

DESIGNING A EUSTRESS TOOLBOX: FROM ENTREPRENEUR EXPERIENCES TO AN ONLINE SERVICE

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Abstract: *Stress is typically seen as a negative phenomenon. However, the positive side of stress (i.e., eustress) has the potential to improve well-being, productivity, and innovativeness, thus increasing individuals' daily resources at work. Focusing on eustress could enhance work engagement by turning some of the negatively perceived stressors into positive challenges. We explored this possibility by interviewing 21 Finnish entrepreneurs from various fields regarding their experiences of eustress. Nine of the interviewed entrepreneurs also recorded a eustress diary. Based on thematic analysis of the interview data, six main themes supporting eustress were identified: (a) Self-reflection toward changing the mindset, (b) Organizing work, (c) Stimulating positive pressure, (d) Harnessing a feeling of joy, (e) Mental preparation, and (f) Recovery. A Web-based service, the Eustress Toolbox, was designed to support practicing eustress skills related to the six main themes within the daily lives of the entrepreneurs.*

Keywords: *eustress, positive stress, work engagement, digital services, human-centered design, entrepreneur interviews, qualitative research.*



INTRODUCTION

Stress has been defined as a psychological and physiological state resulting from an imbalance between demands and resources (Lazarus & Folkman, 1984). This term typically refers to negative stress (*distress*), which occurs when an individual perceives that the demands of an external situation (i.e., stressors causing stress) are beyond his or her perceived ability to cope with them (Lazarus, 1966). However, the responses to stressors can also be positive because a stressor can be perceived either as a negative threat or as a positive challenge (Le Fevre, Kolt, & Matheny, 2006).

Positive stress, also known as *eustress*, has gained rather minor attention in the fields of and research in psychology, health technology, and human–computer interaction (HCI). Even though the positive side of stress is not a new concept (Lazarus, 1966; Selye, 1974), relatively few studies focus on eustress (see, e.g., Le Fevre et al., 2006; Simmons & Nelson, 2007) compared to the overall number of stress studies. In this paper, eustress means a positive response to stressors (Le Fevre et al., 2006; Simmons & Nelson, 2007). Although negative stress is a significant issue and causes serious health problems (Chandola, Brunner, & Marmot, 2006; Kivimäki et al., 2006), approaching stress only from this perspective may ignore a remarkable resource for well-being, innovativeness, and productivity.

In this paper, we concentrate on entrepreneurs' experiences of eustress. The term entrepreneur refers to small business owners or self-employed workers. Managing distress and savoring eustress is especially important for entrepreneurs. Entrepreneurship comes with stressful conditions, such as heavy workloads and a high need for achievement (Harris, Saltstone, & Fraboni, 1999; Langan-Fox & Roth, 1995), along with a personal commitment to the company and the risk of failure (Greenhaus & Callanan 1994). A lower degree of structure, predictability, and support are characteristic as well of the entrepreneur's work (Greenhaus & Callanan, 1994).

Despite the stressors of entrepreneurial work, not all entrepreneurs are reporting higher levels of negative stress compared to organizationally employed people (Baron, Franklin, & Hmieleski, 2016; Rahim, 1996). Cardon and Patel (2015) elaborated that the attitude toward stress, and thus the self-evaluation of it, might differ because the effect of stress on one's income can be positive, even while stress can impact negatively one's physical health. Baron et al. (2016) stated that psychological capital, coping, and effective stress management are critical factors influencing the stress experience and, potentially, the survival of companies. In addition to approaching stress from the perspective of managing distress, we believe that learning to savor eustress can support these factors and thus, positively affect one's overall well-being.

Entrepreneurs often have the freedom to arrange their working schedules and ways of working. This freedom creates the possibility and need for balancing one's time (both at work and in personal life) to achieve the intended results efficiently and to ensure time for recovery from work. We chose to concentrate on entrepreneurs' experiences of eustress at work because the line between work and free time is not always clear in the daily lives of entrepreneurs.

The objective of this research was to increase knowledge of the positive side of stress and the entrepreneurs' ways of fostering it and, based on the qualitative data, present a Web-based service prototype to stimulate eustress in the daily work of entrepreneurs. Overall, we aimed at contributing to the design for well-being and the positive approach to design, which

are growing research interests in the field of HCI (Calvo & Peters, 2014; Desmet & Hassenzahl, 2012; Desmet, Pohlmeier & Forlizzi, 2013).

The research questions that guided the various aspects of our study are

1. What ways of thinking and working help entrepreneurs to identify and feel eustress (i.e., positive stress)?
2. How could a Web-based service be designed to support entrepreneurs in developing eustress skills in their daily lives?

Based on the findings related to Research Questions 1 and 2, we present the resulting Eustress Toolbox, with the aim of providing practical information on eustress and the means to achieve it. Focusing on the positive side of stress builds understanding of one's well-being at work and may empower people to view stress from the beneficial perspective. We expect the results to be useful for practitioners and other members of the HCI community who are interested in the new approaches and studies related to digital services fostering holistic well-being in general and supporting the opportunity to experience eustress in particular.

The paper first presents related research on eustress and digital services designed to enhance well-being. We then elaborate on how eustress relates to other positive work-related concepts, and work engagement in particular. Second, our design process, methods, and participants are described. The results describe briefly the central findings related to entrepreneurs' experiences of fostering eustress (see more on experiences related to technology in Heikkilä, Ainasoja, & Oksman, 2015) and focus more on introducing the Eustress Toolbox. We conclude this paper with discussion of the findings and suggestions for future research.

RELATED RESEARCH

In this section, we present related work on eustress and digital services developed for supporting well-being. Relevant design frameworks also are introduced. The related work on eustress provides background understanding of the concept and its relationship to more familiar positive work-related concepts, and work engagement in particular. The sections related to digital services supporting well-being and design frameworks connect the related research more tightly to HCI and relevant design principles and recommendations.

Eustress: Stress as a Resource

The positive side of stress was recognized already a few decades ago (Lazarus, 1966; Selye, 1974). The term eustress was introduced by Hans Selye (1974), who distinguished two sides of stress: the harmful side (distress), caused by negative stressors, and the beneficial side (eustress) that include positive emotions. He suggested that one can learn to react to stressors with positive emotions, such as gratitude, hope, or good will, which is likely to maximize eustress and minimize distress. Even before Selye, Richard Lazarus (1966) proposed that the cognitive response to stressors can also be positive, leading to positive emotions, such as a feeling of fulfillment.

Despite these early notions, the theories of stress have approached stress primarily as a negative phenomenon or have focused on the negative impacts of stress when studying the

application of these theories. The various theories of work stress have emphasized, for example, the relationship between job demands and job control (the demand–control model; Karasek & Theorell, 1990), the imbalance between perceived efforts and rewards at work (the effort–reward imbalance model; Siegrist, 1996), or the processes of appraisal and coping (the cognitive stress theory; Lazarus & Folkman, 1984). The latter belongs to the transactional theories of stress that acknowledge the role of cognitive and emotional processes in stress experiences. More specifically, Lazarus and Folkman (1984) emphasized that the individual’s resources and ability to cope define the stress experience.

The current definitions of eustress are based mainly on the transactional stress theories, which emphasize the individual interpretation of stressors. In other words, individual responses to stressors can be positive or negative: A stressor can be perceived as a negative threat or a positive challenge (Le Fevre et al., 2006). Consequently, eustress is defined as a positive response to stressors and distress as a negative response to stressors (Le Fevre et al., 2006; Simmons & Nelson 2007). Thus, the stress response is determined by the perception of demand related to the stressors, but also by the perception of other contextual characteristics, such as the source, timing, and desirability of a stressor and one’s perception of having control over it (Le Fevre et al., 2006). According to Simmons and Nelson (2007), eustress and distress are not the two ends of the same continuum, but rather distinct qualitative constructs. This means that a stressor may not only be interpreted either as positive or negative, but it may have both outcomes. Positive and negative responses to a stressor are complex and mixed, and they manifest themselves in different physiological, psychological, and behavioral indicators. However, the eustress experience is characterized with positive emotions, attitudes, and behaviors, such as a feeling of joy, contentment, or excitement, as well as perceiving the situation as meaningful, manageable, or engaging, to mention some of the indicators listed by Simmons and Nelson (2007).

