Behavior Change and Persuasion in Mobile Health Interventions: A Critical Literature Review

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About 1.9 billion people worldwide are considered obese; costing the world economy $147 billion and putting those people at a higher risk of mortality (Centers for Disease Control and Prevention, 2017; World Health Organization, 2018). Obesity as well as many of the chronic conditions are a result of a sedentary lifestyle and an unhealthy diet, among other factors (Lin et al., 2012). Adoption of new and healthy behaviors is a necessary condition to address this global challenge (Hilliard, Riekert, Ockene, & Phet, 2018).

Behavior change interventions have been investigated to provide additional support for individuals to adopt healthier behaviors (Hardcastle et al., 2015). Persuasion to engage in a particular action requires triggers at the optimal moment when the recipient is both capable and motivated to perform a new behavior (Fogg, 2009). Mobile Health (mHealth) apps serve as a popular platform for this purpose (Zhao, Freeman, & Li, 2016). Mobile phones are used by more than 68% of the world’s population, and can facilitate non-intrusive data collection (e.g. solicit readings, monitor user activity) as well as initiating interactions with users (e.g. reminders, educational messages) in a timely manner.

Recent research has found that users are receptive to such interventions (Loescher, Rains, Kramer, Akers, & Moussa, 2018); however it is not clear how to keep users engaged effectively over long periods of time—a critical requirement to transform healthy behaviors into habits (Lally, van Jaarsveld, Potts, & Wardle, 2010).

To address this issue, we conducted a literature review to understand what has been studied in the realm of behavior change intervention on mHealth platforms. Studies were retrieved by searching PubMed, Scopus, Compendex, and PsycInfo databases. After removing duplicates, studies were reviewed by title and abstract in order to apply the inclusion and exclusion criteria. Studies were included if they promoted persuasive design, used or developed a behavior change theory or intervention. Studies were excluded if they were not in English, did not involve mobile phones, or if they were not studied within the healthcare domain. A thematic analysis for latent concepts was then performed for the resulting 47 articles, which rendered 4 key themes: Conceptual Framework, Content Tailoring, Opportune Timing, and Adaptive Capabilities.

A Conceptual Framework constitutes the backbone of an intervention, guiding design via behavioral theories, digital behavior change models and behavior change techniques. By understanding the user’s current and target behavior, the system can be made to interact with the user in a way to achieve the required change (Mohr, Schueller, Montague, Burns, & Rashidi, 2014). Content Tailoring stresses the need to personalize any interaction with the user by including the user’s name and accounting for characteristics such as personality and persuasion profile. To make an interaction more effective, it needs to be initiated at the right time. Opportune Timing is thus another crucial design characteristic that relies on input to gather information about the user’s current state in order to generate a timely interaction when needed. Here, the just-in-time concept is utilized to send customized messages that encourage users to engage with the system. However, if a user’s engagement level drops, then there is no clear approach to know the underlying reasons and to tackle them appropriately. Consequently, the need for Adaptive Capabilities arises in order to account for any external or internal changes that affect the user’s behavior and adapt accordingly by changing set goals or targeting the specific bottlenecks.

Our results show that adaptive capabilities of behavior change interventions is in its infancy (Danaher, Brendryen, Seeley, Tyler, & Woolley, 2015) and a unified framework including all these themes needs to be developed and validated in order to achieve maximum potential for effectiveness. It seems that when a user fails to engage as required, little data is available to understand the contributing factors. It is important to further explore the factors influencing user engagement with an intervention and attempting to predict this relationship in real-time.

REFERENCES


Integrated Conceptual and Technological Framework for eHealth and mHealth Interventions. *Journal of Medical Internet Research, 16*(6), e146. https://doi.org/10.2196/jmir.3077
