Digital Memory Notebook: Experimental Evaluation of Motivational Reward Strategies

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INTRODUCTION

Background
An estimated 5.4 million Americans are diagnosed with AD, with rates on the rise. With this comes an increased need for methods to automate caregiving tasks such that we can reduce the costs and burden associated with caregiving [1]. A Digital Memory Notebook (DMN) can help individuals record independent activities of daily living, and prompting technology can help users remember to write in the DMN [2]. Previous work has shown that prompts delivered during activity transitions are more effective than prompts delivered at specific time intervals [3].

Purpose
We aim to show that a simple scalable reward can further increase compliance to transition-based DMN prompts. We test both a gain-on-compliance and loss-on-noncompliance model to determine which reward structure better fits this environment.

METHOD

Participants and Procedures
- 48 undergraduates (Mean age = 19.96, range = 18-24) performed twelve randomly-ordered activities in a Smart Apartment on the WSU campus.
- Participants were asked to record their completed activity after being prompted by a voice message from the DMN. There were a total of 11 voice message prompts issued from the DMN, each prompt issued between each activity completion.
- Two experimenters recorded the participants’ activities, delivered prompts, recorded use of the DMN and launched the Sudoku by using Real-Time Annotation (RAT) in the control room in the Smart Apartment [4].
- After activity completion a Sudoku puzzle (obtained from the Google Play Store) was generated through the DMN for which the participant had up to 30 minutes to complete.
- Participants were given a questionnaire assessing demographic information, the prompting interface, and reward motivation (see Figure 3).

Technology Design and Implementation
- DMN: Samsung Galaxy Note tablet 10.1
- Extended RAT interface with features for Sudoku launch and compliance tracking. Extended Android interface with progress bar which showed participant’s compliance.
- The participants were informed of their progressive compliance via Android notification sound (whistle).

RESULTS

Figure 3: Questionnaire Information on Technology

Figure 4: Compliance Rate Between Each Condition

Figure 5: Compliance Rate Between No Reward and Reward Conditions

CONCLUSIONS

- Use of our simple scalable motivation reward (Sudoku puzzle) demonstrates an increase in compliance to record daily activities in the DMN.
- While the take-away condition was the only one that significantly increased compliance over the no reward condition, the standard condition still had a higher compliance rate than the no reward condition.
- Although the reward condition (solving an ‘easier’ Sudoku puzzle) has shown to increase the compliance rate of recording activities in the DMN, the length of the current study is too short to decide which model outperforms the other in terms of the compliance rate over an extended period of time.

FUTURE WORK

- Measure the effect of adaptive reward types to sustain the compliance over a longer period of time.
- 4 participants will wear a Fitbit Flex wristband for 6 weeks, with different reward types designed to motivate individuals to move more.
- Record average daily number of steps during the first week and set an increased daily number of steps as a goal for the next 5 weeks.
- Introduce a new reward type after failure to maintain the goal level of participant’s movement.
- We aim to measure the extent to which switching a reward type can return the participant back to their goal-defined compliance level.
- We will integrate the most sustaining reward type with the DMN in the smart apartment.

REFERENCES


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