In addition to minimizing distress, savoring eustress has been suggested as having the potential for increasing the well-being of an individual (Hargrove, Nelson, & Cooper, 2013; Simmons & Nelson, 2007). Hargrove et al. (2013) proposed three means for leaders to encourage eustress in their employees: offering meaningful work, encouraging mindfulness at the workplace, and supporting employees in understanding and embracing their capacity to meet challenging stressors. Moreover, they viewed the match between a person’s skills and the demands of the task as critical. Because the means for approaching stressors are based on self-leadership, they can be assumed to suit entrepreneurs too.

Although experiencing eustress may enhance well-being, an excess of eustress can lead to exhaustion (Hargrove et al., 2013). Therefore, the need to recover from eustress is equally important. Recovery and detachment from work stressors of both kinds can be supported, for example, by developing mindfulness, acceptance, and self-regulation skills (Sonnentag & Fritz, 2015).

Although the terms eustress and positive stress are not often used as such in research, in recent approaches to stress the positive impacts that job conditions may have on well-being are recognized. For example, the job demands–resources model (Schaufeli & Bakker, 2004) stated that job demands can boost work engagement when sufficient resources are available. Experiencing demands such as high time pressure and/or a high workload has been viewed as having the potential to lead to the development of self-efficacy and resilience when adequate resources and recovery between exposures are available (Ilies, Aw, & Pluut, 2015).

Eustress is closely connected to more familiar positive work-related concepts, such as flow experience and work engagement. Experiencing eustress can culminate in flow (Hargrove et al., 2013), in which the individual is extremely focused on the work task (Csikszentmihalyi, 1990). Work engagement is defined as a positive, relatively stable, affective–motivational state of fulfillment at work (Schaufeli, Salanova, González-Romá, & Bakker, 2002). It refers to a persistent state that is not focused on any particular object, event, or individual (Schaufeli & Bakker, 2004). This distinguishes it from eustress or distress, which are seen as short-term responses to stressors (Fevre et al., 2006; Simmons and Nelson, 2007). However, the relationship of eustress and work engagement is not comprehensively elaborated in the literature. The definitions of eustress and work engagement are intertwined and may support each other in several ways. According to the holistic stress model (Simmons & Nelson, 2007), engagement is seen as one positive response to stressors among other attitude indicators, such as hope, meaningfulness, and manageability. On the other hand, the HRD (human resource development) eustress model (Hargrove, Becker, & Hargrove, 2015) presented engagement as one positive outcome of eustress.

In this paper, we focus on eustress, as it has the potential to empower people to view stress from a beneficial perspective. This, in turn, can potentially build personal resources and affect the more stable state of work engagement.

In the field of positive psychology, a shift toward recognizing the positive has been called for in many areas. Thus, eustress is seen as an interesting topic for research. As positive psychology researchers explore health as the presence of the positive—and not only as the absence of the negative (Seligman & Csikszentmihalyi, 2000)—then stress research is seen benefiting from a holistic view that includes eustress (Nelson & Cooper, 2005). Although the literature sheds light on eustress as a concept, more empirical research is needed to understand the everyday experiences of eustress and ways to achieve it. We believe that approaching stress also as a resource and learning to react to stressors in a positive way may be especially useful for preventing distress-related problems of entrepreneurs, who often have to cope with high time demands and pressure.

Well-being Through Digital Services

Digital services are being used increasingly to support health and well-being, including tackling mental health and stress symptoms. Due to limited resources, traditional public health and clinical interventions cannot provide early prevention and health promotion to all people with early-stage health or mental health concerns. Digital interventions provide a scalable means for distributing health promotion and well-being services to a wide range of people. They enable affordable, anonymous, and self-paced access to well-being services with increased fidelity in intervention delivery (Portnoy, Scott-Sheldon, Johnson, & Carey, 2008). Web-based health programs have been proven effective and many of them are as effective as face-to-face programs for a wide variety of health problems, including depression, anxiety disorders, smoking, and alcohol abuse (Cunningham, Gulliver, Farrer, Bennett, & Carron-Arthur, 2014).

Several Web-based programs have been developed for managing mental health symptoms and stress among employees (Stratton et al., 2017). For example, Hasson, Anderborg, Theorell, and Arnetz (2005) presented a Web-based program consisting of stress monitoring, cognitive

exercises, and a chat option for clients' stress management. They found that during the 6-month program, employees' ratings of their stress management ability, sleep quality, mental energy, concentration ability, and social support improved. In a study by van Straten, Cuijpers, and Smits (2008), a 4-week Web-based program for depression, anxiety, and work-related stress resulted in reduced symptoms of depression and anxiety, but less pronounced effects on stress.

In addition to Web-based programs, mobile applications can be utilized in delivering health promotion programs. Ahtinen et al. (2013) presented a mobile application for stress management based on acceptance and commitment therapy (ACT). The application used audio and text exercises to teach the users ACT-based skills, including mindfulness and acceptance. In a month-long pilot study with 15 users, increases in satisfaction with life and decreases in experienced stress were found. Ly, Asplund, and Andersson (2014) studied the effectiveness of an ACT-based stress management program delivered via a mobile application. The program consisted of six weekly modules containing short audio lectures, texts, and exercises on stress and the principles of ACT. In a randomized controlled trial with middle managers, the application was found to decrease stress and increase general health.

Additionally, positive psychology approaches are being incorporated into digital interventions aimed at improving psychological well-being. Ouweneel, Le Blanc, and Schaufeli, (2013) developed an online program intended to improve positive emotions, self-efficacy, and work engagement through happiness, goal-setting, and resource-building exercises. In a controlled trial, improvements in positive emotions and self-efficacy were found, but not in work engagement. However, additional analyses revealed improvements in work engagement among those who scored low at the beginning of the study. Luthans, Avey, and Patera (2008) developed a Web-based training program for increasing positive psychological capital, namely hope, self-efficacy, optimism, and resiliency. The program consisted of two 45-minute sessions that included videos, narrated PowerPoint presentations, and self-reflection exercises. A brief study found improvements in psychological capital in the intervention group compared to a control group. Mitchell Stanimirovic, Klein, and Vella-Brodick (2009) developed a 3-week Web-based positive psychology intervention focusing on personal strengths. In their 3-month study, the intervention was compared to a problem-solving intervention and a placebo control; small but significant effects in well-being were found in the strengths intervention. The attrition in the study was high, with 34% of participants completing the strengths intervention but only 15.5% of participants completing the problem-solving intervention. The authors hypothesized that the difference in adherence to the interventions may have been caused by the fact that the strengths intervention focused on positive aspects whereas the problem-solving intervention focused on problems.

Despite active research in the fields of stress management and employee wellness, it seems that achieving large and sustained improvements in stress management and positive work-related skills, such as work engagement, are challenging. However, a large majority of studies so far have approached the issue from a negative perspective, and positive approaches have emerged only in recent years (e.g., Orsila, Luukkaala, Manka, & Nygård, 2011). Notably, to our knowledge, no Web-based interventions focusing specifically on eustress exist.

Finally, we consider digital services promising for supporting entrepreneurs as they are inexpensive to distribute, can be tailored to various needs, do not require appointments or occupational health care, and can be used independent of time and place. Combining Web and mobile technologies ensures that most users can find ways to incorporate the tools into

their daily lives. Digital services may also provide a feel of having a virtual community of peers, which entrepreneurs often lack.

