Research Article

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Designing for workplace well-being: a design case study using aromatherapy as a provocation

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Abstract: This paper presents the first design iteration of a case study conducted in a pharmaceutical distribution company to investigate the sociotechnical dimensions of managing stress. Aromatherapy is employed both as a design provocation and as a well-being intervention, aiming to uncover the underlying design imperatives of workplace well-being interventions. We conceptualize the workplace as a sociotechnical infrastructure and emphasize the situated and contextual nature of work practices as central to understanding stress. The case study contributes to HCI research by (1) advancing the understanding of stress as a sociotechnical issue in organizational contexts and (2) offering insights into the design and use of aromatherapy as a non-conventional well-being intervention in the workplace, identifying broader implications and tensions for the design of such technologies.

Keywords: SMEs; workplace; digitalization; well-being; sociotechnical

1 Introduction

Stress in the workplace is a persistent challenge with consequences for both worker's well-being and organizational performance. The human and practice-centered computing researchers have approached stress mitigation through a variety of interventions. Many focus on the individual, delivering micro-practices such as breathing exercises, reflection breaks, or digital nudges to interrupt the sedentary behavior of office-based workers and administrative staff. Howe et al.[1] demonstrated in a four-week field study that the timing and type of micro-intervention critically shaped uptake, revealing the limits of "one-size-fits-all" approaches. Similar veins of research also address stress at the organizational level, embedding well-being into the structures of work. For instance, scheduling interventions such as 'Focus Time' or meeting-free days reduce interruptions and overload while improving engagement.[2] The studies in design and computer-supported cooperative work (CSCW) extend this further by treating stress as a collective phenomenon, designing team-based visualizations and reflective activities that foster shared awareness, but also raise risks of stigma and surveillance when stress data is made visible.[3] Chow et al.[4] found that such systems reduced perceived stress and unproductivity but only when well-integrated into work practices, highlighting the centrality of context.

Across physical-health, mental-well-being, and passive sensing (PS) approaches, a common prescriptive design logic is employed, meaning that systems sense or classify states and prescribe actions ("stand up," "take a break," "breathe") and aid user through self-tracking. This design logic prevails in personal health and well-being interventions, framing self-tracking as a cycle of sensing, feedback, and behavior change.[5,6] More recent work extends this logic, for example Ong et al.[7] on motivation in self-tracking and Barker-Canler et al.[8] on reflective versus rigid tracking. While prescriptive designs may work in personal health contexts, they often falter in workplaces, where individuals navigate multiple roles and responsibilities, balancing individual and collaborative demands, as well as personal and team actions. Studies of self-tracking abandonment show how rigid prescriptions misfit lived contexts.[8] Kawakami et al.[9] sharpen this critique for organizational settings, arguing that prescriptive sensing misaligns with norms of availability and can erode meaningful consent, control and autonomy. Collectively, these literatures fail to address the sociotechnical and contextual nature of workplace stress.[9,10]

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Although stress is often contextualized with negative outcomes such as anxiety, depression, or illness, it can also be a source of motivation and engagement in the workplace, sometimes connotated as negative and positive/good stress.[11–13] Stress is embedded in work practices, routines, and emergent situations; however, the response to stress is selective and depends on how demanding the situation is relative to an individual's ability to adapt or cope.[14–16] In other words, stress is experienced and is also defined by this experience and consequences. Stress becomes positive, or 'good,' when it can brings value to the workplace, as current research suggests that using multi-sensory modalities (auditory, haptic, and visual) can transform the experience of stress under time pressure into a positive and motivating experience. Participants reported that auditory and haptic cues, in particular, helped users perceive time rhythmically and physically, enhanced focus, reduced cognitive load, and made time awareness more intuitive compared to traditional timers, fostering engagement and a sense of momentum rather than anxiety.[11,17] Different sensory modalities for mitigating negative stress or promoting positive stress are being investigated, but the olfactory sense or technology-mediated smell interactions remains an untapped area for workplace and organizational context, especially considering social interactions and collaborative practices in workplace context.[18]

Although olfactory design remains under-explored compared to visual or haptic modalities in HCI, some research demonstrates scent's potential as a material for calm technology and as a therapeutic medium (aromatherapy), influencing mood and cognitive performance,[19] while maintaining a unique capacity to permeate shared space and remain peripheral to attention.[20] Unlike prescriptive systems, aromatherapy works ambiently, shaping atmosphere without requiring explicit compliance. This positions it as a promising modality for workplaces where stress is better addressed through infrastructural ambience than through individual prescriptions and repetitive actions.

As much as aromatherapy represents an out-of-the-box olfactory design intervention for stress mitigation and well-being, it requires investigation through pragmatic, action-oriented research to uncover the underlying dynamics and tensions that emerge with such interventions, without overstating their utility or downplaying their challenges. These tensions motivate our central research question: How can aromatherapy be employed both as a well-being intervention and as a design provocation to investigate the sociotechnical dimensions of stress management in the workplace for office-based workers?

With this design case study, we aim to develop a richer understanding of the contextual and sociotechnical nature of stress and mental well-being in workplace settings for office-based workers. At the same time, we seek to surface tensions and extract actionable design implications – both for aromatherapy as a workplace intervention and for workplace well-being technologies more broadly. Therefore, we use aromatherapy as a provocation – rather than proposing an immediately deployable solution – which, in design research, denotes the deliberate creation of artifacts or interventions intended to challenge existing norms, expectations, or practices and to stimulate reflection, discussion, and new understandings.[21]

This paper follows a straightforward structure and presents the first design iteration of this case study. Section 2 discusses the related work on stress and well-being, technologies for well-being, and using different interactive modalities as stress-mitigation interventions; Section 3 outlines and discusses the research method; Section 4 presents the results of the contextual study; and Section 5 builds on this contextual understanding to explore design directions and a plan for appropriation studies and subsequent design iterations. Finally, Section 6 concludes with a discussion that connects contextual insights and design knowledge, contributing to broader research on workplace well-being technologies.

2 Related work

2.1 Workers well-being and stress

Following Wijngaards et al.,[22] worker well-being can be understood as a multidimensional construct which includes subjective, psychological, and workplace well-being. Subjective well-being refers to individuals' overall evaluations of their lives. This includes both life satisfaction, the cognitive appraisal of one's life circumstances and affect, the emotional evaluation of events and experiences. Psychological well-being, in contrast, reflects the realization of human potential and optimal functioning, encompassing aspects such as autonomy, personal growth, purpose in life, positive relations with others, and self-acceptance. Finally, workplace well-being captures work-specific experiences such as job satisfaction, work engagement, and affective experiences at work, linking general well-being to the organizational context. Stress negatively impacts all of these dimensions: it can reduce engagement and job satisfaction, increase burnout, shapes the emotional experience of work, and increases anxiety.[10,23,24] By understanding how workers perceive and cope with stress embedded in work practices, designers can create practice-centered interventions that enhance well-being.

How stress is defined varies across different fields of study, but in general, it is often described as a state in which a person reacts with agitation or anxiety, typically triggered by a subjective feeling of being overwhelmed.[13,25] It is widely described either as the non-specific response of the body to an emergent situation,[26] or as a psychological state in which demands strain or surpass an individual's resources.[27] There are numerous factors that can trigger stress in individuals, particularly in workplace contexts, ranging from organizational and socio-psychological factors (e.g., work-load and time pressure,[15,28] role ambiguity, job insecurity, and effort-reward imbalance,[24,29,30] lack of support from colleagues, and poor management practices [15,30]). Socio-material and socio-technical factors such as environment (e.g., Office design,[31,32] noise,[33–35] lighting,[36–38] and overcrowding[39–41]), increasing digitalization and the need to maintain both physical and virtual presence (technostress and burnout[11,14,42]), and a lack of proper upskilling or onboarding for technologies,[43] also add to the prevalent stress dynamics in the workplace. This demonstrates stress as multilayered and ambivalent phenomenon and calls for solutions that are contextual in nature.[16]

2.2 Workplace well-being technologies

Workplace well-being interventions can be divided into those targeting physical health or mental well-being. Physical-health technologies include sit-stand desks, posture sensors, and activity prompts aimed at reducing sedentary behavior or musculoskeletal strain.[44,45] These interventions are often evaluated using objective measures such as step counts or posture changes. Mental well-being systems, by contrast, aim to mitigate stress and burnout through mindfulness, reflection, or cognitive behavioral therapy style techniques.[4] Their outcomes are typically measured using subjective scales such as the perceived stress scale or diary-based ecological momentary assessments. While both domains report short-term benefits, their methodological divergence complicates comparison. Recent reviews stress the need for multimodal dashboards that integrate objective physical metrics with psychosocial indicators to avoid reductive single-score approaches.[46]

