. Engaging designers who work with mood more explicitly—for example, developers of mood-tracking apps or mood-lighting products—could reveal additional pragmatic orientations to complement and refine our findings.

3.5. CONCLUSION

This chapter presents a study of how design practitioners consider and approach user or customer mood. Our findings show that mood, while not always explicitly acknowledged, is often implicitly integrated into designers' work. We identified five recurring patterns in which designers treated mood as an end in itself or leveraged it to enhance engagement, enrich experience, create differentiation or advantage, and facilitate user research. These insights suggest that designers can not only design for mood but also design with mood, extending our understanding of what mood-focused design entails. We encourage practitioners to be explicit about this distinction at the outset of projects and use it to clarify design intentions, select appropriate strategies, and harness the synergies between the two. At the same time, our study surfaced a range of challenges and knowledge gaps that hinder practice. To address them, we pointed to opportunities for future work, including the development of mood typology-informed tools, a repository of design exemplars, intermediate knowledge such as strong concepts, and the integration of mood as a crucial dimension into human-centered design education and training. Together, these opportunities outline a research and educational agenda that can strengthen the foundations of mood-focused design and support its practical application.

CHAPTER 4

Our Own Exploration of Mood as Researcher-Designers I: Unraveling the "Sunday Blues"

This chapter is based on a manuscript currently under review: Peng, Z., Sethi, H., Xue, H., Hu, J., Kolks, L. A. G., & Desmet, P. M. A. Unraveling the "Sunday Blues": Manifestations, contributing factors, and coping strategies.

4.1. INTRODUCTION

Imagine it is Sunday evening. The weekend has slipped by too quickly, leaving you with a sense of sadness. At the same time, your mind begins to fill with worries about the upcoming workweek: looming deadlines, a packed schedule of meetings, unfinished tasks carried over from last week, and the list goes on. If this scenario sounds familiar, you may have experienced the so-called "Sunday Blues."

The term "Sunday Blues," often used interchangeably with "Sunday Scaries" and "Sunday Night Blues," refers to the dip in mood that occurs at the end of the weekend as the new workweek approaches. A recent survey suggests this phenomenon is widespread among employees, with 80% of respondents reporting frequent experiences of it (Heitmann, 2018). Typically characterised by stress or anxiety (Tufvesson, 2022; Zuzanek, 2014), the "Sunday Blues" directly impacts subjective well-being (Akay & Martinsson, 2009; Csikszentmihalyi & Hunter, 2003; Mihalcea & Liu, 2006), and repeated exposure to these feelings may even contribute to negative health outcomes (e.g., Cohen et al., 2015; Kessler, 1997).

Due to its prevalence, the "Sunday Blues" has gained significant attention in popular media, with numerous blogs, podcasts, and wellness platforms addressing the topic and suggesting coping strategies (e.g., Headspace, 2021; Pinsker, 2020). Despite this wide recognition, the phenomenon remains underexplored in scientific research. While studies on weekly mood fluctuations have touched upon the "Sunday Blues" (e.g., Ryan et al., 2010; Suhara et al., 2017; Zuzanek & Mannell, 1993), a comprehensive understanding is still lacking. Researchers have described it in various ways, such as "emotional discomfort at the doorstep of a new week" (Zuzanek, 2014, p. 7), "anxiety or dread experienced the day before heading back to work after the weekend" (Tufvesson, 2022, p. 50), and a "depressed [feeling] by virtue of heralding in another long week" (Mihalcea & Liu, 2006, p. 142). However, little is known about how this phenomenon specifically manifests, what factors contribute to it, and how it can be effectively managed.

This gap has important consequences. Without a clear understanding, employees may struggle to make sense of their emotional experiences or to take effective steps to protect their well-being. At the same time, the lack of empirical knowledge limits research seeking to develop interventions that address this mood issue.

To address this gap, the present study explores how employees experience and cope with the "Sunday Blues." Specifically, it asks: (1) What does the "Sunday Blues" feel like to individuals? (2) What individual and contextual factors contribute to its occurrence? (3) What coping strategies are commonly used to manage it?

4.2. METHOD

To investigate our research questions, we conducted focus groups, which are well-suited for generating rich, in-depth insights into socially relevant phenomena through collective reflection (Acocella, 2012). This section outlines our participant recruitment process, study procedures, and approach to data analysis.

4.2.1. Participants

Using convenience sampling, we recruited participants from a university-based research pool and our professional networks in the Netherlands. To enable in-person focus groups, we selected individuals who were willing to attend sessions at the university. Eligible participants were required to: (1) be 18 years of age or older, (2) be employed, (3) typically start their workweek on Mondays, and (4) frequently experience, or have previously experienced, unpleasant feelings on Sundays in anticipation of the new workweek. Participants also needed to feel comfortable conversing in English. We conducted six focus groups, each consisting of three to five participants (see Table 10). The sample size aligns with Hennink and Kaiser's (2021) recommendation that four to eight focus groups are generally sufficient to reach data saturation. The size of each group is consistent with Clarke and Braun's (2013) suggestion that smaller groups (three to eight participants) foster richer discussion and are easier to manage. Ethical approval of this study was obtained from the Human Research Ethics Committee of Delft University of Technology (TU Delft, the Netherlands). All participants provided informed consent before taking part in the study and received a fifty-euro voucher as compensation.

Table 10. Overview of participants.

Group name	Group size	Participant code	Age	Working domain
Group 1	4	G1P1, G1P2, G1P3, G1P4	52-65	Healthcare, Transportation and Logistics, Food and Beverage, Elementary Education
Group 2	3	G2P1, G2P2, G2P3	42-64	Standardization and Certification, Professional Services, Healthcare
Group 3	5	G3P1, G3P2, G3P3, G3P4, G3P5	29-65	Wholesale and Retail Sales, Professional Services, Semi-government, Higher Education, Information Technology and Services
Group 4	4	G4P1, G4P2, G4P3, G4P4	26-32	Higher Education, Information Technology and Services
Group 5	5	G5P1, G5P2, G5P3, G5P4, G5P5	26-29	Higher Education
Group 6	5	G6P1, G6P2, G6P3, G6P4, G6P5	25-29	Higher Education, Information Technology and Services

4.2.2. Procedure and Research Materials

4.2.2.1. Sensitization

Prior to the focus groups, participants completed a sensitization task designed to increase their awareness of their contexts, routines, and mood shifts on Sundays. This task involved two online diary entries, completed on consecutive Sunday nights before bed, and was structured into four sections.

First, participants reflected on the highlights and low points of their weekend. Second, they described their mood during the daytime on Sunday and at the time of writing, selecting characters from Pick-A-Mood (Desmet et al., 2016) to represent their feelings and explaining their choices. Third, they noted their expectations and apprehensions for the upcoming week, highlighting any specific events they anticipated or dreaded. Lastly, they reflected on their general awareness of their everyday moods and their strategies for managing unpleasant moods on Sunday evenings.

As a final preparation step, participants revisited their two diary entries a day before the focus group. Further details about the Sunday night diary are provided in Appendix G.

4.2.2.2. Focus Group

Each focus group followed a five-stage structure: (1) warm-up; (2) exploring the "Sunday Blues"; (3) understanding influencing factors; (4) identifying coping strategies; and (5) wrap-up (see Appendix H for the full focus group guide).

We began the warm-up with an icebreaker where participants shared their current moods. We then addressed ethical considerations, such as data privacy, and encouraged participants to engage in dialogue with one another rather than respond solely to the researcher.

In the second stage, we introduced our working definition of the "Sunday Blues" as "the not-so-great feeling we get when the weekend is ending and the workweek is just around the corner." We first asked participants to discuss their general experience, frequency, and when they typically notice the "Sunday Blues" setting in. We then inquired about specific aspects of their experience, including their mental and physical feelings, changes in perceptions of their own lives and surroundings, their reactions to others, and any behaviors and preferences that arise.

The third stage focused on the reasons behind the "Sunday Blues." Initially, we allowed for open discussion, encouraging participants to reflect on and share personal experiences. To prompt further insights, we provided a set of "factor cards" (see Appendix I) that illustrate potential influencing factors, which were identified from diaries participants had completed in the prior sensitization task. We asked participants to identify which of these factors resonated with their experiences beyond what had already been discussed in the focus group.

In the fourth stage, participants discussed coping strategies. They began by sharing their typical approaches, after which they reviewed a set of "strategy cards" (see Appendix J) illustrating potential coping methods. These were similarly derived from participants' diaries and served to stimulate additional ideas and discussion.

Finally, in the wrap-up, we asked participants to describe how they would ideally like to feel on a Sunday evening as an alternative to experiencing the "Sunday Blues." To support coping beyond the focus group session, they received a self-care booklet (see Appendix K) offering recommended strategies and activities.

All focus groups were moderated by the first author, with notes taken by the second author. Each session, lasting two to three hours, was audio-recorded for later analysis. Data collection took place over the course of one month.

4.2.3. Data Analysis

All audio recordings were transcribed verbatim, with participant names, organization names, and geographical locations anonymized to protect privacy. We conducted template analysis, a more structured form of thematic analysis commonly used in qualitative psychology research, which combines inductive coding with the development and use of a coding framework (Brooks et al., 2015; King, 2012). Drawing on King's guidance (2012), our analysis involved six key steps: (1) familiarization with the data; (2) coding; (3) clustering codes; (4) developing an initial coding template; (5) iteratively refining and finalizing the template; and (6) reporting the findings.

Familiarization occurred during transcription. Two researchers (the first and second authors) independently conducted open coding on two randomly selected transcripts (from a total of six) using ATLAS.ti, generating initial codes and organizing them into thematic clusters. To support the analysis of participants' coping strategies for the "Sunday Blues," we incorporated Desmet's (2015) categorization of mood-regulating activities as a set of *a priori* themes; however, these were treated as provisional and open to revision or removal as the analysis progressed (King et al., 2017). The preliminary codes and themes served as the basis for a discussion between the two researchers to align perspectives and develop an initial coding template. This template was then applied to the remaining transcripts. Both researchers independently coded the data and met regularly to review findings and revise the template in response to emerging insights. This iterative process allowed for the addition, modification, and/or redefinition of codes and themes throughout the analysis. The final coding template was reviewed and agreed upon by all authors when reporting the findings.

4.3. RESULTS

Through six focus group discussions, we examined how the "Sunday Blues" manifests, which factors influence it, and which coping strategies individuals use. In this section, we present our findings by organizing codes into structured tables under each thematic area, and by providing narrative accounts of them to ensure both clarity and detail.

4.3.1. Manifestations of the "Sunday Blues"

What does the "Sunday Blues" feel like to individuals? Our analysis revealed five thematic clusters: the general qualities of the "Sunday Blues," along with its affective, physical, cognitive, and behavioral components.

4.3.1.1. General Qualities

Nine key characteristics of the "Sunday Blues" emerged (see Table 11). The experience is often elusive and abstract, making it difficult to pinpoint its exact nature or causes. For many, it is mild to moderate in intensity—more of a subtle emotional undercurrent than an overwhelming state. However, in certain situations, such as when anticipating a high-pressure workweek, the feeling can intensify significantly. Despite these variations, the "Sunday Blues" is generally short-lived, typically peaking on Sunday evening or Sunday night before fading as the new week begins. Its focus can range from a diffuse sense of unease to specific responses to stressors, such as looming deadlines or interpersonal challenges at work. Emotionally, it tends to be multilayered, often involving a blend of feelings such as sadness, anxiety, and regret. These layers shift in prominence depending on personal circumstances. The experience is also dynamic: it may build gradually, spiral downward, or reinforce itself through patterns of avoidance or inaction. Notably, the "Sunday Blues" is not a consistent or routine occurrence. Its presence depends on situational factors such as workload, social interactions, and ongoing life events. Each episode carries unique nuances, shaped by the week's specific context. Furthermore, the phenomenon has a social dimension, often unfolding within close relationships or among peer groups who share Sunday evenings, where one person's mood may influence others or even shape the collective atmosphere.

Table 11. General qualities of the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Intangibility	The "Sunday Blues" is an ambiguous and rather abstract experience, often difficult to define or attribute to a specific source.	– "For me in general, the 'Sunday Blues' is very, very vague. … I didn't know what it is, why it came, and what's the cause." (G5P4)
Low intensity	The emotional tone of the "Sunday Blues" is typically mild or moderate, although it can occasionally be intense depending on circumstances.	– "It's not very heavy, but I know it's there." (G1P1) – "Every week, I felt very strong 'Sunday Blues' because I had a meeting with my supervisor on Monday morning" (G5P3).
Limited duration	The "Sunday Blues" is transient in nature, typically confined to Sunday evening or the period leading up to Monday.	– "Actually, they are very short, momentary feelings … [only] till the start of Monday morning." (G6P2)
Diffuseness and focus	The "Sunday Blues" may manifest as a broad, undefined sense of unease, or be tied to specific stressors, such as particular people or events.	– "I just had a slight nag, like something pulling at you. This is [more] general than others because it could [also] be something specific, and then it's different. Then you might be saying, 'Oh, the idiot you're into, or the team and the people you have to manage, or something like that.'" (G2P2)
Multilayered composition	Rarely singular in nature, the "Sunday Blues" often involves a combination of multiple, co-occurring emotional states.	– "Basically, my 'Sunday Blues' was like you're tired, distracted, postponing, a bit of bored … Also, that anxious feeling was there." (G6P5)
Dynamic progress	The "Sunday Blues" may build gradually or evolve over time, sometimes reinforcing itself through avoidance or inaction.	– "As the time is approaching, the negative emotion is getting more." (G6P4) – "I'm like in a downward spiral, sucking everything [negative] with me." (G1P3) – "One of the things I would ideally want to do is to call my family. But if I feel bad at the 'Sunday Blues,' and then I feel like, 'Oh, now I really don't feel like calling them.' And then I regret that decision." (G4P1)
Irregular occurrence	The "Sunday Blues" does not necessarily occur every week; its occurrence is shaped by situational factors like workload, interpersonal dynamics, and broader life events.	– "It depends on how much pressure is there on the work deadline, how relaxed are the others working with you, or if there're other things going on." (G2P2)
Nuances with each occurrence	Each experience of the "Sunday Blues" can feel slightly different, influenced by the context of that particular week.	– "There are different kinds of experiences, but the overwhelmed feeling of not being able to do all the things I want to do, that's relatively a recurring feeling … If I'm frustrated with someone, like, I have an issue with a colleague, that would be a different kind." (G4P1)

Table 11. Continued.

Code	Explanation	Example participant statement(s)
Social contagion	The "Sunday Blues" can be socially contagious, spreading within relationships and affecting group dynamics.	– "It's my husband [and I] not having the same feeling of satisfaction about the weekend … then you get arguing. Actually, it's his 'Sunday Blues,' but it gets spreading to me." (G1P4) – "When you say goodbye to your friends on Sunday evening, if someone is complaining, 'Oh no, the next day is Monday, we have to work,' I feel everyone is not that happy. It also affects [me]." (G4P4)

4.3.1.2. Affective Components

Participants reported a range of emotional experiences associated with the "Sunday Blues" (see Table 12). At the front was anxiety, often linked to worries about the upcoming week. These included fears of potential difficulties in ongoing projects, underperformance, or receiving negative feedback. Stress was also frequently mentioned, though it had a different focus. While anxiety centered on uncertainties, stress was more about feeling overwhelmed by known responsibilities, such as unfinished tasks from the previous week or approaching deadlines. Sadness or melancholy was another common experience, reflecting a sense of loss as the weekend came to an end. Many participants expressed regret over not meeting personal goals or "making full use" of their weekend, often accompanied by self-blame. In contrast, some described a sense of emptiness, arising from the abrupt shift from a fulfilling weekend to a quieter, less stimulating Sunday evening. This quiet period also appeared to bring on feelings of helplessness and/or inadequacy, particularly when participants reflected on broader challenges or uncertainties that felt beyond their control.

Table 12. Affective components of the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Anxiety	Feeling uneasy or apprehensive about uncertainties in the upcoming week, often fearing negative outcomes.	– "Basically just being anxious about the next day in general because I don't know what the next day will bring in." (G3P2) – "I was a bit nervous about how the workshop would go and how the patient would react." (G6P5)
Stress	Feeling overwhelmed or pressured by upcoming responsibilities, workload, or expectations for the week ahead.	– "Sometimes I feel like there's just too many things and no way of doing them all. So, then, I get overwhelmed." (G4P1) – "Normally, I have a clear goal of what is going to be achieved in the next week. So, on Sunday night, these goals will immediately go to my mind and make me feel stressful." (G6P2)
Sadness	Feeling down or melancholic as the weekend, here understood as a time for rest and enjoyment, is over.	– "When it's turning dark [on Sunday], I feel a bit emotional." (G6P4) – "What I meant by 'sad' is more about why the weekend is too short." (G6P2)
Regret	Feeling remorseful for wasting precious weekend time or failing to achieve personal goals.	– "I've got regret for things that I did want to do on the weekend [but] did not do." (G3P2) – "The regret would be another situation where I feel like I've wasted time on something that didn't turn out as good as I thought." (G4P1)
Emptiness	Feeling a sense of void or lack of purpose as the weekend winds down and activities taper off.	– "All of a sudden, it's gone. It's over. And then your schedule is empty. But you also feel empty on the inside because you have nothing to live for or to look forward to." (G1P3)
Helplessness	Feeling powerless or unable to manage one's emotional states or anticipated challenges in the week ahead.	– "It's about my uselessness … because at that moment, I cannot do anything about it." (G5P4)

4.3.1.3. Physical Components

Participants described a variety of bodily sensations associated with the "Sunday Blues" (see Table 13). A common experience was fatigue, characterized by low energy and often attributed to either an overly active weekend or lingering exhaustion from the previous workweek. In contrast, some reported feeling restless—a sense of inner agitation that made it difficult to unwind or stay still. Several participants noted specific physical discomforts, such as tightness or pressure in the head that sometimes escalated into headaches, and an accelerated heart rate that heightened their sense of unease. Alongside these, many described a sensation of heaviness or tension in the stomach, while others experienced strong cravings for particular foods, especially those offering comfort or stimulation. Muscle stiffness or tension was another prevalent experience, reflecting how stress was carried in the body, and for some, this emotional strain left them feeling vulnerable and on the verge of tears.

Table 13. Physical components of the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Fatigue	A general sense of tiredness or low energy throughout the body, often tied to overexertion during weekend activities or residual exhaustion from a demanding workweek.	– "Sometimes feeling exhausted while I was doing particularly active things during that day. So, an errand exhaustion." (G3P5) – "Maybe mentally I'm getting more relaxed during the weekend, but physically I'm getting more tired sometimes, especially if I have a really busy week." (G4P3)
Restlessness	A feeling of agitation and inability to settle or relax, marked by a persistent but unfocused urge to take action.	– "You cannot sit down, and you feel you have to do something, but you do not do anything really." (G3P4)
Head pressure	A sensation of tightness or heaviness in the head that could develop into headaches.	– "I feel there's some kind of pressure, overpressure, in my head." (G3P5)
Increased heart rate	A noticeable acceleration in heartbeat that could heighten awareness of physical unease.	– "I can feel my heart rates are going this higher." (G3P5)
Stomach discomfort	An uneasy, heavy, or aching feeling in the stomach, sometimes spreading through the body.	– "Nearly an ache, it's a feeling of misery inside your stomach. Something heavy on your stomach." (G1P3)
Food cravings	Strong desires for specific or comforting foods, usually driven by other needs than hunger.	– "It's not like I feel hungry. It's like I feel my needs for the food, especially the spicy food." (G6P4)
Muscle tension	Felt tightness or stiffness in muscles, often associated with stress or emotional strain.	– "I feel being tensed up … I feel it in my body that the tension is over my muscles." (G3P3)
Tearfulness	A sensation of being close to tears, typically in response to anxiety or distress.	– "If I'm anxious and worried, I do feel close to tears." (G3P2)

4.3.1.4. Cognitive Components

Participants described multiple thought patterns linked to the "Sunday Blues" (see Table 14). A pervasive pessimistic mindset often shaped how they interpreted their situations and life in general, with work challenges perceived as insurmountable and their own efforts deemed lacking value. Many reported a constant mental rehearsal of the upcoming week, repeatedly anticipating responsibilities and work demands, which made it difficult to stay in the present moment and relax. In contrast, others experienced difficulty concentrating or organizing their thoughts as if trapped in a mental fog, often leaving them feeling overwhelmed and disoriented. Excessive analysis was also common; participants found themselves caught in prolonged episodes of rumination, revisiting past decisions or imagining negative outcomes. Underlying many of these patterns was a strong tendency toward self-criticism, with participants engaging in harsh self-judgment and blame over perceived failures or an inability to maintain balance between work and personal life.

Table 14. Cognitive components of the "Sunday Blues."

Code	Explanation	Example participant statement(s)
General negative outlook	A pervasive tendency to interpret situations, tasks, or life in general through a pessimistic lens.	– "Everything seems so negative. You experience it as worse and harder than it might actually be." (G1P3) – "I think very little of myself, so then my life has no value." (G3P2)
Preoccupation with upcoming tasks	Persistent mental focus on upcoming responsibilities and work demands, hindering the ability to stay present and relax.	– "All the tasks are going to be getting in fluctuating in your head, like, 'I need to do this, I need to present something, etcetera, etcetera.'" (G6P1)
Difficulty concentrating	A sense of mental fog or lack of clarity regarding current conditions or tasks, resulting in feelings of overwhelm and/or disorientation.	– "I have a 'foggy' mind. The tasks I have to do are not clearly listed, so it feels like I have so much to do." (G5P2)
Excessive analysis	Overanalyzing various aspects of one's life, such as re-evaluating past decisions, second-guessing social interactions, or imagining worst-case scenarios.	– "I'm spiraling about negative things … for example, why did I choose to come to [this country]? I can really go back to my decisions." (G4P3) – "I get a little bit paranoid. … I'm like, 'Does somebody have this alternative motive for something?'" (G3P5)
Self-criticism	Harsh self-evaluation or blame, often focused on personal shortcomings or inability to manage responsibilities or life in general.	– "I get a little negative about myself. I'm giving myself negative feedback." (G1P4) – "It's me overthinking, 'Why I'm letting my work get so busy? Why am I doing this to myself? Why am I making it so difficult?'" (G2P1)

4.3.1.5. Behavioral Components

Participants described distinct behavioral patterns accompanying their experiences of the "Sunday Blues" (see Table 15). Most prominent was a tendency toward procrastination or inaction, with many avoiding tasks by sitting or lying down for prolonged periods, as if waiting for their situations to resolve themselves. This passivity often occurred alongside a quiet social withdrawal from others; participants described turning down invitations or disengaging from conversations to protect themselves from emotional drain. Decreased patience or tolerance also surfaced, with several noting a heightened sensitivity to minor frustrations and a tendency to respond more harshly than usual. In contrast, others attempted to regain a sense of control through compulsive activities—cleaning, organising, or engaging in busywork that appeared to be more about action than purpose. Changes in sleep were another notable pattern: for some, fatigue led to unusually early bedtimes, while others struggled with insomnia or delayed sleep, preoccupied with anxious thoughts about the week ahead.

Table 15. Behavioral components of the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Procrastination or inaction	Avoiding any active tasks by remaining still for extended periods, passively waiting for distractions or hoping situations will resolve themselves.	– "I'm sitting, waiting … I don't know for what I'm waiting." (G1P2) – "I feel lazy …I feel like I really need a stretch, but I don't have the motivation or energy to ask myself to start stretching." (G6P4)
Social withdrawal	Distancing oneself from social interactions, such as ignoring messages, declining invitations, or reducing engagement in conversations.	– "When my neighbor calls, I don't open the door." (G1P2) – "If someone asks me for help on Sunday evening, then I might not be that willing to do it." (G4P4)
Decreased patience or tolerance	Becoming easily annoyed by minor difficulties or inconveniences and reacting to others more negatively or abruptly than usual.	– "I can be upset quicker. I wrote in my diary about how I baked some pancakes and only three were good … then I get quickly irritable." (G2P1) – "I will not be that patient … and also my tone will be not that positive … People [can] really feel that I'm kind of annoyed." (G4P2)
Compulsive activities	Engaging in repetitive or seemingly unnecessary activities, not because of a specific purpose but due to an urge to stay busy.	– "I clean something up, organize it, bring order to chaos … but then I would say, 'Do I really have to be doing this right now?'" (G2P2)
Changes in sleep patterns	Experiencing changes in sleep, such as going to bed unusually early due to fatigue, struggling with insomnia due to racing thoughts, or staying up late to extend the weekend.	– "You can't go to sleep because you're having things in your mind, and then that fucks you up every second." (G3P5) – "I feel sleepy … so I need to go to bed earlier." (G4P2) – "It's a feeling of just wanting to extend the weekend as longer as I can, so I stay up late." (G6P2)

4.3.2. Contributing Factors of the "Sunday Blues"

What individual and contextual factors contribute to the occurrence of the "Sunday Blues"? Three categories of influencing factors emerged during our analysis: triggers directly leading to the "Sunday Blues," aggravators intensifying it, and mitigators alleviating its negative effects.