Design Frameworks

The challenges of digital interventions include low uptake and high attrition rates that hinder the effectiveness of the interventions (Eysenbach 2005). To address these concerns, digital intervention designers have developed frameworks and guidelines to steer the development of new services. In particular, the need to identify and address end-user perspectives in intervention design has been acknowledged. Yardley Morrison, Bradbury, and Muller (2015) introduced the person-based approach to intervention development, which emphasizes understanding and incorporates the perspectives of the target users at every step of the design process, that is, adopting a human-centered approach in intervention design. The design process involves in-depth qualitative research with target-group users to develop guiding principles. The guiding principles state the key objectives of the intervention and outline the key features required to achieve each objective. A prototype is initially tested with end users to evaluate the acceptability, attractiveness, persuasiveness, ease of use, and feasibility of the prototype. After improvements, the prototype may be tested by asking users to use the intervention on their own, which enables them to try out behavioral changes.

Yardley et al. (2015) listed guiding principles that are common to many interventions, drawn from the self-determination theory. The principles address three key design objectives: (a) promoting user autonomy by providing user choice, when possible; (b) promoting user competence by providing a clear structure and guidance, examples, stories modeling overcoming barriers, graded goal-setting, minimizing conscious effort, and lifestyle disruption, when possible; and (c) promoting positive emotional experience and a sense of relatedness through several features. The features include using positive language; giving a rationale for advice; acknowledging and addressing concerns; ensuring all communications provide something interesting, enjoyable, relevant, and helpful to the user; providing immediately rewarding feedback; and following best practice to maximize accessibility, usability, and trust.

The persuasive systems design model (PSD; Oinas-Kukkonen & Harjumaa, 2009) is a framework for designing behavioral-change-supporting technologies. The model divides persuasive features into four categories: (a) primary task support, which consists of seven techniques, including reduction of user effort, tunneling the user through a process, self-monitoring, and rehearsal, (b) dialogue support, which consists of seven techniques, including reminders, rewards, and suggestions, (c) system credibility support, which consists of eight techniques, including trustworthiness, surface credibility, and real-world feel, and (d) social support, which consists of seven techniques, including social learning, social facilitation, and recognition. Research suggests that persuasive features can increase adoption and engagement in Web-based interventions (Kelders, Kok, Ossebaard, & Van Gemert-Pijnen, 2012).

Both frameworks have several recommendations in common, that is, providing a clear structure and guidance through the program, minimizing conscious user effort, social modeling and learning from others, providing ways to monitor progress, and giving rewarding feedback. In addition, trust is emphasized in both frameworks, which is an important aspect to consider in health-related digital services. These recommendations were adopted as guiding principles in the design of the Eustress Toolbox.

DESIGN PROCESS AND METHODS

The design process of our study followed a human-centered design approach (International Organization for Standardization [ISO], 2010) and proceeded from a two-phased collection of user data to designing a prototype of the Eustress Toolbox Web service (see Figure 1). The collection and analysis of user data were conducted by four researchers of a multidisciplinary team having expertise in psychology, HCI, adult education, and business. We conducted our study with a qualitative approach to gain deeper understanding of the eustress experiences and ways to foster eustress in everyday work lives of entrepreneurs.

In the first phase of the study (entrepreneur interviews), 21 Finnish entrepreneurs were invited to participate through various channels, for example, entrepreneur e-mail lists. The volunteer participant candidates completed a short questionnaire that collected background information, designed explicitly to assure that the data represented diversity in gender, fields represented, and entrepreneurial experience. The study participants comprised 10 females and 11 males, aged 30 to 52 years. Most had a small company with fewer than 10 employees, and these companies were active in fields from consulting and education to building industry and software design. Three entrepreneurs had a larger company with 50–130 employees. The majority of the participants were relatively new entrepreneurs; 12 of them had worked as an entrepreneur for fewer than 5 years. Seven of the entrepreneurs had worked as an entrepreneur at least 10 years. All participants signed an informed consent for participating in the study.

We then interviewed the entrepreneurs in pairs to explore their personal experiences of eustress and their means for “feeding” and maintaining it in their daily lives. A semistructured interview protocol was selected as the research method to enable the participants’ freedom in describing their experiences while maintaining a systematic process for the questions asked.

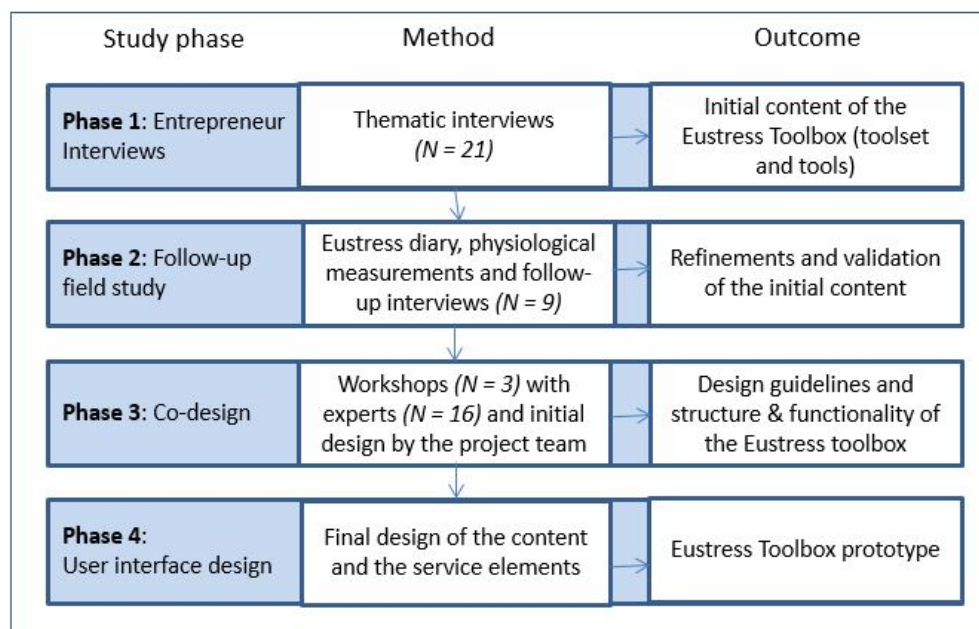


Figure 1. Design procedure describing the study methods and outcomes as Phases 1–4.

The interviews lasted 2 hours and were voice recorded. We conducted them face-to-face at the participant's workplace or other quiet place agreed upon with the participant. All interviews were conducted in Finnish; both the interviewers and the entrepreneurs were competent in the language. The quotes provided in this paper were translated from Finnish to English by a professional translator.

At the start of the interview, each participant was asked to describe his/her current work and daily life as an entrepreneur. The interviewer then briefly explained the term eustress as an experience that occurs when one "enjoys working because of or despite a feeling of pressure." Because eustress has various indicators, enjoyment was selected as a familiar and positive term to encompass positive feelings and attitudes. The interviewee was asked whether he/she has experienced it and whether he/she could recall recent experiences. The participant was asked to elaborate the recent eustress experiences and any feelings or behaviors before, during, and after them, as well as the causes for feeling pressure and enjoyment in the situation. Finally, the interviewer asked how often the entrepreneur experienced eustress, what triggers it, and whether he/she has developed or identified means to achieve it.

The researchers aimed to create rapport with the participants to support them in sharing their experiences freely. However, several means were used to minimize the researchers' impact on the data: The term eustress was explained with a similar description to all participants, the semistructured interview was used as a method instead of a more open approach, and the participants were encouraged to describe concrete examples of their experiences instead of general abstractions.