Passive sensing (PS) for mental well-being in general, and for stress monitoring and mitigation in particular, has emerged as a prevalent design intervention. Wearables, smartphones, keystrokes, and productivity logs are now used to infer stress, focus, or mood. Studies show that PS can power just-in-time adaptive interventions (JITAIs) that tailor support to inferred states.[47,48] Yet PS technologies face major challenges. Stress signals are ambiguous and lacks detail about the context of the event; inference models may be biased across roles; and sensed data can easily be co-opted for performance monitoring.[9,49]

Despite growing interest, much research on stress technologies occurs outside situated workplace contexts.[16,50] CSCW scholars emphasize that stress is not merely an internal state but an organizationally produced phenomenon. Adler et al.[10] and Kawakami et al.[9] argue that wellbeing systems often obscure these dynamics by shifting responsibility from structures to individuals. In workplace-situated interventions, several tensions become apparent: employees may lack sufficient autonomy to respond to system prompts, may encounter stigma associated with the visible use of stress interventions, or may fear that collected data will be appropriated for surveillance rather than genuine support.[49,51] Since the COVID-19 pandemic, the expansion of remote and hybrid work has accelerated the adoption of smart-sensing and productivity-monitoring systems, contributing to an uptick in workplace surveillance and data collection. These developments have amplified concerns around privacy and control, making it crucial to situate workplace well-being technologies within these broader sociotechnical dynamics.[9,52]

2.3 Multi-modalities for workplace well-being

To move beyond prescriptive nudges, researchers have explored out-of-the-box interventions and multi-sensory modalities. Using multi-sensory modalities (auditory, haptic, and visual) has been shown to transform task-related stress into a positive experience, fostering engagement and focus,[11,17] however the use of olfactory sense is not widely researched in human and practice-centered research traditions. Obrist et al.[53] shows that smell has a strong link to memory and emotion, as it can vividly bring people back to past moments and feelings. They suggest that this may be because smell directly connects to brain areas involved in emotion and memory, which can in turn subtly influence how people feel or behave. This makes it a potentially powerful medium for workplace well-being design, capable of creating mood, atmosphere, and reflection. However, much of Obrists work on smell is situated towards using smell to support social interactions in collaborative tasks,[18] smell for olfactory training of people losing smell,[54,55] the use of scent in public and private contexts,[56] using smell for curing eating disorder,[57] but predominantly the culture of smell-care[55,58] and design of technologies to deliver smell using a multi-sensory interaction design.[54,55,57,59] Among this vast research by Obrist and similar work, by their account, we know very little about smell interactions.[53,59,60] In this study, we further expedite this concern – that we know

even less in the context of workplace well-being, especially when this context is multilayered and multifaceted due to overlapping personal, organizational/work, social, and collaborative infrastructural layers.

Among olfactory interventions, aromatherapy has a long history as a stress-reducing practice in psychology and healthcare using the olfactory modality at center. Essential oils such as lavender, bergamot, and rosemary lower cortisol and heart rate while improving mood.[61–63] Workplace trials report reductions in fatigue and improvements in affective states.[23,64,65] Maggioni et al.[58] outline an olfactory design space, providing conceptual and practical grounding for designing with scent. Their work is important because it provides the theoretical and methodological foundation for understanding how scent can be intentionally designed and studied within HCI. The framework is structured around four key dimensions: the chemical dimension, which adresses the physical and perceptual properties of scent such as composition, concentration, and intensity. The emotional dimension, which highlights how scents evoke affective responses and memories trough their direct connection to the limbic system. The spatial dimension, which focuses on how scent diffusion and direction shape a user's sense of space, attention and presence. Lastly, the temporal dimension considers how timing, duration and repletion influence perception and habituation. The context of aromatherapy as an olfactory design intervention for stress mitigation and well-being in a workplace, warrants renewed and practice-centered investigations, especially into the socio-organizational and socio-technical dimensions, in order to understand the design space laden with tensions arising from competing/resonating social, organizational/work, collaborative, and personal infrastructures.

3 Methods

Our methodological approach follows the design case study (DCS) tradition, grounded in the epistemological foundations of Grounded Design[66] and the pragmatic orientation described by Wulf et al.[67,68] This pragmatic view orchestrates knowledge creation through iterative cycles of inquiry and intervention situated in real-world contexts. The study is structured along the three phases of DCS: (1) a context study to empirically investigate existing work practices and sociotechnical dimensions of work in the context of stress and well-being of desk workers through ethnographic fieldwork; (2) a design study in which story-boarding is used as a prototyping activity to elicit and conceptualize aromatherapy as a provocative design intervention in the workplace for situated stress management and well-being of employees; and (3) an appropriation study, where the interventions are introduced into practice and their adaptation and implications are systematically observed. In this paper, we are presenting the first design iteration, i.e., from context study to the design study, and the plan of the appropriation study because it is still ongoing. Through first iterative and meta-reflection, the case contributes transferable insights into design knowledge, particularly concerning the role of passive sensing and well-being interventions in workplace contexts.

3.1 From context study to first design iteration

The ethnographic fieldwork was conducted in a small and medium-sized enterprise (SME) located in the rural western region of Germany. The company is referred to by the pseudonym Pharma GmbH., to protect its anonymity of the company. The company is a pharmaceutical distribution company that employs approximately 60 people in total, including around 20 office-based administrative staff, with the remainder working in packaging, commissioning, and logistics. It specializes in purchasing pharmaceutical products, both directly and through placing its own production orders with manufacturers, and selling them primarily to pharmacies. In addition, the company also sells directly to end customers via its own online platform as well as through third-party marketplaces such as Amazon.

Access to the company was facilitated through an existing contact, who introduced the research project to the company's management and staff. Following review of the study's ethical policy, management granted permission to conduct the study. The participation in the study was kept voluntary. All participating employees were informed in advance about the aims of the research and the ethical policy of the study and were asked to provide their consent to being observed or interviewed. The ethical policy of the study was guided by the regulations of the hosting research institute, which is highly active in research on digitalization and digital transformation in Germany, particularly in the industrialized rural regions of North Rhine-Westphalia. The institute's ethical guidelines ensure participant anonymity, guarantee the right to withdraw shared information, and safeguard confidentiality of data handling, storage, and reporting in accordance with established standards of responsible research practices.

The ethnographic fieldwork was carried out in the company's office, where approximately 20 part- and full-time employees work in management, IT, graphics design,

sales, and other administrative departments. This office context was chosen because the study focused on sedentary behavior, with employees sitting at desks and working on computers for long periods. The fieldwork was conducted by closely accompanying employees in their everyday activities, from desk work to informal interactions such as meetings and coffee breaks. Occasional questions were posed to contextualize observed practices and capture immediate reactions.[69] This approach enabled us to link the observed practices with participants' own reflections, highlighting the multiple situated perspectives that constitute a normal work day.[70] This approach aimed to develop a more detailed understanding of the stressors and coping strategies experienced by individual employees during work.

Data collection was conducted over a one-week period in August 2025 and comprised 25 h of observation, during which eight employees from different roles were accompanied and observed. These roles included head of IT, graphic design and marketing, accounting, quality assurance, human Resource and social media, sales support, head of sales, and sales administration. This diversity of roles allowed us to explore similarities and differences across functions and to develop an intersubjective perspective during analysis. Observation times varied, as participation was voluntary and depended on employees' availability.

At the end of each workday, interviews were conducted with the employees who had been observed that day. Aromatherapy was introduced as a provocation, as a sensitizing concept and a (potential) well-being intervention during the interviews, to provoke deeper and out-of-the-box insights into workplace well-being and to articulate design imaginaries around its potential application for workplace stress mitigation. The interviews were guided by four core research questions: (1) How stress is perceived by workers and how it manifests in their work; (2) How workers recognize and cope with stress; (3) How they perceive aromatherapy (as an olfactory design intervention) as a potential well-being strategy; and (4) How aromatherapy would provoke the design space for well-being technologies and the design of olfactory interventions in the workplace context. These interviews provided an opportunity to clarify questions arising from the observation sessions and enabled employees to reflect on their actions, particularly the moments of stress, as well as on the coping strategies they employed. In addition to formal interviews, the data corpus was enriched by spontaneous informal conversations, both with shadowed employees and with other staff encountered in hallways and packaging areas during the course of their work.

Table 1 outlines the contextualized metadata of the study participants including work contexts and sedentary type of work.

