A Gamified Mobile Application for Approach-Avoidance Tasks

Karim Aebischer

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Cognitive tasks and gamification have great potential for working in pairs. In the literature, cognitive assessments or trainings can be perceived as repetitive and boring, which can lead to inconsistent data and/or have a negative impact on the effects of the intervention. In addition, participants may lose engagement and drop out the experiment or therapy. In this work, we focus on a procedure for measuring cognitive biases called the approach-avoidance task (AAT). The most common design of the AAT is developed on a computer using a joystick to record the reaction time to perform approach-avoidance movements in response to a specific type of stimuli. During our reading of the literature, we found little research on implementing AAT on a smartphone and even less using gamification. Therefore, we decided to design and implement a gamified version of the AAT for smartphone. We hypothesized that successful gamification of an AAT can increase user engagement and motivation. Measurement of approach and avoidance biases would also be more reliable in detecting biases during AAT sessions marked by lower intra-individual measurement variability. The method we have chosen to achieve this objective consists of two main steps. In a first step, we developed two prototypes of AAT for smartphone. A so-called traditional variant based on pre-existing designs found in the literature. The other variant, called gamified, is based on the concepts of the previous prototype and adds game design elements to make the task more interesting and engaging. In a second step, we proceeded to an evaluation of the two prototypes on 25 participants. We compared the emotions (pleasure, arousal, dominance), the experience (competence, sensory & immersion, challenge) and the performance (reaction times, accuracy, approach bias) of the participants between the two prototypes. The results show that the overall experience of the participants is indeed better with the gamified prototype compared to its traditional variant. They also show no significant differences between the two prototypes that measured the same bias. These results reinforce the idea that gamification has a benefit through greater engagement and a better experience for delivering an approach-avoidance task on a smartphone. Future research should examine the application of this gamified prototype through approach-avoidance training that would allow modification of problematic cognitive biases. Also, the investigation of an even richer and more immersive gamification would be a notable contribution to this field.

Prof. Denis Lalanne