Exploring Users' Creation of Personalized Behavioral Plans

Jisoo Lee

School of Arts, Media + Engineering, Arizona State University, Tempe, AZ 85281
jisoo.lee@asu.edu

Erin Walker

School of Computing, Informatics, and Decision Systems Engineering
Arizona State University, Tempe, AZ 85281
erin.a.walker@asu.edu

Winslow Burleson

School of Computing, Informatics, and Decision Systems Engineering, Arizona State University, Tempe, AZ 85281
winslow.burleson@asu.edu

Eric B. Hekler

School of Nutrition & Health Promotion, Arizona State University, Phoenix, AZ 85004
ehekler@asu.edu

Abstract

As an initial effort in developing tools that support users' creation of their own behavior-change plans, we conducted a formative user study. We intended to explore people's creation of plans for their own behavioral goals, with minimal support to facilitate their goal-setting, implementation of behavior-change techniques, and self-monitoring. In this paper, we present lessons that we obtained from this initial study, and insights on shifts in our design tools for a follow-up formative study currently underway.

Author Keywords

Behavior change; Goal-setting; Personalized behavioral plan; Self-tracking

ACM Classification Keywords

H.5.m. Information interfaces and presentation (e.g., HCI): Miscellaneous.

Introduction

Previous research suggests that the primary reason people self-track is to support *behavior change*, or better lifestyle choices such as losing weight or spending less [1][4]. Self-tracking and reflection is one important behavior change technique, but there are several other techniques that can be used to increase

the potency of interventions [5]. At present, the choice on which other behavior-change techniques to utilize is often chosen for an individual by the technology they use. For example, someone using a Fitbit will be provided with a static goal-setting option (e.g., 10,000 steps per day), an opportunity to share steps with others via a leader board, and historical data to foster self-reflection. Not only is there only a limited number of behavior-change techniques available to the person, the exact design of the techniques is largely controlled by the developer of the technology, not the individual using it. An under-explored topic that is in line with the current DIY culture within personal informatics and quantified self communities is the exploration of tools that could help individuals develop their own personalized and temporarily adaptive behavior change solutions. Metaphorically, the current approach is more akin to giving them a fish (i.e., fully developed behavior-change intervention) vs. teaching them how to fish (i.e., tools to support creating and customizing a personal behavior-change plan).

The purpose of this line of research is to develop tools that can support users' in developing their own personalized and adaptive behavior-change plans. To achieve this goal, we conducted an initial formative user study among 11 individuals using a low-fidelity prototype (i.e., powerpoint presentation) to guide individuals through the process of developing their own behavior change solutions over a preliminary two week period. In this formative study, our goal was to explore people's creation of their own behavior change plans for reaching their behavioral goal, with minimal support provided to them via design support tools to facilitate: (1) setting a specific goal; (2) creating personalized implementations of behavior-change techniques; and (3)

supporting self-monitoring. In our first formative study, we aimed to answer: (1) What is the impact of these three resources for creating a behavior-change plan, (2) How might the resources be used differently after one week of engaging in attempting to enact the behavior-change plan with self-monitoring? (3) What difficulties did our participants have with incorporating these ideas into their behavioral plans? This paper summarizes lessons learned in this initial study and provides insights on shifts in our design tools for a follow-up formative study currently underway.

Study design

Participants were a convenience sample (N=11; 9 female and 2 male) of college students at a large US university. Ages ranged from 18-39. Participants were asked to participate in three sessions over a two week period, and received an Amazon gift card after each session for participation. By design, the sessions were delivered by individuals with no formal training in providing behavioral counseling to ensure clinical training did not contribute to any potential effects of the session design. The three sessions largely follow the same general format with two added components only in session 1. In session 1 only, participants were asked to think about a behavioral goal to work on, provided a prompt to think about a recent New Year's resolution (e.g., eat better), and asked to simply write down their behavioral goals. Following this, in session 1 only, they were then provided with several domains to consider (health, self-development, work, etc.) to try and expand their thinking. All material after this point was common with only minor tweaks made to phrasing between session 1 and sessions 2/3. In all sessions, individuals were asked to develop more specific goals for the behavioral goal (e.g., eat less fried food). After

this exercise on goal-generation, participants were asked to select a specific goal to work on for the next week. After the goal was selected, individuals were prompted to create a specific behavior plan via the following prompt: "How will you reach your goal? Specify what you will do, when you will do it, and how". After going through this exercise, they were asked to tell about their past experience regarding the chosen goal, which was followed by generating further ideas or rewriting their current plan ideas, based on their reflection. After this ideation with the past experience, a set of 13 behavior change techniques that covers most categories identified in the behavior-change techniques taxonomy [5] were taught to the participants and participants were asked to choose three techniques to incorporate into their further ideation. Once they finalized their behavioral plan, the researcher presented two options for self-tracking: structured and unstructured. Participants who chose the structured journaling came up with questions to answer. The unstructured journaling was a free-flow of thoughts and ideas. In both types, participants chose specific times of day to do their journaling.