Altogether, the dataset consists of eight interviews (each 30–45 min, recorded and transcribed), 25 h of shadowing, and memory notes from informal exchanges. The data material was analyzed using thematic analysis by Braun and Clark[71] in MaxQDA. Field notes and interview transcripts were first imported into the software, then open coding was done to capture individual and collaborative work practices, stress factors, conscious and unconscious experiences of stress, coping strategies, and participants' responses to the aromatherapy concept, including perceived advantages, disadvantages, and potential use cases. Codes were iteratively clustered into categories which were consolidated into three overarching themes: (1) Workplace dynamics: my stress is not your stress; (2) conscious and unconscious experiences of workplace stress; (2) recognition and coping in practice for stress mitigation and well-being. Leading to the provocation: insights on aromatherapy as a well-being intervention in workplace contexts. These themes form the findings presented in the next section and serve as the basis for deriving design implications and concepts, which are developed as storyboards for evaluation in the first design iteration. The design implications and concept of aromatherapy as a provocative design intervention provide an outlook for generating actionable guidelines and fostering reflection on the sociotechnical dynamics of stress and workplace infrastructures. This paper reports results up to the design study phase of the case study and concludes with the setup of planned appropriation study to follow.

4 Results

In the following, the results up to the first design iteration of the DCS are presented step by step, covering both the context study and the design study results. It begins with the thematic findings, eliciting workplace dynamics and how workers often perceive others' work as less stressful (Section 4.1), the experiences of workplace stress (Section 4.2), followed by the individual and collaborative coping strategies employed by workers (Section 4.3).

4.1 Workplace dynamics: my stress is not your stress

In a typical workplace, administrative staff working in offices on computers and employees on the shopfloor engaged in packaging, commissioning, or logistics-related

Table 1: Overview of participants, roles, and work types; PC = work primarily on a computer, Mobile = use of smartphone/tablet for work tasks, Desk = work with physical files and documents, Landline = use of landline for work tasks.

Pseudonym	Age group	Job role	Work context	Sedentary work type
Tom	40–50	Head of IT	IT infrastructure management: server setup, backups, documentation, coordinating	PC and Desk
Ella	30–40	Graphic design	Designing brochures, flyers, promotional items, packaging	PC and Desk
Alex	40–50	Graphic design & marketing	Graphic design (logos, packaging, flyers), web management	PC
Jamie	30–40	Accounting & controlling	Invoice entry, Excel lists, report generation	PC and Desk
Alice	50–60	quality assurance	Document checking, writing emails, research, customer support	PC
Riley	20–30	Social Media/HR/Sales support	Negotiations with influencers, briefing & content creation, HR assistance, customer support assistance	PC and Mobile
Liam	40–50	Head of Sales	Sales planning, controlling & reporting	PC & Off-site consulting
Emma	40–50	Sales administration	Forwarding orders to fulfillment & customer support	PC & Landline

tasks often perceive each other's work as less stressful or comparatively easy. This divide is not merely physical but also perceptual, reflecting a broader disparity that runs across many organizations. As also observed in other workplace studies,[72] in German workplace discourse, this is sometimes described as oben ("upstairs" or "above") versus unten ("downstairs" or "below"), a dichotomy that highlights the stark differences in how work and its associated stressors are perceived. This division also manifests in collaborative dynamics: tasks and instructions often flow from "upstairs" to "downstairs," while demands and challenges move in the opposite direction. A certain and very clear occurrence was also noted during our fieldwork:

> On August 13th, my shadowing partner (Tom – the head of IT) offered to show me around their warehouse and explain what they do there. To get from the office to the warehouse, we had to go down two staircases and then cross the parking area, about 100 m, to reach the warehouse (there was an elevator, though I have never seen anyone use it; everyone seems to take the stairs).
>
> It was afternoon and around 30°C outside, so when my shadowing partner opened the door to the production hall, he smiled slightly and said, "It's always so nice and cool in here". As we walked through the warehouse, he told me about the products stored there. When we reached the packaging area, eight women were sitting and packaging products into small cardboard boxes. My shadowing partner quickly went over to greet them and then he explained to me what they were packing.
>
> One of the women jokingly asked if we wanted to join them, adding that there were only a couple of hundred boxes left. My shadowing partner replied, ironically, that since it was so cool in here, maybe he would come back later.
>
> Another woman laughed and said that she would happily switch with him – half-jokingly, but with a hint of sincerity. He responded that the computer work he has to do all day wasn't much more exciting than packing boxes. To which she replied laughing a bit more intensely than before, "I'd be even less interested in that".
>
> Then another woman asked, "Has anyone asked the boss yet if we get a day off because of the heat today?" My shadowing partner told her that he didn't think anyone had. She then called him by name, smiled broadly, and pressing on the demand, said, "PLEASE, can you ask?" We continued walking through the warehouse, and later another person asked him again if he could check with the boss about letting them leave early due to the heat. Notably, the warehouse was much cooler than the upstairs offices, where we went after this interaction with shopfloor workers.
>
> On our way back, Tom shared with me that he has respect for the work they do in the warehouse and he couldn't imagine doing that all day. (Field Notes, Day 1)

These interactions made it quite evident that, amid light teasing and fascination with each other's work, both groups perceive themselves as sitting at the epicenter of stress, and that their tasks warrant special consideration – such as an early day off due to heat. At the same time, both types of workers downplayed their own tasks as uninteresting while implicitly signaling that others would only understand the challenges once they experienced them firsthand. Even when shopfloor workers invited office staff to join them, the underlying message was clear: "You'll see what we deal with when you work with us" (Field Notes, Memo).

This also showed that, while shopfloor workers skillfully manage the movement of products in and out of the company, they often perceive office work as less stressful than their own. The implications of this perceptual disparity are significant. Stress factors embedded in different work contexts are frequently underplayed or overlooked, leading to a lack of recognition of the challenges inherent in

other roles. **This downplaying can reduce empathy, create misaligned expectations, and generate barriers to effective collaboration; collaboration that is often crucial for addressing day-to-day problems and stressful situations.** In Section 4.3, we will revisit the role of collaboration in mitigating stressful situations in the workplace.

4.2 Conscious and unconscious experiences of workplace stress

In this section, we examine how stress is experienced and interpreted in office workplaces, where employees primarily work at desks – using computers, interacting with clients, or managing marketing and accounting tasks. While this desk-based work often promotes sedentary behavior, employees sometimes consciously recognize stressful experiences, whereas in other cases, through lived experience and subsequent reflection. In our study, workers generally described the workplace as stress-free; however, our fieldwork revealed a more nuanced dimensions of stress and its impacts of workers well-being, highlighting both subtle and overt stressors that shape everyday work practices.

After shadowing Tom on the first day – an IT specialist and the head of IT – and seeing him hopping from solving one IT problem to another and evidently showing the signs of stress, when we asked him to reflect on the his work, he shared with us that:

> "You have to be pretty flexible here and sometimes jump into other areas on spot (emergent tasks and problems). And that actually causes stress, because you're thinking, okay, how did that go again? (.) And that's actually a pretty typical kind of stress for us (the IT team). So it's not deadlines, not time pressure in that sense, (.) more like unplanned things that just come up." When asked how often these unplanned events happen, he said: "I'd say, like, two or three times a week." (Interview, Tom, Head of IT)

Tom framed stress as something that occasionally happens and is related to unplanned or emergent situations or problems that need to be dealt with. Through observation, however, it became clearer that stress can be present also during routine daily activities, even when the workers are not actively experiencing or registering it as stressful. It may even be to some degree a constant situation in the workplace.

> During an SAP error troubleshooting session, my shadowing partner (Tom) showed noticeably increased posture and hand movements, indicating mild physiological or behavioral stress. While looking on the screen, he sighed and frustratingly said, "I can't believe this!" After trying several times, he called a colleague for assistance. Now, as I observed they started trouble shooting together while discussing the options which Tom had already tried. This collaboration not only redistributed the cognitive load on Tom but also appeared to alleviate tension, as the attempts that followed during collaborative troubleshooting were noticeably more relaxed. (Field Notes, Day 2)

This shows that even though workers consciously describe their workplace as largely stress-free, with only occasional instances of stress, unconsciously stress is an inherent part of the job, strongly dependent on the situatedness and context of the task at hand. Observing different employees over the course of the week as they moved through phases of normal and stressful situations, and later asking them to reflect on what stressed them the most or what they typically contextualize as stressors, participants reported several different sources of stress. Including unplanned tasks as Tom but also bureaucratic procedures ("…the tax office. From our perspective, very narrow-minded in accounting, constantly requesting all sorts of information, numbers, and data" – Interview, Liam, Head of Sales), high workload periods ("It often happens that a lot comes in all at once" – Interview, Jamie, Accounting), and patient interactions, such as handling calls from patients expecting medical expertise because they also sell directly to patients ("When patients, for example, call, have questions, and think they are speaking with a doctor, and I am here and don't have that much expertise, and have to try to help them anyway" – Interview, Alice, Qulaity Assurance) or calls with complaints about medications ("…dealing with patients and lots of complaints (.) And not all patients are easy!" – Interview, Emma, Sales Administration).