We analyzed the verbatim transcriptions of the interviews following the steps of thematic analysis defined by Braun and Clarke (2006). Each researcher first read through each interview transcription independently and then the complete body of transcriptions was discussed within the team for clarity of understanding. Then, we systematically coded the parts of the data in which entrepreneurs described the ways of stimulating eustress. The coding was not limited to specific questions; rather, codes were added every time the respondent described a way he/she stimulated eustress, no matter where that took place in the course of the interview. Based on the similarities, we grouped the codes into wider themes. This data-driven analysis led to six main themes that later became the toolsets of the Eustress Toolbox (described in Results section and Table 1). A review and further analysis of these themes produced 24 subthemes that were later employed as the tools in the toolsets and illustrated with entrepreneur quotations chosen from the data. Thus, the basis for the content of the Eustress Toolbox was formed from this first user data collection phase.

The second phase of the user data collection (follow-up field study) was organized with nine participants from the first phase to collect their near-real-time experiences on eustress over the course of a week. We offered the opportunity to participate in this phase of research to all participants, and all who were willing to invest time in participating were accepted. The methods for this phase were designed to support self-reflection of all stress experiences and were recorded daily. We created a subjective diary in a form of a paper booklet. It included a calendar view where the participants assessed the times of experiencing positive or negative stress, their overall feeling in the situation (smileys), and the causes of pressure and enjoyment in the situation. We asked participants to make more detailed notes of the moments in which they felt eustress (that is feeling enjoyment while feeling pressure) and to provide more detailed descriptions on two or three of these situations. In addition to filling in

Table 1. Toolsets, Underlying Needs, and Tools of the Eustress Toolbox Service Drawn from Interviews with Entrepreneurs, Experts, and the Literature.

Toolset	Needs	Tools
Self-reflection and changing the mindset	Need to identify own ways of thinking and working to be able to change them; Need to recognize the signals of stress (positive and negative)	-Self-reflecting on personal thoughts, feelings and actions -Changing the point of view towards the positive -Putting things into perspective -Fostering trust in oneself and the future -Regulating personal resources -Sharing and sparring
Organizing work	Need to manage work in a meaningful and effective way; Need to achieve clarity and avoid tedious routines	-Planning and scheduling -Concretizing tasks and goals -Working together -Breaking routines
Stimulating positive pressure	Need a boost when there is no external demand or pressure	-Creating challenges -Generating time pressure -Seeking out challenging situations
Harnessing a feeling of joy	Need for meaningful and rewarding work to feel happy and motivated	-Seeking out meaningful tasks -Building a positive environment -Enjoying and sharing successes
Mental preparation	Need to face a challenging situation	-Focusing on the essential -Preparing for challenges
Recovery	Need to recover and detach from work	-Taking breaks -Detaching from work -Easing the pace -Releasing pressure -Fostering physical and mental wellbeing -Ensuring sufficient sleep

the diary, the participants conducted a 3-day physiological heart rate variability measurement with the Firstbeat BodyGuard device,¹ which provided data on their physical well-being: stress, recovery, and sleep.

Because physical data on the participants was to be collected in this study phase, we applied for an ethical review from the Ethics Committee of the Tampere Region. The committee identified no barriers for conducting the study. The personal data was treated confidentially in all research phases and anonymized after the data collection.

The data comprising the diary notes and the heart rate variability measurement were elaborated with the nine second-phase entrepreneurs in a new semistructured interview. The goal was to gain deeper knowledge of eustress experiences and to help entrepreneurs learn to recognize these experiences and to interpret their behaviors. The data drawn from each diary and physiological study were addressed chronologically, and the participant was asked to elaborate his/her stress experiences as presented.

The data of the multiple steps in the second phase were used to gain timely and detailed experiences of eustress and to validate the results of the first study phase. When the second-phase data were thematically analyzed, the same six main themes identified in the first data set were present also in the second data set. However, the second-phase analysis allowed us to execute minor refinements to the descriptions and illustrating quotations of the subthemes. As a final step of the second data collection phase, we organized a workshop for all nine participants. In this workshop, these volunteer entrepreneurs shared their approaches to achieving eustress and had an opportunity to learn new approaches from their peers. Although a fruitful experience, the workshop participants did not reveal any new information to augment what had been collected already.

After the two-phased entrepreneur study, we organized three codesign workshops to identify potential design implications and to define a delivery channel for the results. Altogether 16 experts on health technology, well-being, and professional coaching attended the workshops, 4-6 experts at each workshop. In the 2-hour workshops, we first introduced to the experts the six main themes from the user data (with subthemes and illustrative quotations from entrepreneurs). These were presented on posters in the meeting room. After that, we asked each participant to mark down what he/she believed were the most important themes and challenging issues and to generate design implications related to the themes. After this individual task, the experts discussed the issues together within their group. The resulting material of the workshops was analyzed by the project team. The workshops strengthened the potential of the idea of a Eustress Toolbox service, as the participants regarded the data valuable in increasing knowledge of the positive side of stress. Moreover, they advocated for a holistic service, instead of several separate services concentrating on the six explicit themes. The data of the workshops guided the project team in focusing on the following aspects of the service: supporting entrepreneurial work, highlighting peer experiences, and providing means for reflecting and rehearsing new work practices and ways of thinking in one's daily life. Later, these aspects were emphasized in the design guidelines of the service.

In the final step in our research project, we designed the prototype of the Eustress Toolbox online service iteratively in joint workshops within the multidisciplinary project team. The design work started by defining design guidelines, which we formed by utilizing and reflecting upon the materials of both user study phases, the codesign workshops with experts, and the design frameworks described in the literature. We designed the elements and functionality of the eustress service prototype based on the identified guiding principles. The content of the toolsets and the explicit tools of the service were designed based on the entrepreneur experiences (i.e., the analyzed entrepreneur data). In addition, exercises related to the various themes of the toolbox were created. Furthermore, we identified and evaluated third-party mobile and Web applications related to the themes, and those that deemed most suitable to support the goals of the toolbox were included in the service.

The final service prototype was evaluated with four usability experts outside the project team. Based on their evaluations, minor modifications were made to the design.

RESULTS

The Results section is organized to present the results in the order of the study procedure, proceeding from the findings of the user studies to the design of the Eustress Toolbox. The objectives of this research were to provide understanding of the means that help entrepreneurs to recognize and feel eustress and, based on this knowledge, to design a service that introduces methods to stimulate eustress in one's daily life. In the following subsections, we first describe the role of eustress in the entrepreneurs' daily lives and their ways of thinking about and working to foster it; the implications for the Eustress Toolbox follow immediately. After this, we present the design of the Eustress Toolbox, a digital service designed based on entrepreneurs' experiences.

Entrepreneurs' Means of Fostering the Experiences of Eustress in Their Daily Lives, Leading to the Identified Eustress Toolsets

All participants recognized the phenomenon of eustress and considered it beneficial for their work and well-being. Eustress was perceived to be vital for achieving intended results on schedule, for getting the best out of oneself, and for working with a positive and energetic attitude. Eustress was experienced in different situations, but mostly before and during important meetings, such as customer negotiations or a presentation, or when completing important deliveries on a tight schedule. When experiencing eustress, the participants felt themselves enthusiastic and energetic but also able to concentrate and be present in the current moment. The participants reported that it was typical to feel the new stressors as negative at first but later to perceive them as more positive. Examples of eustress presented by participants included starting to feel more confident, being in control of the situation, or seeing the gradual results of one's work.

Based on the entrepreneurs' descriptions of eustress, several factors contributing to the experience could be identified. The following results describe the entrepreneurs' means to simulate eustress in their daily lives.

First, eustress experiences were facilitated by self-reflection on one's thoughts, feelings, and actions (see more about eustress and self-reflection in Tikkamäki, Heikkilä, & Ainasoja, 2016). For example, eustress experiences included descriptions of putting things into perspective, changing one's point of view, and harnessing a feeling of trust—trust in the future, in one's abilities, and the possibility of having an impact. One participant described her insight on the importance of having an impact on her own work in a following way *“You can have an impact on things. It is up to you whether you carry on without doing anything and just complain or whether you actually do something”* (Female, aged 39).

