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# Beyond the novelty effect: The role of in-game challenges, rewards and choices for long-term motivation to improve obesity-related health behaviours in adolescents

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**Background:** The prevalence of adolescent obesity is high in the UK. Engaging adolescent boys and girls in health behaviour related to the prevention of obesity proves to be challenging. Mobile and wireless technology shows promise for increasing knowledge and motivation to increase physical activity and healthy eating by capturing the interest of many adolescents. However, solutions for overcoming the novelty effect to enable habit formation and thus long-lasting behaviour change needs to be explored. **Aim:** This study aimed to explore Scottish adolescents' perception of the usability and acceptability of a serious mobile game, wearable activity sensors and a smart phone eDiary application (app) for promoting physical activity and healthy eating. **Methods:** The game, sensors and app are being developed following the COM-B model of the Behaviour Change Wheel. The technology is interlinked in that physical activity tracked by the wearable activity sensors and healthy eating captured by using the eDiary app are central to recover the player's energy levels in the serious game. The player replenishes their in-game energy to progress in the game and to boost abilities. Applying a user-centred approach for developing the technology, 11 adolescents aged 13-16 years (6 boys, 5 girls) participated in semi-structured focus groups. This was the first of three pre-pilot study iterations. Mock-up versions of the serious mobile game, wearable activity sensors and the prototype of the eDiary app were presented. Focus groups were audio-recorded, transcribed and thematically analysed. **Results:** All adolescents responded positively to the general idea of the game and all were keen to play the actual game once developed. Adolescents understood the importance and novelty of the link between player's real-life health behaviours and in-game activities for improving obesity-related health behaviour. It became evident that the adolescents would only be motivated to be more physically active and eat healthily for the benefits of the game and not for improving their health and wellbeing. To increase their interest in the game, adolescents reported that they wanted to receive in-game rewards for engaging in health behaviour. A recurrent topic was the desire for more challenges in the game via introduction of new characters and environments. Another dominant topic was to have options of varying story lines, to reset the game

and to unlock secret levels. The adolescents believed that being sufficiently challenged and having choices would increase their interest in the game, keep them interested for longer and so this would encourage them longer to be physically active and eat healthily. Conclusion: Mobile game and wireless technology connecting in-game and real-life activities were perceived to increase physical activity and healthy eating in adolescents. To allow exposure to mechanisms of behaviour change for an adequate amount of time, the novelty effect of new technology needs to be sustained. Age-appropriate in-game challenges, rewards and choices might trigger adolescents' interests in the technology for longer. This in turn might result in long-lasting behaviour changes independently of playing the game.

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**Keywords:** Obesity Prevention, Adolescent Behavior, Smart Phone Application, serious game design, wearable sensors, Focus Groups

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