μEMA: Microinteractions-Based Ecological Momentary Assessments using a Smartwatch

Abstract

Ecological Momentary Assessment (EMA) is a method of in situ data collection for assessment of behaviors, states, and contexts. Questions are prompted during everyday life using an individual’s mobile device, thereby reducing recall bias and increasing validity over other self-report methods such as retrospective recall. We describe a microinteraction-based EMA method (“micro” EMA, or μEMA) using smartwatches, where all EMA questions can be answered with a quick glance and a tap – nearly as quickly as checking the time on a watch. A between-subjects, 4-week pilot study was conducted where μEMA on a smartwatch (n=19) was compared with EMA on a phone (n=14). Despite an 8 times increase in the number of interruptions, μEMA had a significantly higher compliance rate, completion rate, and first prompt response rate, and μEMA was perceived as less distracting.

μEMA: Overview

Interrupt more, ask less

μEMA uses only microinteractions to gather EMA data related to health behavior and context. All the survey prompts in μEMA (micro-EMA) are reduced to single questions with “Yes”, “No” type of answers. Between 8 AM to 8 PM, participants are prompted with more than 36 times in a day. Each interruption consists of only one single question, which can be answered as quickly as checking time on your watch.

Traditional smartphone-based EMA interrupts 6-7 times a day, whereas μEMA interrupts more than 8 times of traditional EMA.

μEMA was compared with traditional EMA in terms of study compliance, survey completion rates and response rates for first delivered prompts. In a between-subject experiment, participants responded to EMA prompts using traditional EMA and μEMA for a period of four weeks. This work only focuses on study engagement. Therefore, a survey from a prior study was used, which was a combination of Positive and Negative Affect Schedule (PANAS) and a physical activity questionnaire.

Results and Conclusions

• High compliance: μEMA participants were 1.25 times more likely to respond to a scheduled prompt
• High completion rates: μEMA participants were 1.35 times more likely to respond to a delivered prompt
• High response rates for first delivered prompts: μEMA participants were 1.65 times more likely to respond to a first delivered prompts

μEMA compliance and completion rates remain at a high value constantly for the four weeks. However, EMA compliance and completion constantly drop towards the end of the study.

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