

Affective Health: a holistic view on how to share bodily data

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ABSTRACT

The human body is in some ways intimately known to us but unpredictable and complex as well. We do not always know how to interpret or listen to our own bodily signals. In order to live a sustainable and healthy life, it is important to understand the body, its possibilities and limitations. The body and how we make sense of our own bodily experiences plays an important role in the Affective Health system. We are exploring how we understand our own bodies and whether we can learn from each other, through a range of design concepts where users can share bodily data. We have learnt that the system is interesting not only for individuals but also for larger groups. Sharing bodily data with a group of people using Affective Health might be useful for understanding behaviour change and sustaining long-term health.

Author Keywords

Social sharing of biodata, interactional empowerment, holistic, behaviour change

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

General Terms

Human Factors; Design; Measurement. If you choose more than one ACM General Term, separate the terms with a semi-colon. See list of the limited ACM 16 terms in the instructions and additional information:

<http://www.sheridanprinting.com/sigchi/generalterms.htm>.

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INTRODUCTION

The field of online support groups and online groups for sharing of knowledge has received a lot of attention recently (e.g. patientslikeme.com and curetogether.com).

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The integration of health and wellness applications into existing social networks may help us to better deal with certain health problems [6]. The focus so far has been on categorizing what is effective and valuable in for example online health communities, but there has not been as much research on how and why people share personal data [7].

We want to raise the question of how people share different types of information with each other and how they could do this. In order to live a sustainable and healthy life, it is important to understand the body, its possibilities and limitations.

The human body is in some ways intimately known to us, but at the same time unpredictable and complex, we do not always know how interpret or listen to our own bodily signals. The Affective Health system [4] is designed to encourage the user to understand and interpret. The system is built on the notion of *interactional empowerment* (Höök et al. 2008) where the design allows users to form their own, personal interpretation to the bio-sensordata and construct the meaning of what the system portrays over time. In this way the system empowers the user to identify, reflect on and find patterns in their behaviour through a value-free design stance. It is through the interaction over time that the system starts making sense, mirroring bodily reactions or users' activities back to them. An interactional stance implies that meaning/emotions/dialogue are constructed in and through the interaction.

We are inspired by theories of how we use of how we use our bodies to live in and move through spaces of interaction [9]. In this project we strive to move away from a dualistic notion of separating body from mind [3], [5], and instead show the tight coupling between the two, a more sustainable way of relating. The interactional empowerment design stance avoids a subjective stance towards the interpretation of data, in doing so it empowers the user to make their own choices and does not let a system or person tell the user what is right or wrong. However similar systems that use biofeedback data mostly represent data in a more dualistic manner [12], using for example numbers or graphs to represent the body. It focuses on representing the human body more as an object that can be measured, controlled, trimmed and kept separate from our own "selves". The technology has over-emphasized on the

intellect and the notion of “cognition” has purely focused on the intellectual processes [1].

In our user studies, we have seen how the Affective Health system helped individual users to gain better insights into their own behaviours and start reflecting on their everyday reactions. But the step from reflection and understanding to behaviour change is very difficult. Most of the time, we fall back into bad habits or negative thought patterns no matter how well we know we should change. Can we encourage people to develop sustainable more behaviours? The strongest behaviour change methods, often involve changing social norms – entering into the group dynamics of the whole situation around an individual [10]. But how can we share bio-data with others in meaningful ways? What are the possibilities and situations where it is possible and even desirable?

AFFECTIVE HEALTH

Affective Health is a system that measures pulse (ECG), movement (tri-axial accelerometer) and arousal level (GSR) through bio-sensors attached to the body. The bio-sensor data is transferred to a mobile application in real-time and it logs the data on the phone. In the application movement is visualized through shapes while arousal and movement are fluently represented in a color scheme. These three measurements can indicate the users bodily states over time, for example it could indicate situations that are for example stressful, engaging or peaceful. The user could also choose to see how their body is reacting in real-time on the mobile application. Affective Health can offer people a different picture of their lives



Figure 1. The sensor placed on the body and the visualization of the Affective Health mobile application

Long-term user study

To understand how users identify and reflect on different relations, situation and understand their own recovery, we conducted a long-term qualitative user study of Affective Health with four female participants. These participants used the system daily during one month and were interviewed each week. They also went through one group interview, once the study had ended. The participants gradually went through a learning process where they started to find connections between social and physical settings, as well as their ways of articulating activities to themselves, with the bio-data the system portrayed back to them. They

also came to reflect on their own personality in novel ways, seeing how they were systematically responding to certain situations. They came to an understanding where they put a tighter coupling between body and mind. For some this eventually led to changes in behaviour.

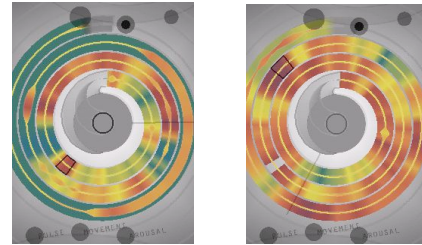


Figure 2. Screen from long-term user encounter, visualizing citations.