The tools for self-reflection formed the first toolset of the Eustress Toolbox: Self-reflection and Changing the Mind-set. The toolset provided various tools for and examples of the means to change one's point of view, put things into perspective, foster trust, regulate one's resources, and share with and/or bounce ideas off others who are members of the work community, peers, mentors, or close friends or family members.

Second, the entrepreneurs had several daily practices that helped them manage their work better or gain a feeling of things being in control. These methods included, for example, ways to prioritize and schedule work, divide it into smaller pieces, share the work with others, and

make the plans concrete and visible. One participant described the effect of writing a to-do list and making pending tasks visible: *“When you start to write down things, you can see what you need to do. It is no longer this enormous mush in your head that makes you [negatively] stressed”* (Male, aged 41).

The ways to manage and organize one’s work formed the second toolset of the Eustress Toolbox: Organizing Work. Thus, the toolset includes tools for planning and scheduling tasks or projects, concretizing tasks and goals, working collaboratively, and breaking up tedious routines.

Third, the entrepreneurs had various means to challenge themselves and create pressure or a boost for accomplishing tasks. The most typical one was to set a deadline for a task. For others, it meant starting the work shortly before the deadline, rather than early, to enhance the effectiveness of one’s work: *“If I start the task very early, I may do the things too well. If I start later, I do the task at a sufficient level and can forgive the hidden perfectionist in me”* (Male, aged 40).

The means for creating pressure helped to achieve eustress in cases of low or no external pressure. This practice formed the third toolset of the Eustress Toolbox: Stimulating Positive Pressure. The tools provided include ideas for challenging oneself.

Fourth, the feeling of eustress was increased not only by increasing the feeling of pressure but also by harnessing the positive aspects of one’s work. The entrepreneurs harnessed the feeling of joy at work by seeking out meaningful tasks, by building a positive working environment, and by stopping to enjoy and share successes. They described situations where humor, playfulness, acknowledging past successes, and a positive work environment reduced negative stress and helped them in seeing the difficult tasks or parts of them as positive challenges. One participant described his attitude as follows: *“There’s no need to act like a wet blanket, even when you’re talking about major, work-related issues.... A little humor goes a long way”* (Male, aged 51).

The ways to see the positive aspects in one’s work formed the fourth toolset of the Eustress Toolbox: Harnessing a Feeling of Joy. The tools within this toolset including means to recognize the meaningfulness of one’s work, create rewarding and fun conditions for work, and cherish one’s efforts and accomplishments.

Fifth, the entrepreneurs noted that facing the stress in challenging situations was alleviated by mentally preparing for the situation and, when within the situation, keeping one’s mind focused and concentrated on the essential issues. For example, the entrepreneurs visualized the situations beforehand or made lists to clarify the goals in advance of important meetings. Identifying goals or preparing for tasks may not only relieve negative stress, but these processes simultaneously may help in focusing on the most relevant issues in the challenging situation. This process was described by one study participant in this way: *“I make wish lists and to-do lists even for short meetings. Then the things go into your unconsciousness and pop up while in the meeting”* (Male, aged 52).

The means to prepare for a challenging situation and focus on the essential when facing a challenge formed the fifth toolset of the Eustress Toolbox: Mental Preparation. The toolset includes two parts: Focusing on the essential and preparing for challenges.

Finally, most of the entrepreneurs recognized that recovery between work challenges—even positive ones—is extremely important. In the entrepreneur’s world, it is typical for this need to be neglected and to work outside office hours as well. Because of this, it is important to

have reminders and routines for detaching from work. For many study participants, observing the scarcity of the moments of recovery in their well-being measurement was eye-opening.

As a result, many of them committed to new daily practices to increase the number of recouping moments. However, a number of the entrepreneurs had already found good practices to detach from work, for example, by doing something completely different from work tasks. This is characterized by the following comment:

When I start feeling that I only do one thing after another [without enjoyment], I take my dog with me and go into the forest. To detach from the ongoing thoughts, I listen to some hard-core rock from Spotify that I wouldn't listen to otherwise. (Female, aged 42)

Suggestions on ways to recoup and recover from the challenges and timetables of entrepreneurial work formed the sixth toolset of the Eustress Toolbox. The Recovery tools include various means to detach from work both during the workday and on free time.

To summarize, we found six main sets of tools based on the thematic analysis that were used by the entrepreneurs to foster eustress in their daily lives. These were concretized within toolsets: (a) Self-reflection and Changing the Mind-set, (b) Organizing Work, (c) Stimulating Positive Pressure, (d) Harnessing a Feeling of Joy, (e) Mental Preparation, and (f) Recovery. Each toolset addresses different but equally important needs for managing one's work and life. For the Eustress Toolbox to be useful and easily applied, each toolset comprised a number of distinct strategies (i.e., tools). The needs and tools are listed in Table 1.

Eustress Toolbox

From the codesign workshops, it was recognized that the Eustress Toolbox should be provided as a holistic entity rather than as individual tools. To do this, while simultaneously catering to individual needs, an interactive, guided, and personalized approach was conceived. A digital delivery channel, specifically, a Web-based service, was chosen due to its easy availability to most entrepreneurs; its capability for easy integration into the daily lives of users; the potential for guiding, personalizing, and reminding usage; and the possibility to monitor progress and provide feedback.

To guide the design of the Eustress Toolbox, five design guidelines were derived based on insights from the entrepreneur interviews and expert workshops. The person-based approach (Yardley et al., 2015) and the PSD model (persuasive systems design; Oinas-Kukkonen & Harjumaa, 2009) were consulted as formal frameworks to inform the guidelines. The guidelines were

1. *Minimizing user effort.* This is accomplished by dividing the content into standard-format, bite-size pieces, tunneling the user through a program, providing personalized suggestions, and reminding of use. Because entrepreneurs generally struggle with balancing their time, it is crucial that the process for adopting and using new tools is as effortless as possible.
2. *Providing freedom to discover.* To meet varying needs for and triggers in stimulating eustress among entrepreneurs, a free choice among a wide range of techniques is essential. Thus, active discovery of personally suitable tools must be enabled and encouraged.

3. *Enabling follow-up of progress.* Both in the program usage and eustress skills facilitated, the system must allow progress indicators and provide feedback. This aligns with the idea of making planned or completed work visible, which was seen as helpful for optimizing one's time and achieving eustress.
4. *Enabling learning from peers.* Learning about and developing skills that encourage eustress in all aspects of one's professional and personal lives is enhanced when other entrepreneurs' experiences and techniques related to eustress are visible. Sharing and bouncing ideas off peers was perceived as especially important because entrepreneurs often work alone and lack support from colleagues.
5. *Supporting the integration of skills into daily life.* Integrating new skills into the everyday life and turning them into automatic habits requires self-reflection and rehearsal. The process can be supported by providing tools and exercises that enable analyzing how the new skills could fit into one's daily life and rehearsing them until they become habits.

The Eustress Toolbox was designed both to increase understanding of eustress and to help users to develop skills for stimulating eustress in their lives. The goals of the Toolbox were to (a) enable users to familiarize themselves with the phenomenon of eustress and the multiple means to stimulate it, (b) allow users to reflect on their current practices and subtly suggest areas for improvement, (c) guide users through a program of learning new skills, and (d) provide practical tools for integrating the skills into their daily lives.

The structure of the Toolbox was built around the six toolsets derived from the data-collection phase with entrepreneurs. In addition, introduction and ending modules were included (see Figure 2) to provide background information and a possibility to identify the most useful toolsets for oneself, and after using the Toolbox, see one's results in learning new skills. The user's progress was indicated as progress bars, representing the completion of each toolset, and presented on the main page of the Toolbox. To facilitate remembering to use the service, email reminders were sent if the service had not been used for a week.

In the following subsections, the modules of the Eustress Toolbox are presented. As the original service is in Finnish, the texts in the screenshots of the service were translated into English.

