Motivations for Mobile Health App Use: The Effect of Self-Efficacy on Why Users Utilize Apps

Elizabeth V. Eikey
Pennsylvania State University
323 IST Building
University Park, PA 16802
412-401-7699
exe145@ist.psu.edu

Erika Poole
Pennsylvania State University
321E IST Building
University Park, PA 16802
814-863-9467
epoole@ist.psu.edu

1. INTRODUCTION

Obesity is a major problem in the United States. According to the Centers for Disease Control and Prevention [2], 69.2% of adults are overweight and 35.9% are obese. There are a number of health risks associated with obesity, including type 2 diabetes and heart disease [2]. These conditions are costly. In fact, compared to people who are at a healthy weight, people who are obese spend on average $1,429 more on healthcare annually [2]. Thus, it is crucial to find ways to help people successfully lose weight and manage their health.

With the prevalence of smartphones and tablets, mobile health or mHealth is becoming increasingly popular. According to the U.S. Department of Health and Human Services [12], mHealth can be defined as the "use of mobile and wireless devices to improve health outcomes, health care services, and health research." While mHealth encompasses not only weight loss and maintenance but also medical conditions, we focus specifically on mHealth dealing with diet and exercise. In our study, mobile health apps refer to a program or piece of software on a mobile phone, cell phone, or tablet that allows people to track their diet, exercise, and nutrition (such as LoseIt, MyFitnessPal, WeightWatchers, etc.).

In spite of their increasing popularity, to our knowledge, little research has focused on the reasons why people use mobile health apps. In our study, we aim to uncover users' motivations for using mobile health apps and how these motivations may be affected by users' eating self-efficacy, exercise self-efficacy, and weight-related self-efficacy.

RQ: What is the relationship between users' self-efficacy (eating, exercise, and weight-related) and their motivations for using mobile health apps?

By exploring this relationship, we can promote user self-efficacy through design. Understanding these motivations may help us encourage long-term lifestyle changes through app use, which can lead to better health outcomes.

2. BACKGROUND AND RELATED WORK

Self-efficacy theory can give us insight into how a person's beliefs influence their ability to complete certain tasks [1]. Generally speaking, those with high self-efficacy are more likely to attempt goals and persist longer in those efforts than those with low self-efficacy [10]. We selected self-efficacy theory to help guide our research because it is highly cited as a key factor in successful weight loss and maintenance [5, 6, 11].

Other authors have used self-efficacy theory to better understand health behavior change and weight management [4]. For example, Strecher et al. [11] review a number of articles related to cigarette smoking, weight control, contraception, alcohol abuse, and exercise behaviors to get clearer understanding of self-efficacy's role in behavior change. They found a positive relationship between self-efficacy and successful health behavior change and thus believe self-efficacy should be considered when providing people with health programs and interventions [11].

Since self-efficacy is a crucial player in behavior change, it is an important aspect to consider. While self-efficacy theory has been used many times in the health context, to our knowledge, there is limited research on its application to mobile health apps.

3. APPROACH AND UNIQUENESS

In order to explore how self-efficacy influences users' motivations, we developed an online survey using Qualtrics and are recruiting 200 respondents through Amazon Mechanical Turk. Respondents were restricted to the U.S. and had to have used a mobile health app to participate. They were compensated $0.21 for approximately 10-15 minutes of their time.

The survey consisted of self-efficacy questions related to eating and diet, exercise, and weight. To measure eating self-efficacy, we used and adapted measures from the Eating Habits Confidence Survey [8] and the Self-efficacy for Eating Behaviors Scale [9]. For exercise self-efficacy, we used and adapted measures from the Self-efficacy for Exercise Behaviors Scale [9]. We selected these scales because they are established measures with high reliability. In order to measure weight-related self-efficacy, we developed measures similar to those in the previously listed scales but focused on reaching a healthy weight. For instance, we asked respondents to rate statements such as "I can achieve my weight-related goals." Each item was rated on a 7-point Likert scale (1-Strongly Disagree to 7-Strongly Agree).

Then we asked respondents questions related to their mobile health app use, including frequency of app use,

perception of health, perception of weight, and affect of app use, as we believe these may moderate the relationship between self-efficacy and motivations. Motivation measures focused on five primary factors that were derived from an unpublished preliminary, exploratory study. (We ran two factor analyses to determine these five distinct factors [Cronbach's $\alpha = .8710$ or higher].) These include:

- Functionality (ease of use, quick information entry, etc.),
- Social connection (seek support from others, compete with other, make friends, etc.),
- Consumption consciousness (measure caloric intake, portion out meals, track the amount of water consumed, etc.),
- Surveillance (measure Body Mass Index, log body fat percentage, track sleep hours, etc.), and
- Exercise consciousness (track calories burned from exercise, track the amount of time exercised, meet fitness goals, etc.).

