

# Influence of Social Factors on Personal Budgeting under Mobile Conditions

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## ABSTRACT

Personal financial management services have gained a lot of popularity in recent times. One of the primary advantages of such services is that they allow users to see a consolidated picture of their expenses. The past few years have also witnessed the rise of social games and their influence on human behavior is an active area of research. We present an experiment to compare the effectiveness of a mobile phone based personal budgeting application under two conditions, one with a social gaming element attached to it and one without. The two versions of the application were compared using a between-subjects study with 16 individuals conducted over a period of two weeks. Our experiment showed, with statistical significance, that people using the social version of the application saved more money as compared to the other group.

**ACM Classification:** H5.3 [Information interfaces and presentation]: Group and Organization Interfaces – *Computer-supported cooperative work, Evaluation/Methodology*.

**General terms:** Human Factors, Economics, Measurement

**Keywords:** Personal budgeting, social gaming, collaboration, competition, mobile

## INTRODUCTION

Financial logging and management services such as Mint[1] have gained a lot of momentum in the past few years. Recent research also suggests that having a conscious knowledge of your expenses and also a medium – with the right form of representation and categorization of expenditures – through which you can go back and review your financial activity, has a noticeable effect on people in terms of their spending behavior [2]. On a different track, [3] suggests that collaboration among individuals is a mutually beneficial activity and [4] shows that competition in

a mobile casual game can be a big motivator for the user. Inspired by these two ideas, we investigate the efficacy of social gaming in a personal budgeting application. With this experiment we wish to see if putting a social construct into the act of expense logging will help people save more money.

## DESIGN

We developed two versions of a native iPhone application. The first version was an individual diary that allowed the user to record all expenses that fall into one of three categories: *Food, Entertainment, Groceries*. The second version included everything from the first version, and in addition allowed users to chat with people in their group to discuss possible avenues for saving money. It also included a scoreboard to facilitate competition with other groups.

We chose to implement a native application rather than a web application because of its faster loading time and accessibility in the absence of a network connection. As suggested by work done in [5], we tried to make the process of entering an expense as short as possible. The user only needed to enter a number corresponding to the amount spent, and choose one of the three categories. The date was set to the current date by default. Any detailed description was optional and left to the user’s discretion.

## STUDY METHODOLOGY

We employed a methodology inspired by [6]. We conducted a two week study with 16 participants (13 male, 3 female). All participants were college students, 11 graduate students and 5 undergraduate.

### Week One

All participants were given the first version and asked to use it for one week to enter their expenses. This part of the experiment was primarily designed to give us a baseline to quantify every participant’s savings for the second week. At the end of the first week, all participants were asked to send us their totals in each category.

### Week Two

We selected 9 participants and divided them into 3 teams of 3 people such that every group’s total expenditure for the first week was roughly equal. Thus, each team had a mix of big and small spenders. Every team was assigned a team name. As soon as any team member entered an ex-

pense, it was normalized by the first week’s average expenditure and added to the team score, which was updated immediately on the scoreboard. The scoreboard also displayed a golden trophy cup that constantly shifted to the team with the lowest score at that point of time. Team members could interact with each other on a chat forum built into our application. The remaining 7 participants continued with the earlier version. All participants were asked to send us their total expenses in each category after week two.

As suggested by [7], we sent reminders to participants every 3 days over the course of our study to ensure that all expenses were recorded.

### RESULTS AND DISCUSSION

We proposed the following hypothesis:

H: Incorporation of social elements such as collaboration and competition into a personal budgeting application will contribute positively towards a user’s savings.

On a Likert scale of 1-5 participants gave an average of

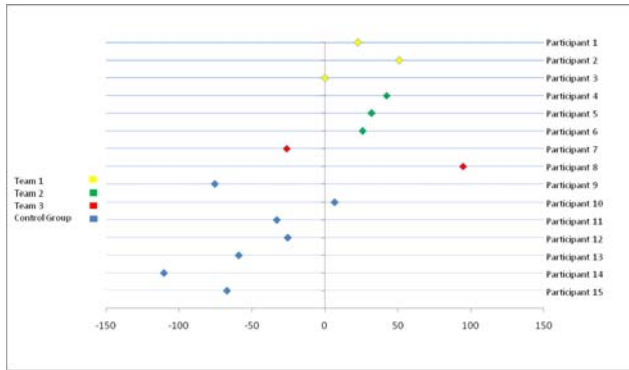


Figure 1: Percentage savings over the two weeks for each participant across all categories. Points on the right of 0 are participants who saved money. Points on the left of 0 are participants who spent more money in week 2.