Introduction Module

The introduction module (denoted as Start Here) presents the phenomenon of eustress and the background of the Eustress Toolbox service. It also summarizes the structure of the service and provides guidance on how to use it. The introduction module contains a questionnaire for identifying the toolsets most useful to the individual. The questionnaire consists of 21 statements representing the various toolsets drawn from the qualitative interview data. After completing the questionnaire, the user receives a summary and recommendation on the potentially most useful toolsets, which are also denoted in the main view with orange stars (Figure 2).

Eustress Toolsets

Each toolset is constructed in an identical way and contains an introduction, 2–6 tools, and off-line titled "Try out in your daily life" (Figure 3). User progress is indicated also at this level by

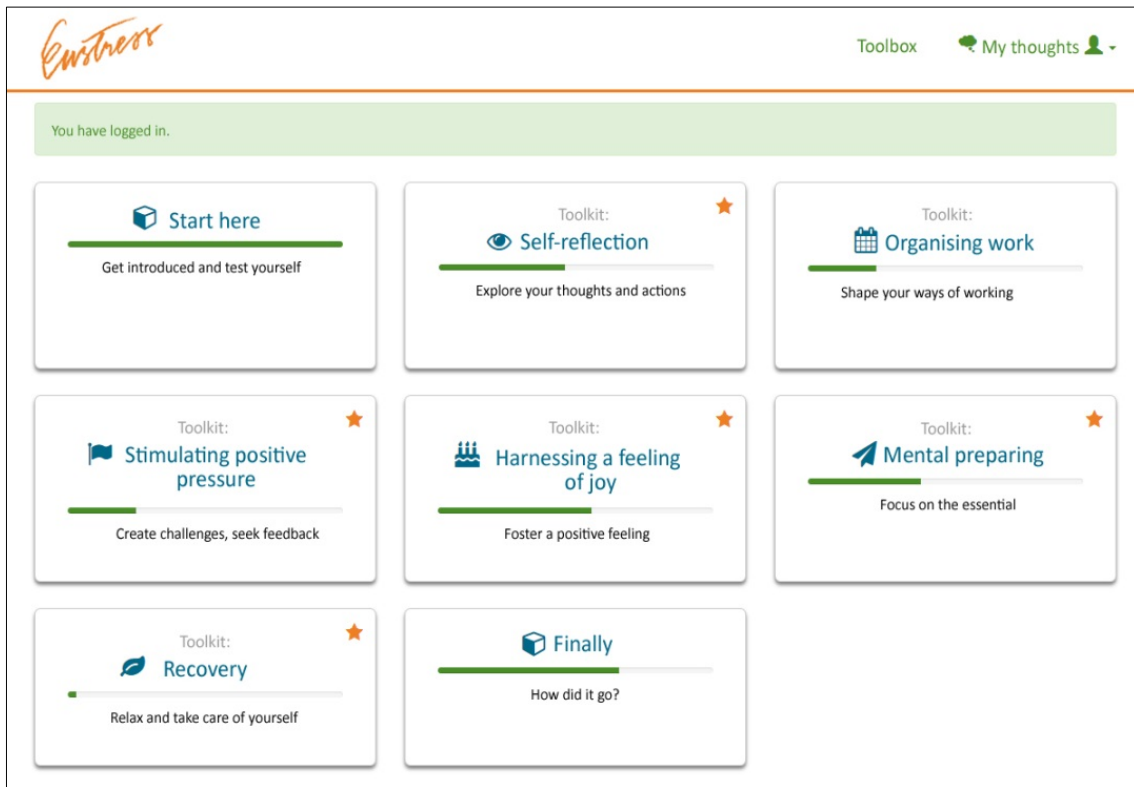


Figure 2. Main view of the Eustress Toolbox: introduction module, six toolsets, and ending module.

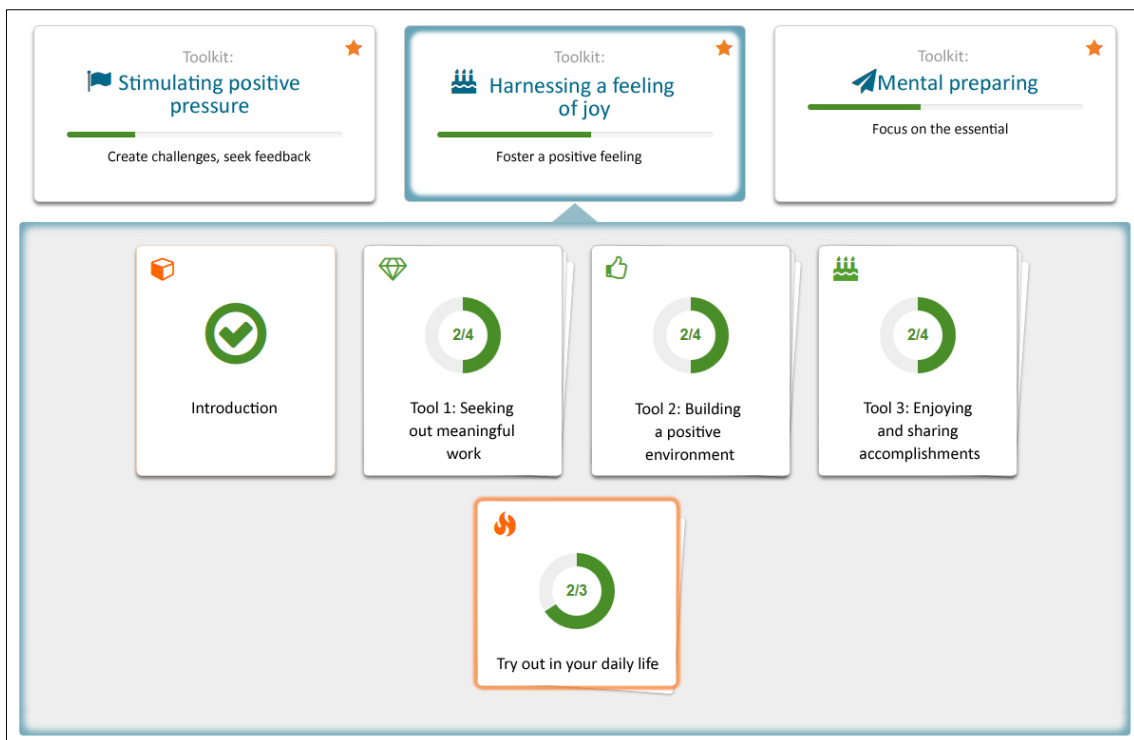


Figure 3. Main view of a toolset: access to introduction, three tools, and off-line exercises.

by round progress indicators, which display the number of steps completed in each tool. The indicators turn into check marks when all steps within a tool are completed.

Eustress Tools

All tools have an identical internal structure and consist of three steps: a description of the tool, entrepreneur quotations, and a reflection exercise. Furthermore, after completing each tool, the users can provide feedback to the researchers. The quotations from entrepreneurs who participated in the first phase of data gathering were used to illustrate real-world experiences related to the tool and to show the origin of the tool (see an example in Figure 4). This way of presenting the tools can make them feel more authentic and interesting, and also enable learning from peers according to design guideline 4.

The reflection exercises aim to help users identify their own practices and habits and to assess how the tools relate to their lives. This is done through one or more questions prompting self-reflection on the topics presented in the tool. A text box is provided for entering notes and reflections.