The fieldwork and subsequent analysis demonstrate the importance of context, which is highly relevant for understanding which form of stress is present, as the context is defining it. Stress in the workplace is not isolated, it emerges in strong dependence on tasks, their difficulty, environment, and individuality in form of personal perception or mindset. The perception of stress being connotative as positive or negative was also a notable finding that strengthens our argument of the stress being situated and contextual because the meaning of context in situation is also formulated by workers within the context. Explicitly differentiating between positive and negative stress, depending on the nature of the task at hand, participants indicated instances when stress changed its connotation and meaning depending upon the context. Positive stress was described as occurring in the form of pressure when a task was perceived as meaningful:

> Yes, I find stress to be a push, actually a positive push . for example, when we …once a month we do market analyses …Then of course you have, in a certain way, stress to want to or also have to get it finished. On the other hand, you are also very, very interested in the things that are in there (.) That is then

> positive stress, that you really want to achieve something. For that you have to do something, also do something quickly. (Interview, Liam, Head of Sales)

Negative stress, on the other hand, was linked to tasks perceived as unnecessary, bureaucratic, or not contributing to getting the actual job done:

> Just a few days ago it became very stressful to work, because we constantly had problems in our office with …registrations of new employees. Ah! That doesn't bring a cent, not a euro of revenue. And that is of course negative stress, where you're simply annoyed. (Interview, Liam, Head of Sales)

These accounts show that stress in the workplace cannot be reduced to a single, uniform experience but instead emerges in relation to the situatedness of tasks and work contexts. Depending on whether a task is perceived as meaningful or futile, stress can be connoted positively; as a motivating and energizing force, or negatively; as a source of frustration and distraction. This underscores the contextual and interpretive nature of stress shaped by the task at hand, its meaning, and the individual's work context, highlighting that its effects are contingent on both the organizational environment and the subjective perceptions of workers. **It is an ambivalence with direct implications for the design of workplace well-being interventions, requiring that both sides be taken into account.** For example, this means supporting workers when stress is harmful (e.g., bureaucratic overload, meaningless tasks) while also harnessing stress when it is motivating (e.g., meaningful deadlines, stimulating challenges).

4.3 Recognition and coping in practice for stress mitigation and well-being

Stress is an inherent aspect of workplace experience, yet its recognition and management are highly situated and individual. When it is deemed negative, employees generally develop coping strategies to navigate stressful moments, but the process of identifying stress is neither immediate nor uniform. In some cases, participants struggled to recognize stress as it occurred, highlighting the subtle and often embodied nature of stress in office settings:

> How do I notice that I'm stressed? .Physically? God! that's hard to say. Maybe my pulse goes up or I start (.)? I don't know, but I haven't really paid attention to it. I don't know, it's really hard to answer. (Interview, Alice, Quality Assurance)

This quotation, together with observations of employees affirms that stress is not always consciously apprehended; it may manifest in physiological cues or behavioral changes that employees do not actively monitor. Some participants reported noticing stress only through its tangible aftereffects, such as physical discomfort or neglected basic needs:

> I'm someone who gets stressed quickly. Headaches. That's definitely how I notice it. Mhm, I …then at some point during the day I also realize, wow, I haven't eaten anything today. Or I haven't drunk anything today. That's also how I notice that I have so much to do that I'm completely stressed. I just forget to drink or eat. Those are the signs I have. (Interview, Riley, HR and Social Media)

These accounts demonstrate that as experiencing stress is both contextual and situated, as we discussed in the last section, recognizing stress in the workplace is also situated and individually embodied: it emerges in relation to the task context, workload, and individual perception, and is sometimes only apprehended retrospectively. The findings challenge simplistic notions of workplace stress as a uniform or immediately recognizable phenomenon. Instead, stress can be understood as a dynamic interplay between situated work contexts and individual bodily and cognitive responses, with recognition often delayed until aftereffects become salient. **This implicates that design interventions aimed at supporting well-being, such as passive sensing systems, must account for both explicitly recognized stress and latent, embodied stress that employees may not consciously register in real time, which can lead to an inaccurate self-perception of stress.** This indicates that, employees could benefit from technologies that help them notice early signs of stress before they have noticeable effects.

Recognizing negative stress factors leads to coping and recovery. Individuality in stress recognition is also reflected in the coping strategies participants employ, which vary widely and are often a matter of personal preference in the form of micro-recoveries and stress-managing habits. Ella, for instance, highlights how she manages stress by taking breaks to clear her head:

> For a few years now, I've been going for walks at lunchtime. I've noticed for myself that there's a sense of freedom in this, and it somehow does me good. I notice that with movement I can calm down a bit. That releases quite a lot. Yeah. Otherwise, I'd say …close my eyes and get through it. (Interview, Ella, Graphic Designer)

This illustrates not only a habit or ritual individualized for coping with stress but also the meaning of coping and recovery itself, which is linked with a feeling of freedom. The alternative she mentions – closing her eyes and simply bearing it – highlights the more grimmer aspect of stress, emphasizing the seriousness of stress arising from mundane tasks, emergent situations, and sedentary office work. This entails

that negative stress is often accepted as an inherent aspect of office work, or in some cases, a more highly paid position.

Office work can blur the boundaries between work and personal life; even if employees do not take work home, they may still carry stress with them. In such cases, rituals for stress relief are often performed after work. Whether coping occurs on-site or afterwards, the notion of containing stress and internalizing it – through closing one's eyes or letting it fade over time – remains a constant, reflecting the "muddling through" perception of coping with stress in office-work-settings, as Alex mentioned in his interview after the observation session:

> I'm more the type to first internalize stress and let it fade afterwards (.) Nothing specific happens right after stress. I just follow my evening rituals. I go for a walk with the dog. Yeah, then that's already balancing and relaxing, helping me unwind. Yeah, then afterwards everything is fine again. (Interview, Alex, Graphic Design and Marketing)

These rituals, whether walking during lunch or after work with the dog, vary individually, but the underlying pattern of muddling through is consistent, even developing behaviors in employees who start viewing these coping and recovery mechanism as counterproductive:

> Push through until it's finished (.) In an office job, there's no movement. I really notice that when I don't exercise. It's just a must. So, exercise is definitely necessary. And riding my motorcycle clears my head for me . . but (.) I often think that even if it might sound unhealthy, in such moments you just have to get through it, as long as it stays within limits and doesn't happen too often. That's been my mindset so far. (.) When it comes to work, if there's simply too much going on, I find breaks very disadvantageous, because the work, for example, doesn't get any less. Yes, you just have less time to do it, which in my opinion could even increase stress. (Interview, Jamie, Accounting)

Other coping responses are subtler and often perceived as natural responses to stress, such as drinking water three times in quick succession during documentation work (Field Notes, Day 1) or typing with frequent pauses when drafting messages to a supervisor (Field Notes, Day 2). Such micro-breaks in cognitively demanding tasks likely serve as unconscious mechanisms to regulate attention and maintain focus. Similarly, small actions – like stepping aside briefly for a coffee sip or engaging in short conversations with colleagues – illustrate how employees balance cognitive effort with micro-recoveries throughout the day (Field Notes, Day 3).

Individualized coping practices for stress, although necessary and effective, are insufficient due to the context-dependent emergence of stress in office work. The collaborative nature of work in the office highlights how collaboration itself acts as a coping mechanism, often triggered unconsciously in teams working together, rather than through formalized habits or protocols, as envisioned in management literature with a high emphasis on standard-operating-procedures. The following vignette will demonstrate this argument:

> When I arrived at my next observation session, Alice seemed visibly stressed. She was clicking slightly nervously on her computer and sighing repeatedly. She asked if I could help her, saying that I looked like someone who probably knew more about IT than she did. Expressing that she "doesn't like computers that much", which she later revealed to me. I said sure and asked what the problem was. She then explained that she couldn't open a link that had been sent to her by a client with whom she was communicating. Whenever she clicked the link, she was unable to log in with her Microsoft account, despite entering the correct password the login kept getting blocked. She told me that she had already informed her client about the issue several times and asked them to send a new link, but new links didn't resolve the problem.
>
> She then demonstrated the problem to me, hoping I could help. I suggested trying a different browser but told her that beyond that, I couldn't offer much advice since I didn't know how their account system or firewall worked. She kept attempting to log in several more times, which took longer than usual due to repeated two-factor authentication steps. At one point, she could no longer receive SMS codes for authentication, and the verification calls took a long time to come through, making a login attempt around 5 min.
>
> After about three more failed attempts, she became so frustrated that she loudly shouted, for the IT-specialist in their office across the hall. Though in a way that was slightly humorous, as if she intentionally made it sound funny to lighten the mood. The office of the IT-specialist is around 15 m down the hall. He came and they collaboratively solved the problem. (Field Notes, Day 4)

This vignette, alongside the one mentioned from Day 2 observations in Section 3.2, demonstrates that collaboration is essential not only for completing tasks and solving emerging problems but also as a coping mechanism in stressful situations. It acts as an adaptive response to stress, enabling employees to manage challenging situations in real time, particularly when individual strategies or rituals are insufficient. **This implies that designing workplace well-being interventions should leverage collaboration as a coping and adaptive response mechanism to stress.** By capturing these nuanced experiences, workplace technologies can better support adaptive coping strategies and contextualized interventions, ultimately enhancing both individual well-being and organizational functioning.