4.3.2.1. Triggers

Participants reported various triggers for the "Sunday Blues" (see Table 16). As Sunday evening unfolded, many described a sudden realization of a time for fun and relaxation coming to an end, often leaving them feeling sad. When weekends were packed with social events or household chores, participants commonly reported feeling mentally and physically depleted, which contributed to a sense of unpreparedness for the week ahead. In contrast, when the weekend failed to meet their expectations—due to unfinished tasks, disappointing experiences, or insufficient personal time—feelings of regret often emerged and lingered into the evening. Beyond reflecting on the weekend, participants also described a constant anticipation of the upcoming week, which frequently triggered anxiety, especially when they faced uncertainty around work demands, potential feedback, or social interactions. This anticipation became particularly stressful when they foresaw overloaded schedules or especially difficult responsibilities. For many, Monday itself emerged as a stressor, seen as an indicator of routine, responsibility, and, in some cases, the most demanding day of the week due to recurring meetings and heavy workloads. In addition to these psychological factors, tangible cues, such as early morning alarms or work-related messages, were frequently noted as stressful reminders of the return to work.

Table 16. Triggers for the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Loss of leisure	The realization that the weekend—understood here as a time of freedom, relaxation, and enjoyment—is ending.	– "My weekend of free time is almost over." (G3P3)
Insufficient rest	A lack of physical and mental recovery due to weekends filled with social activities, family obligations, or accumulated chores.	– "You don't rest enough because you're too busy being socially with other people." (G5P2)
Unfulfilled weekend expectations	The belief that the weekend has not met personal expectations, whether due to missed plans, unsatisfying activities, or a lack of meaningful time for oneself.	– "If there were something planned, but I didn't really do that, that makes me feel a bit unsatisfied with myself." (G4P4) – "If I didn't spend enough time for myself, I will feel a little bit disappointed." (G6P2)
Uncertainty about the week ahead	A lack of clarity around what the upcoming week may involve, including unclear workloads, unforeseen challenges, or uncertain feedback from others that could affect project progress.	– "I don't know what might happen, and I don't know whether I'll be able to handle them. And that makes me anxious." (G5P4) – "The panic moment you get on Sundays is like, 'Oh no, they're going to give me some feedback [tomorrow] … because if the feedback is not in favor of you or the work you did, that's going to be in a dilemma phase." (G6P1)

Table 16. Continued.

Code	Explanation	Example participant statement(s)
Anticipated challenges at work	The projection of a challenging workweek, including heavy workloads, looming deadlines, unresolved issues, structural barriers in the job, or difficult social dynamics at work.	– "One is the upcoming heavy workload because we get more and more work." (G3P2) – "There's a lot of things blocking me in my work, either software-related or people-related." (G3P5) – "It's been stressful at work with relationships and with people doing the power plays and stuff." (G2P2)
Monday as a stressor	Monday as a starting point of hectic routines, often perceived as the busiest day of the week due to recurring meetings or early work commitments.	– "The whole rush is starting up again." (G2P2) – "For all of us, it always is a busy Monday—it's quite one day." (G1P2)
Tangible reminders	Specific environmental or digital cues—such as emails or alarms—that interrupt the weekend mindset and signal the return to responsibilities.	– "When you go to bed, if you set the alarm clock, the blues kick in." (G2P3) – "If I get working emails on Sunday night, I will be extremely anxious." (G6P2)

4.3.2.2. Aggravators

Participants described a range of factors that intensified their experience of the "Sunday Blues" or increased the likelihood of its onset (see Table 17). Leading among these was an overall imbalance between personal and professional life, particularly the struggle to mentally disengage from work over the weekend, which often left participants prone to mental fatigue. Starting a new job also emerged as an aggravator: for some, it involved major life transitions, such as relocation or physical separation from loved ones; for others, the uncertainty surrounding a new role or probationary status served as a continuous source of insecurity. In parallel, a strong drive for visibility or success at work frequently introduced extra pressure, often prompting comparisons with peers and, in many cases, resulting in a sense of inadequacy or underachievement. Additionally, several participants described how ongoing personal ill-being left them in a more emotionally vulnerable state, amplifying feelings of reluctance or even dread in anticipation of the workweek.

Table 17. Aggravators for the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Work-life imbalance	Blurred boundaries between personal and professional life, often involving a perceived obligation to work during weekends and difficulties switching off.	– "I don't have a clear distinction [between] work and leisure. I'm still hopeful that there's an hour or two hours that I can squeeze [for work] on a Sunday." (G5P2)
Life transition	Navigating new roles or environments, often involving adjusting to changes such as physical separation from loved ones.	– "I'm used to doing the weekend with friends or my partner, and if I don't meet with them, then I feel a bit sad." (G4P3)
Job instability	Perceived uncertainty or insecurity in one's employment, such as being in a new role, on probation, or unclear about career direction.	– "There's a bit of uncertainty about where I'm going to end up, and that's always in the back of my mind." (G3P5)
High ambition	A strong internal drive for career advancement or visibility, often accompanied by self-imposed stress or performance pressure.	– "You want to have a promotion within the inside. You want to be visible. And that creates a bit of pressure you put on yourself as well." (G3P5)
Workplace social comparison	Comparing oneself to colleagues or peers, often resulting in feelings of inadequacy or underachievement.	– "I get a lot of pressure from others because [I feel] they did very well, but I didn't." (G5P3)
Personal vulnerability	Being in a mentally or physically vulnerable state, such as experiencing low motivation, burnout, or existential doubts.	– "The past few weeks I felt a bit burned out, so at Sunday night, I was filled with a bunch of negative feelings." (G6P3)

4.3.2.3. Mitigators

Participants mentioned several factors that helped reduce the intensity or frequency of their "Sunday Blues" (see Table 18). These included both environmental and social elements. A pleasant physical workspace, coupled with the presence of supportive colleagues, was frequently cited as making the return to work feel less daunting. Other work-related conditions also served to ease the transition. For instance, periods of lighter workload allowed participants to re-engage with their responsibilities more gradually, while autonomy over their schedule, pace, or work location provided a greater sense of control. Beyond these external factors, participants highlighted the role of intrinsic motivation—such as genuine interest in their projects or a broader sense of career satisfaction—in helping reframe work not as a burden, but as a meaningful and purposeful pursuit.

Table 18. Mitigators for the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Pleasant workspaces	A physically comfortable and aesthetically pleasing environment that makes returning to work feel more inviting.	– "I'm very glad with my workspace because I'm sitting next to a very big window from floor to ceiling … you get to see the daylight all day." (G2P3)
Healthy work relationships	Positive interpersonal dynamics, such as friendly colleagues or understanding managers, which foster emotional security.	– "I have a pretty relaxed life right now because I don't have a lot of people around me to push me." (G2P2)
Slow work periods	Periods of reduced workloads or less demanding schedules that allow for a more gradual transition back into work.	– "Recently, because the summer is coming, my workload is a little bit lower, so I feel okay." (G6P2)
Flexibility and autonomy	The ability to manage one's own schedule or work location that diminishes rigid return-to-work stress.	– "With the PhD, I don't feel that much actually, because it feels that your work schedule is so flexible as compared to being in a job … because I can swap days or work times." (G5P2)
Enthusiasm for ongoing work	Genuine interest or excitement about current tasks that makes work a source of purpose rather than a burden.	– "I don't feel I have too much 'Sunday Blues,' because many of my work I feel internally motivated to do so." (G5P1)
Career satisfaction	A deep sense of contentment with one's overall career path or professional identity.	– "I also want to be back to work because I love my job … I won't miss it for the world." (G2P2)

4.3.3. Coping Strategies for the "Sunday Blues"

What coping strategies are commonly used to manage the "Sunday Blues"? Our analysis uncovered three thematic clusters, including relief-focused, balance-focused, and resilience-focused coping strategies. Notably, many strategies aligned with our *a priori* framework—Desmet's (2015) categorization of mood-regulating activities—while context-specific strategies such as "plan the weekend thoughtfully" or "prepare for the coming week" also emerged as key approaches.

4.3.3.1. Relief-Focused Coping Strategies

Participants described a wide range of strategies focused on alleviating the negativity or intensity of the "Sunday Blues" (see Table 19). Many reported deliberately distracting themselves through hobbies or social interactions, while others engaged in activities chosen for their mood-enhancing qualities, ranging from relaxation and comfort to entertainment and refreshment. Self-reward was a common approach, often taking the form of indulgences or self-granted privileges. Some participants found relief by openly expressing their feelings, either to process their thoughts or to receive supportive feedback, whereas others preferred to suppress their feelings and maintain their usual routines to avoid amplifying their distress. Efforts to adopt more positive perspectives were also prevalent, with participants imagining ideal future scenarios or recalling past successes and joyful moments. Additionally, several individuals described drawing on personal traits, such as confidence, to foster a sense of control, or humour, to make the situation feel less difficult.

Table 19. Relief-focused coping strategies for the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Seek distraction	Shifting attention away from distress by engaging in hobbies, chores, entertainment, or social interaction.	– "You have something else to think about because you're talking with someone else." (G3P3)
Seek relaxation	Calming the body and mind through restful practices, such as meditation, deep breathing, or quiet solitude.	– "I might shut myself down sometimes … kind of lie on my bed … do some meditation." (G2P3)
Seek comfort	Turning to people, pets, or familiar objects to feel safe or at ease, such as drinking a favorite beverage, cuddling with pets, or seeking care from loved ones.	– "If I stay with my boyfriend and I feel my 'Sunday Blues' at that moment, I would like to ask for some comfort, like a hug or support from him." (G6P4)
Seek entertainment	Engaging in activities that bring laughter and amusement, such as watching comedies or playfully chatting with friends.	– "I like sending memes [to my friends] because it makes me laugh and lightens up the situation." (G4P3)
Seek refreshment	Taking actions that leave one feeling mentally and physically rejuvenated, like going for a walk outdoors or taking a long shower.	– "Long shower. That's actually better … It's like you have a new version of yourself, and it feels like stronger and more powerful than before." (G6P4)
Reward oneself	Giving oneself small treats or pleasures, such as indulging in a TV series, snacks, or window shopping.	– "I do a lot of window shopping. It's like a gift that can bring you some motivation to work again." (G6P1)
Vent the feelings	Expressing feelings openly, either by speaking to others or writing in a journal.	– "If I write my feelings down, then they're not that bad anymore." (G3P2)
Repress the feelings	Suppressing or ignoring difficult feelings by denying them or acting as if everything is normal.	– "If I don't keep thinking about it, it's just a 'fake' feeling." (G5P4)
Think positively	Focusing on the bright side of situations, such as the remaining time to relax, past achievements, or hopeful future outcomes.	– "What you think was, 'Oh, but I'm only going to work on it tomorrow. I don't have to do it now.'" (G2P2)
Recall happy memories	Looking back on meaningful or happy past experiences, for example by revisiting photo albums or social media posts.	– "It's like the reminiscence therapy … making you feel that your life was not wasted … you had a lot of beautiful memories." (G6P2)
Use personal traits	Relying on one's inherent strengths, such as resilience, humor, or a confident mindset to manage emotional discomfort.	– "Even if these thoughts do creep in, I also know that it's not going to stick for long, and I believe it doesn't affect me as much as I think." (G6P5)

4.3.3.2. Balance-Focused Coping Strategies

Participants reported various strategies to address the causes of the "Sunday Blues," with a shared emphasis on balancing personal resources and external demands (see Table 20). A common approach involved enhancing overall health, with many highlighting the importance of rest or exercise to build the energy needed for the week ahead. To reduce external pressures, participants described actions such as avoiding Monday meetings, silencing work notifications over the weekend, postponing non-urgent tasks, or declining social invitations. Another frequently used strategy was thoughtful weekend planning—balancing personal tasks with relaxation and incorporating activities perceived as enriching or fulfilling. Some participants sought to extend the weekend experience by staying up late, while others

preferred to mentally prepare for the week by organising tasks or scheduling post-work activities (e.g., social outings) to create a sense of anticipation. A subset found that engaging in limited work during the weekend helped reduce anxiety about unfinished responsibilities. In contrast, others deliberately built firm boundaries between work and leisure, distancing themselves from work-related devices and conversations to preserve the weekend's restorative potential.

Table 20. Balance-focused coping strategies for the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Improve overall health	Enhance physical and mental health through restorative actions, such as rest or energizing exercises.	– "I've preemptively been trying to go running more on Sundays because then I feel better in general." (G6P5)
Avoid work-related stressors	Steer clear of triggers like Monday meetings, deadlines, or work notifications during the weekend.	"Better to not have a deadline [on] Monday, because I don't like spending the last time on working." (G4P4)
Reduce upcoming responsibilities	Minimize non-essential obligations by postponing certain tasks or declining social invitations that feel draining.	– "I feel better to cut things out because you realize these different aspects contributing to your overall stress." (G2P2)
Plan the weekend thoughtfully	Deliberately structure weekend time by balancing productivity and leisure, and incorporating enriching or relaxing activities.	– "Plan well ahead of Sunday to be realistic about how much time I have on weekends, and kind of priorities fun things but also productive things in a good way." (G4P1)
Extend the weekend	Prolong the weekend experience by delaying regular routines, such as staying up late on Sunday or starting work later on Monday.	– "Sometimes I even just go to sleep at 2:00 am on Sunday night. Just to extend the weekend." (G6P2)
Prepare for the coming week	Get mentally ready for the week ahead by organizing upcoming tasks, choosing outfits, or preparing meals.	– "Those things are intertwined as a 'huge block.' That's why it feels so terrifying. But if you break them down, it's just small tasks." (G5P4)
Create positive expectations	Plan things to look forward to, such as hobbies, post-work social events, or upcoming holidays.	– "I also plan something different from work, like workouts, or a dinner with friends after work." (G4P4)
Work	Engage in limited work to complete pending tasks or maintain a productive rhythm.	– "Once something is done, I'm suddenly more optimistic." (G2P2)
Maintain clear work-life boundaries	Keep firm boundaries between work and leisure time during weekends by disconnecting from work devices or communications.	– "I started my work three months ago, and up to now, I've only brought [my laptop] once with me on one weekend, and I want to keep it that way." (G3P3)

4.3.3.3. Resilience-Focused Coping Strategies

Participants mentioned four strategies centered on fostering long-term emotional resilience and well-being (see Table 21). One common approach was deep reflection and analysis, with participants seeking to understand the patterns and root causes behind their mood state, which often led to greater clarity, potential solutions, or strategies for prevention. In contrast, others chose to simply allow the "Sunday Blues" to unfold, accepting these negative feelings as a natural and transient part of life rather

than something to be resolved. Some went further by reframing their experience in a constructive light, viewing the "Sunday Blues" as a catalyst for productivity, a means to connect with others, or an opportunity for personal growth. Additionally, several participants shared coping skills they had acquired through therapy or past experiences, underscoring the importance of self-regulation and the long-term value of building mood resilience.

Table 21. Resilience-focused coping strategies for the "Sunday Blues."

Code	Explanation	Example participant statement(s)
Analyze patterns and causes	Engage in reflective thinking to understand the "Sunday Blues," including its patterns, underlying causes, and potential solutions.	– "I try to understand why I have it, and what is the cause. And in that way, maybe next time I can do better to get rid of it." (G4P2) – "When I filled in the diary, it was amazing that I understood what's happening … so, it wasn't about Monday, it was about a struggle with my son." (G1P2)
Embrace the feelings	Accept the "Sunday Blues" as a natural part of weekly emotional rhythms, allowing the feeling without trying to suppress, fix, or avoid it.	– "Sometimes you have to just let it happen. You should allow yourself to feel sad at some moment." (G4P4) – "Actually, the negative part is normal, and if you take it as a normal thing, it won't harm you so much." (G6P4)
Reframe the experience	Reinterpret the "Sunday Blues" in a constructive way, viewing the experience as potentially motivating, meaningful, or a tool for personal growth or social connection.	– "I would rationalize it and then place it in a way like, 'I'm stressed because I'm nervous and I want to do well. Maybe the stress is going to help me perform better.'" (G6P5) – "I use it as one of the very small tricks to build connection with my partner. I know she probably has more severe 'Sunday Blues' compared to mine. So, it's a way to start a conversation and provide a chance for her to vent the emotions." (G5P1)
Develop self-regulation skills	Develop emotional self-regulation skills through personal practice or therapeutic support to remain calm, centered, and proactive in everyday mood management.	– "I had some hypnotherapy and learned some tricks for breathing and relaxing. So when it was stressful, or I felt very down, I learned how to cope. That helped me very much." (G2P3)

4.4. DISCUSSION

For many, Sunday evening comes with familiar, lingering emotional discomfort—often referred to as the "Sunday Blues." While widely acknowledged in popular culture, this phenomenon has received surprisingly little attention in academic research, and a holistic understanding remains lacking. Our qualitative study addresses this gap by diving deep into how the "Sunday Blues" specifically manifests itself, what contributes to it, and how individuals cope with it. In the sections that follow, we discuss the theoretical and practical implications of our findings, as well as key limitations of the study.

4.4.1. Theoretical Implications

This study advances theoretical understanding of the "Sunday Blues" by illuminating its multifaceted nature. Both popular media and academic literature have described the phenomenon inconsistently, alternately characterizing it as unease, dread, or depression (e.g., Mihalcea & Liu, 2006; Tufvesson, 2022; Zuzanek, 2014). Our findings help clarify these discrepancies by showing that the "Sunday Blues" encompasses a spectrum of affective experiences—including anxiety, stress, sadness, or regret—accompanied by a range of cognitive, physical, and behavioral manifestations. Our evidence suggests that it is best understood as a dynamic constellation of intertwined emotional and physiological experiences, which vary with each occurrence. These variations are shaped by a complex interplay of personal, social, and situational factors—both within and outside the workplace, and extending past the temporal boundaries of the weekend. Thus, the "Sunday Blues" is not merely a reaction to the impending workweek but reflects broader tensions within an individual's overall work-life context.

To further facilitate theoretical clarity, we integrate our key findings into a framework (see Figure 12) that outlines the core components and contributing factors of the "Sunday Blues." Noteworthily, this framework is not intended to build a formal theory but rather serve as a tool for understanding the phenomenon in a structured and holistic way.

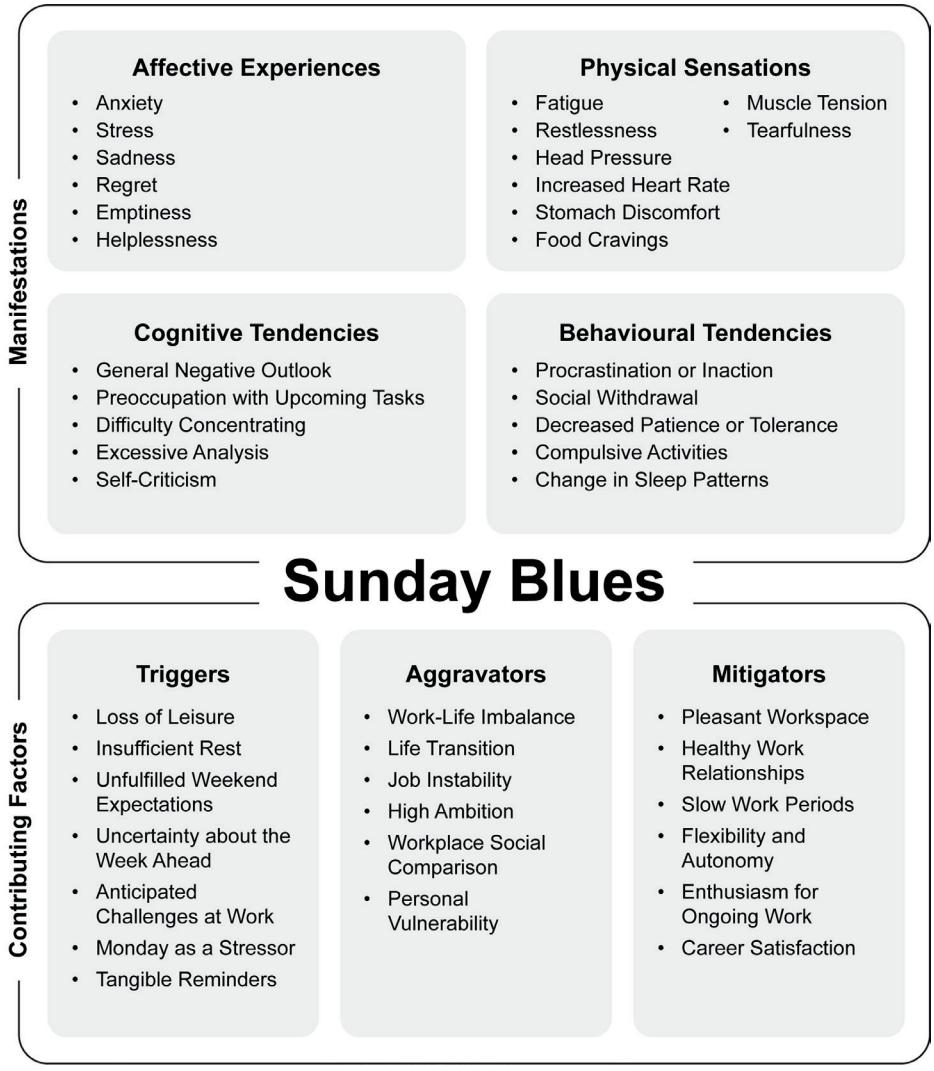


Figure 12. A framework for understanding the "Sunday Blues."

4.4.2. Practical Implications

The study's findings can inform the development of mood-regulation interventions aimed at alleviating or managing the "Sunday Blues." Researchers and practitioners in fields such as design research, organizational management, and mental healthcare may draw on these insights to inspire innovation addressing this mood phenomenon. Here, we propose six potential directions for such efforts:

(1) Easing weekend-to-weekday transition. The stark contrast between weekend leisure and weekday obligations can induce feelings of sadness or loss. Interventions could be developed to help individuals establish end-of-week rituals that promote closure and anticipation—for instance, reflecting on weekend experiences, expressing gratitude, or setting motivating goals for the upcoming week.

(2) Enhancing weekend fulfilment. When weekend experiences fall short of expectations, individuals may experience regret or disappointment. Digital or physical planning tools could be designed to support intentionally structuring their weekends to balance productivity with relaxation and meaningful engagement, thereby reducing the likelihood of the "Sunday Blues."

(3) Promoting mental readiness for Monday. Anticipatory stress about Monday's responsibilities often emerges on Sunday night. Interventions could encourage mental preparation through activities like expressive writing or socially supportive interactions to help individuals process thoughts and plan manageable first steps for the week ahead.

(4) Reducing tangible work-related stressors. Organizational policies that discourage work-related communication during weekends may prevent work stress from extending into personal time. In parallel, personal digital assistants could be developed to automatically mute work notifications or schedule device downtime to support detachment from work.

(5) Leveraging environmental or organizational mitigators. Designing workplaces to foster a calming and restorative atmosphere (e.g., through biophilic elements) may help ease employees' transition back to work on Mondays. Institutions could also offer flexible arrangements, such as personalised "weekend" days or delayed start times on Mondays, to enhance autonomy and support a smoother psychological re-entry into the workweek.

(6) Building emotional resilience. Personal resilience plays a key role in managing mood fluctuations. Organizations could integrate resilience-building programs, such as workshops on emotional self-regulation, into professional development offerings. Additionally, individuals may benefit from self-guided toolkits, such as coping strategy cards or serious games, to learn and reinforce coping skills for everyday use.

4.4.3. Limitations of This Study

This study has several limitations that should be acknowledged. First, the participant pool consisted exclusively of individuals working in the Netherlands. As a result, their lived experiences may reflect cultural or contextual biases specific to Dutch workplace norms and societal expectations. To enhance the generalizability of our findings, future research should consider larger and more culturally diverse samples. Second, the fully qualitative design of the study may be seen as limiting, particularly in its ability to examine the extent to which specific factors trigger or intensify the "Sunday Blues." However, the qualitative approach was intentionally chosen to prioritize breadth and to develop a rich, contextualized understanding of the phenomenon. Rather than viewing this as a shortcoming, we consider it a valuable opportunity for future inquiry. For instance, subsequent quantitative research could help identify patterns or test hypotheses about the relationships between individual or contextual variables and the onset of the "Sunday Blues."

