Imagining the future of stress therapy through a design exploration

Abstract
In this paper, we present a design exploration [4] of the domain of stress therapy, involving stress researchers and professional therapists. We address the problem of using bio-data, collected during the course of everyday live, in stress therapy. The challenge is centered on how to visualize data in a way that can be useful for therapists and patients. We present our results and reflect on our design exploration, arguing that research through design can provide useful insights in domains that are hard to access using other methods of inquiry, as well as support imagination of future scenarios.

Author Keywords
stress, stress therapy, research through design

Introduction
There are many systems that aim to improve health and living conditions through the use of wearable technologies. These technologies enable new ways of monitoring bodily processes through biosensor measurements. They open a challenging design space for systems aiming to be used by non-experts, helping them to better manage their lifestyles and stress reactions. Some claim that this might serve a role in preventive care, aiding end-users to engage in various stress management practices [2]. While we build on
that work, our specific focus is on what can be done inside the realms of stress therapy, in settings where there is a psychologist in the loop. Our idea is that this may alleviate some of the burden placed solely on end-users who are supposed to interpret data, figure out what to change in their life and then making sure that the interpretation of the resulting bodily reactions indeed are pointing in the right direction.

Today the interaction between a therapist and a patient is, for the most part, based solely on interviews and questionnaires [1]. While there are practices to increase body awareness and even using bio-sensors, there is a lack of solutions for everyday monitoring of patients that can later be shared, discussed and acted upon in dialogue with the therapist. Trying to remember, without any support, the situations that incur stress may lead to distortion of results [3]. We see an opportunity to open a potential design space here for life-logging applications, building on bio-sensing in combination with other tools. However, it is unclear the role that visualizations of bio-data collected through sensors can play in these settings.

The research we present here stems from lessons learned from early work in HCI on designing with stress and emotions. We are particularly inspired by the design of Affective Health [2], displayed in Fig. 1. This system included a wristband that measured bodily data, and an application for visualization. The aim was to make stress related bodily data, measured with skin conductance level and accelerometer sensors, available to people to enable reflection on their own data. Based on the design process, ways to represent bodily data that are easily interpretable by the end user were proposed, based on experiential qualities such as ambiguity and openness to interpretation, interactive history of prior states, fluency and aliveness. [2].

**Our design exploration**

We asked: *how can bio-data be used in stress therapy?*

We explored the domain initially from the perspective of stress research, realized our understanding of the domain in a mockup, and finally used it as a basis for inquiring into the role of bio-data in stress therapy. This process is visualized in Fig. 2. Several methods were employed to narrow in on this design space: a literature review, a mockup, and semi-structured interviews with our experts. The reviewed literature provided an understanding of the state of art on bio-sensor data and how it is linked to stress. In order to frame the problem of using bio-data in stress therapy, five expert interviews were initially conducted with experts: two psychologists, two medical researchers and one specialist building medical systems measuring stress. The design of our mockup was influenced by our earlier work in designing bio-data based interaction tools, and experience with different sensor technologies. From the first round of interviews we learned about the specificities of designing for this particular setting: 1) the types of data to be displayed, with connection to stress, 2) the needed interactive options to explore data, and 3) the need to visualize assignments and calendar information, to support therapist-patient interaction. These were realized in a mockup, which shows simulated data, with a certain degree of realism. We used the mockup as a tool to support imagining how the interaction between therapists and patients would be re-configured if bio-data would be present. The mockup was then used to elicit responses in interviews with therapists about their practice.
Suitability of the method
Due to the novelty of combining stress therapy and stress research we had to understand how is stress measured, and how is stress treated. We focused on specific metrics that may give a window into the complex connection between stress and the body, in ways that are useful to a therapist. Our mockup was meant to be as simple as possible and hence we tried various ways of visualizing and interacting with data. Some sketches can be seen in Figures 3-5. Based on this a mockup was build (Figure 6).

The imaginations of the future of stress therapy based on this mockup provide context for our design, e.g. expected and experienced stress level in exposure therapy can be made measurable. Even though observing the interaction between therapists and patients would give us insights about how stress therapy is conducted nowadays, direct observation of the encounter between therapists and patients can be problematic due to confidentiality reasons. With our method, we got to know how stress is to be measured, what therapists need, and the therapists got to know about what could a bio-data visualization provide them. The design process and the mockup we produced were important parts of establishing a dialogue with the therapists. With the help of the mockup, the therapists themselves came up with future scenarios, where bio-data plays a central role to support current activities or future ones. The knowledge generated is therefore quite practical. Research through design can complement other methods, such as interviews, or ethnographic observations. We found that it can be particularly suitable for speculative approaches, such as ours.

Roles of bio-data in stress therapy
Our design exploration generated ideas about the future of stress therapy. Questions of realism of the data, completeness of the data in being able to represent the lives of individuals, and usefulness of the data to support specific therapeutic activities can be seen in the sometimes conflicting roles that bio-data can assume.

1) Helping the therapist see the patient
Therapists mentioned identifying causes of stress as an important part of their therapy. Bio-data can be seen as an additional window into a patient’s life, complementing already existing quantification practices, such as questionnaires. It does so by providing information about stress reactions and the surrounding information, e.g. time, position, calendar data. However, its explanatory power is limited to the physiological reaction, and more information is needed from the patient to understand what caused stress. Quantification of data makes sense in therapy when inserted into a larger eco-system of quantification practices, such self-reported stress ratings, or qualitative information such as the patients’ personal input like thoughts and moods.

2) Helping the patient see themselves
Exercises for body awareness and relaxation were mentioned as an important part of the therapy process. These are meant to improve awareness of stressors and developing coping strategies. Here bio-data appears as an entity that may provide the patient with an externalized view of her own body, turning it into a ‘visible object’ that can be manipulated, even empathized with. To our experts, this enabled helping
the patient to reflect on the exercise and the impact of it.

3) **Bio data as holding authority**

Bio-data can be seen as an objective truth for argumentation and explanation. This holds potential, for example, in approaches that involve controlled exposure to stressors, when a therapist has to explain the positive effects of exposure, even when these are seemingly counter-intuitive to the patient. In this case, bio-data was mentioned as an argument to convince the patient of the validity of the exposure, or observing the effects of that exposure.

4) **Supporting exercises**

An interesting statement came from one therapist who entirely rejected the mockup we showed. He expressed a need for an entirely different representation to support his preferred therapy method: body-awareness exercises. In body awareness exercises, an entirely different visualization (or embodied interaction) might be needed. Rather than attributing objectivity, or a value of truth to quantified data, once can represent physiological processes in a way that creates conditions where individuals may feel more aware of their bodies.

**Conclusion**

Bio-data can enter the space of stress therapy as a powerful entity, having the potential to both support and re-define how therapy is conducted. A research through design approach [4] allowed us to adopt a speculative stance, which would be harder to achieve through other research methods, such as questionnaires, interviews, or even ethnographic observations. Our artifact served as a probe, supporting a dialogue with the therapists, and was used to find roles that bio-data may assume in the future of stress therapy. Our process of design-led inquiry provided a good starting point for exploring the design space for quantifications of the body in stress therapy.

Future work will include producing different mockups that will solve the specific needs of each therapeutic activity, and include patients in future iterations of the design exploration. We also intend to explore the physicality of bio-sensors. Other than maintaining batteries and wearing a bracelet all the time, patients may have to consider how appropriate it is to wear sensors in various social contexts and what actions are required to make the stigma of stress illness and coping problems acceptable in a public manner.

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**References**