5 From context to design

These findings and lived experiences lead to the provocation: insights on aromatherapy as a well-being intervention in workplace context (Section 5.1). During the interviews conducted after the observation sessions, we began introducing aromatherapy as a provocative well-being intervention to stimulate the workers' design imaginaries. These discussions revealed several design-related nuances that directly affect the development of aromatherapy as a design technology, while also carrying broader implications for workplace well-being technologies. Finally, we used these implications of this conceptual provocation and the ones highlighted in the results (Section 4) for the design of aromatherapy interventions, illustrated through design scenarios/story boards (Section 5.2).

5.1 Provocation: insights on aromatherapy as a well-being intervention in workplace context

5.1.1 Tension I: ubiquitous versus situational

Choosing aromatherapy as a provocation was intended to stimulate out-of-the-box and critical thinking about workplace well-being interventions. Many existing approaches tend to be prescriptive, downplay or disregard the work context, and offer one-size-fits-all solutions. Aromatherapy, by contrast, opened a space for participants to reflect differently on stress mitigation. During the interviews, almost all participants expressed curiosity about why well-being and stress management were being discussed in relation to scent. At the same time, they began to imagine concrete use cases, considering both when such an intervention might be effective and what challenges it could pose. They expressed genuine interest in the idea of an aromatherapy device and could readily envision its deployment in their office environment. This openness was not merely speculative: participants described specific scenarios in which scent could be beneficial, revealing two dominant use-case categories. These use cases extend the findings presented in Section 4 and reinforce the implications highlighted there, underscoring the need for contextualized workplace interventions for stress mitigation and well-being.

The first consists of **contextually driven, situational interventions that are event-triggered** and preferably deployed during acute stress episodes, such as difficult phone calls or peaks in workload. As one participant put it, "In really extreme cases of stress, I think it could definitely be useful. [High workload] actually caused me to stay several hours longer every day, which really created a lot of stress. It might have been pleasant to have something different than the usual office air." (Interview, Jamie). Another identified phone calls with difficult clients as a clear trigger: "Yes, during phone calls with difficult customers." (Interview, Emma). These quotations frame aromatherapy as an automatic, situational regulator, something that could be invoked or invokes itself to distract and reduce immediate tension.

The second category consists of **ambient, preventive interventions, where scent is diffused continuously** to help maintain a calm and balanced atmosphere throughout the day. Participants imagined the device operating unobtrusively in the background: "Maybe also during lunch break. I sit here, read a book, and have this quiet background hum." (Interview, Ella). Others imagined it to be continuous so that stressful moments might not even arise: "Actually, I hope it would help me continuously. That it would basically work preventively so that stress is avoided in the first place." (Interview, Riley).

Typically, well-being apps establish procedural routines to encourage healthy habits, but these are mostly linked to physical health. When the context expands to mental well-being, such as tracking stress, the occurrence of stress events becomes critically important for users, as reflected in both the study results and the emerging design implications. Interestingly, these implications also unveil the complexity of designing well-being interventions for workplace contexts: a sort of tension in users' expectations of these applications. Users want these technologies to be ambient and ubiquitous, stretching the reach and scope of the application, while simultaneously being situational and available exactly when needed to address a specific problem (in real time when stress event is occurring).

5.1.2 Tension II: personal versus social

Another tension that emerged from the provocative line of questioning was the heightened and continually increasing need to personalize and customize the intervention while maintaining its social and collaborative function. The rationale for personalization is clear and multifaceted. Health-related concerns such as headaches, allergies, and sensitivity to scent intensity were frequently cited: "I often have headaches. I don't know whether some scent might then bother me.", and "As I said, we talked about allergies. That's just an issue. Well, you have to see …That it doesn't spray directly into my face." (Interview, Ella). These accounts reveal non-negotiable constraints on scent deployment, highlighting the necessity for options to opt out, adjust intensity, direction and exposure.

Individual olfactory preferences and the strong mnemonic associations of scent further complicate this design space, emphasizing the need for control and agency to keep the intervention in the background or bring it to the foreground as desired. Participants generally favored light, fresh, and natural (homely) fragrances and explicitly contrasted these with heavy perfumes, which were considered intrusive in office contexts: "If it's too extreme . that's like putting on perfume. To a certain degree it's still pleasant. And then, if it's too much, it becomes intrusive. (.) I think it needs to stay subtle in the background." (Interview, Tom). Memory associations and the meanings they derive were also mentioned: "I'm especially someone who always connects scents with moments or experiences …and they're always tied to something positive or negative." (Interview, Riley). Consequently, a scent that is pleasant or calming for one individual may evoke discomfort or negative associations for another, emphasizing more and multifaceted need for personalization and control.

Habituation constitutes another salient factor influencing personalization. Several participants reported quickly becoming "nose-blind" to a scent, which simultaneously reduces intrusiveness but can also undermine the purpose of its employment as stress mitigating intervention: "I have a relatively quick habituation factor. Then I don't smell it anymore …I'd have to keep changing the scents." (Interview, Alex). This suggest that with the functionality to personalize and control, the intervention must stay novel, in the aromatherapy context to avoid sensory overload and habituation.

The need for personalization and control in the use of a well-being intervention exists in tension with its collective nature. On one hand, offices are shared spaces where multiple individuals occupy and interact within the same environment, and on the other hand, coping with stress is not just individual but inherently collaborative, as discussed in the results Section 4.3. Adjacently, aromatherapy needs to be personalized, but because of its ambient and atmospheric nature, it remains a collective intervention even when deployed for each individual. Within this context, social acceptability and obtaining consent emerged as equally important constraints that must be considered in the design and deployment of any workplace well-being intervention. Participants expressed concern not only for their own responses but also for the impact on colleagues sharing the same environment: "Even if the smell didn't bother me, I'd always think about others . how does it affect my colleagues?" (Interview, Ella). Participants also highlighted another side of the social: what it means to use such an intervention, which has a collective dimension even when applied individually, and the mockery and stigma it can provoke. The potential for judgment or unwanted commentary when using the device to modulate mood or reduce stress: "If I didn't smell it. I think that's better. Just to avoid the stupid comments from colleagues." (Interview, Tom). These accounts demonstrate that collective deployment in shared spaces inherently carries social risks, which must be addressed through design.

Taken together, the findings underscore a critical design imperative for aromatherapy and, more broadly, workplace well-being interventions that user agency and control are essential. Interventions must allow for configurability (tailorability), enabling individuals to select or exclude scents, adjust intensity, and activate or deactivate the system at will. But it is not only the users' autonomy but at the same time, they must consider social dynamics to avoid undermining colleagues' comfort or autonomy. Notably, this tension also highlights a challenge for interventions intended to leverage collaboration as a coping mechanism: for example, a colleague attempting to support someone in distress by diffusing a scent may inadvertently violate the recipient's agency or preferences, creating new sources of tension.

5.1.3 Tension III: tracking versus privacy

As most participants either use or are familiar with some form of mobile or wearable interventions for physical well-being, their experiences with these technologies also shape their expectations and perceived affordances for a mental well-being intervention. The distinction in this study, however, lies in the provocative nature of aromatherapy and its deployment within the workplace context, which sparked discussions about the scope of functionalities while simultaneously highlighting a tension between tracking and privacy.

Most physical health interventions provide some form of self-tracking, using user provided data or the passive sensing technology, as visualization-outlooks, statistics, or figures-showing how the user has performed and the goals they have achieved. These visualizations inspired participants, who expressed interest in integrating stress visualization as an important function. Many participants suggested that observing stress patterns (daily, weekly, monthly) would be valuable for self-reflection and early mitigation: "That would almost be the most important thing for me, to check it …I'd want to know how it plays out over the week or month …maybe I should get it checked (with a doctor)" (Interview, Riley). This indicates that self-tracking stress can reveal latent stress, enabling mitigation through behavioral adjustments or medical interventions.