Each item was rated on a 7-point Likert scale (1-Strongly Disagree to 7-Strongly Agree). Additionally, we included a few check questions to ensure respondents' answers are valid. At the end of the survey, we asked respondents for demographic information.

4. RESULTS AND CONTRIBUTIONS

4.1 Current Status

Preliminary results show five distinct factors as stated above. Currently, we are still collecting data. We have 176 respondents and aim to reach at least 200 by the end of March. In April, we plan to analyze the data fully by running a series of regressions and other tests using SPSS.

4.2 Contributions

The contributions of this work are two-fold. Designers can leverage the findings of this research to develop better apps that promote long-term mobile health app use. Users, on the other hand, will benefit by having mobile health apps that better suit their needs, and therefore, they will be more likely to persist in their efforts to be healthy.

One issue in combating the obesity epidemic in the U.S. is encouraging long-term lifestyle changes. Since self-efficacy is so important for users to persist in efforts to exercise, eat healthier, and lose weight, it is important to understand how this impacts the reasons users utilize mobile health apps. Mobile health apps are a promising intervention, but how can we promote long-term lifestyle changes through these apps?

We suspect that these motivations will differ for people who have high, low, and moderate levels of self-efficacy. In addition, we believe a user's perception of health and weight may also influence this relationship and therefore his/her motivations.

We believe the design and features of mobile health apps can influence a user's belief in their abilities, which is consistent with literature stating that reducing the amount of effort users have to exert [13] and guiding them through a systematic process to complete tasks can increase their self-efficacy [7]. Choe et al. [3] examined how framing influenced self-efficacy. Specifically, they altered the valence, presentation type, and data unit of the feedback. They found participants had higher self-efficacy when information was presented as how many steps a participant "achieved" and when it was presented as text-only.

If we can uncover the factors that influence these motivations, we can find ways to promote self-efficacy through design. We can also develop a more personalized health app experience by focusing on aspects of mobile health apps that best promote specific types of self-efficacy for certain types of users. This research is good first step at understanding these motivations and what affects them.

5. ACKNOWLEDGMENTS

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6. REFERENCES

[1] Bandura, A. 1977. Self-efficacy: toward a unifying theory of behavioral change. *Psychological Review*, *84*(2), 191. doi: 10.1037/0033-295X.84.2.191

[2] *Centers for Disease Control and Prevention (CDC)*. 2013. Overweight and obesity. Retrieved from http://www.cdc.gov/obesity/data/adult.html

[3] Choe, E.K. et al. 2013. Persuasive performance feedback: The effect of framing on self-efficacy. *AMIA* (Washington, D.C., 2013), 1–9.

[4] Clark, M.M. et al. 1991. Self-efficacy in weight management. *Journal of Consulting and Clinical Psychology*, *59*(5), 739–44. doi:10.1037/0022-006X.59.5.739

[5] Edell, B.H. et al. 1987. Brief report: Self-efficacy and self-motivation as predictors of weight loss. *Addictive Behaviors*, *12*, 63–66. doi: 10.1016/0306-4603(87)90009-8

[6] Elfhag, K. & Rössner, S. 2005. Who succeeds in maintaining weight loss? A conceptual review of factors associated with weight loss maintenance and weight regain. *Obesity Reviews: An Official Journal of the International Association for the Study of Obesity*, *6*(1), 67–85. doi:10.1111/j.1467-789X.2005.00170.x

[7] Fogg, B.J. 2003. *Persuasive technology using computers to change what we think and do*. Amsterdam: Morgan Kaufmann Publishers.

[8] Sallis, J. 1996. Eating habits confidence survey. Retrieved from

http://sallis.ucsd.edu/Documents/Measures_documents/Selfefficacy_diet.pdf.

[9] Sallis, J.F. et al. 1988. The development of self-efficacy scales for health-related diet and exercise behaviors. Health Education Research, 3, 283-292.

[10] Schunk, D.H. 1990. Goal setting and self-efficacy during self-regulated learning. *Educational Psychologist*, *25*(1), 71-86. doi: 10.1207/s15326985ep2501_6

[11] Strecher, V.J. et al. 1986. The role of self-efficacy in achieving behavior change health. *Health Education Quarterly*, *13*(1), 73–92. doi: 10.1177/10901981860130010

[12] *U.S. Department of Health and Human Services.* n.d. mHealth. Retrieved from http://www.hrsa.gov/healthit/mhealth.html.edu/selfefficacydiet.pdf

[13] Yoganathan, D., & Kajanan, S. 2013. Persuasive technology for smartphone fitness apps. *Proc. of PACIS '13.* Paper 185. Retrieved from http://aisel.aisnet.org/pacis2013/185.