Initial Results

Conducting the study and brief analysis of results, we found four primary issues with our initial support tools.

Goals and plans were not specific enough
We found the participant-generated goals and plans too vague to be actionable by most individuals. Although the prompt to think of sub-goals was effective in leading participants to transform goals into more specific forms, the ideas were not specified enough to really make them actionable. Related to the plans, the majority of individuals developed plans that included

many vague and hard to enact components. Based on this, the most common complaint about the strategies they came up with was that they "burned out" trying to achieve them. While goals and plans became more specific during meetings 2 and 3 based on their previous experience, most individuals still found it difficult to enact the new behavioral goals.

Dominance of initial ideas
In designing the user study, we assumed that participants would develop more sophisticated plans as new support tools were provided to them during the session (e.g., new behavior-change techniques provided) and over the sessions. Counter to expectations, the majority of individuals tended to enact and stick with the initial idea they generated to enact at the beginning of each session. That said, past experience with trying to enact the behavior plan did tend to elicit changes in techniques used (see below).

Natural reflection on the past experience was powerful
When participants were asked to think about their behavioral plans relative to past experience, they tended to improve upon their ideas. This was particularly true during Sessions 2 and 3 as participants immediately reflected on the past week (or past two weeks) when asked to revise their goals/plans.

Less engaged with behavior-change techniques
While participants expressed that the techniques served as a helpful reminder of tools that they could utilize, we found that our provision of techniques was not successful in leading participants to generate rich ideas. Frequently, the behavior-change techniques served as a way for participants to give labels to elements they had already implemented. Every participant changed at

least one behavior change technique after the first week, while most changed two or three. Very few individuals attempted to tweak the technique they initially chose to try and make it work better.

Implications for Future Research

Based on results from this initial study, the team is developing a revised protocol that they plan to implement to try and facilitate more specific goals/plans, reduced influence of the first idea on what to implement, increased utilization of self-reflection to support the behavior-change process, and a rework on how best to present behavior-change techniques.

As of this writing, the revised protocol is still under development. That said, the current modified procedure includes some of the following tweaks. First, to support better specified goals, participants are provided with the SMART goal [3] concept (i.e., Specific, Measurable, Actionable, Realistic, and Timely). Reflection on the past experience will be utilized more often throughout the process as a benchmark for judging the quality of a goal as well as the appropriateness of the behavior-change technique chosen. To help reduce the impact of the dominance of the first idea, behavior change techniques are now provided right after setting a "SMART" goal.

To improve upon the teaching of behavior-change techniques, lessons from Fogg's behavior model and Michie's COM-B model, are combined to provide individuals with a model for choosing the best behavior-change technique [2][6]. In line with our goal to metaphorically "teach how to fish," the inclusion of this hybrid model, which emphasizes that a behavioral problem may be occurring because of a lack of the

opportunity to do it, trigger for enacting it, ability to do it, and/or motivation to do, is meant to provide individuals with a model to support self-diagnosis on the core behavioral driver of the problem and thus come up with better solutions. The group will continue to iterate on supporting the creation of personal behavioral plans based on lessons learned from these initial formative studies.

Acknowledgement

References
[1] Choe, E. K., Lee, N. B., Lee, B., Pratt, W., & Kientz, J. A. Understanding quantified-selfers' practices in collecting and exploring personal data. *Proc. the 32nd annual ACM conference on Human factors in computing systems*. ACM (2014), 1143-1152.

[2] Fogg, B. A behavior model for persuasive design. *Proc. the 4th International Conference on Persuasive Technology - Persuasive '09*. ACM (2009).

[3] Latham, G. P. Goal Setting: A Five-Step Approach to Behavior Change. *Organizational Dynamics, 32*, 3 (2003). 309-318.

[4] Li, I., Dey, A. K., & Forlizzi, J. Understanding My Data, Myself : Supporting Self-Reflection with Ubicomp Technologies. *Proc. the 13th international conference on Ubiquitous computing*, ACM (2001), 405–414.

[5] Michie, S., Richardson, M., Johnston, M., Abraham, C., Francis, J., Hardeman, W., Wood, C. E. The Behavior Change Technique Taxonomy (v1) of 93 Hierarchically Clustered Techniques: Building an International Consensus for the Reporting of Behavior Change Interventions. *Annals of behavioral medicine: a publication of the Society of Behavioral Medicine, 46*, 1 (2013), 81–95.

[6] Michie, S., van Stralen, M. M., & West, R. The Behaviour Change Wheel: A New Method for Characterising and Designing Behaviour Change Interventions. *Implementation Science, 6*, 1 (2011), 42.