Yet, there is a critical caveat: these visualization can be double-edged. Some participants expressed concern that persistent feedback might exacerbate worry rather than reduce it: "At some point it (tracking data and stats) would probably occupy you more than help …One can be directed to think more, 'Why am I always so stressed? What's wrong with me?"' (Interview, Alex). This underscores a fundamental design tension within self-tracking interventions: design must provide informative visualization/feedback without inadvertently pathologizing (normal) stress fluctuations. Visualization should therefore be contextualized to support reflection while avoiding inducing anxiety.

Contrasting the use of self-tracking for personal insight, the workplace context introduces additional concerns around being monitored by others. While tracking one's own stress patterns has potential benefits, the same visualization in the hands of an employer could be used as a tool for surveillance, revealing employees' habits, work patterns, and productivity. Participants explicitly rejected any possibility of such data flow: "It must not store data, and certainly not make it available to the employer. My health, my stress level …none of that is any of their business!" (Interview, Alex). This establishes a clear boundary condition for workplace well-being interventions: systems must be designed to preserve workers' autonomy and privacy, while preventing any form of managerial surveillance.

In practice, this suggests that self-tracking features should empower employees while simultaneously obstructing employer access by design. Drawing inspiration from existing health and well-being applications, these features must be carefully contextualized for the workplace, balancing the benefits of self-tracking with privacy protections. These implications demand workplace well-being interventions must integrate mechanisms that allow employees to monitor and reflect on their own stress without risking oversight or judgment from others, which is a conflict for designing interventions. While the data from tracking remains available for self-tracking, it must stay hidden to protect privacy and to prevent the extraction of managerial, work-related insights or patterns. This layer of use conflicts with the notion of well-being as a collective artifact or as something mandated by the company, where it is often expected to strengthen team building, relationships among employees, and collaborative work within the organization.

5.2 Provocation: prototyping via story boarding for use cases

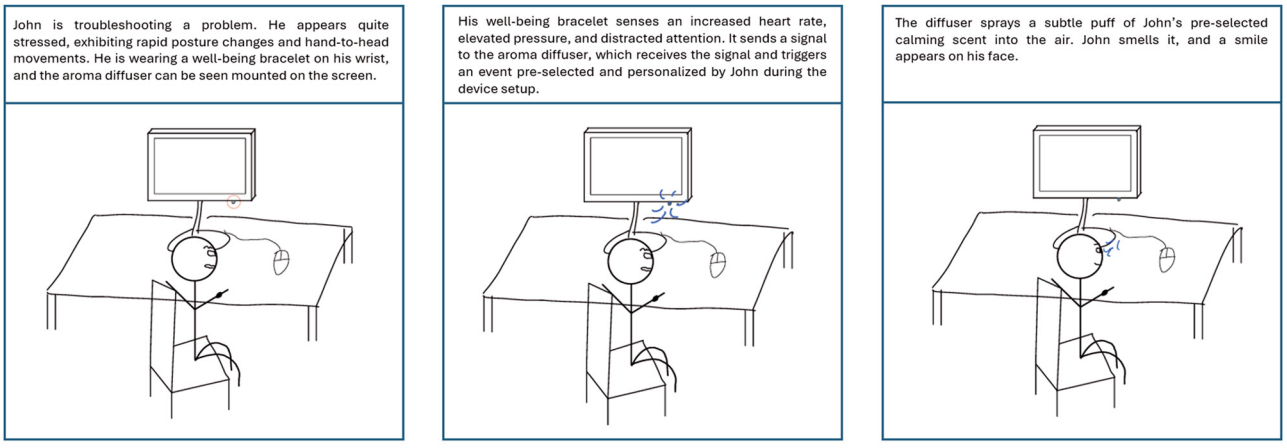
Taken together, aromatherapy serves here as a productive provocation as it excavates the tensions and implications for design that a workplace well-being technology must address. In order to further excavate the implications, we used story boarding as a prototyping technique to conceptualize the passive sensing aromatherapy intervention in the workplace context. The device's ambivalent reception entails a design space characterized by five interlocking imperatives:

- Personalization and Choice: users must be able to select, exclude, and tune scents to accommodate health, memory associations, and preferences.
- Collective Consent and Configurability: shared environments require mechanisms for negotiation (zoning, scheduling, opt-out protocols) to avoid social friction.
- Transparent Boundaries and Privacy: sensing and visualization features must be local, private, and decoupled from managerial access.
- Seamless Integration and Control: interventions must be low-friction (physical controls, lightweight apps) and compatible with existing workflows to avoid becoming a new stressor.
- Responsible collaboration: Using collaborative coping, but with a responsible attitude toward social norms in the workplace.

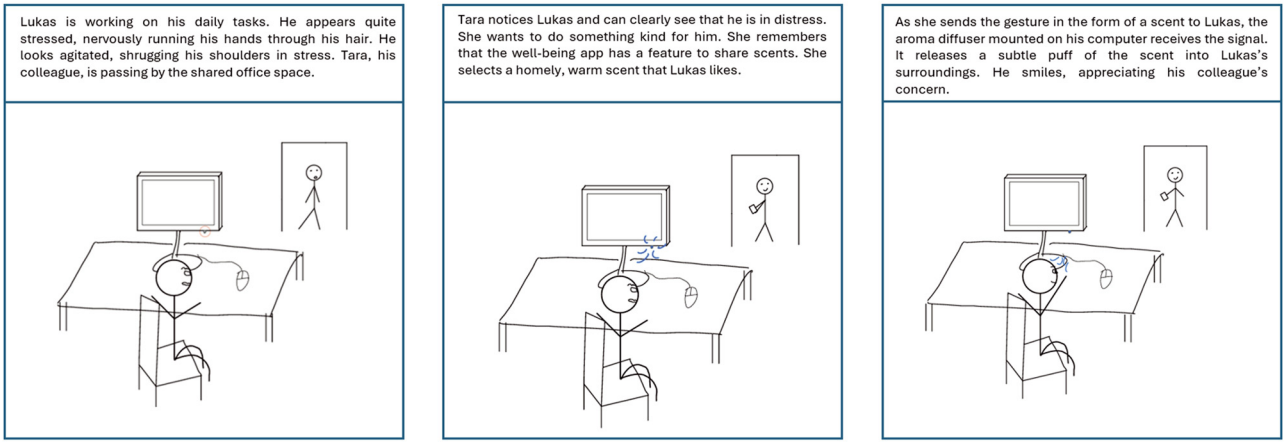
These imperatives are far from complete, as they do not specify features that would instantiate or help navigate these tensions. For further exploration, we brainstormed them into three provocative storyboards designed to embody the extracted design imperatives at this stage of the case study. All storyboards were first sketched on a tablet in three co-design sessions including the two researchers, the ones who were also involved in the fieldwork. Personas were also created based on the contextual analysis and findings, using work, age, gender, and ethnic diversity as guidelines. These personas will be explained within the storyboards themselves. The Table 2 shows the rough sketches of the three story boards.

Later these sketches were enhanced collaboratively with an AI-based storyboard online solution. Our co-design exercise with AI was conducted in a controlled manner using the hand-sketched storyboard frames as the seed data (Table 2) and was a highly reflexive experience, as it allowed us to contextualize the storyboards and personas with our findings while prompting the AI to generate the individual frames. This enhancement took several iterations with the AI solution and prompt engineering for features such as scene focus, protagonist or characters, background setting, action, scene angle, emotional cues, props or objects, and frame style. It involved approximately a four-hour iterative prompting and design session with AI, with at least 6–7

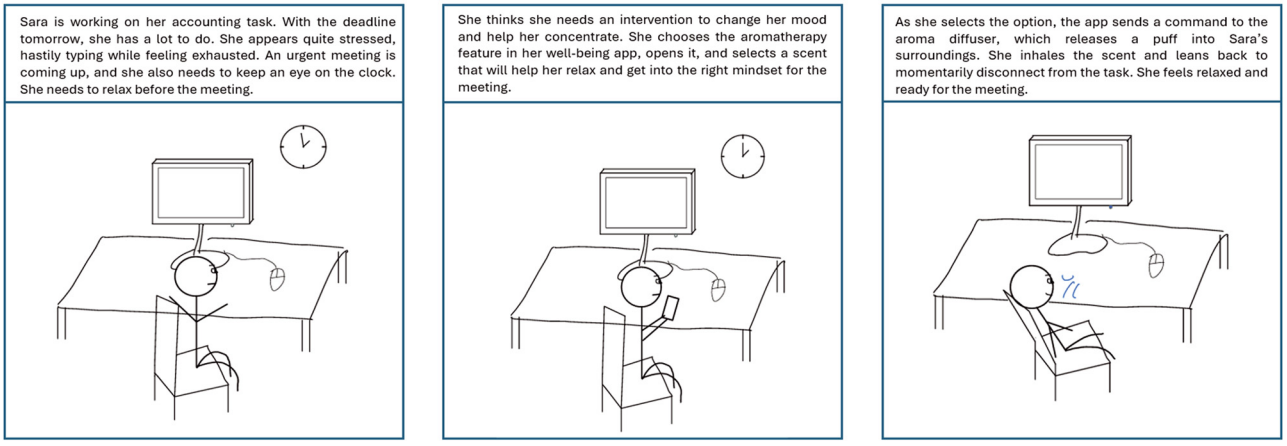
Table 2: The rough sketches of the three story boards from top to bottom, namely the passive-sensing case, the collaborative coping case and the self-care case.