4.5. CONCLUSION

This chapter presents a qualitative exploration of the "Sunday Blues," a culturally recognized yet academically overlooked phenomenon. Our findings reveal its nuanced and multifaceted nature: rather than a mere emotional dip at the weekend's close, it often emerges as a dynamic constellation of emotional and physiological experiences, shaped by both situational triggers such as unmet weekend expectations and systemic issues like work-life imbalance. Coping strategies range from those focused on alleviating unpleasant feelings to deeper forms of self-reflection and behavioral change. By offering a holistic understanding of the "Sunday Blues," this study contributes to the growing body of research on employee well-being. We conclude by proposing an integrative framework for understanding the phenomenon and outlining directions for future intervention development.

CHAPTER 5

Our Own Exploration of Mood as Researcher-Designers II: Designing Against the "Sunday Blues"

This chapter is based on a manuscript currently under review:
Peng, Z., Kolks, L. A. G., Hu, J., Xue, H., & Desmet, P. M. A. (2025). Design for mood regulation: An exploratory case study on addressing the "Sunday Blues."

5.1. INTRODUCTION

Our moods fluctuate as part of everyday life. One day, we may feel upbeat and energized, while the next, we might find ourselves feeling down or unsettled, often without understanding why. Moods are low-intensity, diffuse feeling states that typically persist for hours or even days (Morris, 1989). They tend to be subtle, constantly present, gradually evolving, and often exist below the level of our conscious awareness (Parkinson et al., 1996). Despite their subtle nature, moods have a significant impact on our daily lives. For instance, moods shape how we perceive and interpret situations, make judgments, and arrive at decisions (Forgas, 1995). They also directly influence our subjective well-being. When experiencing positive moods, we tend to view our lives as more satisfying and fulfilling, and we are more likely to recall positive life events than when experiencing negative moods (Morris, 1999; Schwarz & Strack, 1999). Furthermore, moods play a crucial role in both physical and mental health. Persistent negative moods are linked to both mental disorders, such as depression (Mondimore, 2006), and physical illnesses, like cardiovascular disease (Balon, 2006).

As individuals become more aware of the importance of mental health and well-being, the ability to manage everyday mood fluctuations is increasingly seen as a vital life skill (Gross, 2015; World Health Organization, 2022). This has fueled interest in tools and technologies that assist in mood regulation (Desmet, 2015). One notable example is the rise of mood-tracking apps, which help users regularly monitor their mood states, gain insights into patterns, and develop proactive strategies for self-regulation (Caldeira et al., 2017; Schueller et al., 2021). According to a recent industry report, the global market for these apps is expanding rapidly, with a valuation of approximately USD 1.5 billion in 2024 and projected growth to USD 5.7 billion by 2033 (Verified Market Reports, 2025). In response to this growing public interest in self-regulation and emotional well-being, designers and design researchers have been actively exploring diverse design interventions to support or enhance mood regulation (see Peng et al., 2023 for a comprehensive review). These interventions range from digital applications (e.g., Liu et al., 2019) and physical artifacts (e.g., MacLean et al., 2013) to social robots (e.g., Ullrich et al., 2016) and immersive environments (e.g., van de Garde-Perik et al., 2016). Their underlying mechanisms also vary widely, including facilitating self-awareness and reflective practices (e.g., Rajcic & McCormack, 2020), supporting mood-sensitive social interactions (e.g., Pradana & Buchanan, 2017), offering personalized coping guidance (e.g., Hollis et al., 2017), and cultivating long-term emotional regulation skills (e.g., Agrawal et al., 2018).

While this body of work presents many promising directions, it also reveals a critical gap: there remains a limited understanding of the challenges people face when using mood-regulation interventions in everyday life. For instance, it remains unclear what discourages people from adopting these interventions or using them effectively. Some researchers have identified several issues, such as the risk of reinforcing negative moods through reflective practices (Isaacs et al., 2013), the difficulty of tailoring support to individual users (Besserer et al., 2016), and user frustration with intrusive or poorly timed

system interventions (Balaam et al., 2010). In response, those researchers have also proposed design suggestions, including limiting user exposure to negative content, utilizing artificial intelligence to enhance personalization, and enabling users to control when and how they interact with the system. However, these insights are often tied to specific intervention types or use cases. As a result, they fall short of offering generalizable guidance on what designers should deliberately consider or be mindful of when designing for mood regulation. This lack of knowledge can hinder the development of effective interventions, especially when designers rely solely on conventional user experience (UX) or emotional design principles that do not explicitly incorporate the unique characteristics of mood (Desmet, 2015; H. Xue et al., 2020).

To address the gap, we conducted an empirical study exploring how people perceive, experience, and evaluate mood-regulation interventions in everyday contexts. Our research focused on addressing two key questions: (1) What challenges and issues do people face when using mood-regulation interventions in everyday life? (2) What design considerations can support designers in addressing these issues when designing for mood regulation?

To ground our exploration, we focused on a specific mood phenomenon: the "Sunday Blues"—the unpleasant feelings that arise at the end of the weekend as the new workweek approaches (Akay & Martinsson, 2009; Tufvesson, 2022; Zuzanek, 2014). We chose this phenomenon for three main reasons. First, it represents a diffuse and enduring mood state that typically extends from Sunday evening into Monday morning (Tufvesson, 2022). This provides a clear context for studying mood regulation beyond more immediate or acute forms of emotion regulation or stress management. Second, the "Sunday Blues" is a common experience; a recent survey found that 80% of respondents reported frequently feeling this way (Heitmann, 2018). Its prevalence offers a highly relatable context for investigation and also aligns with our own lived experiences, helping inform the research and design process. Third, while the "Sunday Blues" is widely discussed in popular media (e.g., Headspace, 2021; Pinsker, 2020), it remains unexplored in design research, highlighting a valuable opportunity for design-led inquiry.

In our study, we began by conducting user research to better understand the complex nature of the "Sunday Blues." Based on this, we created a set of speculative design interventions targeting different factors that contribute to this mood. These concepts were transformed into video-based "provotypes"—provocative prototypes designed to spark reflection and discussion among potential users (Wensveen & Matthews, 2014). By engaging those users in evaluating and reflecting on our design solutions for the "Sunday Blues," we sought to uncover broader insights into everyday mood-regulation interventions. From this process, we developed a series of actionable design recommendations intended to inform future practice in the field (Koskinen et al., 2011; Stappers & Giaccardi, 2017).

The following sections detail our user research and intervention design process, followed by our interview studies, including participant recruitment, study procedures, and data analysis. We then

present our findings, discuss their design implications, and reflect on the broader challenges, study limitations, and directions for future research.

5.2. USER RESEARCH AND INTERVENTION DESIGN

In this section, we report on our user research aimed at understanding individuals' experiences of the "Sunday Blues." Based on this research, we identified three distinct user groups, each with unique needs and experiential patterns. We then introduce three corresponding design concepts that emerged from a series of ideation sessions, informed by our research findings and supported by insights from the mood-regulation literature.

5.2.1. Understanding the "Sunday Blues" and Target Users

Although the "Sunday Blues" is a widely recognized phenomenon, the specific ways in which individuals experience and cope with it remain unclear, hindering the exploration of interventions. To investigate this, we conducted six focus groups involving 26 participants of diverse ages and occupations, all of whom frequently experienced or had previously experienced the "Sunday Blues." The discussions uncovered a range of nuanced experiences, including how the "Sunday Blues" manifested, what contributed to it, and the coping strategies participants commonly used. A detailed account of the study's methodology and findings is presented in a separate work that adopts a phenomenological lens (see Chapter 4). In the current study, however, we reinterpreted those findings from a design-oriented perspective to guide our exploration of mood-regulation interventions. Our analysis highlighted that the "Sunday Blues" is a complex, multifactorial emotional experience: individuals may feel it in different ways, and even the same person's experience can vary each time it occurs. Thus, rather than attempting to develop a one-size-fits-all solution, we focused on three commonly reported experiential patterns as relatable contexts for designing targeted interventions. Based on these patterns, we defined three target user groups and proposed corresponding design directions.

The first user group involved individuals who experienced the "Sunday Blues" because of difficulties transitioning from a relaxed, carefree weekend to a structured, responsibility-driven workweek. They felt reluctant or even sad when facing the stark contrast between weekend leisure and weekday obligations. To help this group, we proposed designing an intervention that facilitates a smoother mental transition from weekend to weekday. The intervention should establish routines that bridge the weekend and workweek while maintaining their distinction. It should encourage users to reflect on their weekend with a sense of accomplishment and help them approach the upcoming workweek with positive anticipation.

The second user group included individuals experiencing the "Sunday Blues" due to a sense of wasted or unfulfilled weekend time. They felt regretful or disappointed for not using their free time as intended,

either because they did not accomplish planned activities or because activities turned out more draining than rejuvenating. To help address this, we proposed designing an intervention that promotes fulfilling weekend planning. The intervention should help individuals strategically plan restorative and meaningful weekend activities without turning weekends into work-like schedules. It should support users in effectively organizing and following through on their weekend intentions, thus preventing regret or dissatisfaction as the weekend concludes.

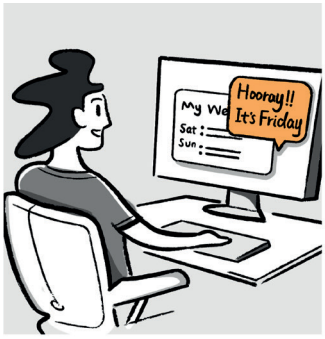
The third user group consisted of individuals who experienced the "Sunday Blues" because of mental clutter or uncertainty about the upcoming week. They typically felt anxious and uneasy due to a lack of clarity on what the week would bring and doubts about their ability to manage potential challenges. To assist this group, we proposed designing an intervention that cultivates mental preparedness for the week ahead. This design should support users in organizing their thoughts, gaining clarity about their schedules, and feeling in control without adding further stress. It should emphasize positive aspects of the coming week, reducing feelings of uncertainty and enhancing a sense of anticipation.

5.2.2. Designing Interventions for the "Sunday Blues"

To address the specific needs of the identified three user groups, the first author collaborated with a design engineer to conduct three creative sessions for idea generation and refinement. These sessions resulted in three speculative design concepts. Here, we explain how each design aims to address or alleviate the "Sunday Blues," and we outline the evidence-based psychological strategies for mood regulation that underpin these intended outcomes.

5.2.2.1. WeMo: Supporting a Smoother Transition

WeMo is a desktop and mobile application designed to ease the emotional shift from weekend to weekday by promoting positive reflection and anticipation (see Figure 13 for a storyboard). On Fridays, it sends uplifting notifications to help users look forward to the weekend, and during the weekend, it encourages them to capture meaningful moments through photos. On Sunday evening, users are invited to review and upload their favorite moments, which are then transformed into a personalized visual summary that appears on their work laptop Monday morning. The concept draws on psychological research showing that recalling positive memories (Josephson, 1996) and anticipating future enjoyment (Monfort et al., 2015) can improve mood. By helping users reflect on and relive their weekend highlights, WeMo aims to foster a sense of renewed energy for the week ahead. The Monday visual summary also adds a pleasant, motivating element to the work environment, encouraging a more optimistic outlook and reinforcing a lasting sense of satisfaction.



On Friday, *WeMo* cheerfully checks in with a weekend reminder.

Throughout the weekend, *WeMo* sends gentle notificiations, prompting the user to capture meaningful moments with photos.

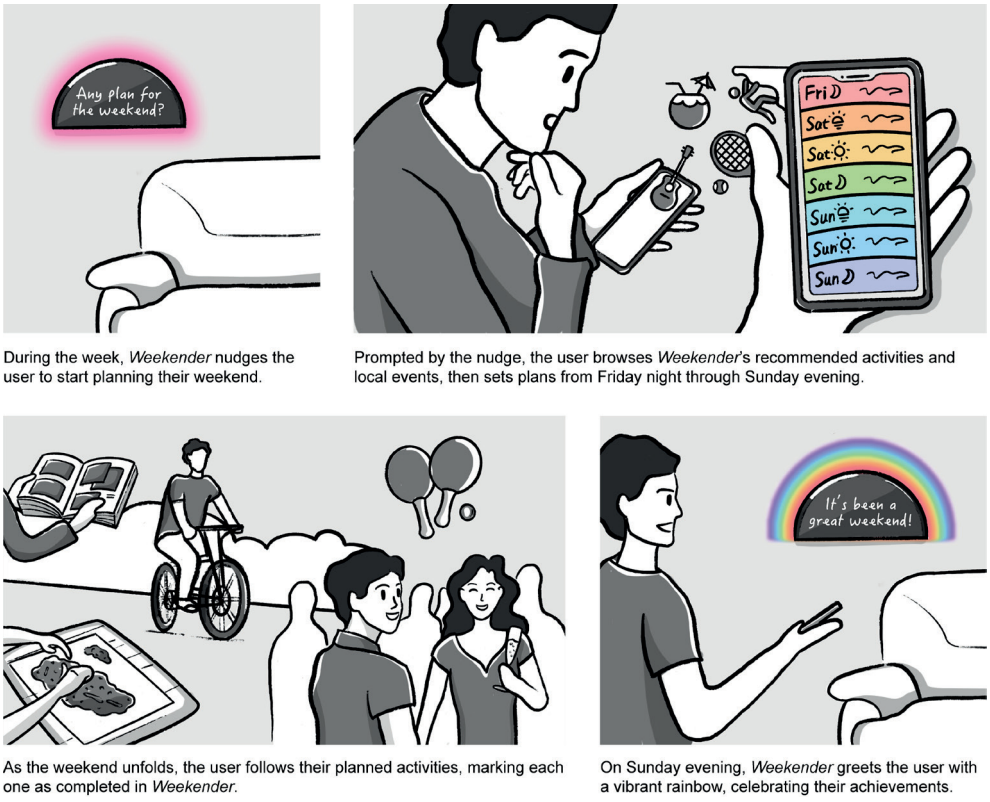
On Sunday night, *WeMo* invites the user to reflect and upload their weekend memories.

On Monday, when the user opens their work laptop, *WeMo* greets them with a visual summary of their weekend.

Figure 13. Storyboard of WeMo.

5.2.2.2. Weekender: Promoting a Fulfilling Weekend

Weekender, made up of a phone application and an ambient wall display, is designed to help users approach their weekends with greater intention, preventing feelings of regret or disappointment (see Figure 14 for a storyboard). It begins midweek with gentle prompts encouraging early reflection on how one wants to spend their weekend. Users plan across seven time slots—from Friday night to Sunday evening—using a curated mix of suggested activities and local events. The schedule remains flexible, allowing adjustments based on changing energy and priorities. As the weekend unfolds, users mark off completed activities in the application, with their progress visualized through the wall display. At the end, a celebratory rainbow animation marks the completion of the weekend plans. The design is grounded in weekend recovery theory, which emphasizes the restorative effects of engaging in leisure activities that are both enjoyable and personally meaningful (Ginoux et al., 2021). It also incorporates strategies of positive reflection (Josephson, 1996) and gratitude (Rash et al., 2011). By ending the weekend with a ritual that highlights personal achievements and moments of joy, Weekender helps users carry forward a sense of fulfillment into the new week.



During the week, *Weekender* nudges the user to start planning their weekend.

Prompted by the nudge, the user browses *Weekender*'s recommended activities and local events, then sets plans from Friday night through Sunday evening.

As the weekend unfolds, the user follows their planned activities, marking each one as completed in *Weekender*.

On Sunday evening, *Weekender* greets the user with a vibrant rainbow, celebrating their achievements.

Figure 14. Storyboard of Weekender.

5.2.2.3. Mora: Fostering Mental Preparation

Mora is a home-based social robot designed to monitor users' mood fluctuations and provide timely emotional support. Functioning as both a companion and a personal assistant, Mora becomes especially active on Sunday evenings. Upon detecting signs of anxiety or unease, Mora approaches users and initiates supportive conversations to help them mentally prepare for the week ahead (see Figure 15 for a storyboard). Mora's intervention approach draws on three mood-regulation strategies. First, it promotes emotional venting (Zech & Rimé, 2005), inviting users to openly express thoughts and feelings while offering empathetic acknowledgement and validation. Second, Mora facilitates problem-solving (D'Zurilla & Nezu, 2010). It helps users break down upcoming tasks, set priorities, and create actionable plans, thus reducing feelings of overwhelm and fostering a sense of control. Lastly, it encourages positive anticipation (Monfort et al., 2015), guiding users to plan small, enjoyable activities for the coming weekdays and look forward to these moments with optimism.

Noticing the user's low mood on Sunday evening, *Mora* checks in to offer emotional support.

Mora starts a conversation to help the user process their thoughts, explore solutions, and get mentally ready for Monday.

Figure 15. Storyboard of Mora.

5.3. INTERVIEW STUDIES

To explore how prospective users might relate to and engage with our three proposed design concepts—*WeMo*, *Weekender*, and *Mora*—we conducted three separate interview studies, each involving a different target user group. It is important to recognize that these studies did not involve functioning systems but instead used speculative design concepts as prompts to spark conversation. The goal was not to evaluate usability, but to encourage participants to reflect on how such technologies might fit into their everyday lives. For instance, what potential uses do they envision? What concerns or uncertainties arise? And what do these reflections reveal about the challenges of employing mood-regulation technologies in real-world contexts?

5.3.1. Participants

A total of 45 participants were recruited through convenience sampling, with 15 individuals in each of the three target user groups. During recruitment, potential participants were asked brief screening questions in an informal verbal format about their personal experiences of the "Sunday Blues." Their responses were used to confirm eligibility and to guide assignment into one of the three groups. Most participants were researchers employed in higher education or the technology sector and typically began their workweek on Mondays (see Table 22 for demographic details). Each group was selected to represent a unique pattern of experiencing the "Sunday Blues": Group 1 struggled with emotional transition from weekend to weekday, Group 2 felt regret or dissatisfaction about how they had spent their weekend, and Group 3 felt overwhelmed or anxious about the demands of the upcoming week. Each group was paired with the design concept that aligned most closely with their lived experiences. Ethical approval was obtained from the Human Research Ethics Committee of Delft University of Technology (TU Delft, the Netherlands). All participants provided written informed consent before taking part and received a five-euro voucher as compensation.

Table 22. Participants' demographic details.

Study group	Participant code	Age*	Industry	Occupation	Years of work experience in current position*
Group 1	P1-1	26	Higher education	PhD Researcher	>1
	P1-2	28	Higher education	PhD Researcher	>1
	P1-3	29	Higher education	PhD Researcher	>3
	P1-4	30	Healthcare technology	Design Engineer	>2
	P1-5	27	Higher education	PhD Researcher	>2
	P1-6	33	Higher education	PhD Researcher	>1
	P1-7	26	Higher education	PhD Researcher	>2
	P1-8	32	Information technology	Design Engineer	>2
	P1-9	27	Higher education	PhD Researcher	>2
	P1-10	26	Higher education	Learning & Development Specialist	<1
	P1-11	28	Higher education	PhD Researcher	>2
	P1-12	29	Higher education	PhD Researcher	>3
	P1-13	29	Higher education	PhD Researcher	>2
	P1-14	24	Higher education	PhD Researcher	<1
	P1-15	27	Higher education	PhD Researcher	>1
Group 2	P2-1	28	Higher education	PhD Researcher	>1
	P2-2	29	Information Technology	Design Engineer	<1
	P2-3	41	Higher education	PhD Researcher	<1
	P2-4	26	Higher education	PhD Researcher	>1
	P2-5	27	Higher education	PhD Researcher	>2
	P2-6	26	Higher education	Bachelor Program Coordinator	<1
	P2-7	28	Higher education	PhD Researcher	>3
	P2-8	29	Higher education	PhD Researcher	<1
	P2-9	27	Higher education	PhD Researcher	>3
	P2-10	30	Higher education	Software Engineer	>2
	P2-11	28	Higher education	Librarian	>1
	P2-12	27	Healthcare technology	Design Engineer	>1
	P2-13	26	Transportation and logistics	Sales Engineer	>1
	P2-14	26	Higher education	PhD Researcher	>1
	P2-15	26	Information technology	Design Engineer	>1

Table 22. Continued.

Study group	Participant code	Age*	Industry	Occupation	Years of work experience in current position*
Group 3	P3-1	28	Higher education	PhD Researcher	>3
	P3-2	24	Higher education	PhD Researcher	<1
	P3-3	29	Higher education	PhD Researcher	>4
	P3-4	25	Higher education	PhD Researcher	>1
	P3-5	28	Information technology	Design Engineer	>1
	P3-6	28	Higher education	PhD Researcher	>3
	P3-7	31	Higher education	PhD Researcher	<1
	P3-8	27	Higher education	PhD Researcher	<1
	P3-9	26	Higher education	PhD Researcher	>1
	P3-10	32	Information technology	Design Engineer	>1
	P3-11	27	Healthcare technology	Design Engineer	<1
	P3-12	30	Higher education	PhD Researcher	>1
	P3-13	26	Higher education	PhD Researcher	>1
	P3-14	31	Higher education	PhD Researcher	>2
	P3-15	34	Higher education	PhD Researcher	>2

5.3.2. Procedure and Research Materials

The three interview studies were conducted independently, with each interview following a two-phase structure: (1) sensitizing participants to the phenomenon of the "Sunday Blues," and (2) guiding them to envision and reflect on how they might use one of the designs. While the overall structure remained consistent, the interview questions used to prompt discussion were adapted to the specific context of each design. The interview procedure was informed by the co-constructing stories method (Buskermolen & Terken, 2012), which encourages participants to draw on their own lived experiences to imagine and articulate their thoughts about using a design in their lives. This method has been shown to effectively facilitate in-depth user reflection and generate constructive feedback in various design research contexts (e.g., Cerón-Guzmán et al., 2022; K. Davis et al., 2016; M. Xue et al., 2023).

During the sensitization phase, participants were first asked to describe their usual weekend activities and how they typically felt as the weekend came to an end. They then watched a short video portraying someone experiencing the "Sunday Blues." Each study featured a unique video tailored to reflect the experiences and context of that particular user group. After watching the video, participants were invited to reflect on the scenario, share similar personal experiences, and describe coping strategies they had used to manage the "Sunday Blues."

To engage participants with the design concepts, we created three video-based "provotypes," each depicting a fictional narrative where a character manages the "Sunday Blues" using one of the proposed designs. In the envisioning and reflection phase, participants viewed one of the "provotypes" and were asked to imagine themselves as the main character interacting with the design. Afterward, they shared their general impressions and reflected on the design's potential to help manage their own "Sunday Blues," noting what aspects they appreciated or found problematic. They were also asked whether they could envision using the design in their everyday lives, what obstacles might hinder its use, and how the concept could be improved or adapted based on their personal experiences and needs.

Both the sensitizing videos and the video-based "provotypes" can be viewed on Figshare (https://doi.org/10.6084/m9.figshare.30257488.v1).

Each interview lasted approximately 30 minutes. All participant discussions were audio-recorded for later analysis.

5.3.3. Data Analysis

All audio recordings were transcribed verbatim and analyzed using template analysis, a more structured form of thematic analysis that combines inductive coding with the development and iterative refinement of a coding framework (Brooks et al., 2015; King, 2012).

In line with King's guidance (2012), each user study's data was first analyzed separately. Familiarization occurred naturally during transcription. The first author then independently coded all transcripts and generated initial themes, producing a preliminary coding template. A second researcher independently applied this template to the same transcripts, critically evaluating the codes and themes and suggesting modifications or additions. Discrepancies between the two researchers were then discussed and resolved, resulting in a refined and mutually agreed-upon set of categories. The first author collaborated with one researcher for the first two user studies, and with a different researcher for the third.

Once the separate analyses were completed, the first author conducted a cross-study synthesis. This involved taking a holistic view of the initial results and re-examining data from all three studies to identify recurring patterns and overarching meanings related to challenges in using mood-regulation interventions. Similar codes were merged, themes were refined, and a consolidated coding template was developed to encompass all three datasets. Finally, all authors collaboratively reviewed and refined this template, which was used to structure the reporting of results. The final coding framework consisted of two overarching categories, seven themes, and twenty-two codes.

5.4. RESULTS

This section presents our findings, organized into two main categories: issues affecting user adoption and those affecting intervention effectiveness. These findings are grounded in participants' reflections on specific design interventions targeting the "Sunday Blues" (i.e., the coded data), and interpreted to derive broader insights applicable to mood-regulation interventions in general (i.e., the generated themes).