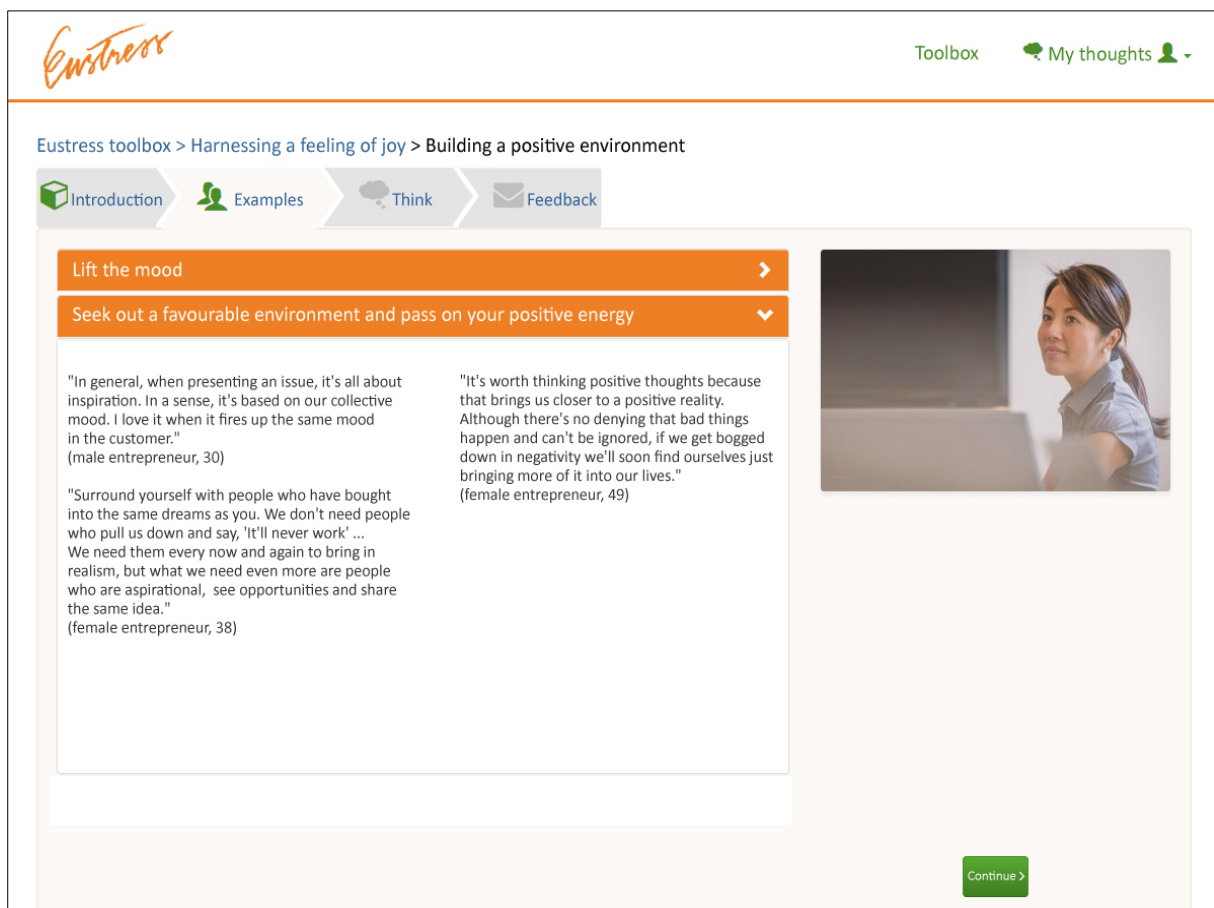


Figure 4. Example of contents of a tool: quotations from entrepreneurs who participated in the first phase of data gathering. Photo by Jeremy Bishop on Unsplash.

An example of a reflection exercise related to recalling successes asks the user to look back on one's successes at work:

When have you felt the feeling of success in a challenging work situation? What did you do?

Can you recall a situation where you succeeded even though you were afraid of failing? What did you learn?

The users can see only their own responses to the reflective exercises. Should they wish to revisit those comments, they can access them via the tools or via the main view (e.g., see the My Thoughts option; upper right of Figure 1).

Off-line Exercises and Eustress Applications

The last step of each toolset is an off-line exercise that aims to provide an opportunity for the users to rehearse the skills and, ultimately, to integrate them into their daily lives. The users are provided with 2 to 3 off-line exercise options and are asked to select one to complete during the following week. Off-line exercises consist of long activities, such as planning work tasks on a weekly basis or including a moment of recovery to each day of the week, and shorter exercises, such as having a meeting with oneself to analyze one's values or envisioning and trying out a new approach to a work assignment. Detailed instructions for completing the exercise are provided and the users may also write down their own plans for the exercise. The commitment and plans are then sent to their email as a reminder. Twenty-four hours after activating the exercise, a reflection form is enabled in the Toolbox, allowing the user to reflect on the exercise during or after the rehearsal period and to mark it as done after completing it.

An example of an exercise related to the toolset of Harnessing a Feeling of Joy challenges the user to lift his/her own mood and that of others:

Praise Week

On each day of the week, praise yourself or someone else for a job well done, an inspirational attitude, or a brave try. This can be about even small deeds and successes and is just one way to surprise others and create a positive buzz around you. Remember to choose yourself as a recipient of praise on at least one of the days!

Answer the following questions after Praise Week: Did you remember to praise someone every day? What kinds of reactions resulted from praising others? Did you learn something during the week or begin to see anything in a new light?

As part of the off-line exercises, users also are provided with links to selected third-party mobile and Web applications related to the toolset. These applications aim to provide practical tools to foster eustress and give users additional means for integrating the skills into their daily lives and work. For example, in the first toolset (i.e., Self-reflection), a mindfulness-related application² is provided, and in the second toolset (Organizing Work), applications for listing, scheduling, and delegating tasks are included.³

Ending Module

The final module of the service contains an ending questionnaire that repeats the questionnaire presented in the introduction module. The ending questionnaire opens only 3 weeks after the first use session to ensure that users have had time to practice the skills before

repeating the questionnaire. After the users complete the questionnaire, graphical feedback summarizing the status of various eustress skills is provided along with a comparison to the screening questionnaire status. This feedback enables the users to reflect on what they have learned during the program and to see their progress in the skills related to the toolsets.

DISCUSSION

This paper sheds light on entrepreneurs' means to feel eustress in their daily lives and, based on this understanding, it presents the design process and implementation of an online service prototype, the Eustress Toolbox, for fostering eustress. We wanted to focus on the positive side of stress because research has been focused more typically on the negative aspects of stress. However, a positive view of stress may offer new tools for well-being (Simmons & Nelson, 2007). Although a positive approach has become a growing research and design approach in HCI (Calvo & Peters, 2014; Desmet & Hassenzahl, 2012; Desmet & al., 2013) and interventions fostering psychological well-being have emerged (Ahtinen et al., 2013; Luthans et al., 2008; Mitchell et al., 2009; Ouweneel et al., 2013), design studies and experiments have not focused on the positive side of stress. Our study provides new insights on this phenomenon, based on the experiences of Finnish entrepreneurs. It also proposes a new way to approach work engagement, that is, acknowledging the holistic nature of stress and potentially offering new tools to see some work stressors in a more positive light.

The ways of thinking and working that entrepreneur participants identified as helping them feel eustress were analyzed and grouped into six toolsets of the Eustress Toolbox: 1) Self-Reflection and Changing the Mind-set, 2) Organizing Work, 3) Stimulating Positive Pressure, 4) Harnessing a Feeling of Joy, 5) Mental Preparation, and 6) Recovery. These toolsets have similarities to methods proposed by Hargrove et al. (2013) to help managers encourage eustress among their employees. Hargrove et al. (2013) suggested that eustress experiences can be fostered by offering meaningful work, encouraging mindfulness in the workplace, and supporting employees in understanding their capacity to meet challenging stressors. According to our interviews with the entrepreneurs, the meaningfulness of the work was seen as a particularly important accelerator for eustress experiences. Thus, the first toolset in the Toolbox relates to self-reflection, providing tools that help users find meaning in their work or recognize the meaningful aspects of their work. Seeking out meaningful work is also a tool in the fourth toolset: Harnessing a Feeling of Joy. Our first and fifth toolsets (Self-Reflection and Mental Preparation) acknowledge the benefit of mindfulness. All toolsets can be seen to contribute to understanding or increasing one's capacity to meet challenging stressors through various means: increasing self-knowledge, enhancing the feeling of control of one's work, exposing oneself to challenges, stimulating positive affect, offering means to prepare for challenges, and reminding of the need to rest and recover before new challenges.