The passive-sensing case, where the bracelet senses stress and sends a signal to the diffuser, which then automatically releases one of the user's preferred scent choices.



The collaborative-coping case, in which a colleague senses stress in others and takes action by sharing a scent as a gesture of kindness and care.



The self-care case in which the user registers their stress and chooses to take action in the app to relax through aromatherapy

prompt adjustments per frame to perfect each one in accordance with the vision of both researchers.

We always started the basic prompt with more functional parameters, such as scene focus, scene angle, and frame style on the seed image, and then iteratively extended the contextual parameters, such as protagonist, background setting, action performed, emotional cues, etc. For example, in Table 2, first frame, the sketch shows John sitting on a chair in front of a computer and raising his hands. A small dot representing an aroma diffuser can be seen mounted on the screen. When using this image as the seed with AI, the prompting began with focusing on the person, who that person is (John) and that he is sitting at a desk with a computer. Next, the camera perspective was defined, i.e., focusing from the side, along with the desired frame style, i.e., pencil sketch.

The context was then iteratively added to refine the image: How is John described in the persona? John is a middle-aged European male. What needs to be shown in his background in the image? A busy office, but blurred since the focus is on John. As this is the passive sensing case, he is wearing a bracelet, so the prop was added in the form of a stress sensing bracelet, he is seen wearing. The smell delivery is through a diffuser mounted on the screen, so another prop was included on the computer. The action he is performing is rubbing his hands on his head and tapping on the desk with the other hand. showing the signs of stress (also mentioned in the results section). Emotions were also added iteratively, i.e., he also looks stressed, as shown by the frown on his forehead and his eyes fixed in concentration on the task on the screen.

Likewise, each frame of each storyboard was enhanced through iterative, collaborative prompting. Table 3 shows the enhanced storyboards along with the description of the scenarios. As this co-design exercise became a tool for reflexivity – further brainstorming and contextualizing the storyboards with our findings – it also brought some critical reflections and insights on the process, which are discussed in the discussion section.

The three cases, presented as storyboards, represent different scenarios using aromatherapy as a well-being intervention. All of these use cases incorporate multiple implications extracted from our findings.

The **passing-sensing case** illustrates the use of sensor-based technologies – specifically, a wrist bracelet in our sketch, and the automatic event-triggering that occurs when the sensor detects a signal and sends to the aroma diffuser. This case highlights the need for situational support through well-being interventions during moments of stress while bringing tensions around control, agency, and surveillance to the foreground.

It raises several questions: What happens if the person wearing the bracelet is away from their desk but still experiences stress? What if the bracelet acts as a digital tag and could be used secretly to track employees? What insights might the sensor data and triggered events reveal about stress patterns for self-tracking? And how much agency remains with employees if the sensor automatically senses and benchmarks stress against a general human profile?

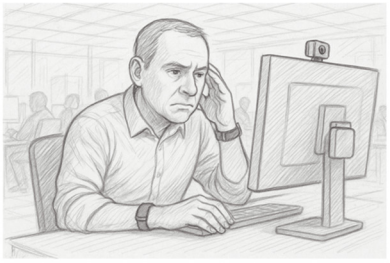
The **collaborative-coping case** illustrates the use of collaborative care as a strategy for coping with stress. It occurs when a colleague observes signs of stress in another and decides to take action by sending a kind gesture to show care. They can select an aroma and send a command to the other person's aroma device. This case highlights the tension between well-being interventions as individual versus collective artifacts and brings to the fore issues around personalization and privacy in the workplace, especially in collaborative work situations.

It also raises several questions: Collaborative-coping, as shown in the results, often requires asking someone for help. Does this form of collaborative care (as shown in the use case) count as genuine support, or could it be perceived as an invasion of privacy? How well must colleagues know each other to feel comfortable sending such gestures, and what social stigmas might be associated with them in the workplace? What design features could ensure that users can choose, opt in or out, and maintain appropriate boundaries amid such interventions and organizational culture?

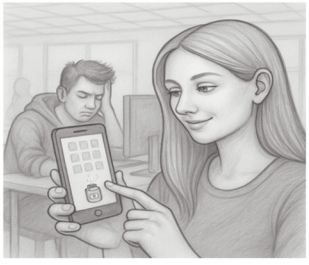
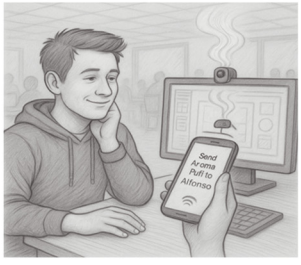
Finally, the **self-care case** illustrates an employee who, being self-aware of stress indicators, chooses to activate the aroma or a special scent mode in the aroma device. They can select when, how much, and which scent to use in different stress situations. This case emphasizes personalization, autonomy, and agency, while highlighting tensions related to collective versus individual artifacts, surveillance, and privacy.

It also raises several questions: How does organizational culture support self-care and help navigate the social stigmas associated with it? Can self-care or sending a gesture for oneself become a tool for surveillance, inadvertently signaling to others that someone is stressed? How can design ensure self-care while preserving privacy? Could a self-care action by one person become problematic for others in shared office settings? These questions provide the foundation for our subsequent appropriation study and the next design iteration.

Table 3: The enhanced sketches of the three story boards with AI from top to bottom, namely the passive-sensing case, the collaborative coping case and the self-care case.

John (a middle-aged European male, IT specialist) is troubleshooting an ERP problem. He appears quite stressed, exhibiting rapid posture changes and hand-to-head movements. His posture is slouched, and he sighs after attempting solutions on the computer. He is wearing a well-being bracelet on his wrist, and the aroma diffuser can be seen mounted on the screen.	His well-being bracelet senses an increased heart rate, elevated pressure, and distracted attention. It sends a signal to the aroma diffuser, which receives the signal and triggers an event pre-selected and personalized by John during the device setup.	The diffuser sprays a subtle puff of John's pre-selected calming scent into the air. John smells it, and a smile appears on his face. He feels relaxed as it takes his mind off the error. He is ready to start again with a fresh outlook.
		

The passive-sensing case, where the bracelet senses stress and sends a signal to the diffuser, which then automatically releases one of the user's preferred scent choices.

Lukas (a young European male, Graphic Designer) is working on a marketing campaign. He is experiencing a creative block and appears quite stressed, nervously running his hands through his hair. His posture is tense, and he is tapping his fingers on the table. He looks deep in thought, trying to find the right design elements. He stares at the design grid on his screen and then at the table.	His colleague, Tara (a young European female, HR) notices Lukas and can clearly see that he is in distress. She feels concerned and wants to do something kind for him. She remembers that the well-being app has a feature to share scents as happiness triggers with others. She selects a homely, warm scent that Lukas likes, feeling confident that it will help him feel relieved.	As she sends the gesture in the form of a scent to Lukas, the aroma diffuser mounted on his computer receives the signal. It releases a subtle puff of the scent into Lukas's surroundings. He also receives a notification on his screen indicating that he received the gesture from Tara. He smiles, appreciating his colleague's concern, and feels ready to give the design task another try.
		

The collaborative-coping case, in which a colleague senses stress in others and takes action by sharing a scent as a gesture of kindness and care.

Sara (a young African female, Accountant) is working on product pricing sheets. With the deadline tomorrow, she has a lot to do. She appears quite stressed, rubbing her head as if she has a headache. Leaning over the keyboard, she types while feeling exhausted. An urgent meeting is coming up, and she needs to relax in order to concentrate, get into the right headspace, complete her task, and be ready to present.	She thinks she needs an intervention to change her mood and help her concentrate. She chooses the aromatherapy feature in her well-being app, opens it, and scrolls through the list of available scents in her aroma diffuser. She selects "Cool Breeze," which reminds her of the early-morning freshness of opening windows on a breezy day.	As she selects the option, the app sends a command to the aroma diffuser, which meticulously creates the scent and releases a puff into Sara's surroundings. She inhales the freshness and closes her eyes to momentarily disconnect from the task. She feels her body relaxing and is glad she chose to take action to calm her mind. She now feels confident that she can finish the task.
		