5.4.1. Issues Affecting User Adoption

This category includes barriers that may discourage potential users from adopting mood-regulation interventions. These issues fall into three main themes: (1) conflicts with personal values and needs; (2) misalignment with existing lifestyles and habits; and (3) ethical concerns over technology use.

5.4.1.1. Conflicts with Personal Values and Needs

Participants identified several ways in which the design of mood-regulation interventions clashed with their core values and psychological needs, reducing their willingness to use these tools. Table 23 offers an overview of these conflicts, together with illustrative participant statements.

A key tension was the perceived constraints on flexibility and spontaneity. Participants felt that tools like WeMo and Weekender imposed too much structure on their weekends, which they preferred to keep open and unstructured. Weekender, in particular, was described as "just another planning app," clashing with the desire to escape the rigid schedules of the workweek. Likewise, WeMo's photo-taking reminders, tied to pre-set plans, were seen as restrictive. Participants noted that the reminder system assumed users would follow a fixed schedule, which conflicted with their belief that weekends should allow for missed plans and unstructured time without guilt.

Another prominent issue was the perceived overemphasis on productivity. Participants noted that both WeMo and Weekender encouraged maximizing weekend time, which conflicted with their basic need for rest. Some described implicit pressure from WeMo to have "colorful" weekends because it framed outcomes such as photos or memories as indicators of a successful weekend. This was seen to diminish the importance of quieter, less eventful forms of activities. Similarly, Weekender was critiqued for transforming the weekend into a "to-do list," extending the sense of obligation and stress associated with the workweek. Several participants challenged the underlying assumption that weekends must be "meaningful," arguing that such a mindset could be counterproductive or even harmful. They advocated instead for recognizing so-called "wasted" time as equally restorative and inherently valuable.

The instrumentalization of experiences also emerged as a critical concern. Participants noted that using WeMo and Weekender might hinder their ability to fully engage in and enjoy the present moment. For example, one participant noted that following WeMo's prompts to take photos during weekend activities

could disrupt their sense of immersion, undermining what they valued most about those moments. Likewise, another participant questioned Weekender's checklist-like design, suggesting it could shift their attention away from the experience itself toward the act of task completion. As a result, the satisfaction derived from ticking items off could overshadow the intrinsic enjoyment of the experience in the moment.

Table 23. Conflicts with personal values and needs.

Code	Example participant statement(s)		
	Group 1 (WeMo)	**Group 2 (Weekender)**	**Group 3 (Mora)**
Constraints on flexibility and spontaneity	"One thing I think distinguishes between weekend and weekdays is that on weekends, you can have more flexibility. You can choose that I don't want to do that or I don't want to do that. … WeMo will kind of need to show respect to that flexibility." (P1-2)	"Because my work weeks are already planned out, I don't have too much sort of room for spontaneous things during the week. So then the weekend is where … that's sort of the time slots in a week where spontaneous things can emerge." (P2-11)	—
Overemphasis on productivity	"I do wonder, like, if I really have an inactive weekend, what it could show me. … I'm not sure whether it's a motivation or a little bit also stress, like, "Hey, you need to plan something more colorful … to have some nice … deliverables." (P1-3)	"I don't think doing more 'valuable' things or activities in the weekend is better for people who suffer from the 'Sunday Blues.' Instead, for me, I think maybe a good solution could be that you value your 'wasted time.'" (P2-14)	—
Instrumentalization of experiences	"Sometimes we've made a very nice, elaborate meal, and for me, the process is nice, and then just sitting down and eating. But they are like, 'No, let's take a picture.' And then I'm like, 'Why do you want a picture now?'" (P1-13)	"If I experience it as a 'checkbox,' then the activities become more superficial to me. Then I don't really enjoy it for the sake of doing it, but more for the sake of ticking off the box that I had told myself to do so." (P2-7)	—
Overemphasis on positivity	—	—	"This kind of always being positive could be annoying … so, it's like, sometimes when you take this role of being the positive one, then you don't give the other person space to be negative." (P3-10)

The final issue concerned the perceived overemphasis on positivity. One participant expressed discomfort with Mora's intervention when it detected signs of the "Sunday Blues." They emphasized that this consistent focus on positivity could feel overwhelming and leave little room for individuals to acknowledge or process their negative feelings. Although only one person raised this concern, we found it insightful that mood-regulation interventions might not always be appropriate or welcomed.

5.4.1.2. Misalignment with Existing Lifestyles and Habits

Participants reported difficulty in adopting mood-regulation interventions when these did not align with their established lifestyles and habits. Table 24 offers an overview of these misalignment issues, together with illustrative participant statements.

One major challenge was the incompatibility between the intervention design and users' personal traits or dispositions. For example, WeMo required frequent photo-taking, which several participants found burdensome due to a general lack of interest in photography. Similarly, some were unwilling to use Weekender because they did not enjoy planning or structured routines. Additionally, one participant was reluctant to engage with Mora, citing general unease and awkwardness when interacting with social robots.

A second issue was the redundancy with users' existing mood-regulatory practices. Some participants noted that they had already engaged in similar routines, making the interventions feel redundant. For instance, one participant mentioned that they had already reflected on personal experiences with loved ones through shared photos, reducing the need for WeMo. Another participant had a habit of organizing their weekends similar to Weekender's method, while a different participant had already used journaling to manage negative feelings and prepare for challenges, making Mora feel unnecessary.

The third concern was the intentional reduction of digital engagement. Several participants had made personal efforts to limit screen time or disconnect from technology, especially on weekends, which made them hesitant to adopt interventions like WeMo and Weekender that relied heavily on mobile phone interaction.

Additionally, participants saw environmental or spatial restrictions as a barrier. Physical interventions like Weekender and Mora were seen as difficult to integrate into some participants' current living spaces. They also criticized the lack of multifunctionality, suggesting these interventions would be more feasible if they could be integrated with devices or technologies already present in their environments.

Table 24. Misalignment with existing lifestyles and habits.

Code	Example participant statement(s)		
	Group 1 (WeMo)	**Group 2 (Weekender)**	**Group 3 (Mora)**
Incompatibility with personal traits or dispositions	"It requires some mind shift or something in the sense that you have to take photos of all the things you like. And I usually don't take a lot of photos." (P1-10)	"I'm that kind of person who is not good at making plans. Making plans will make me feel stressed because I need to stick to the plan, and I need to check whether I finish it." (P2-1)	"If I'm in my own situation, I would feel very awkward talking to a robot. That's the feeling I always have with these kinds of things. It would feel so weird." (P3-3)
Redundancy with existing mood-regulatory practices	"I would have already sent these pictures to my parents, so that would be kind of a reflection moment already." (P1-9)	"I'm already very structured in my approach towards having a lot of activities in the weekend. Then, this would feel more like another reminder." (P2-6)	"I have this booklet and I've written down a lot of questions on every page. So when I feel down, I just go to this, and I answer the questions, or when I want to reflect on the thought that I'm having. And then it's more like … I'm already asking myself questions." (P3-7)
Intentional reduction of digital engagement	"I don't prefer having new apps on my phone. Maybe it is perfect, but then I feel it's too much about being on the phone." (P1-13)	"Especially in the weekends, I'd like to disconnect a little bit from screens. … I want to be in the moment, in the present, like switching off." (P2-7)	—
Environmental or spatial restrictions	—	"I wouldn't know where I would place it in my own home. … With limited space, I want to use my space as optimal as possible." (P2-10)	"If I don't necessarily need to have an object in my home, then I'd rather not." (P3-10)

5.4.1.3. Ethical Concerns over Technology Use

Participants identified several ethical concerns regarding mood-regulation technologies, which affected their willingness to adopt them. Table 25 offers an overview of these concerns, together with illustrative participant statements.

A primary issue was the potential violation of user privacy. Some participants felt uncomfortable displaying personal content in shared environments, such as showing weekend memories at work using WeMo, or revealing weekend plans at home with Weekender. Mora's constant mood monitoring and analysis also raised concerns, with many describing a sense of being surveilled. These participants also worried about data security, fearing unauthorized access to sensitive information related to their professional and personal lives.

Another significant concern was the perceived erosion of user autonomy. Many participants felt uneasy with Mora's frequent suggestions, which they felt could manipulate their thinking and decision-making. Mora's behaviors were also perceived as "paternalistic," leading some to feel that the technology did

not fully respect their capacity for self-care. One participant noted a lack of control with WeMo, where users were "forced" to take photos in order to access the final visuals. Another participant challenged Weekender's implicit authority to evaluate the meaning or quality of one's weekend, arguing that such judgments should come from the user alone.

The risk of emotional overdependence on technology was also highlighted. While several participants acknowledged Mora's potential benefits, they feared becoming emotionally attached to it over time. One participant imagined that as Mora became familiar with their behaviors and preferences, they might increasingly rely on its interventions. This reliance not only felt dreaded but also raised concerns about reduced motivation to seek social support, which could undermine their real-life relationships.

Table 25. Ethical concerns over technology use.

Code	**Example participant statement(s)**		
	Group 1 (WeMo)	**Group 2 (Weekender)**	**Group 3 (Mora)**
Violation of privacy	"I think weekend activities are totally private. It's kind of a private memory. So, for me, it's a little bit weird if I reflected [on the visual summary] here [in the office]." (P1-12)	"It's in the public area, but maybe I have something on my own schedule I don't want him to know. There's a concern if you don't live alone that how will you handle this." (P2-12)	"When I'm talking, it's about my emotions. And because I want to make my mind empty, maybe I talk about my relationships or some personal stuff. So I want to know where my data is going or who can access to it." (P3-5)
Erosion of autonomy	"The final picture generated will be based on those pictures … so if I don't do that, I assume there will be an empty picture, right? … So, basically, this app kind of forces people to take pictures." (P1-11)	"Who's this app that gets to say you've got a fulfilling weekend? I should be the person saying I've got a fulfilling weekend. Who's the person behind this app? What gives them the authority to judge?" (P2-8)	"When it started giving kind of proper tasks, like, 'You could do this or this.' I think in that case I would maybe feel like losing autonomy in a way, like, Mora is starting to make the decision for you." (P3-7)
Emotional overdependence	—	—	"I would be worried that it would work a little bit, and therefore my need to share my feelings with a friend or with my partner would go down. Therefore, I wouldn't do that. … So, I feel like, when you're not feeling well, it's kind of an opportunity to share that with other people. And it could be a shame if you don't do it." (P3-10)

5.4.2. Issues Affecting Intervention Effectiveness

This category encompasses issues that may undermine the effective use of mood-regulation interventions. These issues fall into four main themes: (1) the intractable nature of mood issues; (2) limitations in intervention approaches; (3) counterproductive intervention effects; and (4) user demotivation and disengagement.

5.4.2.1. The Intractable Nature of Mood Issues

Participants noted that mood states, such as the "Sunday Blues," are often inherently difficult to influence or change, posing significant challenges for effective intervention. They identified several key factors that contributed to this perceived intractability (see Table 26 for an overview and supporting participant statements).

One major difficulty was the complex and multifaceted causes of mood. Participants explained that the "Sunday Blues" might arise from underlying issues that are difficult—or even impossible—to resolve. For example, one participant noted that talking with Mora could not help them prepare for Monday because their reluctance to return to work stemmed from negative workplace relationships—an issue beyond Mora's scope. Another participant attributed their "Sunday Blues" to broader concerns about life satisfaction and happiness, suggesting that such deep-rooted issues would require more comprehensive solutions than what WeMo can offer. Participants also emphasized that the "Sunday Blues" often involve multiple layers of negative feelings triggered by different factors. This complexity means that a single intervention might not fully address all aspects of the experience. For instance, while some felt that Weekender could help prevent disappointment over an unfulfilling weekend, it could not alleviate the dread they inevitably felt about the coming workweek.

Another issue was the intangible and ambiguous nature of mood states. Participants noted that moods are often subtle and may not be expressed through explicit facial or bodily cues, making it difficult for systems like Mora to detect them accurately. One participant also described feeling mixed moods on Sunday night—such as joy from the weekend alongside anxiety about the week ahead—which made the "Sunday Blues" even more difficult to detect. This ambiguity could create additional challenges for Mora in determining the right moment to intervene effectively.

The third challenge was the immobilizing impact of negative moods. Participants noted that experiencing low moods can significantly affect their motivation and behavior, potentially limiting how effectively they interact with the interventions. For example, some described a tendency to process their thoughts and feelings internally during the "Sunday Blues," which could lead them to withdraw from social interactions with Mora or reduce their level of engagement and self-disclosure.

Table 26. The intractable nature of mood issues.

Code	Example participant statement(s)		
	Group 1 (WeMo)	**Group 2 (Weekender)**	**Group 3 (Mora)**
The complex and multifaceted causes of mood	"There's something about day-to-day life that's not really fulfilling you … that makes you already not happy." (P1-4)	"To me, this 'Sunday Blues,' is two-sided because you look back, and because you look forward. For looking back, this is a beautiful concept … but I think more often you also have to think forward on what's going to happen on Monday, and you have to be prepared for the next week. So, that's still there." (P2-11)	"[What] if I don't want to see a colleague in the office? Actually, this is not about work itself—it's about the relationship in the office." (P3-14)
The intangible and ambiguous nature of mood states	—	—	"If someone is in a not good mood, they might not have very clear facial expressions, or they just want to lie down on the sofa … with no bodily language." (P3-8)
The immobilizing impact of negative moods	—	—	"Sometimes, if you are in the 'Sunday Blues' … you probably just want to lock your mind and want to self-digest your negative mood." (P3-13)

5.4.2.2. Limitations in Intervention Approaches

Participants identified several limitations in the intervention approaches that might reduce their overall effectiveness. Table 27 offers an overview of these limitations, together with illustrative participant statements.

A key limitation was the perceived suboptimal timing of the support provided. For example, participants noted that WeMo's main intervention took place on Monday, which felt too late to meaningfully address the negative feelings that typically arise on Sunday night. While some appreciated Weekender's preventive guidance, they believed it could be more helpful if it also provided real-time support on Sunday night to distract them from potential negative rumination. In contrast, Mora's in-the-moment interventions were seen by participants as potentially ineffective due to time constraints. They mentioned that by late Sunday night, they often lacked the time or energy to fully engage in mood-regulation activities.

Another issue was the insufficient support for deeper emotional reflection, which participants felt was important for building emotional resilience. For instance, some expressed a desire for an additional step in Weekender that would allow them to reflect more deeply on how they spent their weekend, rather than simply celebrating the completion of planned activities. A similar need was raised by participants who engaged with WeMo: they wanted more opportunities to track and reflect on their mood patterns

over time, and to explore how these patterns related to their broader emotional well-being. Additionally, some participants hoped that Mora could go beyond offering temporary comfort and relief and instead support a more sustainable approach to self-regulation. They envisioned Mora as a tool that could help them better understand their emotional experiences and gradually develop personal coping strategies, reducing their reliance on the intervention in the long run.

Table 27. Limitations in intervention approaches.

Code	Example participant statement(s)		
	Group 1 (WeMo)	**Group 2 (Weekender)**	**Group 3 (Mora)**
Suboptimal timing of support	"Is it a bit late for me? Because at some point, you already start to worry and become stressful about Monday." (P1-3)	"For me, the solution to helping with the 'Sunday Blues' was having something at Sunday night, because it didn't allow me to ruminate before I go to bed." (P2-3)	"Mora probably can do one step ahead. Like, instead of fixing it after the problem happened, they can prevent this even before this happened." (P3-13)
Insufficient support for deeper emotional reflection	"After the app generates the picture, it can be followed by a question asking my mood status, then I can track my emotional progression … and there might be something that can be taken from there." (P1-11)	"There should be a moment where you actively reflect on: how was my weekend, and did I like it? Or what were nice moments? So, creating a reminder to take a moment to reflect instead of [only] applauding you that you have finished all your fun activities." (P2-6)	"I think a more sustainable way is that the users can learn those strategies, and they can adopt them when they feel depressed during weekends. … I want to have some technology [that] can help me reflect and can help me do better for the next time after all of this." (P3-2)

5.4.2.3. Counterproductive Intervention Effects

Participants identified several ways in which the design interventions could inadvertently produce negative emotional effects, undermining their intended benefits. Table 28 offers an overview of these issues, together with illustrative participant statements.

One such effect was a heightened awareness of the weekend's end. Some participants felt that features like WeMo's prompt to review weekend memories or Mora's offer of emotional support might unintentionally increase their sense of the approaching workweek, thereby intensifying their "Sunday Blues." Similarly, Weekender's structured and goal-oriented approach to the weekend might make users more conscious of time passing, which could, in turn, hinder their ability to relax and remain fully present in the moment.

Another issue was the potential for negative self-reflection triggered by certain features. For example, prompts to review the weekend from both WeMo and Weekender might lead users to notice unfinished plans or recall unpleasant experiences, evoking feelings of regret or disappointment. One participant noted that these features might also bring up particularly enjoyable moments, leading to feelings of

nostalgia or sadness, especially when those memories were juxtaposed with the reality of the weekend coming to an end. Additionally, some participants mentioned that they were not always fully aware of their negative moods or their underlying causes. In such cases, Mora's attempts to initiate emotional dialogues could inadvertently draw attention to these feelings, leading users to dwell on them and potentially worsening their distress.

A further concern was users' potential dissatisfaction with how the content was delivered. Some participants felt that WeMo's automatically generated visual summaries might fail to fully reflect the emotional or experiential quality of their weekends, leaving them feeling misunderstood or disconnected from the system. Others noted that Mora's advice might lack relevance to their complex, real-life situations involving work, relationships, and personal well-being. When the content seemed repetitive or impersonal, users could feel frustrated or disappointed rather than supported.

Table 28. Counterproductive intervention effects.

Code	Example participant statement(s)		
	Group 1 (WeMo)	**Group 2 (Weekender)**	**Group 3 (Mora)**
Heightened awareness of the weekend's end	"This kind of reminder can also be a reminder that your time is not so much—it's the end of your weekend." (P1-2)	"When [it] approaches Sunday morning, it will make me anxious again. I will be like, 'There's only half a day left for my weekends.' And it's really interfering me to really live that weekend." (P2-8)	"It then reminds me, 'Okay, tomorrow is Monday.' And probably it's like reinforcing the bad mood." (P3-2)
Triggered negative self-reflection	"I like to capture the moments when I'm with people I want, but sometimes it makes me more nostalgic about my friends." (P1-8)	If I didn't accomplish this, I think then it's like a record that nothing happened that weekend. So I could imagine it being a little off-putting." (P2-3)	"I think sometimes what happens is with these technologies is like, say, I'm feeling a little bit stressed right now, but then if [Mora] comes up and says, 'Oh, you look really sad or stressed,' then maybe it kind of gets exaggerated more for me. So, like maybe I start thinking, 'Maybe I'm really stressed right now.' It kind of builds up more around it." (P3-8)
Unsatisfactory content delivery	"This [visual] wouldn't accurately tell how I felt in those moments … it doesn't fully resonate with me." (P1-9)	—	"It will probably provide very predictable answers … sometimes they can be helpful, but sometimes you feel like, 'Eh, I've heard it one million times.'" (P3-3)

5.4.2.4. User Demotivation and Disengagement

Participants expressed concerns about a potential decline in motivation and engagement with the interventions, identifying several contributing factors. Table 29 offers an overview of these limitations, together with illustrative participant statements.

One notable issue was users' psychological resistance to system prompts. Some participants reported that constant notifications from WeMo and Weekender might feel like imposed tasks or interruptions, leading them to resist following the suggested actions. In the case of Mora, a few participants described a general reluctance to accept guidance from a social robot, which they perceived as lacking the intellectual and emotional capacity to genuinely understand human thoughts and feelings.

A second concern was the continuous effort required by the interventions and the burden this could place on users. For instance, one participant questioned the value of consistently investing effort only to receive a visual summary from WeMo. Another preferred to keep only essential apps, such as communication apps, rather than auxiliary ones like Weekender, emphasizing the importance of tools that deliver immediate or tangible benefits.

Finally, participants noted a potential decline in the perceived novelty and value of the interventions over time. Several described how initial enthusiasm for tools like WeMo and Weekender might diminish as the novelty faded. Similarly, some observed that conversations with Mora could become repetitive and predictable after a few weeks, leading to boredom and reduced motivation to continue engaging with the system.

Table 29. User demotivation and disengagement.

Code	Example participant statement(s)		
	Group 1 (WeMo)	**Group 2 (Weekender)**	**Group 3 (Mora)**
Psychological resistance to system prompts	"When I get the notification, I do always see it as a task, as a chore. It doesn't really match with what I want to do in the weekend where I don't want any tasks." (P1-9)	"If I get random notifications, I'm like, I don't want to deal with this right now. There's something else going on." (P2-11)	"It always sort of rubs me the wrong way. When it goes, 'Let's do meditation,' and I'll be like, 'What? F*** you. You're a robot. You don't know what I'm feeling.'" (P3-9)
Burden of continuous effort	"There are some efforts there. You need to input something to get something output. So I'm not sure whether I will keep investing those efforts during the long run." (P1-11)	"If an app is not so necessary in my life like WeChat, I usually won't use it like for a long time. I try it, then maybe I quit it." (P2-1)	—
Decline in perceived novelty and value	"Even though the content is based on your personal experience every week, the visual effect can be repetitive. If I see this for several weeks, I will probably get bored. So then I will never use it probably." (P1-11)	"I think I would try it, but I also think that there is a high chance that maybe after two weeks, I will be like, 'Okay, I've seen it now, and I will go back to my old system.'" (P2-6)	"In the first weeks, you might think it's a good conversation. But after a few weeks, you [might] realize why there is always a fixed routine, and I can imagine what you are gonna say next, right? So, I might feel a bit bored." (P3-6)

5.5. DISCUSSION

Designing for mood regulation remains a complex challenge. Our exploratory case study underscored this complexity, surfacing a range of critical issues that can influence people's adoption and effective use of mood-regulation interventions in daily life. How might designers better navigate these challenges in future practice? In what follows, we offer a series of design considerations grounded in our study's findings and informed by our own experiences throughout the research and design process.

5.5.1. The Current Study's Implications for the Practice of Designing for Mood Regulation

In this section, we introduce four key design considerations that emerged from our study. These recommendations translate empirical, user-centered insights into actionable design strategies intended to support user adoption and improve intervention effectiveness.

5.5.1.1. Balance Mood Regulation with Other Basic Psychological Needs

Our findings indicate that while design interventions may support mood regulation, they may also unintentionally conflict with other fundamental psychological needs, such as privacy, autonomy, social connection, and personal development. For example, some participants acknowledged the emotional support offered by Mora, but expressed concern that relying on it might reduce their motivation to seek support from friends and family, potentially weakening those relationships. Others saw value in WeMo's capacity to enhance mood, yet worried that using it could undermine their personal goals to disconnect from digital devices and be more present in daily life. These concerns highlight a core tension of supporting users' mood-regulatory needs without compromising other broader needs, which may hinder acceptance and adoption of such interventions. To address this challenge, we recommend that designers and design researchers identify users' context-specific psychological needs—beyond mood regulation—early in the development process. Tools such as design-oriented need frameworks can support this effort (e.g., Desmet & Fokkinga, 2020; Hassenzahl et al., 2013). Rather than regarding mood regulation as the sole design objective, these psychological needs should be considered essential design requirements and thoughtfully integrated into the overall design strategy.

5.5.1.2. Build on Users' Existing (Often Implicit) Mood-Regulatory Practices

Our findings suggest that interventions that introduce unfamiliar or incongruent practices may face rejection, particularly when users already rely on informal or implicit strategies to manage their mood. Across all three user studies, participants acknowledged the value of our proposed designs, but also noted their redundancy with existing mood-regulatory practices, making such interventions unnecessary in their daily lives. This highlights a crucial opportunity for design: rather than introducing entirely new strategies, designers could seek to identify and support the mood-regulatory behaviors users already employ, whether consciously or subconsciously. Building on these existing practices may lead to interventions that feel more intuitive, adaptive, and effective. We therefore recommend that, during the user research phase, designers and design researchers conduct a comprehensive investigation

of users' own mood-regulation strategies that they have adopted or developed over time (Erber, 1996; Morris & Reilly, 1987; Thayer et al., 1994). These insights can serve both as inspirational materials for ideation and as direct input for addressing certain mood causes in the design process. Desmet (2015) advocates for deliberately designing interventions that engage users in mood-regulatory activities. Our proposed design consideration complements this perspective by emphasizing the value of grounding such interventions in users' own lived experiences and established routines.

