

# Integration of BCTs in a Companion App to Support and Motivate Teenagers in the Adoption of Healthy Lifestyle Behaviours

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## Background

The Health Companion App is being developed as a user interface and “gateway” for teenagers to interact with a multi-technology system comprising wearable sensors, garments, a serious game, and other services, designed to help promote and encourage healthy lifestyle behaviours to prevent obesity in 13-16 year olds across Europe.\*\*

The design of Prototype 1 is underpinned by the motivational principles of self-determination theory, namely autonomy (responsibility for one’s own actions in achieving the target health behaviour), competence (gaining mastery through achievement), and relatedness (interpersonal connections with others). The multi-technology system as a whole will focus on the healthy lifestyle behaviours that have been identified as priorities for the prevention of overweight and obesity in teenagers by the World Health Organization. A series of systematic reviews were conducted to identify the most effective behaviour change techniques (BCTs) specific to each health behaviour for this target population and in the context of overweight and obesity. These BCTs were then operationalised within the suite of functions incorporated within the design of the Health Companion App.

The Health Companion App will be accessed via the teenager’s smartphone, and will act as 1) a “Personal Digital Friend”; with customisable settings for a single user, 2) a “Daily Life Guide”; accompanying them throughout their daily activities and providing feedback on daily behavioural targets, and 3) a “Coach”; to provide reminders, set behavioural plans, and to motivate and support them through the behavioural changes needed to achieve their health behaviour targets.

## Aims

To understand UK teenager’s preferences for functions designed to operationalise BCTs within the Health Companion App.

## Methods

A two-step, iterative, design approach was used to allow the research team to build on the findings of Phase 1 and utilise those results to inform Phase 2 and develop and refine the functionality of the Health Companion.

**Phase 1** –A structured evaluation of the first iteration prototype of the Health Companion application was conducted by sixteen UK teenagers aged 13-16 who were recruited for a day long workshop. The whole group was arranged into smaller groups in a round-table-style (n= 4-6) and reviewed the application in a semi-structured interview with one member of the research team facilitating the discussions at each table. The participants were each provided with a smartphone with the application installed and were asked to start the application and explore each of the different functions. During evaluation of the application the teenagers engaged in a verbal evaluation guided by a member of the research team using a topic guide. The topic guide was based upon the content of the application and used to elicit teenage views about the visual aesthetic and the range of functionality within the application and offered flexibility for the teenagers to explore additional topics themselves if not included in the topic guide.

**Phase 2** –A week-long trial of the Health Companion application prototype version 2 was conducted by ten teenagers aged 13-16. Participants were briefed at the start of the week to ensure their understanding of the application. At the end of the week, the participants took part in a focus group to examine their use of the Health Companion application and their perspectives of the functions that operationalised the BCT’s identified, including the aesthetics, usability, motivation for use, and levels of engagement throughout the trial.

## Results

The findings showed high acceptance of the Health Companion application as a central gateway to interact with the rest of the multi-technology system. Operationalisation of BCTs was shown to be acceptable, desirable, and well utilised by UK teenagers, for: goal setting (target behaviour self-selection and daily target setting function); feedback on behaviour, self-monitoring of behaviour and outcomes (daily/weekly/monthly performance feedback displays and health information/daily tips/ notifications); Information about health consequences (daily health facts SMS); prompts & cues (daily target reminders); incentives and rewards (badges are earned for goal achievement and displayed on feedback screen).

In addition, there was high desirability for the application functions that corresponded particularly to how feedback was presented and delivered, the use of avatar mini-companions to deliver performance feedback and motivational messages, and instant access to

feedback displays for health information, along with options for personalisation.

## Conclusions

Findings show that acceptability and desirability of Smart Companion App functions operationalising BCTs relating to aspects of motivation, increased self-efficacy, feedback on outcomes, incentives, prompts/cues, goal setting, self-monitoring, and information about health consequences. Results from further testing iterations over the next year will refine the PEGASO system functions and facilitate wider roll-out to allow cross-cultural exploration of the Behaviour Change Wheel and COM-B model (Michie et al 2011) as intervention design tools for healthy lifestyle behaviour change interventions in teenagers across Europe.

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