Module 2: Can the Use of Machine-Learning Prediction Models and Visuals increase User Receptivity? – An Optimization Trial

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1 Background

Just-in-time adaptive intervention (JITAI) is a framework to guide the design of mobile health interventions by providing the right type of support at the right time [1]. A crucial aspect of properly timing intervention delivery is to ensure that a user is receptive, i.e., able and willing to receive, process, and use the provided support [2].

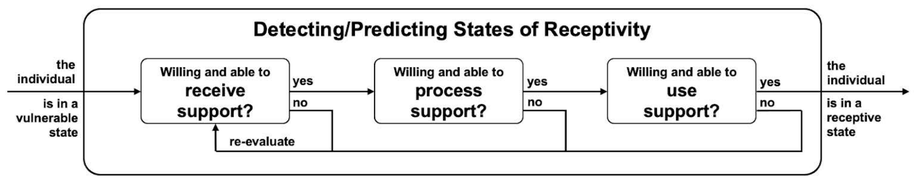

Figure 1: Key processes involved to determine receptivity to a just-in-time adaptive intervention.

Figure adopted from Keller et al. Chapter 8 Digital Therapeutics for mental health and addiction.

2 Objectives & Methods

While prior receptivity research has so far mostly focused on whether users are able to receive support, our study attempts to investigate whether and how users can also process and use the delivered support.

Using the holistic lifestyle intervention LvL^{UP} [3], we plan to conduct a micro-randomized optimization trial[4]. The LvL^{UP} app delivers two types of push notifications to the user within specific time windows each day. Our study hereby aims:

- To assess whether users are more receptive to interventions delivered at a time detected by a machine-learning model compared to a random time.
- To investigate whether the use of visuals in notifications can increase user receptivity compared to solely text-based notifications.

3 Machine Learning Models

The machine-learning models employ several contextual and personal features such as time of the day, battery status, physical activity, and user interaction to detect the users' state of receptivity in real-time [5].

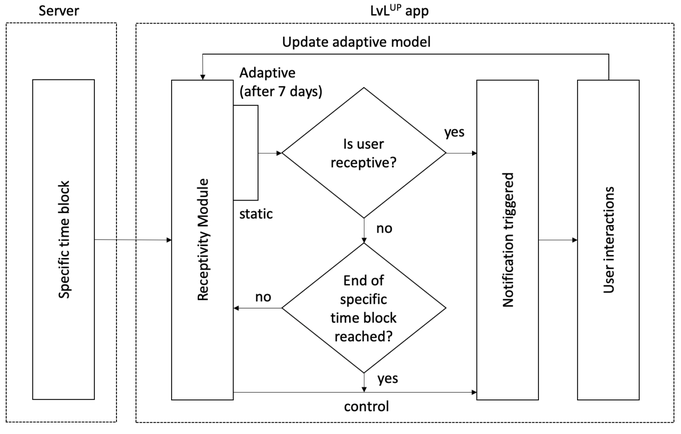

Figure 2: System design of the LvL^{UP} app notification feature.

4 Visuals

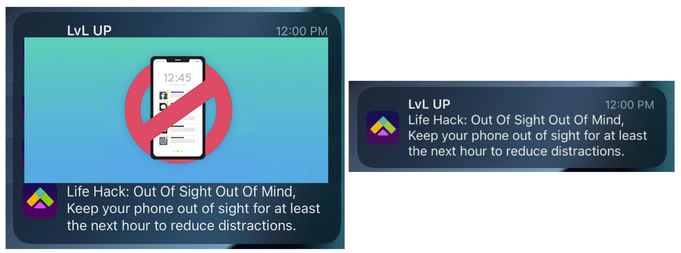

Figure 3: Comparison of the two visual notification conditions. On the left: lifehack notification with image and text. On the right: Lifehack notification with only text

5 Expected results

We expect that both intervention components, using machine learning models and visuals, will increase user receptivity in terms of receiving, processing, and using support. We further hypothesize that adaptive models perform better than static models and that socio-economic status mediates the effect of visuals on user receptivity.

6 References

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