5.5.1.3. Tailor Strategies to the Complex and Multifaceted Causes of Mood

Our findings reveal that a single design intervention is often insufficient for improving negative mood states, especially when those moods arise from multiple, often coexisting causes. For example, in the case of the "Sunday Blues," people may simultaneously experience regret over how their weekend was spent and anxiety about the upcoming workweek. Moreover, some contributing factors, such as strained social relationships or personal ill-being conditions, may fall outside the scope of what a mood-regulation intervention can directly address. To help navigate these challenges, we recommend a holistic approach that combines multiple mood-regulation strategies, each tailored to a specific type of mood cause. For instance, identifiable and manageable stressors, such as an unfinished task or an upcoming difficult meeting, might be addressed through features that support problem-solving or positive thinking. In contrast, causes linked to broader conditions—like an unfavorable work environment—that require organizational or collective action to change might be better managed through temporary, symptom-focused strategies, such as uplifting distractions or mindfulness practices. This layered approach acknowledges the complex and multifaceted nature of mood and can facilitate the development of more adaptive, personalized mood-regulation support for users.

5.5.1.4. Integrate Both Preventive and Responsive Intervention Approaches

Our findings show that both preventive and real-time interventions have limitations, and their effectiveness can vary across individuals and contexts. Real-time interventions, like Mora, may struggle to support mood regulation during Sunday evenings due to time and contextual limitations, such as users' low mental and physical energy or limited environmental resources. In contrast, more prevention-oriented interventions like Weekender and WeMo may also fall short when users continue to experience the "Sunday Blues" despite earlier preventive efforts, and need more immediate, situation-specific support from these interventions. We recommend integrating both preventive and responsive approaches into a single, cohesive intervention. Preventive components can help reduce or even avoid anticipated stressors in advance, while responsive elements can provide timely support when these stressors nonetheless arise. We propose that this combined approach is better suited to the elusive and enduring nature of mood and more effectively addresses users' evolving emotional needs—particularly during sensitive periods like Sunday evenings. Additionally, we suggest that both preventive and responsive components should be designed to support ongoing reflection and learning, helping users to strengthen emotional resilience and build personal coping strategies over time.

5.5.2. The Authors' Critical Reflections on the Practice of Designing for Mood Regulation

This section takes a step back to reflect on a broader question: how do our roles, biases, and lived experiences shape what and how we design? Our reflections lead to three additional design considerations. While aligned with those outlined above, they are broader in scope, addressing the mindset and the personal or social stance designers may subconsciously bring to their work. Here, we advocate approaching this practice with integrity, reflexivity, and care.

5.5.2.1. Avoid the Pathologization of Normal Mood Experiences

Through our conversations with participants, we came to recognize that the "Sunday Blues" is not always experienced as a problem requiring intervention, contrary to our initial assumptions. As one participant highlighted, "It's just one of my blue moments. It's not like such a big deal" (P3-2). While this recurring low mood can certainly impact well-being for some, many participants appeared to have accepted it as a routine part of their week, which they had grown accustomed to and found ways to live with. In such cases, introducing an intervention, especially one framed as problem-solving or emotional support, may inadvertently encourage individuals to reinterpret this otherwise manageable experience as a more serious issue. This could lead them to abandon their natural coping mechanisms in favor of solutions aimed at alleviating or avoiding negative moods. Over time, such a shift may undermine their ability to accept and navigate normal mood fluctuations, potentially making them more emotionally vulnerable (Ford & Mauss, 2014). We therefore caution designers and design researchers, including ourselves, against the uncritical pathologization or medicalization of everyday negative mood experiences. Even when there is a genuine need for support, proposed interventions should acknowledge that negative moods are a normal and sometimes beneficial part of human life (Ford et al., 2018; Shallcross et al., 2010). In the design process, it is important to respect—and when appropriate, support—individuals' existing acceptance of these moods.

5.5.2.2. Design with Positionality and Reflexivity

During our user studies, participants challenged our design concepts and our roles as designers. Some viewed the structure, productivity-oriented nature of our design interventions as misleading, while others noted that we were imposing a particular meaning or value on how weekends should be experienced. We welcomed these critiques, which prompted our deeper reflections on the root causes of these tensions. One possible reason was the implicit influence of our own personal, social, and cultural identities, which inevitably introduced biases into the design process. For instance, I (the first author), as someone within the community experiencing the "Sunday Blues," tend to find structured and eventful weekends helpful in managing those feelings. This perspective likely stems from my upbringing in environments that valued productivity, as well as my current life in a society that emphasizes structure and organization. These subconscious biases may have steered our designs toward structure and productivity. To address this, we advocate for integrating positionality and reflexivity early in research and design. Positionality involves acknowledging and articulating one's identity in relation to others, while reflexivity encourages constant self-examination of how one's background, assumptions, and privileges shape design choices

(Rodriguez Schon & Celi, 2023). These practices can help designers critically assess their influence and actively incorporate alternative knowledge and worldviews into their design work (Fox et al., 2020; Öz & Timur, 2023; Schiffer, 2020).

5.5.2.3. Attend to the Designer's Own Emotional Vulnerability

In this section, I (the first author) reflect on my personal experiences with the "Sunday Blues," which motivated this study and became a key focus of my PhD research. Over more than one year of sustained engagement—through both design activities and user studies—my awareness and sensitivity to this mood significantly increased. This heightened sensitivity was a double-edged sword. On one hand, it allowed me to recognize and reflect on the phenomenon in real-time and in context. Drawing on these personal experiences helped refine design directions, shape interview questions, and foster deeper empathy with participants and more nuanced analysis of their responses. On the other hand, the ongoing attention to the "Sunday Blues" also increased my emotional vulnerability. The constant awareness, together with the perceived obligation to analyze and reflect, often intensified the mood itself, sometimes leading to emotional fatigue and even affecting those close to me. For instance, this mood and its negative impact frequently spread to my partner, with whom I shared Sunday evenings. Even now that the study has concluded, I suspect this sensitivity will continue to influence how I experience the "Sunday Blues" and similar moods. This reflection points to a broader consideration: when working with emotionally demanding topics like mood regulation, designers and design researchers should also attend to their own well-being. We advocate for self-care practices such as taking intentional breaks and incorporating small acts of self-reward (Howard, 2020; Kumar & Cavallaro, 2018). Moreover, we urge the design research community to foster environments where designer vulnerability is acknowledged and care for designers is regarded as integral to the research and design process (Kumar & Cavallaro, 2018).

5.5.3. Limitations and Future Research Directions

Our exploratory case study has several limitations. First, the mood phenomenon we explored—the "Sunday Blues"—is inherently multifaceted and influenced by a range of individual, environmental, and contextual factors. No single design intervention, or even a set of interventions, can fully address its complexity. While we explored three key dimensions of this experience in our designs, many other contributing factors remain unexplored. For example, tangible stressors in home environments and personal devices represent promising areas for design-led inquiry (see Chapter 4). Future research could expand this exploration and contribute more nuanced perspectives to enrich our understanding.

Second, our participants were drawn from a local research community, most of whom had backgrounds in design and human-computer interaction (HCI). Their familiarity with emerging technologies may have influenced their perceptions of the design interventions. As one participant noted, "Because I know what goes on behind the scenes, I don't trust it somehow" (P3-9). To capture a broader and

more representative range of perspectives, future studies should involve participants with more diverse backgrounds and lived experiences.

Third, because the goal of this study was to use speculative design concepts to provoke reflection and discussion—rather than to evaluate fully functioning systems—our participants only briefly interacted with conceptual videos illustrating the design concepts. Their responses were therefore based on anticipated instead of actual use, limiting their ability to reflect on how they might engage with the interventions in practice. As one participant remarked, "I really don't know. I'd have to test it to know how that makes me feel" (P1-9). Future research could address this by developing high-fidelity, functional prototypes and deploying them in real-world settings over extended periods to validate and expand our findings.

Lastly, our findings and the resulting design considerations were derived from a single case focused specifically on the "Sunday Blues." As a result, their applicability to other mood issues or mood-regulation contexts may be limited. Future work could investigate a broader range of mood experiences and everyday scenarios to further develop and generalize these insights.

Despite these limitations, we believe this study offers meaningful preliminary insights and lays the groundwork for future investigations into the complexities and nuances of designing technologies that support mood regulation in everyday life.

5.6. CONCLUSION

This study provides empirical insights into the challenges people face when using mood-regulation interventions in everyday life. It translates these insights into actionable design considerations for creating more effective mood-regulation technologies, such as balancing mood regulation with users' broader psychological needs, leveraging existing coping strategies, tailoring interventions to the specific causes of mood, and integrating both preventive and real-time support. These recommendations underscore that designing for mood regulation requires understanding not just what technologies can do, but how they fit into the complex realities of users' lives, values, or emotional practices. In reflecting on our own research and design process, we urge designers and researchers to avoid pathologizing everyday negative moods, which are a normal part of human experience. We also advocate for positionality and reflexivity in the design process, and for attending to the emotional vulnerability and well-being of designers themselves as they engage with this topic.

CHAPTER 6

General Discussion and Conclusion

6.1. THE INTEGRATIVE EXPLORATION OF MOOD-FOCUSED DESIGN

This dissertation set out to develop a comprehensive understanding of mood-focused design. To this end, we undertook an integrative exploration that brought together insights from design researchers, design practitioners, and ourselves as researcher-designers. In the sections that follow, we revisit the key findings from each strand of this exploration and explain how they answer our research questions. We then reflect on how these findings collectively address the overarching research aim, acknowledge the limitations of our research approach, and consider the implications for the field and beyond.

6.1.1. How Have Design Researchers Understood and Approached Mood in Their Work?

Our scoping review (Chapter 2) found that while design researchers tend to conflate mood with related constructs like emotion or affect, they have nevertheless recognized a set of defining features and consequences of mood. Specifically, mood has been understood as an enduring, diffuse affective state that fluctuates over time and exerts pervasive influences on health and well-being, everyday functioning, and social relationships. Compared to how mood is conceptualized in psychology, this understanding appears selective, emphasizing aspects that are most relevant to shaping human-design interactions or informing design qualities.

Design researchers have approached mood in three ways: (1) design for mood monitoring, (2) design for mood expression, and (3) design for mood regulation. The first two are typically technology- or innovation-driven, leveraging emerging technologies to help users track or express their moods. Yet these designs frequently extend beyond their technical focus, enhancing self-awareness or mutual awareness that can foster self-regulation or social support. The third approach builds on these purposes more explicitly, exploring how artifacts and environments can help regulate mood. This approach is underpinned by the shared premise that maintaining positive or balanced moods is beneficial, contributing to well-being, healthy interpersonal dynamics, and various other aspects of everyday life.

Together, these approaches clarify what design can do to or for mood and delineate three conceptual categories of mood-focused design: mood-monitoring design, mood-expressing design, and mood-regulating design. This provides a useful lens for understanding what can be considered as mood-focused design initiatives. At the same time, our review surfaced specific design issues tied to each category, together with strategies researchers have proposed to address them. These insights add a practical dimension, offering actionable guidance for practitioners seeking to create more effective mood-focused designs.

In addition, reviewing design researchers' work revealed several research gaps. Theoretical understanding remains limited, particularly regarding mood's functions, mechanisms of emergence, and contributing factors. The boundaries of mood-focused design are underexplored, leaving space for novel design

categories. Methodological support is also scarce, with few methods or tools available to guide practice. Together, these gaps highlight opportunities for future research to advance the field.

6.1.2. How Have Design Practitioners Considered and Incorporated User or Customer Mood in Real-World Projects?

Our retrospective interviews with design practitioners (Chapter 3) revealed that, much like researchers, practitioners also tend to equate mood with other affective phenomena, such as emotion, product personality, or brand impression. Despite this conceptual ambiguity, mood has been implicitly or indirectly woven into their projects. Some have addressed it under the umbrella of "well-being" or aspirational goals such as "positive experience," while others have drawn upon tacit knowledge that "happier" users are more satisfied and engaged—even if mood itself is not explicitly named.

Design practitioners have approached mood in five ways: (1) designing to foster a specific positive mood, and (2-5) designing to improve mood as a means to enhance engagement, enrich experience, create differentiation or advantage, or facilitate user research. The first approach treats positive mood as intrinsically valuable, a direct indicator of well-being, and therefore a legitimate design goal in itself. While relatively rare in commercially driven projects, this orientation appears increasingly visible in initiatives where teams and organizations embed public benefit or social impact into their missions. In contrast, the other four approaches have been more prevalent, emphasizing the instrumental value of mood, particularly its influence on people's perception and behavior. Here, mood improvement becomes a useful tool to achieve broader outcomes closely tied to commercial success.

These practitioner perspectives add nuance to the picture drawn from design researchers' work. While Chapter 2 delineates three categories of mood-focused design, Chapter 3 further demonstrates how one category—mood-regulating design—can be oriented either toward intrinsic well-being goals or toward instrumental, outcome-driven goals in real-world projects. To capture this, we refined the earlier characterization of design for mood regulation into design for mood (regulation) and design with mood (regulation). This refinement enriches our understanding of mood-focused design by highlighting subtle but important differences in how mood is considered and addressed in research versus practice.

In addition to these insights, practitioners identified general challenges in doing mood-focused design—ranging from the difficulty of determining specific mood effects to the complexity of guaranteeing and validating these effects across contexts. To address these challenges, they emphasized a need for stronger knowledge resources, including both general knowledge (e.g., types and manifestations of moods) and design-specific knowledge (e.g., tools that enhance or cultivate designers' mood sensitivity). These findings point to opportunities to make mood-focused design more explicit and accessible, as well as areas where knowledge transfer could strengthen practice.

6.1.3. How Can We, as Researcher-Designers, Understand and Help Address People's Mood in Everyday Contexts?

Mood, by its very nature, is elusive and difficult to grasp—a challenge we recognized at the outset of this PhD project and encountered repeatedly in the work of both design researchers and practitioners. This sparked our curiosity: how might we study a subtle, everyday mood phenomenon in depth? Our phenomenological exploration of the "Sunday Blues" (Chapter 4) exemplified such an approach. By examining its manifestations, contributing factors, coping strategies, and nuances within each, we moved beyond abstract definitions toward a situated account of how a specific mood is shaped, experienced, and navigated. The "Sunday Blues" proved to be multifaceted, and our layered analysis enabled us to engage with and reveal its complexities in detail.

This inquiry laid the groundwork for our subsequent designerly exploration (Chapter 5), in which we developed and evaluated mood-regulating interventions for the "Sunday Blues." This process showed that designing for mood regulation is as challenging as understanding mood itself. People's adoption and effective use of mood-regulating designs can be hindered by factors ranging from the intractability of mood issues to tensions between interventions and users' values or existing lifestyles. In response, we articulated a set of design considerations, such as combining preventive with responsive intervention mechanisms and addressing users' broader psychological needs from the outset. These considerations remind practitioners that effective mood-regulating designs require attention not only to technological possibilities but also to how they integrate into the lived realities, values, and coping practices of users.

While Chapters 2 and 3 provide a broad overview of mood-focused design, Chapters 4 and 5 demonstrate how to engage with a specific mood phenomenon—first by unraveling its qualities, then by designing mood-regulating interventions that respond to them. Moreover, Chapter 5 extends earlier findings by surfacing additional challenges involved in mood-regulating design and distilling practical considerations. These considerations offer general guidance for practitioners, complementing the more context-specific strategies identified in Chapter 2.

6.1.4. Synthesis and Reflection

So far, research and practice in mood-focused design have been largely implicit, inconsistent, and fragmented, leaving the field conceptually ambiguous. In response, our integrative exploration contributes a more explicit and comprehensive understanding by (1) articulating **conceptual categories** of mood-focused design, (2) revealing **pragmatic orientations** when incorporating mood in real-world projects, and (3) providing **situated examples and considerations** for engaging with mood in everyday contexts. Figure 16 synthesizes these contributions by connecting back to the integrative approach outlined in Figure 1 (Chapter 1).

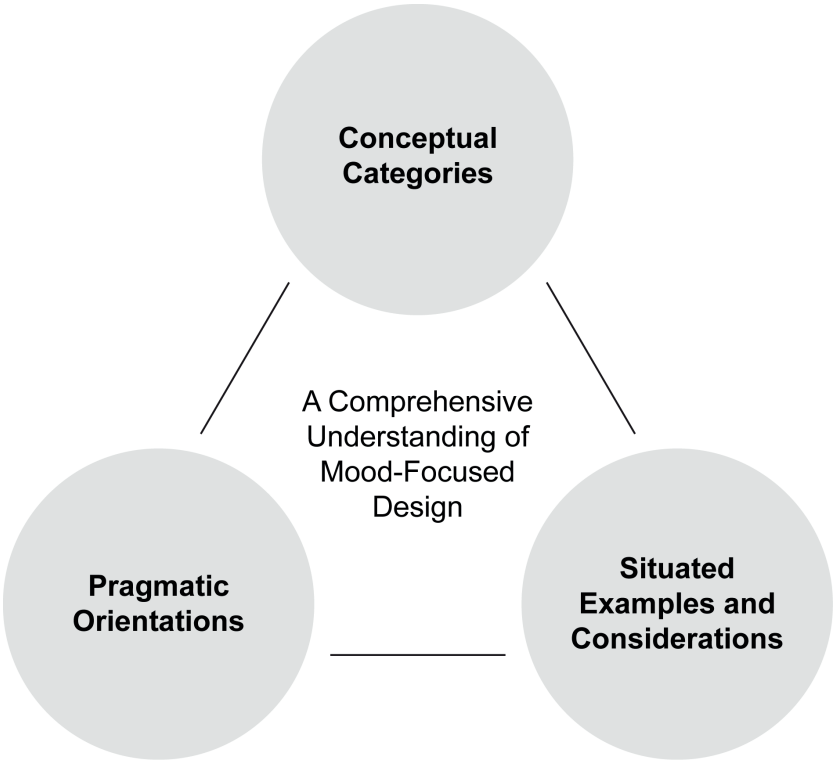


Figure 16. Key contributions of the integrative exploration of mood-focused design.

Importantly, rather than prescribing a fixed definition of mood-focused design, we outline its current contours and demonstrate how it can be approached in research and practice. This approach brings much-needed clarity while preserving openness for future development, fitting the current status of mood-focused design as an early-stage, evolving area of inquiry and practice.

These contributions should be considered in light of three key limitations of our integrative exploration. First, our analysis of design researchers' work relied solely on published resources rather than direct engagement. Future research could build on this by interviewing researchers who actively study mood, uncovering more nuanced and tacit perspectives. Second, our exploration of practitioners' perspectives was limited to those working broadly in experience-driven design, where mood was addressed more implicitly. Engaging practitioners who work more explicitly with mood—such as developers of mood-tracking apps or mood-lighting products—could reveal additional pragmatic orientations. Third, time constraints prevented us from exploring how mood can be leveraged to achieve broader goals in real-world, commercial projects, a key orientation identified in practitioner accounts. Collaborating with industry partners could enrich our understanding of mood-regulating designs, especially in commercially driven settings.

Despite these limitations, the findings of this dissertation provide meaningful implications for the field and its future development. In Chapter 1, we argued that developing a more explicit and comprehensive understanding of mood-focused design "would enable researchers to build cumulative knowledge and support practitioners in addressing mood in a more systematic and impactful way." These implications can now be made more concrete.

For research, this understanding enables scholars, both within the field and in interconnected domains, to identify opportunities for further exploration and articulate their mood-focused contributions with greater precision—whether in the form of artefacts that fall into or extend beyond the three conceptual categories, or as methods and tools that support pragmatic orientations in design projects. It also lowers the entry threshold for newcomers, who can more easily position their work and anticipate outcomes with explicit attention to mood. Together, these benefits contribute to a more cumulative process of knowledge generation, where insights and innovations build upon one another rather than remaining fragmented.

For practice, the comprehensive understanding serves as a reservoir of mood-related design knowledge. Practitioners can draw on it to reference mood-focused design innovations, tailor mood-regulating intentions to specific project contexts, and take inspiration from concrete cases of designing for mood regulation. It also highlights the considerations they need to be mindful of during the design process. These insights equip practitioners to address mood in a more systematic and deliberate manner, ultimately supporting the creation of more effective mood-focused designs.

The implications also extend to the broader domains of experience-driven design and positive design. Within experience-driven design, which has long explored facets of human experience ranging from pleasure to meaning, introducing mood-focused design foregrounds a subtle yet often overlooked dimension. It enriches the catalogue of experiences that design can address and offers a novel source of inspiration. At the same time, it invites researchers and practitioners to revisit puzzling aspects from past projects—where something unarticulated may now be recognized as mood—while guiding more deliberate engagement with mood in future work. Since mood is inevitably woven into human-centered design, attending to it more explicitly can enhance both experiential quality and commercial outcomes.

For positive design, the implications are also meaningful. Mood is not only a direct indicator of how well people are doing but also a powerful influence on many dimensions of overall well-being, from individual to interpersonal. Positioning mood explicitly within design thus opens up two pathways: it can serve as a creative space for ideation and innovation in well-being-oriented projects, and it can function as a unique approach, offering designers practical strategies to incorporate mood into interventions that support and enhance well-being. In this way, mood-focused design extends the toolkit of positive design, foregrounding a subtle yet crucial factor in human flourishing.

6.2. POSSIBLE FUTURES FOR MOOD-FOCUSED DESIGN

Building on the insights presented, the next step is to consider where mood-focused design might be headed. Rather than prescribing a fixed trajectory, we sketch two possible futures that could guide further exploration.

6.2.1. Toward a More Explicit Field

Although this dissertation brings greater clarity to mood-focused design, whether and how (well) researchers and practitioners carry this clarity forward in their work remains a persistent challenge. There is a telling example. Since Desmet's (2015) influential article "Design for Mood: Twenty Activity-Based Opportunities to Design for Mood Regulation," designers and researchers have frequently cited his work.[16] While Desmet clearly defines mood in contrast to emotion and introduces mood-specific theories, many citing works nonetheless blur the boundary, either by conflating mood with emotion or by engaging primarily with emotion when referencing his mood-related perspectives. This makes us pause to ask: Does it really matter to distinguish mood from emotion in design?

Our answer is yes—but with nuance and openness. We do not propose that designers and researchers rigidly enforce the distinction in all cases. Instead, we recommend that they explicitly consider whether their design or research problem concerns mood, emotion, or both, and adopt the term "mood" when referring to more diffuse or enduring affective states. There are at least two reasons for doing so.

First, mood and emotion play distinct roles in user-product or service interactions (H. Xue et al., 2020). Recognizing this difference opens up unique design opportunities. For example, a user may experience many discrete emotions during an interaction, but they carry their pre-existing mood into that interaction (and often leave with their mood either maintained or altered). Thus, design innovations that aim to evoke multiple discrete emotions are different from those that seek to accommodate or shape a particular mood. Consider airline travel: an emotion-centric perspective might design a series of stimuli—such as playful mini-games or surprise snacks—to give passengers richer, moment-to-moment experiences. A mood-focused perspective, by contrast, might design the overall cabin atmosphere—through lighting, sound, or seating arrangements—to soothe passengers' underlying anxiety or irritability. Design projects that overlook this difference may miss valuable opportunities to enhance user experience and satisfaction, either by ignoring mood entirely or treating all affect as if it were episodic emotion.

16 Throughout this PhD project, we monitored citations of Desmet's (2015) article through Google Scholar alerts in order to stay informed about how the field was unfolding.

Second, designing for mood regulation versus emotion regulation often requires different strategies and methods. Emerging empirical work shows that some regulation strategies are more effective for moods than for emotions, and vice versa. For example, cognitive reappraisal appears particularly effective for regulating emotions, which are directed at specific objects or events, but less effective for moods, which tend to be less intentional (Meyers et al., 2025). By contrast, strategies with more diffuse or delayed effects—such as expressive writing, comfort eating, or taking a restorative nap—may be more impactful in shaping moods over time (Meyers & Tamir, 2024). These findings suggest that the choice of regulation strategy depends on whether mood or emotion is the target, which implies that design projects aiming to influence either should tailor their approach accordingly.

In an interview, Desmet reflects:

> I used to say that design research cannot focus on mood because it is too elusive; the relationship between design and mood is too indirect, and that is why we originally focused on emotions. But it is time to actually take on that challenge (Desmet & de Francisco Vela, 2020, p. 39).

That challenge remains. To take it on, we believe, means to make mood-focused design clearer in its definitions, more explicit in its aims, and more purposeful in its methods—so the field can gain real momentum.

