

Addressing Barriers to Reflection in Physical Activity Tracking

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Physical activity tracking is one of the most common tracking activities [5]. While users make sense of their data, they reflect on their behaviours, learn and take action. However, this reflection process is not straightforward and can be hindered when users' expectations are unmet, which causes disappointment and reduces their motivation to keep tracking [4, 6]. Our work explores the impact of uncertainty on self-trackers' reflection, and proposes interventions to mitigate for uncertainty and leverage reflection.

We conducted an interview study to understand how uncertainty manifests in self-tracking and its effect on reflection. We found that users' unmet expectations could exacerbate uncertainty and hinder reflection [2]. Interestingly, uncertainty can facilitate reflection when self-trackers embrace adaptive strategies to reduce the discomfort of unmet expectations. For example, in order to make sense of their data, users explore relationships between their data and contextual factors. They also reconstruct their activities to recall events that potentially affect their data. Informed by these adaptive techniques, we implemented two interventions.

The first intervention is motivated by social cognitive theory, which states that expectations can moderate one's performance [3]. We conducted a mixed-methods study (N=14, four weeks) in which we trialled *FitReflect*, a physical activity tracking app to moderate self-trackers' goals based on their daily self-efficacy – i.e. their perceived confidence in achieving their physical activity goals [1]. We found that when *FitReflect* moderated their goals based on their perceived self-efficacy, users achieved their step goals more often and got closer to them. Also, users were more satisfied with their physical activity. Our findings suggest that incorporating self-efficacy in self-tracking and moderating the goals accordingly can help users to reflect on their goals and update them more frequently to adjust their capabilities to fluctuating routines.

In the second intervention, we trialled the *FitReconstruct* app to support activity reconstruction and reflection on physical activity data and goals through a combination of spatio-temporal and contextual cues. We ran a mixed-methods study (N=26, four weeks) where we found that fostering reconstruction did not influence goal achievement. However, it enhanced user satisfaction and enriched reflection by enabling users to acquire new knowledge about the factors that facilitate or hinder physical activity goals achievement.

Future research will examine different techniques to mitigate uncertainty in self-tracking by factoring users' past experiences, expectations and contextual patterns when presenting data-driven predictions of physical activity. Crucially we will explore how cognitive biases manifest as our studies suggest that self-tracking under uncertainty is prone to biased learning and decision-making.

References

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