

Designing Interventions for Health and Wellbeing

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ABSTRACT

Emotion sensing has become ubiquitous in the physiological sensing and affective computing communities. While we leverage these methods in our research, we have found that the truly difficult problem is “what you do about it” once you have identified a user’s emotional state. This position statement describes various lessons learned, as well as traps to avoid, if you want to design engaging and life-changing interventions to help users cope positively with stress, depression, diet, exercise, sleep, and productivity.

Author Keywords

Emotions, interventions, behavioral change, productivity, health and wellbeing.

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous. J.3 Life and Medical Sciences: Health. J.4 Social and Behavioral Sciences: Psychology.

INTRODUCTION

Because of the pervasiveness of mental health issues in the US and around the world, in addition to the complications arising from such conditions (e.g., cardiovascular disease, somatic injuries, gastrointestinal problems, etc.), much attention has recently been given to non-clinical solutions that might be useful to those needing it. In other words, researchers have been asking whether we can create mobile technologies that can complement, not replace, one on one dialog with therapists and caregivers in order to teach positive coping skills. We have been studying this problem for around 5 years now, and we believe that the answer to this question is a resounding “yes”, though the design of the solution is far from formulaic, and much work remains to be done.

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REFLECTIVE INTERFACES

We have designed several user experiences that were meant to be experienced by users as “reflective interfaces”. In other words, these applications were meant to provide the user with historical perspectives about their emotional states over time, and what they were doing while they experienced those states. For instance, AffectAura [1] showed the user their summary mood state hour by hour, alongside what applications they were using, what people they were in contact, where they were and what meetings they were in. AffectAura used a wide variety of sensors to accomplish the categorization of the user’s mood (Affectiva Q sensor, MS Kinect, webcam, speaker, GPS, PC activity logging and self-reports of the user’s mood). This led to a highly accurate system which users claimed was very valuable, especially after long periods of time might have passed. Users mentioned that they could easily make behavioral change decisions based on the visualized data, but that they preferred it be done in real time.

We therefore developed the BioCrystal [2], Textile Mirror[3] and MoodWings [4] to give real-time, reflective feedback, and these systems all proved useful for gathering data about what interventions users were and were not willing to share, and how reactive to make these systems in terms of how much attention they attract not only from the user but also from others who might be able to see the emotional state shown.

JUST IN TIME INTERVENTIONS

Another category of prototypes we designed was designated for Just In Time (JIT) interventions. In this category, we explored ParentGuardian [5] for parents of ADHD children, and Heart2Heart, a system for alerting your close friends, family and co-workers about when you are stressed and might need some assistance. For this category of designs, we learned that when the timing of the intervention is just prior to the apex of a stress event, a JIT notification can be very empowering in terms of teaching a positive coping behavior. However, if the system mistimes delivery of the JIT, the opportunity is lost for behavioral change moments.

SOCIAL MEDIA MASHUP AND INTERVENTIONS

We have also learned that interventions need to be personalized so that they are relevant to you, your context, and things that you already like to do. To this end, we developed PopTherapy [6], an application for a smartphone that can be accessed during high stress or depression

moments in order to learn positive coping activities that you like and that you think really help you. To make the suggested activities interesting, we married them to social media activities that people normally do anyway, like Facebook and Pinterest. Instead of mindlessly grazing your Facebook feed, for example, PopTherapy might suggest that the user go to their newsfeed and look for “3 things they are thankful for” out of Positive Psychology. However, machine learning was used to determine not only the intervention category that users’ personally preferred, but also in what contexts they wanted those activities. Using PopTherapy significantly reduced reported depression during the 4 week study but also the machine learning approach led to the report of significantly more positive (as opposed to negative) coping skills utilized during the study.

We have designed many other prototypes, but we think this is sufficient to demonstrate that we have applied multiple design solutions to this space and have come up with some simple lessons learned. Of course, there is still much work to be done in this space and we in no way claim to have solved the mobile, real time, intervention delivery problem for mental health and wellbeing.

LESSONS LEARNED

It didn’t take a very long study to see that users do not want to have to go to an “app” to get an intervention. Those most in need of help, for example, would typically drop out in just 1 or 2 weeks of a longitudinal study, unless they were highly motivated, like the parents of ADHD children. *We believe that a design is necessary that presents interventions JIT, without the user needing to leave whatever it is they are doing on their device.* This implies a delivery mechanism that is not too disruptive, yet gently nudges the user to partake in a useful activity that they prefer in that particular context. The advent of personal assistants like Siri, Cortana, and Google Now present great opportunities to deliver these suggestions, regardless of what the user is doing on their phone, for instance. *Machine learning techniques should be used to customize and leverage the user’s activity and context.*

We also have observed that users want the interventions to have a social component. In the PopTherapy longitudinal study, users strongly preferred interventions that included another human being as part of the activity. Since we know that strong relationships are highly correlated with wellbeing in life [7], *making interventions social seems to be a good rule of thumb in design.*

Some further lessons worth considering include: *giving direct feedback about a negative affective state without providing an accompanying coping strategy creates even stronger negative affect.; diversity and novelty of the suggested activities is crucial, and when designing a solution to a problem in this field, the designer should consider whether to intervention is to be used permanently or if it is something that should only be practiced for a short period of*

time before moving on to something new and more challenging (e.g., DBT skills).

Finally, ParentGuardian and PopTherapy provided data that showed that *interventions should be simple* (hence, easy to memorize), *stylishly designed* (i.e., pleasing to look at) and *fun to use or tied to something fun the user is going to do anyway* (e.g., Facebook). This makes the whole experience more likely to be something the user wants to partake in again, or even better, adheres the intervention to an existing habit. In fact, the parents who used ParentGuardian often found it enjoyable to consume the interventions at their leisure while their kids were performing after school activities. In this way, most of the parents had memorized the interventions by the end of the first week of the study, and felt well equipped to use them in the time of need with their child. Some of those parents are still using the app today, despite the study being over 2 years old now! In PopTherapy, users told us it was enjoyable to go to social media with a more mindful purpose.

CONCLUSION

We look forward to participating in this workshop and hearing about what other rules of thumbs intervention designers have developed over time in the area of health and wellbeing, and are happy to share our designs and visualizations with participants at the meeting. We believe that there is still a huge body of work needed in order to design interventions that users can use to grow positive coping skills over time, and as their interests come and go, as do their social networks and coping skillsets. To us, the three main challenges include, but are not limited to:

- Getting users to use your app or assistance the first time;
- Hooking users so that they continue to use your advice; and,
- Guiding long-term, behavioral change.

We look forward to learning from the workshop participants what best practices others have developed with regard to these challenges.

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