6.2.2. Integration into Human-Centered Design Education

Our discussion of this theme is inspired by an anonymous reviewer's comment on the manuscript that underpins Chapter 3:

> To this reviewer's knowledge, mood is not something undergraduate or graduate designers are much exposed to during their education. Beyond personal anecdotes and feelings, we cannot expect practitioners to be especially well prepared or equipped to deal competently with mood. Would this situation be regarded as a weak point in design education?

We concur with the reviewer: the absence of education on mood (as a facet of human experience) and on mood-focused design (as a branch of experience-driven design) represents a weakness in current design education. However, rather than proposing mood-focused design as a stand-alone course at this early and still evolving stage, we suggest three ways in which education on mood can be integrated into existing bachelor's and master's programs.

First, mood and mood-focused design can be incorporated into broader, introductory courses on human-centered or experience-driven design. For example, within our faculty, the undergraduate course *Understanding Humans* introduces students to the relevance of human context (cultural, social, political), human experience (emotion, motivation, behavior), and human factors (physical, perceptual,

cognitive ergonomics) for design. Integrating mood into this framework foregrounds it as a crucial dimension of human experience. Doing so not only enriches the conceptual scope of the course but also sensitizes students to the complex, multi-layered nature of lived experience. In the long run, this cultivation of sensitivity helps students better comprehend user concerns, dilemmas, and preferences that are often subtle and difficult to articulate.

Second, mood can be introduced as complementary content in emotion-centric design courses. These courses already focus on affective dimensions of experience and can be enriched by lightweight, exploratory workshops that bring mood into the picture. Here, students can reflect on their own moods and those of others, exploring how moods interact with emotions and behaviors. It could be argued that emotion is already a challenging topic, both for teachers to teach and for students to grasp in design education. We, however, contend that considering mood alongside emotion does not overcomplicate but rather deepens understanding. Just as knowledge of emotion supports understanding mood, so too can knowledge of mood provide fresh perspectives on emotion.

Third, education on mood regulation can be woven into specialized courses such as design for well-being or design for health. Because mood plays a critical role in both mental health and overall well-being, mood-regulating design examples can serve as tangible, inspirational cases. These examples help students envision how design might contribute directly to well-being or mental health, especially when more abstract theories prove difficult to apply. In this context, mood regulation becomes a concrete, relatable entry point for students to translate theory into practice.

In sum, embedding mood into design education is less about creating an entirely new course but more about broadening the sensitivity and competencies of future designers. While mood-focused design is still emerging, its integration into curricula positions students to be more reflective, empathetic, and adaptive in their practice. This, we believe, anticipates future demands for designers who can engage with the full spectrum of human experience.

AFTERWORD

On the "Joys" and "Sorrows" of Researching Mood

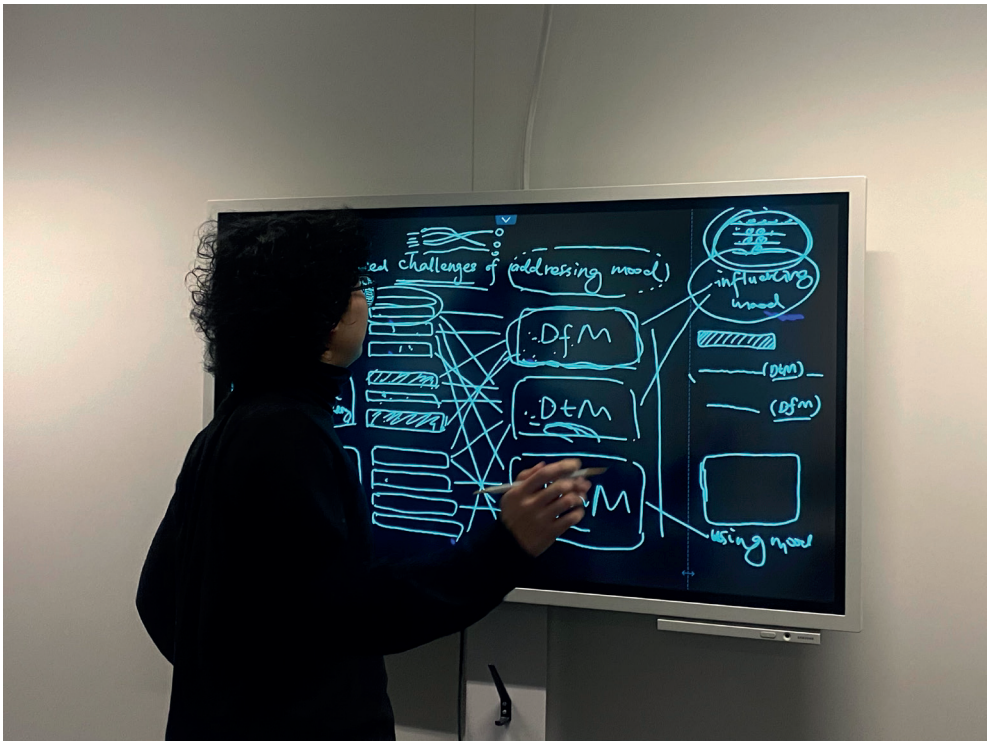
Researching mood has been both rewarding and challenging—like every PhD project in some sense, but also unlike any other, because of the mysterious, elusive, and yet utterly familiar phenomenon that mood is.

I have long been fascinated by the richness of human experience, and studying mood has sharpened my sensitivity to it. The euphoria of standing in the proud crowd at a Pride parade. The serenity of floating on a kayak at dusk on a Saturday. The tenderness of slow summer days in Texel with a Dutch grandmother who reminded me of my own. This project taught me not only to savor such moments more deeply but also to remember them more vividly, as if my emotional life had been given a higher resolution. It also gave me a habit of stepping back: asking whether my current mood is shaping how I see a situation. Often, this little pause makes it easier to let go. Beyond the personal, mood has also been a great "icebreaker": at conferences and talks, people are instantly curious, because it touches something everyone knows.

But there is, inevitably, the other side. Researching mood has often been a lonely road. The field of mood-focused design is so underexplored that it is hard to find fellow travelers. This sense of loneliness can easily turn into existential doubt: if so few scholars care about mood, does my work matter at all? The struggle shows up in publishing, too. Journal editors struggle to find suitable reviewers, leading to long delays. Reviews come back full of confusion and skepticism, often demanding more clarifications and examples. This, of course, can be understood as evidence: it shows how underdeveloped this field is, and why this dissertation is not only legitimate but necessary. Still, it can be taxing to explain and defend, again and again.

So yes, there have been both "joys" and "sorrows." Researching mood has given me new ways to live and reflect, but it has also tested my perseverance and my confidence as a researcher. Maybe that is what makes it fitting: mood itself is never simple, never one-sided. Finishing here, with that mix of light and shadow, feels like the most honest way to close this chapter of my journey.

Analyzing data with supervisors in Delft, July 2022.



Zhuochao discussing results with a colleague in Eindhoven, January 2024.

APPENDICES

Appendix A: Search Strategies and Results

Primary Search I: Electronic Databases

Database 1: Scopus
Last search date: 17 January 2022
Articles identified: 3,064
Search strategy:
1. Title = (mood* OR emotion* OR affect*)
2. Title = (design*)
3. Publication date = (01.01.1999 to 17.01.2022)
4. Language = (English)
5. Document type = (article OR conference paper)
6. #1 AND #2 AND #3 AND #4 AND #5

Database 2: Web of Science Core Collection
Last search date: 17 January 2022
Articles identified: 2,356
Search strategy:
1. Title = (mood* OR emotion* OR affect*)
2. Title = (design*)
3. Publication date = (01.01.1999 to 17.01.2022)
4. Language = (English)
5. Document type = (articles OR proceedings papers)
6. #1 AND #2 AND #3 AND #4 AND #5

Database 3: ACM Digital Library
Last search date: 17 January 2022
Articles identified: 135
Search strategy:
1. Title = (mood* OR emotion* OR affect*)
2. Title = (design*)
3. Publication date = (01.01.1999 to 17.01.2022)
4. Document type = (research article)
5. #1 AND #2 AND #3 AND #4

Table A1. Articles identified from electronic databases.

Database	Number of articles
Scopus	3,064
Web of Science Core Collection	2,356
ACM Digital Library	135
The total number of articles identified from three databases	5,555

Primary Search II: Electronic Journals and Conference Proceedings

Data sources: 20 design journals and 9 design conference proceedings (Table A2)

Search engines: Scopus, Google Scholar, and DSR Digital Library

Last search date: 21 January 2022

Articles identified (in total): 1,132

Search strategy: at least one of the terms "mood," "emotion," and "affect" (or their derivative words such as "emotional" or "affective") occurring in the article title

Table A2. Articles identified from electronic journals and conference proceedings.

Source type	Source name	Search engine	Number of articles
Journal	Applied Artificial Intelligence	Scopus	22
	Applied Ergonomics	Scopus	62
	CoDesign	Scopus	1
	Computer-Aided Design	Scopus	1
	Design Issues	Scopus	2
	Design Science	Scopus	3
	Design Studies	Scopus	10
	Digital Creativity	Scopus	9
	Ergonomics	Scopus	42
	Human-Computer Interaction	Scopus	9
	Human Factors	Scopus	39
	International Journal of Design	Scopus	24
	International Journal of Human-Computer Interaction	Scopus	51
	International Journal of Industrial Ergonomics	Scopus	47
	International Journal of Technology and Design Education	Scopus	12
	Journal of Design Research	Scopus	8
	Journal of Engineering Design	Scopus	16
	Research in Engineering Design	Scopus	1
	She Ji: The Journal of Design Economics and Innovation	Scopus	2
	The Design Journal	Scopus	20
Conference proceedings	ACM Conference on Designing Interactive Systems (DIS)	Scopus	47
	ACM Conference on Human Factors in Computing Systems (CHI)	Scopus	424
	ACM International Conference on Mobile Systems, Applications, and Services (MobiSys)	Scopus	12
	Congress of the International Association of Societies of Design Research (IASDR)	Google Scholar	31
	Design Research Society Conference (DRS)	DSR Digital Library	29
	International Conference on Design and Emotion (D&E)	Scopus & Google Scholar	169
	International Conference on Designing Pleasurable Products and Interfaces (DPPI)	Scopus	16
	International Design Conference (DESIGN)	Scopus	16
	Nordic Conference on Human-Computer Interaction (NordiCHI)	Scopus	7
The total number of articles identified from 20 journals and 9 conference proceedings			1,132

Supplementary Search: Backward and Forward Citation Search

In addition to primary searches, we did a supplementary search to retrieve additional relevant articles, using a backward and forward search method. In the backward citation search, we checked the references of a collection of highly relevant articles we selected after the first-round full-text screening. After seeing the possibilities in their titles, we accessed some references online for abstract and full-text reading. In the forward citation search, we extensively used Google Scholar to check the cited-by records of selected articles. Both backward and forward citation searches adhered to our selection criteria. Please note that we did not further consider a snowballing method (also referred to as pearl-growing or cross-referencing). We considered the newly retrieved articles diverse enough as complements for the previously selected articles to scope the field. The supplementary search was completed on April 2, 2022 and yielded a total of 33 articles for the second-round full-text screening.

Appendix B: Articles Included for Review

Publication type	Author	Year	Title	Source
Journal article	Adams, Brett, Dinh Phung, and Svetha Venkatesh	2014	Social Reader: Towards Browsing the Social Web	Supplementary search
	Baños, Rosa María, Ernestina Etchemendy, Diana Castilla, Azucena García-Palacios, Soledad Quero, and Cristina Botella	2012	Positive Mood Induction Procedures for Virtual Environments Designed for Elderly People	Primary search
	Benke, Ivo, Michael Thomas Knierim, and Alexander Maedche	2020	Chatbot-Based Emotion Management for Distributed Teams: A Participatory Design Study	Primary search
	Bentley, Frank, Konrad Tollmar, Peter Stephenson, Laura Levy, Brian Jones, Scott Robertson, Ed Price, Richard Catrambone, and Jeff Wilson.	2013	Health Mashups: Presenting Statistical Patterns between Wellbeing Data and Context in Natural Language to Promote Behavior Change	Supplementary search
	Cavanagh, Bliss, Kirsti Haracz, Miranda Lawry, Kylie Wales, and Carole James.	2021	Changes in Emotions and Perceived Stress Following Time Spent in an Artistically Designed Multisensory Environment	Primary search
	Desmet, Peter M. A.	2015	Design for Mood: Twenty Activity-Based Opportunities to Design for Mood Regulation	Primary search
	Desmet, Pieter M. A., Haian Xue, and Steven F. Fokkinga	2019	The Same Person Is Never the Same: Introducing Mood-Stimulated Thought/Action Tendencies for User-Centered Design	Primary search
	Esnaf-Uslu, Pelin, Pieter M. A. Desmet, and Hendrik N. J. Schifferstein	2022	The Eye Inward and the Eye Outward: Introducing a Framework for Mood-Sensitive Service Encounters	Supplementary search
	Hollis, Victoria, Artie Konrad, Aaron Springer, Matthew Antoun, Christopher Antoun, Rob Martin, and Steve Whittaker	2017	What Does All This Data Mean for My Future Mood? Actionable Analytics and Targeted Reflection for Emotional Well-Being	Primary search
	Janssen, Joris H., Egon L. van den Broek, and Joyce H. D. M. Westerink	2012	Tune in to Your Emotions: A Robust Personalized Affective Music Player	Supplementary search
	Liu, Fannie, Mario Esparza, Maria Pavlovskaia, Geoff Kaufman, Laura Dabbish, and Andrés Monroy-Hernández	2019	Animo: Sharing Biosignals on a Smartwatch for Lightweight Social Connection	Supplementary search
	Rivera-Pelayo, Verónica, Angela Fessl, Lars Müller, and Viktoria Pammer	2017	Introducing Mood Self-Tracking at Work: Empirical Insights from Call Centers	Supplementary search

Publication type	Author	Year	Title	Source
Journal article	Roseway, Asta, Yuliya Lutchyn, Paul Johns, Elizabeth Mynatt, and Mary Czerwinski	2015	BioCrystal: An Ambient Tool for Emotion and Communication	Supplementary search
	Sönmez, Alev, Pieter M. A. Desmet, and Natalia Romero Herrera	2022	Chill, Fiery, Slack, and Five Other Vibes: A Phenomenological Inquiry into Group Mood	Supplementary search
	Ståhl, Anna, Kristina Höök, Martin Svensson, Alex S. Taylor, and Marco Combetto	2009	Experiencing the Affective Diary	Supplementary search
	Sundström, Petra, Anna Ståhl, and Kristina Höök	2007	In Situ Informants Exploring an Emotional Mobile Messaging System in Their Everyday Practice	Supplementary search
	Van De Garde-Perik, Evelien, Federico Trevia, Adam Henriksson, Luc Geurts, and Helle Ullerup	2016	Getting a GRIP on Work-Related Stress: Design and Evaluation of a Nature Inspired Relaxation Space	Supplementary search
	Xue, Haian, Pieter M. A. Desmet, and Steven F. Fokkinga	2020	Mood Granularity for Design: Introducing a Holistic Typology of 20 Mood States	Primary search
	Xue, Mengru, Rong-Hao Liang, Bin Yu, Mathias Funk, Jun Hu, and Loe Feijs	2019	AffectiveWall: Designing Collective Stress-Related Physiological Data Visualization for Reflection	Primary search
Conference paper	Agrawal, Vasundhara, Mayuri Duggirala, and Sushovan Chanda	2018	Journey: A Game on Positive Affect	Primary search
	Alonso, Miguel Bruns, David V. Keyson, and Caroline C. M. Hummels	2008	Squeeze, Rock, and Roll; Can Tangible Interaction with Affective Products Support Stress Reduction?	Supplementary search
	Ashoori, Maryam, Rachel K. E. Bellamy, and Justin D. Weisz	2015	Creating the Mood: Design for a Cognitive Meeting Room	Primary search
	Balaam, Madeline, Geraldine Fitzpatrick, Judith Good, and Rosemary Luckin	2010	Exploring Affective Technologies for the Classroom with the Subtle Stone	Primary search
	Balta, Andra, and Janet C. Read	2016	U OK?: Txt Me the Colour of Ur Mood!	Primary search
	Besserer, Daniel, Johannes Bäurle, Alexander Nikic, Frank Honold, Felix Schüssel, and Michael Weber	2016	Fitmirror: A Smart Mirror for Positive Affect in Everyday User Morning Routines	Supplementary search
	Boehner, Kirsten, Rogério DePaula, Paul Dourish, and Phoebe Sengers	2005	Affect: From Information to Interaction	Supplementary search

Publication type	Author	Year	Title	Source
Conference paper	Carneiro, Davide, Paulo Novais, Fábio Catalão, José Marques, André Pimenta, and José Neves	2013	Dynamically Improving Collective Environments through Mood Induction Procedures	Supplementary search
	Cernea, Daniel, Christopher Weber, Andreas Kerren, and Achim Ebert	2014	Group Affective Tone Awareness and Regulation through Virtual Agents	Supplementary search
	Chang, Angela, Ben Resner, Brad Koerner, XingChen Wang, and Hiroshi Ishii	2001	LumiTouch: An Emotional Communication Device	Primary search
	Church, Karen, Eve Hoggan, and Nuria Oliver	2010	A Study of Mobile Mood Awareness and Communication through MobiMood	Primary search
	Dang, Chi Tai, Ilhan Aslan, Florian Lingenfelser, Tobias Baur, and Elisabeth André	2019	Towards Somaesthetic Smarthome Designs: Exploring Potentials and Limitations of an Affective Mirror	Primary search
	Davis, Felecia, Asta Roseway, Erin Carroll, and Mary Czerwinski	2013	Actuating Mood: Design of the Textile Mirror	Primary search
	De Lera, Eva	2015	Emotion-Centered-Design (ECD) New Approach for Designing Interactions That Matter	Primary search
	De Luca, Vanessa, Denise Lombardi, Cinzia Cruder, and Marta Pucciarelli	2018	How Do Performers Increase Their Wellbeing? An Investigation Among Music and Theater Professionals	Supplementary search
	Ghandeharioun, Asma, Daniel McDuff, Mary Czerwinski, and Kael Rowan	2019	Emma: An Emotion-Aware Wellbeing Chatbot	Supplementary search
	Gluhak, Alexander, Mirko Presser, Ling Zhu, Sohail Esfandiyari, and Stefan Kupschick	2007	Towards Mood Based Mobile Services and Applications	Supplementary search
	Guo, Chen, Yingjie Victor Chen, Zhenyu Cheryl Qian, Yue Ma, Hanhdung Dinh, and Saikiran Anasingaraju	2016	Designing a Smart Scarf to Influence Group Members' Emotions in Ambience: Design Process and User Experience	Primary search
	Hansson, Rebecca, and Tobias Skog	2001	The LoveBomb: Encouraging the Communication of Emotions in Public Spaces	Primary search
	Huldtgren, Alina, Christina Katsimerou, Andre Kuijsters, Judith A. Redi, and Ingrid E. J. Heynderickx	2015	Design Considerations for Adaptive Lighting to Improve Seniors' Mood	Primary search
	Isaacs, Ellen, Artie Konrad, Alan Walendowski, Thomas Lennig, Victoria Hollis, and Steve Whittaker	2013	Echoes from the Past: How Technology Mediated Reflection Improves Well-Being	Supplementary search

Publication type	Author	Year	Title	Source
Conference paper	Jiang, Mengqi, Martijn ten Bhömer, and Hai-Ning Liang	2020	Exploring the Design of Interactive Smart Textiles for Emotion Regulation	Primary search
	Kim, Younghui, Geri Gay, Lindsay Reynolds, and Hyuns Hong	2015	Mood.Cloud: Data as Art	Primary search
	Krøger, Erle, Frode Guribye, and Tor Gjøsæter	2015	Logging and Visualizing Affective Interaction for Mental Health Therapy	Supplementary search
	Lee, Sunmin, Wing Yi Chung, Emily Ip, and Thecla Schiphorst	2014	The Laughing Dress: Evoking Prosocial Interaction among Strangers	Supplementary search
	LiKamWa, Robert, Yunxin Liu, Nicholas D. Lane, and Lin Zhong	2013	MoodScope: Building a Mood Sensor from Smartphone Usage Patterns	Primary search
	Lutchyn, Yuliya, Paul Johns, Asta Roseway, and Mary Czerwinski	2015	MoodTracker: Monitoring Collective Emotions in the Workplace	Supplementary search
	MacLean, Diana, Asta Roseway, and Mary Czerwinski	2013	MoodWings: A Wearable Biofeedback Device for Real-Time Stress Intervention	Supplementary search
	McDuff, Daniel, Amy Karlson, Ashish Kapoor, Asta Roseway, and Mary Czerwinski	2012	AffectAura: An Intelligent System for Emotional Memory	Primary search
	Mora, Simone, Verónica Rivera-Pelayo, and Lars Müller	2011	Supporting Mood Awareness in Collaborative Settings	Supplementary search
	Pammer, Viktoria	2015	Mood in the City—Data-Driven Reflection on Mood in Relation to Public Spaces	Supplementary search
	Pradana, Gilang Andi, and George Buchanan	2017	Imparting Otsukaresama: Designing Technology to Support Interpersonal Emotion Regulation	Primary search
	Rajcic, Nina, and Jon McCormack	2020	Mirror Ritual: An Affective Interface for Emotional Self-Reflection	Primary search
	Sánchez, J. Alfredo, Ingrid Kirschning, Juan Carlos Palacio, and Yulia Ostróvskaya	2005	Towards Mood-Oriented Interfaces for Synchronous Interaction	Supplementary search
	Snyder, Jaime, Mark Matthews, Jacqueline Chien, Pamara F. Chang, Emily Sun, Saeed Abdullah, and Geri Gay	2015	Moodlight: Exploring Personal and Social Implications of Ambient Display of Biosensor Data	Supplementary search
	Spillers, Frank	2010	Getting in the Mood: The Role of Mood in Product Design and Interaction	Primary search
	Stangl, Abigale, Joshua Wepman, and Dylan White	2012	Moodcasting: Home as Shared Emotional Space	Primary search

Publication type	Author	Year	Title	Source
Conference paper	Sundström, Petra, Tove Jaensson, Kristina Höök, and Alina Pommeranz	2009	Probing the Potential of Non-Verbal Group Communication	Supplementary search
	Tsujita, Hitomi, and Jun Rekimoto	2011	HappinessCounter: Smile-Encouraging Appliance to Increase Positive Mood	Primary search
	Ullrich, Daniel, Sarah Diefenbach, and Andreas Butz	2016	Murphy Miserable Robot: A Companion to Support Children's Well-Being in Emotionally Difficult Situations	Primary search
	Wagener, Nadine, and Jasmin Niess	2021	Reflecting on Emotions within VR Mood Worlds	Supplementary search
	Wang, Liuping, Xiangmin Fan, Feng Tian, Lingjia Deng, Shuai Ma, Jin Huang, and Hongan Wang	2018	MirrorU: Scaffolding Emotional Reflection via In-Situ Assessment and Interactive Feedback	Primary search
	Wensveen, Stephan, Kees Overbeeke, and Tom Djajadiningrat	2002	Push Me, Shove Me and I Show You How You Feel: Recognising Mood from Emotionally Rich Interaction	Primary search
	Wu, Jiayu, Katrine Dalum Hesseldahl, Sam Johnson, Sheila Clark, Dan Quinlan, Dale Harrow	2021	Designing for Driver's Emotional Transitions and Rituals	Primary search
	Yamashita, Naomi, Hideaki Kuzuoka, Keiji Hirata, Takashi Kudo, Eiji Aramaki, and Kazuki Hattori	2017	Changing Moods: How Manual Tracking by Family Caregivers Improves Caring and Family Communication	Primary search
	Yoon, JungKyoon, Anna E. Pohlmeyer, and Pieter M. A. Desmet	2014	The Mood Street: Designing for Nuanced Positive Emotions	Primary search
	Zhao, Jian, Liang Gou, Fei Wang, and Michelle Zhou	2014	Pearl: An Interactive Visual Analytic Tool for Understanding Personal Emotion Style Derived from Social Media	Supplementary search