A Web-based service was chosen as the delivery channel of the Eustress Toolbox. Web-based services enable easy access, independent of the user's time and location, as well as self-paced use, an interactive and personalized approach to providing content, and the ability to design means to guide the user through a program. Another benefit is the possibility of reminding users of yet-to-be completed tasks and providing feedback on progress. The guidelines used for designing the Eustress Toolbox were (a) minimizing user effort, (b)

providing freedom to discover, (c) enabling follow-up of progress, (d) enabling learning from peers, and (e) supporting integration of skills into daily life. For this service, we considered learning from peers an especially important component as it may be more enlightening and motivational to hear about experiences from peers than from researchers. In the future, this aspect could be further strengthened by providing ways to communicate with other entrepreneurs, for example, by creating a discussion board or an associated Facebook group. Another crucial part of the service was to provide exercises and third-party applications that would support the integration of skills into the user's daily life. There are thousands of applications and services available related to well-being and work management, but finding and adopting them takes time, a commodity in short supply for most entrepreneurs. Integrating recommendations for services such as these may help to lower the threshold for adopting new practical tools. Reflection exercises were designed to help users identify their own practices and assess what each tool signifies for them, enabling the users to internalize the different concepts and skills related to eustress. The intention of the off-line exercises was to encourage practicing the skills in the real world and to help in integrating them into everyday routines.

Our design approach was in line with human-centered design approaches (ISO, 2010) and was related closely to the person-based approach applied by Yardley et al. (2015). Additionally, the PSD model (Oinas-Kukkonen & Harjumaa, 2009) was consulted to include features that would facilitate adoption and increase engagement with the service. Our design was based on the actual experiences of entrepreneurs rather than a specific psychological therapy, which is a typical base for many digital interventions. Moreover, our approach was empirical and experience-based with the goal to learn from the mind-sets and work practices of entrepreneurs, to find out their ways of fostering eustress, and to share the insights through a digital service. In the recent years, both theory-based digital well-being interventions and design experiments based on the empirical user data have increased, and our work is one attempt to foster a dialogue between these fields.

Despite the vast research on work stress, the complex relation between negative and positive stress is far from clear. Although the two sides of stress have been acknowledged already decades ago, stress usually is considered a negative phenomenon and termed as such, and this can result in challenges in studying the positive side of stress. The terms eustress and positive stress divided opinions also in our data, and some entrepreneurs expressed contradictory feelings about the terms, even though they recognized the phenomenon.

Additionally, the relationship of eustress and work engagement is still somewhat speculative and based on only a few linkages presented in earlier studies. As work engagement can be seen as a more stable state than eustress, it may contribute to a greater likelihood of experiencing eustress. Furthermore, the means to foster eustress may increase the attributes of work engagement—such as vigor, dedication, and absorption (Schaufeli et al., 2002)—especially if they are adopted as everyday tools and practices. However, more empirical research and further elaboration on the conceptual level is needed to bring clarity to the relationship between these two concepts. The relationship could be empirically clarified with quantitative research. For instance, surveying a representative sample of entrepreneurs could indicate whether people who experience higher work engagement also experience eustress more often or more intensively. Another option could be an experiment testing into whether practicing the means to foster eustress as a part of daily life also increases work engagement in

the long run. However, the implementation of such research is not straightforward, particularly because no validated measure of perceived eustress exists.

The Eustress Toolbox was created based on the experiences of Finnish entrepreneurs, and in its current form, it is targeted at entrepreneurs. Because entrepreneurs often have a need for effectiveness, the state of eustress can be seen as especially beneficial to them. Entrepreneurs also need to protect themselves from too long days and too intensive working in the goal of maintaining their well-being and mental resources. Further research is required in evaluating whether the current toolsets and processes are the most effective in assisting entrepreneurs in achieving these goals.

We believe the Eustress Toolbox might be beneficial for other user groups as well. As self-leadership skills are important in contemporary working life, the service may be beneficial for employees needing an entrepreneur-like mindset and skills. However, adopting the service requires voluntary interest from the user. Promoting ways to implement eustress by a supervisor involves ethical issues that need to be considered: The tool cannot be used as a means to increase stressful work among employees, no matter how positive that stress might be. By emphasizing the potential of stress as a positive resource, we do not want to deny the harmful effects of distress or to claim that all stressors could be perceived as positive. Instead, we aim at a more holistic view on stress by presenting the entrepreneurs' current practices to foster the positive side of it and explaining a service prototype that may help entrepreneurs in perceiving some stressors as more positive and by challenging their current ways of thinking and working.

The strengths and limitations of the research and design work relate to the user group studied. Entrepreneurs gave valuable insights on eustress, but naturally, the results cannot be straightforwardly generalized to other occupational groups. In the future, qualitative research on other user groups would provide interesting new knowledge. Also quantitative approaches will be needed to give a wider perspective on the subject and validate the results.

The Eustress Toolbox is a Web-based service prototype built for the purposes of this study and its wider utilization would require further developmental steps. In the next phase of the project, the content and implementation of the Eustress Toolbox will be evaluated among a new group of about 20 entrepreneurs and company employees doing entrepreneur-like work. This pilot will be used to study whether the content and design of the Eustress Toolbox are acceptable and useful to the users, as well as to inform us on further needs for development and design ideas. The potential of the Toolbox will be evaluated based on the user experiences, user acceptance, perceived benefits, and initial impacts on the users' well-being or stress experiences.

In the future, it would be interesting to study the use of Eustress Toolbox also with a larger group of users. It would allow us to study the use of the service in relation to work engagement. Specifically, it would be interesting to learn whether the work engagement of the users affects the use of the service and impacts of the benefits of the Eustress Toolbox or vice versa.

IMPLICATIONS FOR RESEARCH AND APPLICATION

This work contributes to the body of research related to eustress and work engagement in the field of HCI. On the theoretical level, the work enlightens the potential connections between

work engagement and the two sides of stress: eustress and distress. The empirical aspect of this research provides an understanding of the work practices of Finnish entrepreneurs and the ways of working that help entrepreneurs foster eustress in their daily lives. These findings present a basis for understanding the potential practical means of achieving eustress, especially in the context of entrepreneurial work. This knowledge provides a foundation for a nascent understanding of the concept of eustress in the work environment that may be beneficial to future theorizing and refinement of the concept, both within the work world and beyond.

Our research also contributes significantly to the research into the design of solutions to support individuals' development and implementation of eustress in their lives. The Eustress Toolbox, a novel online service, provides insights into eustress and offers users the opportunity to practice skills for stimulating eustress in their daily lives. Thus, our research and this article contribute to the field of HCI through a new perspective and a human-driven design example of how to enhance a positive state of mind and work engagement by means of a novel digital solution. Our Web-based service may help practitioners and other members of the HCI community to design engaging and useful services for well-being.

ENDNOTES

1. The devices employed to measure the physiological components of this study were provided by Firstbeat Technologies Ltd., Jyväskylä, Finland. The researchers were trained by the service provider to interpret the data that were collected during the study, and this process was completed in collaboration with each study participant.
2. Information on the Oiva application, developed by VTT Technical Research Centre of Finland and University of Jyväskylä, and currently owned by Headsted Ltd, can be found at <http://oivamieli.fi/>
3. The Trello application is produced by Fog Creek Software, Inc. and can be accessed at <https://trello.com/home> while the Wunderlist application, created by 6 Wunderkinder GmbH, can be obtained from <https://www.wunderlist.com/home>

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