3.86 when asked if they ever felt the need to save money in the past. Participants in the individual version averaged \$51.83 more spending in week two ( $\sigma = \$38.14$ ) while the participants in the social version of the application averaged \$29.77 of savings ( $\sigma = \$33.38$ ). We believe that application habituation could have been one of the reasons contributing to the increased spending by participants in the control group. A total of 6 out of 7 people from the control group spent more money in the second week. One out of 9 participants from the experimental group spent more in the second week, 1 person remained unchanged and 1 person dropped out of the experiment. We analyzed the results as a paired sample 2-tailed t-test (Figure 1) and found that the reduction in expenses by the introduction of social aspects such as collaboration and competition into personal budgeting under mobile conditions was statistical-

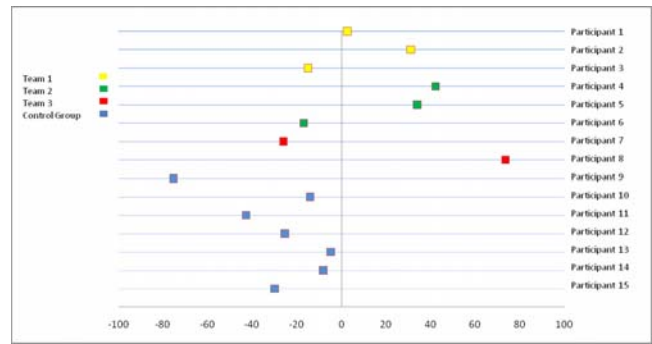


Figure 2: Percentage savings over the two weeks for each participant in the food category.

ly significant when compared to the control group which was not exposed to these social aspects ( $t = 2.75, p < 0.05$ )

Among the three categories – food, entertainment and groceries – participants saved the most in food (Figure 2). A possible reason for this could be the fact that all of our participants were college students, whose regular expenditures fall into the food category. In particular, 11 out of 16 participants did not spend anything on entertainment and 11 out of 16 participants did not spend anything on groceries either on week 1 or week 2.

Because of the nature of the study we were not able to get statistical significance on which of the two, collaboration or competition, was a bigger motivator so we asked participants from the experimental group to compare and rate both these aspects of our application in a post-hoc anonymous survey. Two participants felt that competition was a bigger motivator, 1 felt that collaboration had a bigger impact while 1 person felt that both were equally motivating.

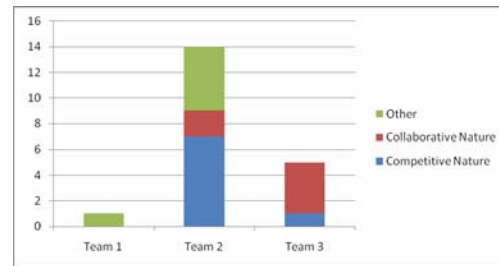


Figure 3: Distribution of chat log entries excluding moderator comments.

### Chat Logs

Participants averaged 4 out of 5 on a Likert scale when asked whether or not they felt comfortable chatting with their team members. However, our chat log analysis indicates that, in general, participants were not very talkative. Team 2 had the maximum number of posts with the majority of them being competitive in nature such as “We are first. Keep it up” and “Come on team”. In the end, Team 2

won the competition although this might have been coincidental.

### **User Input**

Despite the fact that we tried to minimize user effort to enter an expense some participants felt that this process was “cumbersome”. Other participants said that sometimes, they did not enter their expenses right away. For future work we plan to automate the process of inputting an expense by tracking the user’s credit card activity but at the same time allowing the user to add expenses which were paid in cash.

### **FUTURE WORK**

To better understand the effects of less frequent expenses, such as groceries and entertainment, we plan to lengthen our study to a few months. Future work might also explore the possibility of recruiting more participants which will allow us to isolate competition and collaboration in order to investigate which of the two is more effective in terms of motivating people to save money. As mentioned above, we might look into automating the process of expense entry.

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### **REFERENCES**

[1] Mint, [www.mint.com](http://www.mint.com), June. 5 2010

[2] Seymour Sudman, Robert Ferber, Experiments in Obtaining Consumer Expenditures by Diary Methods, *Journal of the American Statistical Association*, Vol. 66, No. 336, December 1971, pp. 725-735.

[3] Rimmershaw, R., 1999. Using conferencing to support a culture of collaborative study. *Journal of Computer Assisted Learning* 15 3, pp. 189–200.

[4] Li, K. A. and Counts, S. Exploring social interactions and attributes of casual multiplayer mobile gaming. In *Proceedings of the 4th international Conference on Mobile Technology, Applications, and Systems and the 1st international Symposium on Computer Human interaction in Mobile Technology* ACM Press, New York, NY, 2007, p. 696-703.

[5] Brandt, J., Weiss, N., and Klemmer, S.K. txt 4 l8r: lowering the burden for diary studies under mobile conditions. In *CHI Extended Abstracts 2007*, pp. 2303-2308.

[6] Vaiva Kalnikaitė et al., Now Let Me See Where I Was: Understanding How Lifelogs Mediate Memory, *CHI 2010*, ACM Press, Atlanta, GA USA, April 2010, p.2045-2054.

[7] W. F. F. Kemsley and J. L. Nicholson, Some Experiments in Methods of Conducting Family Expenditure Surveys, *Journal of the Royal Statistical Society. Series A (General)*, Vol. 123, No. 3 (1960), pp. 307-328.

[8] Luis von Ann, Laura Dabbish, Designing Games with a Purpose, *Communications of the ACM*, Vol. 51, August 2008, p.58-67.

[9] Hardy, C., Phillips, N., Lawrence, T.B., Resources, knowledge and influence: the organizational effects of interorganizational collaboration, *Journal of Management Studies*, Vol. 40 No.2, 2003, p. 321-47.