“The I am sitting still on the train, and then the pulse goes down. And here there is a hill, as I live fairly high up, so I have to climb this hefty hill, and then there is plenty of pulse here, and it is that way as I am now home [...] and here all of a sudden it starts to change colors, that is pulse is higher which is really, really exciting compared to my, kind of, arousal-color.” (see left-hand side Figure 2.)

Another participant could identify a pattern of how her arousal could be represented over time:

“You know if you look over all the days I am, I think, I am in summary kind of yellow, orange and when I see that it is as usual (as it should be)”. (see right-hand side Figure 2.)

However the system did not always make sense to the participants. Some of the participants expressed a need to share the data with a therapist or with relatives or friends. In this example a participant is discussing the issue of trying to understand what certain colors represent in specific situations, she argues that it could be easier to do the reflection together with someone else:

“But I don’t think that you will be able to do that reflection by yourself... I think... you need to make a connection and have a purpose and maybe get a chance to also reflect together with someone. Either in a group of few people doing it together. Yes, or in a relationship or if you are in therapy, so if you have a physician or that you do something at your workplace...”

SOCIAL SHARING

The Affective Health system is currently designed to be used individually and it does not portray social aspects of your bodily experiences [11]. But what if we could gather bodily data to find patterns of group behaviour or to support behavioural change in groups? To explore social sharing further we set up a social sharing brainstorming workshop.

Social Sharing Workshop

The goal of the workshop was twofold; first, we wanted to investigate how to share data and connect that sharing to a real-life experience, second, we needed to liberate our

creativity and move outside the typical office or lab environment. In order to reach both of these two goals we decided to set up the workshop in a forest and let the participants take walks along a walking trail. They walked the trail on their own as well as with a companion.

In total 11 people participated in the workshop. The set up was as follows: participants walked the walking trail three times by themselves and three times in pairs. Each walk took around 10-15 minutes. They were encouraged to collect things during their walk that they later could choose to share. In between the walks the participants could sit by a fire and either share their reflections with us or write them down on paper. During this entire workshop half of the participants wore bio-sensor that measured for example their arousal, heart rate variability and movement. Three of the participants wore Affective Health.

Once the walks were finished we regrouped to finalize the reflections from the workshop and discuss three topics:

- The overall experience of the walks. Was it unpleasant, scary, engaging, relaxing or soothing?
- What was the difference in experience of walking alone vs. in pairs?
- We also asked them to describe a specific experience or memory from the walks.

A method called World Café [2] was the framework for the group reflections that took place after the walks. The main idea for World Café is to open up discussions in a simple and effective way. Each topic was to be discussed at one table and each table had one host that would act as a moderator the discussion. The participants were then divided into three groups and would rotate every fifteen minutes between these three tables. Each table was covered with paper cloth and pens to encourage them to scribble or make notes.

This World Café reflection process allowed us to end up with three design concepts and some related problems that needed resolving.

The first concept involved sharing information in social media platforms. One of the main ideas was that the user would share their own data and that would then be represented on the social platform as correlations between behaviours and bodily reactions as picked up by the bio-data sensors. The user has to be able to control what information to share rather than showing actual, raw bio-data. Different correlations, such as what patterns could one find during a lesson between students or what occurred during working hours between colleagues, could perhaps create new ways of thinking about bodily data.

The second concept focused on sharing raw bio-data with a therapist or an expert in bio-data interpretation. This concept was problematic because of issues regarding trust and privacy from a patient-therapist view. However if the

therapist could ensure the control of the shared bodily data and keep the feedback balanced, this would be an interesting source for sharing bodily data.

The third concept focused on the issue of sharing big amounts of data in a meaningful and sensible way. One solution for this concept was let users choose to enter a particular context and set goals to their bodily data that they wished to achieve. This would allow users to add semantics to the raw bio-data, semantics that in turn could make sense to other users – something that the raw bio-data did not.

The two first concepts were rather similar in that both involved self-tagging of information and could be both continuous or/and individual blocks of data for a given activity. The third concept was more of a technical step further and added continuous monitoring and on-going contextual tagging.

DISCUSSION

Learning more about yourself and your bodily reactions through a system like Affective Health has proved to be highly interesting to the many users we have shown the system to. But if we want Affective Health to be useful in terms of behaviour change – as in monitoring your stress behaviours, or dealing with your emotional arousal or relaxation in novel ways – we need to shift from only providing a mirror for reflection. A shift towards social sharing could add an important piece in the puzzle.

How can we share bodily data amongst a group of people and still remain within the interactional empowerment stance? How can we focus on the act of sharing and provide users with aesthetically pleasing, attractive design, and communicate our values of simplicity and embodiment? Our goal is not to make life more complex than it already is. We must consider designing for social sharing in addition to individual use. We cannot separate our body from our thoughts and individual interpretation if we want to create a space for reflection and meaning. This is also tightly coupled with social processes; how can we live a sustainable healthy life without considering how social norm can impact our behaviour? We need to consider what impact this type of technology can have on social, ethical and political issues [8].

The future of this system depends on the balance in design; the individual must be able to distance themselves from their own bodily reactions in order to share and understand their own emotions. In the future this system will change how we view our bodies and but also how we choose to share our bodily data with others.

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