The self-care case in which the user registers their stress and chooses to take action in the app to relax through aromatherapy

5.3 Plan for the appropriation study and the next design iteration

The design study has not only explored the design space, identifying implications and tensions that resulted in the creation of storyboards, but has also raised many questions in the process, as noted above. Our plan is to use the storyboards to evaluate the use cases and abstracted technological features with the company. We will conduct walkthroughs and focus group discussions for this evaluation.

From these evaluations, we expect to gain nuanced insights into how employees perceive aromatherapy as a workplace well-being intervention in practice, how they interpret the technological features presented in the storyboards when considered against the backdrop of actual work, and which aspects of the storyboards resonate with or conflict with their everyday work practices. A major point of evaluation will be to identify whether the tensions elicited in the context study dissipate or aggravate with the introduction of aromatherapy as a workplace well-being intervention. How do workers envision balancing the personal, social, and collaborative dynamics of stress management in the workplace?

As an appropriation study is anchored in the self-reflexive cycle of technology aiding and changing practices, creating new uses, and examining how the evolving practices, in turn, impact the technology and work infrastructures. We also expect to reflect on the resonating infrastructural layers within the organization that may compete with, reject, or alter emergent workplace well-being practices, and the kinds of points-of-infrastructuring that occur before these practices disappear into the socio-organizational infrastructures.[73–75] Analyzing these insights, and further provoking a richer understanding of the mental well-being context in the workplace, will guide us in designing high-fidelity prototypes.

These prototypes will then be tested within the company, accompanied by ethnographic fieldwork, to observe how such interventions are reflexively appropriated in real work settings. In particular, we aim to understand how employees integrate, reinterpret, or even repurpose these technologies in ways that extend beyond their initial design intentions. This approach allows us to explore the dynamics of appropriation, including emergent practices, tensions, and adaptations, and to iteratively refine the prototypes to better align with both individual needs and organizational/work contexts.

6 Discussion and conclusion

6.1 The need for configurable socio-technical infrastructures for workplace well-being

Our design case study of aromatherapy as a workplace well-being intervention highlights how stress and well-being technologies must be understood through the frictions they generate rather than the solutions they claim to provide. Prior research has shown that prescriptive solutions dominate the design of workplace well-being technologies: systems sense, classify, and prescribe actions such as “stand up” or “take a break”.[5,6] These approaches often succeed in personal health domains but falter in workplaces, specially for mental well-being, where stress emerges from organizational and collaborative structures as much as from individual states.[9,10] Our findings reinforce this critique and suggest that workplace interventions must grapple with three interrelated tensions – ubiquitous versus situational, personal versus social, and tracking versus privacy – that complicate the deployment of any one-size-fits-all solution.

The first tension lies in the demand for both continuous and event-triggered support. Prior studies of micro-interventions highlight the limit of generic routines and the importance of contextual timing.[1] Our participants echoed this concern but extended it by simultaneously imagining aromatherapy (being atmospheric and ambient in nature) as a background ambience that could help prevent stress from escalating and as a situational tool that could be activated during acute episodes, such as difficult phone calls or peak workloads. This duality undermines rigid prescriptive designs and calls for hybrid systems that flexibly shift between ambient and situational modes. Aromatherapy, precisely because of its ambiguous status between atmosphere and intervention, made this demand especially salient.

A second tension emerges between the individual and the collective. Prior research has long emphasized the social nature of stress and the risks of stigmatization when stress data becomes visible.[10,76,77] Our findings nuance this picture by showing that even ambient interventions like scent, appearing to be deployed for individuals, are inherently social when diffused across shared office environments. Workers expressed strong desires for personalization (control over intensity, fragrance, and timing) yet also worried

about the impact on colleagues, the potential for stigma, and the awkwardness of making stress mitigation visible. This dual need for agency and social acceptability complicates the individualizing design imperatives of most well-being systems. Unlike self-tracking dashboards that can be kept private, ambient modalities demand negotiation in shared space, highlighting that stress interventions cannot be designed solely for the individual user but must account for social dynamics and cultural norms of the workplace.

The third tension revolves around tracking and privacy. Passive sensing technologies promise adaptive personalization, but as others have argued, they risk becoming tools for surveillance and control.[9,49] Our participants were interested in tracking their own stress patterns as a reflective practice, particularly to recognize latent stress that might otherwise go unnoticed. Yet they drew clear boundaries around ownership and visibility, rejecting any possibility of employer access. This finding complicates recent calls for stress dashboards that integrate physical and psychosocial metrics,[22,46] since such tools risk collapsing the distinction between self-reflection and organizational oversight. Aromatherapy as a non-tracking modality sharpened this paradox, provoking participants to articulate what they would and would not allow in terms of sensing, visualization, and data sharing.

Taken together, these tensions suggest that the future of workplace well-being design lies not in eliminating stress or prescribing singular solutions, but in creating configurable sociotechnical infrastructures that allow interventions to shift between ambient and situational roles, balance individual agency with collective negotiation, and provide reflective insight without enabling surveillance. Aromatherapy is not a universal answer, but its very unfamiliarity as a workplace intervention helped participants surface assumptions and concerns that are equally applicable to more mainstream technologies. In this sense, it functioned less as a solution than as a generative provocation that opened up the sociotechnical design space of workplace well-being.

Future research should build on these tensions but longitudinal appropriation studies are particularly needed to understand how such interventions unfold over time, how they interact with workplace cultures, and how they are shaped by organizational power relations. More broadly, we call for HCI and CSCW researchers to treat stress not simply as an internal state to be measured and reduced, but as an ambivalent and socially situated phenomenon that demands infrastructural, cultural, and organizational responses as much as technological ones.

6.2 Co-designing with AI

Co-designing with AI is still an unorthodox way, but it is not a novelty, especially in HCI through initiatives like technology-assisted participatory and reflexive methods. Some examples of such usages include co-designing speculative futures with urban designers,[78] rapid and iterative prototyping in software teams,[79] and sketching and interactive design ideation with professional designers.[80] These technology-assisted participatory methods offer reflexivity into the design process while harnessing the generative capabilities of current forms of AI through collaborative prompt engineering.

Obviously, there is a lot of bad air and negative sentiment around the use of AI, because values such as copyright, authorship, misinformation, biases, and societal inequalities are at risk of being exploited.[81] Among initiatives like responsible and ethical AI, there are also voices that also debunk this fearmongering, bringing the focus to the fact that AI, with all the fascination around it, is still a technology, has been around for some time, and will continue to be, even if we close our eyes to that.[82] AI, when used in a controlled manner is rule-based and task-driven, and can be very helpful, which in generative AI basically connotes what seed data is given to AI, how the context is created and controlled, and how the prompts are engineered. Co-designing through collaborative AI-prompting can provoke the designer to think and reflect on the context of design and implications as they try to answer the detailing in prompts. This aligns with Schön's reflection in action,[83] where designers critically reassess and reshape ideas during the act of designing through a continuous conversation with the situation. By critically reflecting on the "why" and "how" questions for prompting and configuring AI outputs, AI as a technology externalizes that reflective loop, effectively acting as a facilitator.[84]

In our design process, the storyboards were sketched first and then enhanced in a controlled collaborative co-design activity with AI. During this exercise, we realized that, initially, we sketched the storyboards with scenarios, focusing primarily on the use cases and the technologies. We included personas, but they were very superficial – more like placeholders for identities. As we began enhancing the storyboards frame by frame, the prompting exercise and scene creation compelled us to think more deeply about the features that would describe each scene. It was not just about selecting the angle and focus of the scene; we also analyzed the personas in detail, what they were doing, why they were stressed, what actions were being performed, what interactions were happening with technologies or colleagues, and how they might react. This exercise helped us

significantly, not only in creating the enhanced visuals in Table 3, but also in developing a richer understanding of the contextual design space. It also revealed that storyboards can be more context-rich and provide deeper detail about the design space and context of use. In this paper, we have been transparent about the use of AI, how it was done in a controlled manner, and how it assisted the design activity and reflexivity, highlighting the implications for design and demonstrating good practice and ethical use of AI. In effect, aromatherapy as a provocation kept generating insights into well-being applications, serving as a key takeaway and connecting to the implications and mentions extracted in the sections above.

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Research ethics: The ethical policy of the institute was applied and complied with in the study.

Informed consent: It was formally taken from the study participants and the management of the organization.

Author contributions: All authors have accepted responsibility for the entire content of this manuscript and approved its submission.

Use of Large Language Models, AI and Machine Learning Tools: AI was used to enhance the sketched story boards and is explicitly mentioned and detailed in Section 5.2 and also discussed critically in Section 6.2.

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