Accuracy analysis of walking-triggered e-diaries to analyze person - place interactions during walking episodes of urban dwellers

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Introduction

Walking is positively associated with physiological and mental health. However, to investigate how physical and social environments shape individual experiences during walking episodes we need to develop sophisticated measurement approaches during everyday life.

Method

This study estimates sensitivity and specificity to investigate the accuracy of walking triggered e-diaries. This approach allows to gather real-time and real-life data of individuals, and to examine time-varying associations between environmental and individual factors.

The walking-trigger combines movement-acceleration (via accelerometers) and mobile positioning (via GPS and transmission towers) to track walking activities. On 10 consecutive days, the trigger starts an e-diary whenever a movement acceleration exceeds a predetermined threshold and participants' locations are identified as outside. Every 420 sec (+- 300 sec) repeated e-diaries were prompted if the trigger conditions were met. To estimate accuracy, we firstly investigate sensitivity by reconstructing walking routes objectively via GPS and calculated a percentage score for all triggered prompts in relation to all walking routes. Specificity was investigated by examine activity levels (self-reports and accelerometer) before the trigger prompted an e-diary.

Results

Data of 67 participants and 2258 e-diary prompts could be analyzed. Concerning sensitivity, the walking-trigger prompted an e-diary on 732 of 842 reconstructed walking routes (86.9%). Concerning specificity, in 69.5% of the triggered e-diaries participants self-reported that they were currently walking outside. Steps and acceleration movement were higher during these self-reported walking episodes compared to the ones participants denied being currently walking outside (steps: 106 vs. 32; g > .2 in 58.4% vs. 19%).

Discussion

The accuracy analysis revealed that walking-triggered e-diaries are suitable to collect data on individuals' current experiences in the very situations in which a person walks outside. Combined with environmental data, such an approach increases knowledge about person-place interactions and provides the possibility to gain knowledge about user preferences for health-enhancing urban environments.