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Exploring mechanisms of behaviour change in interventions using mobile technologies: new opportunities

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Purpose

The identification of mechanism of behaviour change is necessary for the systematic progression of physical activity (PA) and dietary behaviour research. The ability of mobile technologies to continuously collect a large amount of objective data on behaviours (e.g., PA levels and geographical locations) and self-report data on related psychosocial mechanisms (e.g., barriers to PA) in "real-time" has the potential to substantially advance our understanding of whether and how intervention strategies can change people's behaviour.

Methods

Using simulated data on a hypothetical mobile phone- and GPS-based PA intervention programme, three types of statistical models were used to evaluate the mediating role of barriers to PA. These were latent (growth curve) models, multilevel regression models and hierarchical dynamic linear regression.

Results

Although each statistical approach was able to identify perceived barriers as mediators of intervention effectiveness, latent growth curve and multilevel regression models could only give estimates of the average mediating effect of perceived barriers across the monitoring period. In contrast, hierarchical linear models provided information on temporal changes in the mediating effect of perceived barriers and on individual differences in such changes.

Conclusion

In order to develop effective interventions, we need to be able to identify mechanisms of behaviour change, understand their temporal patterns and identify psychosocial and situational factors that are responsible for individual differences in such patterns. Use of hierarchical dynamic linear models for analysing "real-time" data from mobile-technology-based intervention trials facilitates finding answers to these important yet unexplored issues.