Appendix C: Coding Scheme

Category	Theme	Code	Data exemplar	Reference
RQ1: What facets of mood have been comprehended and explored?	Features of mood	Long duration	"…mood is typically less intensely felt by an individual and tends to last longer than emotion, e.g., persisting for days or hours instead of minutes or seconds."	LiKamWa et al. (2013)
		Diffuseness	"In line with existing research, we understand mood as more diffuse than emotions and with a less clear cause, longer in duration and less focused and intense."	Rivera-Pelayo et al. (2017)
		Dynamics	"Moods pass—they can last for hours, or sometimes even days, but they are constantly changing and converging into other moods."	Desmet (2015)
		Social relevance	"Group mood arises in the context of an ongoing collective activity in which group members interact to achieve a shared purpose; it is formed by its particular situational dynamics."	Sönmez et al. (2022)
	Impacts of mood	Health and subjective well-being	"A relationship between burnout and a broad range of negative health symptoms including physical and emotional exhaustion, has been found in several studies. It results in a lack of energy and enthusiasm, feelings of depression, frustration, hopelessness, and a sense of entrapment."	Carneiro et al. (2013)
		Performance	"The environment in which we work affects our mood, which in turn affects the decisions we make, our attitudes toward work, and how we interact with others."	Ashoori et al. (2015)
		Social relationships	"…it has been shown that when we are happy we are more likely to communicate with others, while when we are sad we tend to distance ourselves from friends and family."	Church et al. (2010)

Category	Theme	Code	Data exemplar	Reference
RQ2: What mood-focused design innovations have been developed?	Designs that support mood monitoring	Detecting moods	"…MoodScope is a "sensor" that measures the mental state of the user and provides mood as an important input to context-aware computing."	LiKamWa et al. (2013)
		Self-tracking moods	"Our system is called EmotiCal (Emotional Calendar), a web and smartphone application. Like many current products, participants first log past moods and events triggering those moods."	Hollis et al. (2017)
		Analyzing moods	"EmotiCal analyzes past mood data to generate a 2-day forecast for a user's potential moods for tomorrow and the day after."	Hollis et al. (2017)
	Designs that support mood expression	Displaying moods	"AffectAura is a visualization of the user's estimated affective states over time. It incorporates two components 1) the affect prediction engine for labeling users' states and 2) a timeline interface, surrounded by other context, for the user to reflect on these data."	McDuff et al. (2012)
		Sharing moods	"MobiMood supports explicit mood sharing and awareness among groups of friends while on-the-go. Aside from mood, MobiMood also allows users to share other forms of context including location, time and social context (i.e. who I'm with)."	Church et al. (2010)

Category	Theme	Code	Data exemplar	Reference
RQ2: What mood-focused design innovations have been developed?	Designs that support mood regulation	Self-awareness or self-reflection	"Once the product detects stress-related behavior it responds through tactile feedback to make the user aware of his or her way of manipulating the object. It continuously tries to modify the user's behavior by guiding them towards making a relaxed behavior."	Alonso et al. (2008)
		Mood-sensitive interactions	"…it is shown that anticipating a shared experience with their family, friend, or partner, can help them cope with their daily ups and downs. The new technology will only act as a tool – a trigger that leads to interpersonal emotional regulation process through actual conversation."	Pradana & Buchanan (2017)
		Recommendations	"The immersive ABT is conceptualized as a moderator that intervenes in team interactions through suggestion of breaks…Emotional regulation strategies are designed to be stimulated by recommendations for action and direct mediation."	Benke et al. (2020)
		Competence development	"…from the results we designed UpStage, an open digital toolkit of behavioural practices and training methods for anxiety release and stress management. The toolkit aims to share how to integrate effective preventive strategies in daily performance preparation."	De Luca et al. (2018)
		System adjustments	"The presented work aims at creating a technical system that can detect an older resident's mood and consequently adapt the lighting in the room to either calm or activate the person."	Huldtgren et al. (2015)
		Mood regulation technologies	"The environment stimulates paced breathing, meditation and helps employees to become more aware and in control of their personal response to stressors and relaxation."	Van de Garde-Perik et al. (2016)

Category	Theme	Code	Data exemplar	Reference
RQ3: What issues related to mood-focused design have been discussed?	Issues related to mood-monitoring designs	Lack of reliability	"…biological measures such as heart rate or body temperature do vary significantly with room temperature and may hence not reveal objective data. In addition, data based on self-report (e.g. pre-post mindfulness exercises) do merely produce information from a subjective perspective."	De Luca et al. (2018)
		Lack of granularity	"…in some cases, users referred to subtler moods that they wished they had available on the panel…It would be possible to include dozens or even hundreds of affective states and to make them available for selection."	Sánchez et al. (2005)
		System surveillance	"People often feel uncomfortable and violated in their privacy when they are observed by a camera and judged by algorithms as our prototype does."	Dang et al. (2019)
	Issues related to mood-expressing designs	Misinterpretation	"…not all participants were able to interpret animos, and even when they did, their interpretations did not always match their partner's without a clarifying conversation."	Liu et al. (2019)
		Mood privacy	"…some students valued this choice since it engendered privacy around their emotional communication. And for some students it wasn't simply that an individual may not want fellow students within the class with whom they were not close to know how they were feeling…"	Balaam et al. (2010)

Category	Theme	Code	Data exemplar	Reference
RQ3: What issues related to mood-focused design have been discussed?	Issues related to mood-regulating designs	Negative effects of introspection	"We showed overall benefits for recording and reflecting on the positive but that recording and reflecting exclusively on intensely negative past experiences detracts from well-being."	Hollis et al. (2017)
		Individual preferences	"We have already begun experiments to identify different emotional styles, finding that work activities have varied impacts on different user's mood. For one subset of users, work has positive effects on mood, for others it has negative effects, and for a final subset it has little emotional effect."	Hollis et al. (2017)
		System intrusiveness	"…there is a trade-off attached to actively reflecting on emotional experiences in the classroom, namely, thinking about one's emotional experiences within a classroom environment requires a conscious effort and diverts attention from the content being taught and learnt."	Balaam et al. (2010)
RQ4: What methods for mood-focused design are available?	Sources that support empathizing	Mood typologies	"The mood typology provides a fine-grained overview and a vocabulary of user moods. Designers and design researchers can use these results…as a tool to facilitate user interviews in empathy-based design processes."	Xue et al. (2020)
		Mood tendency space	"It aims to enable designers and service providers to become better aware of, and adequately respond to, the dynamics of mood-stimulated user preferences, feelings, and actions during the design process."	Desmet et al. (2019)
	Sources that support ideation	Mood regulation strategies and patterns	"We can, however, also imagine products that have the deliberate intention to enable, support, and inspire people to engage in mood-regulating activities. In light of this potential, I propose that each of the 20 strategies can be a source of design inspiration."	Desmet (2015)

Appendix D: Mood-Focused Design Innovations

Reference	Name	Characteristic		Functionality		
		Design fidelity	Hardware platform	Monitoring moods	Expressing moods	Supporting mood regulation
Adams et al. (2014)	Social Reader	Concept	Computer	✓	✓	✓
Agrawal et al. (2018)	Journey	Concept	Computer			✓
Alonso et al. (2008)	Wigo	Prototype	Hand-held object	✓	✓	✓
Ashoori et al. (2015)	Zen Garden	System	Ambient installation	✓		✓
	N/A*	System	Wearable	✓	✓	
Balaam et al. (2010)	Subtle Stone	System	Multiple platforms	✓	✓	✓
Balta and Read (2016)	N/A*	Concept	Mobile phone	✓	✓	✓
Baños et al. (2012)	N/A*	System	Wearable			✓
Benke et al. (2020)	NeutralBot (NBT)	System	Computer	✓	✓	✓
	SocialBot (SBT)	System	Computer	✓	✓	✓
	ActionBot (ABT)	System	Computer	✓	✓	✓
Bentley et al. (2013)	Health Mashups	System	Mobile phone	✓	✓	✓
Besserer et al. (2016)	FitMirror	System	Smart screen			✓
Boehner et al. (2005)	Miro	System	Smart screen	✓	✓	
	Affector	Prototype	Computer	✓	✓	
Carneiro et al. (2013)	N/A*	Concept	Ambient installation	✓		✓
Cavanagh et al. (2021)	Sensory-Art Space (SAS)	System	Ambient installation			✓
Cernea et al. (2014)	Pogat	Prototype	Computer	✓	✓	✓
Chang et al. (2001)	LumiTouch	Prototype	Handheld object		✓	
Church et al. (2010)	MobiMood	Prototype	Mobile phone	✓	✓	✓
Dang et al. (2019)	N/A*	Prototype	Smart mirror	✓	✓	✓
Davis et al. (2013)	Textile Mirror	Prototype	Multiple platforms	✓	✓	✓
De Luca et al. (2018)	UpStage	Finished product	Multiple platforms			✓
Desmet (2015)	Grumble Bubble	Concept	Public installation			✓
	Happiness Tree	Concept	Public installation			✓

Reference	Name	Characteristic		Functionality		
		Design fidelity	Hardware platform	Monitoring moods	Expressing moods	Supporting mood regulation
Ghandeharioun et al. (2019)	EMMA	Prototype	Mobile phone	✓		✓
Gluhak et al. (2007)	N/A*	Prototype	Mobile phone	✓	✓	
Guo et al. (2016)	N/A*	Concept	Wearable	✓	✓	✓
Hansson and Skog (2001)	LoveBomb	Prototype	Hand-held object	✓	✓	
Hollis et al. (2017)	EmotiCal	Prototype	Mobile phone	✓	✓	✓
Huldtgren et al. (2015)	N/A*	Concept	Ambient installation			✓
Isaacs et al. (2013)	Echo	System	Mobile phone	✓	✓	✓
Janssen et al. (2012)	N/A*	System	N/A*	✓		✓
Jiang et al. (2020)	N/A*	Prototype	Wearable	✓	✓	✓
Kim et al. (2015)	mood.cloud	System	Ambient installation	✓	✓	
Krøger et al. (2015)	Clutch	Concept	Multiple platforms	✓	✓	✓
Lee et al. (2014)	Laughing Dress	Prototype	Wearable			✓
LiKamWa et al. (2013)	MoodScope	System	Mobile phone	✓	✓	✓
Liu et al. (2019)	Animo	System	Wearable	✓	✓	✓
Lutchyn et al. (2015)	MoodTracker	System	Computer	✓	✓	✓
MacLean et al. (2013)	MoodWings	System	Wearable	✓	✓	✓
McDuff et al. (2012)	AffectAura	System	Computer	✓	✓	✓
Mora et al. (2011)	MoodTimeline	Prototype	Mobile phone	✓	✓	✓
	MoodDisplay	Concept	Smart screen		✓	✓
	Nabazmood	Prototype	Handheld object		✓	✓
	Twittmood	Concept	Mobile phone	✓	✓	✓
Pradana and Buchanan (2017)	Human Tamagotchi	Concept	Wearable		✓	✓
Rajcic and McCormack (2020)	Mirror Ritual	System	Smart mirror	✓	✓	✓
Rivera-Pelayo et al. (2017)	MoodMap	System	Computer	✓	✓	✓
Roseway et al. (2015)	BioCrystal	System	Handheld object	✓	✓	✓
Sánchez et al. (2005)	Affective IM	Prototype	Computer	✓	✓	

Reference	Name	Characteristic		Functionality		
		Design fidelity	Hardware platform	Monitoring moods	Expressing moods	Supporting mood regulation
Snyder et al. (2015)	MoodLight	Prototype	Multiple platforms	✓	✓	✓
Ståhl et al. (2009)	Affective Diary	System	Multiple platforms	✓	✓	✓
Stangl et al. (2012)	Moodcasting	Concept	Smart screen	✓	✓	
Sundström et al. (2009)	eMoto	System	Multiple platforms	✓	✓	
Sundström et al. (2007)	FriendSense	Prototype	Multiple platforms	✓	✓	
Tsujita and Rekimoto (2011)	HappinessCounter	System	Smart mirror	✓	✓	✓
Ullrich et al. (2016)	Murphy Miserable Robot	Prototype	Robot			✓
Van de Garde-Perik et al. (2016)	GRIP	Prototype	Ambient installation			✓
Wagener and Niess (2021)	VR Mood Worlds	Concept	Wearable	✓	✓	✓
Wang et al. (2018)	MirrorU	Prototype	Mobile phone	✓	✓	✓
Wensveen et al. (2002)	N/A*	Prototype	Handheld object	✓		✓
Wu et al. (2021)	Feeling Ready	Concept	Multiple platforms			✓
Xue et al. (2019)	AffectiveWall	Prototype	Smart screen	✓	✓	✓
Yamashita et al. (2017)	Family Mood and Care Tracker (FMCT)	System	Computer	✓	✓	✓
Yoon et al. (2014)	Good night	Concept	Mobile phone			✓
	The curtain	Concept	Ambient installation			✓
	The big button	Concept	Public installation			✓
Zhao et al. (2014)	Pearl	System	Computer	✓	✓	

* N/A: Not mentioned or available in the article.

Appendix E: Interview Guide

Stage	Focus	Question/Action	
Warm-up	Basic information	Can you briefly introduce yourself (including your current job, your education background, and your past work experience)?	
Sensitization	How designers themselves understand mood	From your personal experience, what is mood? How would you define or conceptualize mood?	
	How we (authors) understand mood	Display a conceptual video explaining our definition of mood.	
	How designers see the relevance of mood in design	In your opinion, what is the role of user/customer mood in design?	
Retrospection	Whether designers have addressed mood	Have your ever considered or approached user/customer mood in any of your design projects?	
	How designers have addressed mood	*If designers report yes*	*If designers report no*
		Can you describe an example of such design projects (including the target group, context, design intentions, and design outcomes)?	—
		How did you specifically consider or approach mood (or any aspects of mood) in your design process? – *Prompt 1*: Did you determine a certain mood is appropriate for or should be considered in the project? If so, in what ways, and what factors influenced this decision? – *Prompt 2*: Did you measure mood or gather information related to mood? If so, in what ways, and for what purposes? – *Prompt 3*: Did you incorporate user or customer input or feedback into your design decisions related to mood? If so, in what ways, and how (well) did that work?	
		Can you describe an example of a design decision related to mood, or a design outcome because of mood consideration?	
	What challenges designers have faced	What challenges did you encounter? How did you overcome them?	—
Envisioning	What challenges designers perceive	What other challenges do you see about addressing mood in design?	What challenges do you see about addressing mood in design?
	What knowledge designers consider essential	If you are going to work on a mood-focused design project, what knowledge do you think is necessary to have?	
Wrap-up	Extra information	Would you like to share more about mood or addressing mood in design?	

Appendix F: Coding Scheme

Category	Theme	Code	Subcode	Example quote
Approaches to addressing mood in design	Mood as an end in itself			"It was for a mental healthcare institution. In the building, people were living with heavy mental health issues. … What, with this research, we wanted to find out is in which way we could create an entrance that makes people 'feel better.' So, it's really about the design for well-being, and how can you create a design that makes people feel really better." (P20)
	Mood as a means to enhance engagement			"I think we do have something, some product that is really relatable with taking into account of the mood. For instance, our robot. Before we tried to instruct, for instance, a person to take the medicine, or reminding them to take medicine, we try to first start setting up a good relationship that they feel good about it [the robot] by creating a series of interactions that hopefully put them in a more positive mood. … So, to increase acceptance and also increase [their] willingness to act on the good advice [that the robot gives]." (P18)
	Mood as a means to enrich experience			"A good example of a project that was very much about customer mood was for the [company name] railways. And then they wanted to know if they could make their clients' experience better based on interior. And then we made a water sofa … and we made a water floor, so you can stand on water and have more of a supportive, active traveling experience … and we made air pillows, so you can sit upon, also when you're recovering your balance. … So, it was about creating a positive customer experience, or, like, to make people more satisfied by using a train." (P14)
	Mood as a means to create differentiation or advantage			"The idea was that when the phone gets on the wireless charging pad, it's like, 'Okay, I'm also relaxing like you are.' And then it started talking to you. … So, the idea was to kind of create this more light-hearted scenario at home at the end of the day. … For this particular example, it was technology-led. It wasn't something that we were just thinking, let's do this [designing for a relaxed mood]. But from a design perspective or a product perspective, we were thinking about differentiation that in a crowded market of wireless chargers … so, if there are so many of these, how do you make a wireless charger which stands out from others?" (P16)

Category	Theme	Code	Subcode	Example quote
Approaches to addressing mood in design	Mood as a means to facilitate user research			"When I enter an interview situation, I do try to read: what kind of state is this person I'm talking to in? Is the person energetic, or is the person outgoing? Is the person responding to my questions? Is the person talkative? Does the person get worried? Why do you say this? Why this example? But then, I'm looking at it from the interview context point of view. So, I'm looking at it from—can I get more information from this person or not? Is this person responding to the questions in the way that I think I can dig deeper?" (P10)
Challenges related to addressing mood in design	Challenges related to understanding	Difficulty of discussing moods		"What I found out is—it's way more difficult for someone who does not have the complete comprehensive knowledge about moods and emotions to actually say granularly what exactly they were feeling." (P11)
		Difficulty of identifying moods		"I feel this is remarkably difficult for many people, like, what do they really feel? … There are layers of feelings: you can feel anxious, you can feel angry, but [for] the underlying feeling, you might not recognize it." (P4)
		Difficulty of identifying mood causes		"Even myself sometimes, I also find it difficult to find out where that [mood came from and] why my mood is bad or not. So, it's also really difficult to use that in an interview with people. … It's even more difficult because sometimes the bad mood started three days ago. How do you remember exactly what happened three days ago and what makes you in a bad mood?" (P19)
		Difficulty of documenting moods		"I don't think of mood because it's quite difficult. Any customer could be in any mood. And if I do any personas or profiles, it would be need-based. … But mood is interesting because it can change. It's not an inherent quality of somebody." (P15)
		Difficulty of empathizing with moods		"Do you really have a chance to engage with people long enough to really understand their mood? Because, for example, if it's an interview context, a person can 'fake' a mood for an hour … like, you don't necessarily get to see a mood … especially when it, like, the research process has to be done very fast." (P2)

Category	Theme	Code	Subcode	Example quote
Challenges related to addressing mood in design	Challenges related to goal setting	Difficulty of determining mood effects		"… what would be the best mood that we are after? The user might not know it by themselves. It might be very difficult to describe what is the mood that you want to have. We can't really ask, like, directly from the user that. But then, also designer might have a very limited view on that." (P7)
		Difficulty of exclusively targeting a certain mood		"I don't know if that would make sense … to first tell how you feel, and then based on that, we redefine the experience for you. Unless, of course, the aim of the service or the product was to kind of uplift your mood, or help you change your mood in a certain way. But in your day-to-day product design work, you are trying to solve problems. And you're trying to understand the general mood a person might have or a general emotional state a person might have when doing a certain activity. And you have to then design for that general situation." (P16)
	Challenges related to designing	Difficulty of affecting mood		"Changing somebody's moods is just a very complicated enterprise, like, how are you gonna achieve that? If I am in a bad mood, [this could be] because my car broke, because I had a fight with my mom, because the person who was coming to put my floor was late. I think that sometimes those things are just very complicated to change. It just needs time to fade." (P8)
		Difficulty of catering to various moods		"When they have a touch point with the product, they can be in all kinds of different moods. I think it's very difficult to design a product that can be best used for all the moods. … I think before the product, something needs to induce the right mood. So it becomes more feasible for the product to act in only several options of mood that this product needs to facilitate." (P18)
		Difficulty of addressing diverse mood-regulation needs		"If someone is afraid of flying, then does their airline company, for example, have some kind of ways to calm you down or like bring some peace of mind for those people? And then, maybe you don't want to give that same service for someone who is very confident, like, used to flying and then just wants to relax, enjoy a drink, or something like that." (P5)

Category	Theme	Code	Subcode	Example quote
Challenges related to addressing mood in design	Challenges related to evaluating	Difficulty of guaranteeing mood effects		"In the concept planning phase, we use this mood [as our goal, but] it might be a different mood that it evokes from the customer. … There's always gonna be someone who gets different types of moods from our product, or, like, chooses this piece to regulate different types of moods." (P17)
		Difficulty of measuring moods		"… [an] experiment is much more in a moment. … So then, there's this paradox, because you design it for moods, and you design it for a longer use, but because you need to do an experiment, you're [actually] measuring emotions." (P14)
		Difficulty of validating mood effects		"It's also difficult to verify whether [an] intervention actually has an impact, because there could be a hundred other things that influence it [mood]. So, I think that's a big problem if you actually want to keep it [mood] at the center of the design process." (P9)
Essential knowledge for addressing mood in design	General knowledge	The concept of mood		"I'm thinking about the first step is to understand what mood is … but also, what could be really important is, of course, how mood relates to emotion." (P19)
		The landscape of mood		"I would want to know the mood wheel, like, [there is] the [Wheel of] Emotions, but then [there can also be the Wheel of] moods, right?" (P15)
		The causes of mood		"… a mechanism behind, like, why certain things cause certain type of moods … so that would be properly in a bit of psychology." (P6)
		The manifestations of mood		"… when you say I'm angry or sad … what does it really mean? Because it can be too broad, we can't maybe design for just three emotional states like happy, sad, angry. Maybe we need a bit more detail." (P16)
		The impacts of mood		"What kind of effects do certain moods have? I think that's also something [I would like to know]." (P13)

Category	Theme	Code	Subcode	Example quote
Essential knowledge for addressing mood in design	General design-focused knowledge	Influencing mood through design		"If you were to tell me that if you took a series of steps in the user experience, it would result in so-and-so mood … or if I have a table-kind-of-thing, which says this action, plus this action, plus this action equals this mood … I think that would help [me] out." (P11)
		Triggering mood's impacts through design		"I can imagine that it could be useful to know what are the effects of certain moods on their behavior … and how I can direct the mood [to reach those effects]. … Because as a designer, you're creating something to influence behavior often, or to create something to help a certain behavior [change]." (P13)
		Utilizing mood in the design process		"I think that the current knowledge about mood as a 'parameter' for design is limited. … I think most of my team members we don't know how to use it—even if you can correctly identify the mood, we are not equipped with the knowledge on how to really design it or use it in the design process." (P18)
	Design project-specific knowledge	Tools for understanding	Tools for discussing moods	"… a bit more standardized way to discuss something which is quite subjective … and a way to be able to talk to other designers about that mood and that we are designing for this particular state of a person." (P16)
			Tools for identifying moods	"… if there is some kind of a framework, with which I could maybe interpret the mood based on user interviews." (P16)
			Tools for reporting moods	"… if you could show a 'Wheel of Moods,' I think it could be interesting to help people dive a little bit more inside to figure out—how do I really feel?" (P20)
			Tools for empathizing with moods	"I think there can be some tools and then methods, for example, [you can] try by yourself. Like, you kind of work as a 'picker' for maybe certain days, and you get to know the feelings [they experience]." (P12)
		Tools for goal setting	Tools for determining mood effects	"It would be great to have a toolkit to better get more ideas on what could be the potential outcome or what would be the best mood that we are after." (P7)
			Tools for prioritizing mood-regulation needs	"… interesting if there would be a tool that would somehow prioritize the moods. Or I don't know if the moods can be like … are they always supporting each other, or are they actually opposites? That could also be the case in some products." (P7)

Category	Theme	Code	Subcode	Example quote
Essential knowledge for addressing mood in design	Design project-specific knowledge	Tools for designing	Tools for exploring design exemplars	"… or even having archetypes, like, in that project, we were designing for this particular scenario where a person was in this emotional state, this was the expected mood … what did we do to kind of design for that scenario … and how can we reuse that archetype in this project where we have come across a similar mood, even though it's a different project." (P16)
			Tools for sharing design experiences	"If I'm leading a design team, and there are many designers in my team, and they all have worked on different projects [related to mood] … it'll be great that we'll be able to put our knowledge together from our work into this structure." (P16)
		Tools for evaluating	Tools for measuring moods	"… how do you effectively measure the user's mood before and after design [intervention]? And thus, you need to have a reference. You can't just rely on what people say, right? Direct you need to have some sort of measuring stick." (P4)
			Tools for validating mood effects	"We probably wouldn't know what the reason for the mood is—you can see the person is angry or happy, or [the design is] working or not working, but we can't see what is happening. It would be valuable to understand: Is this not the correct mood? Is it working as we decided to work? Is it not working? What is not working?" (P7)
		Tools for self-development	Tools for enhancing mood sensitivity	"… you [need to be] very sensitive to different moods—you can recognize [the moods of] the target user of the products you are designing, the interviewees you are dealing with, the stakeholders … what kind of mood they are in. Then you can be flexible with your approaches. Then you can really achieve what you want." (P3)
			Tools for enhancing mood regulation skills	"Maybe [in terms of] mood regulation, like, how to deal with people who are clearly in a distressed mood, like, how to work with vulnerable participants in my design process who are clearly in a distressed mood. That kind of tools I would definitely appreciate." (P2)

Appendix G: Sunday Night Diary

Table G1. Instructions and questions from the online Sunday night diary.

Section	Instruction/Question
Onboarding	Welcome to your Sunday reflection space! We'll guide you through a few prompts to help you reflect on your mood, review your weekend, and look toward your week ahead. Grab your favorite drink, find a cozy spot, and let's gently explore some thoughts together.
Weekend review	Let's get started by journaling about your weekend.
	In general, my weekend was…
	– What did you do? Who were you with?
	A highlight of my weekend was…
	– What makes it a highlight? What has it brought you?
	A lowlight of my weekend was…
	– What makes it a lowlight? How did it influence you?
Mood shifts	Let's take a closer look at how your Sunday has been.
	Overall, during the daytime on Sunday, I was feeling…
	– Choose one or more character(s) that best describe(s) your mood during the daytime on Sunday.
	– Please express in your own words what feeling(s) the character(s) represent(s).
	– Please reflect on and explain why you felt this way.
	At this moment right now, I am feeling…
	– Choose one or more character(s) that best describe(s) your current mood.
	– Please express in your own words what feeling(s) the character(s) represent(s).
	– Please reflect on and explain why you feel this way.
Week ahead	Now, let's explore what the upcoming week looks like for you.
	Things I look forward to in the upcoming week are…
	– Are there any specific reasons that you are looking forward to them?
	Things I do not look forward to in the upcoming week are…
	– Are there any specific reasons that you are not looking forward to them?
Mood awareness and coping	Great job, you're almost done with today's journaling—only three questions to go! Journaling provides a chance to reflect and have a deep conversation with yourself. Through this, you're getting to know yourself a little more. Now, let's finish up by checking in with yourself.
	What insights did you gain from today's journaling, and what would you like to remember from this session?
	Are you generally aware of your mood?
	– If yes, what clues help you? If not, can you reflect on what might be the reason?
	If you experience unpleasant feelings on Sunday evening or night, do you have ways to cope with them?
	– If yes, can you reflect on how you cope with the unpleasant feelings? Do you have particular strategies?
Closing	Thank you for taking the time to reflect with us! You've done a great job today. We hope your upcoming week is filled with joy, purpose, and balance. Remember, you've got this.

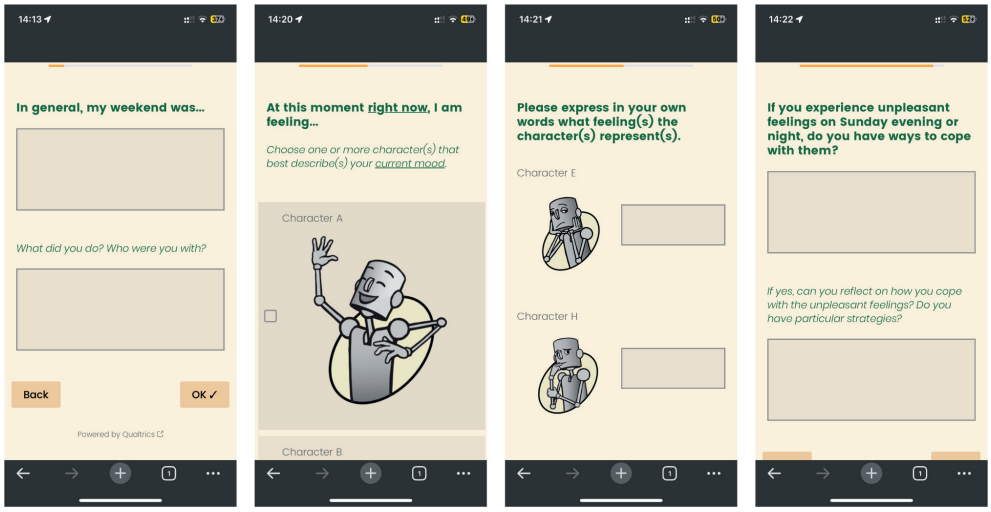


Figure G1. Example interfaces of the online Sunday night diary, which is available through the Qualtrics platform: https://tudelft.fra1.qualtrics.com/jfe/form/SV_6AyqzhQZxSSiL7E.

Figure G2. Template summarizing participants' two Sunday night diaries, used as a final sensitization step.

Appendix H: Focus Group Guide

Stage	Focus	Instruction/Question
Warm-up	Basic information	Please pick one or more meme cards that best represent how you're feeling right now, and tell us who you are, what you do, and why you chose the card(s).
	Ethical considerations	This session will be recorded on video and audio, but any personal information will be kept anonymous. If you ever feel uncomfortable with a topic, please let us know—you can skip any question or stop participating at any time.
	Ground rules	Please try to talk to each other as much as possible, rather than only responding to the researchers. We're interested in your real-life experiences, not scientific explanations, so there are no right or wrong answers—feel free to share openly.
Exploring the "Sunday Blues"	Working definition	As you may know, the "Sunday Blues" is the not-so-great feeling we get when the weekend ends and the new workweek is just around the corner.
	General experience	Can you describe a recent time when you felt the "Sunday Blues"?
		How often do you experience the "Sunday Blues"?
		When do you usually start to notice the "Sunday Blues" kicking in?
	Micro experiences	What specific feelings do you have when you experience the "Sunday Blues"?
		When you have the "Sunday Blues," do you notice any symptoms in your body?
		How do you view your life or the world around you when you're experiencing the "Sunday Blues"?
		If someone interacts with you when you're feeling the "Sunday Blues," how do you usually respond to them?
		What kind of behaviors or actions do you notice in yourself when you have the "Sunday Blues"?
		When you're feeling the "Sunday Blues," what activities do you feel like doing, and what do you prefer to avoid?
Understanding influencing factors	Personal experiences	What specifically makes you feel the "Sunday Blues"?
		Is it something about your work, your personal life, or something else?
		Why do you think this particular thing causes your "Sunday Blues"?
	Supplementary insights	Is there any factor on the "factor cards" that you can relate to, besides what we've already discussed?
		Why do you think this factor affects you?
Identifying coping strategies	Personal experiences	When experiencing the "Sunday Blues," what do you usually do to make you feel better?
		Do you talk to someone, do something fun, or have any other methods?
		How does this help you? Why do you think it helps (or doesn't)?
	Supplementary insights	Is there any strategy or activity on the "strategy cards" that you've tried before, besides what we've already discussed?
		How does it work for you? Why do you think it's effective (or not)?
Wrap-up	Extra information	Please choose one or more meme cards that capture how you'd ideally like to feel on a Sunday night, then share the card(s) you picked, the mood you're aiming for, and why.

Appendix I: Factor Cards

Appendix J: Strategy Cards

Seek distraction
Watch TV, play games, stay busy

Seek relaxation
Do meditation, breathing exercises, yoga

Engage in a hobby or other enjoyable activities
Read, listen to music, handcraft

Seek social support
Talk to family or friends, ask for help

Prepare for the week ahead
Prepare lunch meals, select outfits, plan schedules

Avoid stressors
Avoid making any plans, avoid checking social media or work emails

Repress the bad feeling
Ignore, do not think about, or actively forget the bad feeling

Embrace the bad feeling
Allow, accept, or appreciate the bad feeling

Recharge
Rest, go to bed early, get enough sleep

Plan well
Structure your Sunday, arrange chores and activities well

Think positively
Think about happy things, focus on your achievements

Reduce demands
Reduce workload, cancel or postpone meetings

Eliminate energy drainers
Eliminate noises or bright lights, create a calm environment

Reward yourself
Cook a special meal, buy something you've been wanting

Rationalize the bad feeling
Try to understand the bad feeling, analyse causes

Seek refreshment
Take a walk, go outside, get some fresh air

Create expectations
Plan something exciting for the next week

Vent
Express or write about the bad feeling

Appendix K: Self-Care Booklet

Suggested Articles

The 7 Kinds Of **Rest** You Need

99 Inexpensive **Self-Care Ideas**

Journal Prompts For Every Emotion

Positive Affirmations To Start Your Morning With

Self-Care Wheel

DECLARATION OF AI USE

During the preparation of this dissertation, the author used ChatGPT-5 to improve the language and readability. After using this tool, the author reviewed and edited the content as needed and takes full responsibility for the content of this work.

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SUMMARY

Sometimes bright and lively, sometimes slow and somber, moods are like the background music of everyday life. Even when we are not consciously aware of them, moods profoundly influence how we think and decide, how we live and work, how we see ourselves and relate to others, and how we explore and experience the world.

Recognizing mood's importance, the design community has increasingly turned toward mood-focused design. However, efforts in this area remain implicit, inconsistent, and fragmented. Researchers frequently conflate mood with related constructs like emotion or affect, while practitioners typically address mood indirectly under broader categories such as experience-driven or strategic design. Consequently, mood-focused design remains largely ambiguous: there is no clear consensus on its defining features, archetypes, methodological approaches, and strategies for effective implementation. This ambiguity has hindered the field's progression, despite growing recognition of the relevance and urgency of mood in design.

This dissertation addresses this gap by developing a comprehensive understanding of mood-focused design through an integrative exploration of three interconnected research questions:

1. How have design researchers understood and approached mood in their work?
2. How have design practitioners considered and incorporated user or customer mood in real-world projects?
3. How can we, as researcher-designers, understand and help address people's mood in everyday contexts?

To answer the first question, we conducted a scoping review of mood-related design literature in which researchers documented and reflected on their efforts to explore and address mood (Chapter 2). Although mood was often blurred with emotion or affect, many researchers nevertheless recognized distinctive features and consequences of mood and used these insights to inform design. From this review, we mapped three broad categories of innovations that support mood monitoring, expression, and regulation, along with their corresponding design challenges and considerations. We also synthesized existing methodological resources for empathizing and ideation in mood-focused design processes. These findings contribute to an initial understanding of mood-focused design by delineating its three conceptual categories (mood-monitoring, mood-expressing, and mood-regulating design) while revealing underexplored areas such as novel artifact possibilities, the lack of design-focused mood theories, and limited methodological guidance.

To address the second question, we interviewed design practitioners (Chapter 3). While their work was generally framed within experience-driven design, many engaged with mood implicitly, often under the broader aims of fostering positive experiences or achieving strategic outcomes. We found

that practitioners approached mood in nuanced ways: regarding positive mood as an end in itself, or using mood improvement as a means to enhance engagement, enrich experience, create differentiation or advantage, and facilitate user research. These findings extend our understanding of mood-focused design by illuminating the pragmatic orientations of mood-regulating design in practice, whether directed toward intrinsic well-being goals or instrumental, outcome-driven goals. Practitioners also highlighted challenges in addressing mood and emphasized the need for explicit knowledge about mood itself and mood-related design approaches—underscoring opportunities to make mood considerations more explicit, systematic, and actionable in practice.

For the third question, we grounded our own exploration in a specific mood phenomenon: the "Sunday Blues," the dip in mood often experienced during the transition from Sunday to Monday. We engaged groups of employees to reflect on its manifestations, contributing factors, and coping strategies (Chapter 4). Our inquiry revealed that the "Sunday Blues" extends beyond sadness to encompass anxiety and regret, and that it is shaped by both individual and contextual influences. We also identified coping strategies centered on relief, balance, and resilience. Building on these phenomenological insights, we designed and evaluated three speculative mood-regulating prototypes with individuals who frequently experienced the "Sunday Blues" (Chapter 5) This designerly exploration uncovered factors influencing adoption and effective use, and it led to a set of design considerations emphasizing that effective mood-regulating design must attend not only to technological opportunities but also to the lived realities, values, and coping practices of its users. Together, these findings further enhance our understanding of mood-focused design by providing situated examples of how researcher-designers can engage with a mood phenomenon in action and offering guidance for more effectively integrating mood-regulating designs into everyday contexts.

In conclusion, by bringing together insights from design researchers, design practitioners, and our own researcher-designer exploration, this dissertation develops a more explicit and comprehensive understanding of mood-focused design. It articulates conceptual categories, reveals pragmatic orientations in real-world projects, and provides situated examples and considerations for engaging with mood in everyday contexts. We envision that this work will enable researchers to build cumulative knowledge and help practitioners address mood in more systematic and impactful ways, marking a meaningful step forward for the field.

SAMENVATTING

Soms helder en levendig, soms traag en somber – stemmingen vormen de achtergrondmuziek van het dagelijks leven. Zelfs wanneer we ons er niet bewust van zijn, beïnvloeden stemmingen hoe we denken en beslissen, hoe we leven en werken, hoe we onszelf zien en ons tot anderen verhouden, en hoe we de wereld verkennen en ervaren.

Met het groeiende besef van het belang van stemming, richt de ontwerpdiscipline zich steeds meer op stemmingsgericht ontwerpen. Toch blijven activiteiten in dit domein vaak impliciet, inconsistent en gefragmenteerd. Onderzoekers verwarren stemming regelmatig met verwante concepten zoals emotie of *affect*, terwijl ontwerpers stemming doorgaans indirect benaderen onder bredere noemers zoals *experience-driven* of strategisch ontwerpen. Daardoor blijft stemmingsgericht ontwerpen grotendeels ambigu: er bestaat geen consensus over de definiërende kenmerken, archetypen, methodologische benaderingen of strategieën voor effectieve toepassing. Deze onduidelijkheid heeft de voortgang van het veld belemmerd, ondanks de toenemende erkenning van de relevantie en urgentie van stemming in ontwerpen.

Dit proefschrift adresseert dit gebrek aan kennis met een integratieve verkenning van stemmingsgericht ontwerpen, gebaseerd op drie gerelateerde onderzoeksvragen:

1. Hoe hebben ontwerponderzoekers stemming geïnterpreteerd en benaderd in hun werk?
2. Hoe hebben ontwerpers in de praktijk de stemming van gebruikers of klanten meegenomen in concrete projecten?
3. Hoe kunnen wij, als onderzoeker-ontwerpers, stemming begrijpen en stemming regulering ondersteunen in alledaagse contexten?

Voor de eerste vraag deden we een scoping review van stemming-gerelateerde ontwerpliteratuur waarin onderzoekers hun pogingen om stemming te verkennen en te adresseren documenteerden en reflecteerden (Hoofdstuk 2). Hoewel stemming vaak werd verward met emotie of affect, beschreven veel onderzoekers toch specifieke eigenschappen en effecten van stemming, en gebruikten zij deze inzichten om ontwerponderzoek en -praktijk te informeren. Op basis daarvan onderscheiden wij drie brede categorieën innovaties die zich richten op het monitoren, uiten, en reguleren van stemming, elk met hun eigen ontwerputdagingen en overwegingen. Tevens brachten wij bestaande methodologische hulpmiddelen in kaart voor empathie en ideevorming binnen stemmingsgericht ontwerpen. Deze inzichten dragen bij aan een samenhangende definitie van het veld, door drie conceptuele categorieën te formuleren (stemming-monitorend, stemming-uitdrukkend en stemming-regulerend ontwerpen), en tegelijkertijd onderbelichte thema's te identificeren, zoals nieuwe artefactmogelijkheden, het ontbreken van ontwerpgerichte theorieën over stemming en beperkte methodologische richtlijnen.

Om de tweede vraag te beantwoorden, interviewden wij ontwerpers in de praktijk (Hoofdstuk 3). Hun werk werd meestal gekaderd binnen experience-driven design, maar velen werkten impliciet wel met stemming, vaak met het bredere doel om positieve ervaringen te creëren of strategische doelen te realiseren. We ontdekten dat ontwerpers stemming op genuanceerde wijze benaderen: soms wordt een positieve stemming als doel op zich gezien, soms als middel om betrokkenheid, ervaring, differentiatie of onderzoeksresultaten te verbeteren. Deze bevindingen verrijken het begrip door de pragmatische oriëntaties van stemming-regulerend ontwerpen in de praktijk te belichten, zowel gericht op intrinsiek welzijn als op instrumentele, resultaatgedreven doelen. Bovendien benoemden de ontwerpers in het onderzoek de uitdagingen van het werken met stemming en benadrukten zij de noodzaak van expliciete kennis over stemming en stemmingsgerichte ontwerpmethoden. Dit onderstreept de kansen om stemming explicieter, systematischer en toepasbaarder te maken voor de ontwerppraktijk.

Voor de derde vraag richtten wij ons onderzoek op een specifiek stemmingsfenomeen: de "Sunday Blues," de stemmingsdaling die kan optreden tijdens de overgang van zondag naar maandag. Samen met groepen werknemers verkenden wij de verschijningsvormen, oorzaken en copingstrategieën van dit fenomeen (Hoofdstuk 4). Hieruit bleek dat de "Sunday Blues" verder gaat dan somberheid, en ook angst en spijt omvat, en wordt beïnvloed door zowel individuele als contextuele factoren. Wij identificeerden drie clusters van copingstrategieën: gericht op verlichting, op balans, en op veerkracht. Op basis van deze fenomenologische inzichten ontwierpen en evalueerden wij drie speculatieve stemming-regulerende prototypes met personen die vaak de "Sunday Blues" ervaren (Hoofdstuk 5). Deze ontwerpgedreven verkenning genereerde inzichten in de factoren die invloed hebben op adoptie en effectief gebruik van stemming-regulerende technologie. Dit resulteerde in ontwerpaanbevelingen die benadrukken dat effectief stemming-regulerend ontwerpen niet alleen oog moet hebben voor technologische mogelijkheden, maar ook voor de geleefde realiteit, waarden en copingpraktijken van gebruikers. Gezamenlijk dragen deze inzichten bij aan een dieper begrip van stemmingsgericht ontwerpen door concrete voorbeelden te bieden van hoe onderzoeker-ontwerpers met een stemmingsfenomeen kunnen werken en hoe stemming-regulerende ontwerpen beter in alledaagse contexten kunnen worden geïntegreerd.

Samenvattend brengt dit proefschrift inzichten samen van ontwerponderzoekers, ontwerpers uit de praktijk en onze eigen onderzoeker-ontwerper verkenning. Het ontwikkelt een explicieter en omvattender begrip van stemmingsgericht ontwerpen, formuleert conceptuele categorieën, onthult pragmatische aanpakken in de praktijk, en biedt concrete voorbeelden en ontwerpaanbevelingen voor de omgang met stemming in alledaagse contexten. Wij hopen dat dit werk onderzoekers een basis biedt voor het verder opbouwen van kennis en ontwerpers in de praktijk helpt stemming systematischer en effectiever te adresseren.

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CURRICULUM VITAE

Biography

Zhuochao Peng (彭卓超) was born on February 5, 1997, in Hunan, a southern province of China known for its fiery cuisine, vibrant popular culture, and strong regional character. Having lived and studied there for his first eighteen years, Zhuochao was deeply shaped by the Hunan spirit—often summarized as "吃得苦、耐得烦、霸得蛮": the ability to endure hardship, to persist patiently through complexity, and to face challenges with resilience and determination.

In 2018, Zhuochao received his Bachelor of Engineering in Mechanical Design from Hebei University of Technology (Tianjin, China). He later earned his Master of Engineering in Industrial Design from Hunan University (Changsha, China) in 2021. During his undergraduate and master's studies, he developed a strong interest in emotion-centered design research, which led him to begin his PhD in September 2021 at Delft University of Technology in the Netherlands, under the supervision of Pieter Desmet, Haian Xue, and Laurens Kolks. This dissertation presents the outcomes of his doctoral research on mood-focused design. During his PhD, Zhuochao was also a visiting researcher at Aalto University in Finland for three months and at Eindhoven University of Technology in the Netherlands for one year.

Currently, Zhuochao is a postdoctoral researcher at the Eindhoven School of Education, Eindhoven University of Technology, where his work focuses on understanding the socio-emotional processes underlying team learning in challenge-based engineering education.

Grants and Awards

- 2025, Probe Funding (4000 EUR), 4TU.Federatie Design United
- 2025, Special Recognition for Outstanding Reviews, Interaction Design and Children (IDC) Conference
- 2022, Best Poster Award, 23rd Summer School on Engineering Design Research, The Design Society

Academic Service and Engagement

- Peer Reviewer for top-tier conferences and journals, including CHI 2026, DRS 2026, HRI 2026, CHI 2025, DIS 2025, IDC 2025, ServDes 2025, EKSIG 2025, Interacting with Computers, and Current Psychology
- Speaker, 7 Experiences Summit 2025 - Around the World in 48 Hours (online)
- Speaker, ICSR 2025: International Conference on Social Robots (Naples, Italy)
- Moderator, Panel Discussion "Beyond Algorithms: Social Intelligence, Creative Cognition, and Thriving at Work," China-Netherlands Design Research Doctoral Forum 2025 (online)
- Associate Chair, Design United.DIALOGUE on Health and Well-being, Dutch Design Week 2025 (Eindhoven, the Netherlands)
- Co-chair, China-Netherlands Design Research Doctoral Forum 2024 (online)
- Co-organizer, Workshop on Envisioning the Futures of Design for Well-being, IASDR 2023 (Milan, Italy)

Supervision and Teaching

Master's Thesis and Research Supervision

- Zakalia Zhang, Graduation Project, Acculturation through food design: Playful small-talk interactions in shared kitchens (TU Delft, 2025)
- Isa Jorritsma, Graduation Project, Dear Future: A meaning-focused coping game to empower youth experiencing eco-anxiety (TU Delft, 2024)
- Demeng Commissoris, Research Elective, A design research to prevent the "Sunday Blues" (TU Eindhoven, 2024)
- Harshita Sethi, Research Elective, A qualitative study of the "Sunday Blues" (TU Delft, 2024)

Master's Courses (Coach/Teaching Assistant)

- IDEM1211 Design for Emotion and Well-being (TU Delft, Spring 2025)
- DCM100 Constructive Design Research (TU Eindhoven, Fall 2024)
- MUO-E0022 Design Culture Now (Aalto, Spring 2023)

Bachelor's Courses (Teaching Assistant)

- IOB1-5 Understanding Human (TU Delft, Fall 2021)

Publications

Journal Articles

1. Peng, Z., Xue, H., Joseph, A. W., Roto, V., & Desmet, P. M. A. (2026). Mood as a means or an end: Unraveling how experienced practitioners address mood in experience design. *International Journal of Design*. In press.
2. Peng, Z., Lin, Q., Hu, J., Xue, H., & Desmet, P. M. A. (2025). Design considerations for mood-regulation interventions: Insights from a case study on the "Sunday Blues". *Proyecta56, an Industrial Design Journal*, *5*(1), 8-22.
3. Peng, Z., Desmet, P. M. A., & Xue, H. (2023). Mood in experience design: A scoping review. *She Ji: The Journal of Design, Economics, and Innovation*, *9*(3), 330-378.

Conference Papers

1. Peng, Z., Xu, J., Hu, J., Xue, H., Kolks, L. A. G., & Desmet, P. M. A. (2025, September). User concerns regarding social robots for mood regulation: A case study on the "Sunday Blues." In *Proceedings of ICSR 2025: International Conference on Social Robotics + AI* (pp. 59-79). Singapore: Springer.
2. Peng, Z., Sethi, H., Xue, H., Hu, J., Kolks, L. A., & Desmet, P. M. A. (2025, September). When Sunday feels blue: A phenomenological study of the "Sunday Blues." In *Proceedings of 7 Experiences Summit 2025 - Around the World in 48 Hours*. Oulu: University of Oulu.
3. Commissaris, D., Peng, Z., & Hu, J. (2025, November). Mie: An interactive and personalized intervention to prevent the "Sunday Blues." In *Proceedings of ICHEC 2025: International Conference on Human-Engaged Computing*. New York: ACM.
4. Ling, J., Peng, Z., Yin, L., & Yuan, X. (2020, July). How efficiency and naturalness change in multimodal interaction in mobile navigation apps. In *Proceedings of AHFE 2020: International Conference on Applied Human Factors and Ergonomics* (pp. 196-207). Cham: Springer.
5. Peng, Z., & Xu, J. (2020, July). User-defined gestures for taking self-portraits with smartphone based on consistency. In *Proceedings of AHFE 2020: International Conference on Applied Human Factors and Ergonomics* (pp. 316-326). Cham: Springer.

Manuscripts under Review

1. Peng, Z., Kolks, L. A. G., Hu, J., Xue, H., & Desmet, P. M. A. Design for mood regulation: An exploratory case study on addressing the "Sunday Blues."
2. Peng, Z., Sethi, H., Xue, H., Hu, J., Kolks, L. A. G., & Desmet, P. M. A. Unraveling the "Sunday Blues": Manifestations, contributing factors, and coping strategies.
3. Moghe, B., Antognini, R., Dideriksen, S. A. T., Peng, Z., Toso, F., & Houben, M. Exploring common understandings and bodily experiences of vulnerability in design researchers in sensitive contexts.


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