

Exploring the Persuasiveness of “Just-in-time” Motivational Messages for Obesity Management

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Abstract. The healthcare industry in the United States is going through major challenges in terms of financial and human resources. One of the preferred ways to address this issue is to develop effective prevention systems so that the people can live healthy lives and in turn minimize the use of the medical system. Preventing diseases requires people to adopt healthy lifestyles. Advances in pervasive technology provide promising opportunity in developing such systems. Specifically, sending “just-in-time” motivational messages to help people make right health related decision has been pointed out as an emerging field of research. However, in order to persuade the users to take a healthy action, it is essential that the “just-in-time” messages are persuasive to the recipients. In this study, we explored persuasiveness of such messages by considering two of the five elements of a communication process with a focus on obesity management.

1 Introduction

The United States is facing an impending crisis to reduce its ever increasing cost of providing healthcare and serving an aging baby-boomer population [1]. Moreover, obesity and being overweight, which are the risk factors for many chronic diseases and disabilities, are increasing among adults and children [2]. However, obesity is preventable by changing one’s behaviors related to eating healthy and being physically active. Recent scholars have proposed the use of pervasive technology to send “just-in-time” motivational messages for such behavior change [3]. Sending “just-in-time” information means sending reminders or messages to a person at the time and location of the event in order to assist the person in making appropriate health-related decisions. For example, when a person is at a restaurant, a message can be sent suggesting healthy meal options. A framework called Healthy Lifestyle Management Information System (HLMIS) to guide the development of such an information system was presented in Maheshwari et al [4]. Our research explores the persuasiveness of such messages by considering five central elements of a communication process: a source, a message, a channel, a receiver, and a destination [5]. In this short paper, we report our results on the first two elements i.e. a source and a message.

The first element refers to the source of a message. It is apparent that if a message originates from a source that is an expert or trustworthy, it is likely to influence the recipient. For an HLMIS to be effective, the users should find the system as credible

as a healthcare expert. The study investigates the credibility of the information system by comparing how the recipients would respond to the messages received via interactive media versus the messages received from a healthcare expert. The second element of the communication process is a message. The language of a message is a very important factor. As described by Bettinghaus [5], there are plenty of strategies to add appeal in the content of a message. For example, the messages can be made appealing by adding an element of fear or emotion in the content. In this study, we divided the messages into four categories based on the inherent nature of the actions indicated in the messages. The categories are: a) messages with negative enforcement, b) messages asking for activities that require substantial effort, c) messages asking for simple activities, and d) messages suggesting equivalent healthy alternatives. Further, we investigated how these different message categories appealed the users.

2 Research Methodology

A survey was conducted to understand the persuasiveness of the messages. The survey instrument consisted of a questionnaire and it was carried out among the students at our university. The participants were presented thirty one messages (See Table 2, <http://wfs.cgu.edu/chatters/home/persuasive2008.htm>) that can appear on their cell phones and they were asked how they would respond to such messages. To understand source credibility, the questionnaire was divided into two parts. Half of the participants taking part in the survey were given part 1 and the other halves were given part 2. Part 1 asked the participants to assume that they received the messages through their cell phones, while part 2 asked the participants to assume that they received the messages from health care experts such as a doctor, a nurse and a dietitian. Besides, the messages in both the parts belonged to four message categories described above.

3 Results

Ninety nine students took part in the survey. All the tables depicting results are available at: <http://wfs.cgu.edu/chatters/home/persuasive2008.htm>. Table 1 depicts the sample characteristics (57.6% are males, 42.4% are females). The scale to measure the likelihood of the response was 1 to 5 representing very unlikely to very likely respectively. The first analysis was two-tailed independent samples t-test to measure source credibility with two groups: a) participants who were asked to assume that they received the messages from a health care expert, and b) participants who were asked to assume that they received the messages on their cell phones. Table 2 represents the results of the independent samples t-tests. A portion of Table 2 is depicted below in Figure 1. The independent sample t-tests for the thirty-one messages resulted into seven significant mean differences ($p < 0.05$) between the two groups and three marginally significant mean differences (p close to 0.05) between the two groups. Equal variances were not assumed for the significance.

Message	SMS Mean (SD)	Expert Mean (SD)	t	df	p
When you get a chance, just go up and down the stairs a few times.	2.92 (1.16)	3.44 (1.24)	-2.14	91.20	0.035
Good Morning! Please include some fruit in your breakfast.	3.33 (1.28)	3.91 (0.97)	-2.56	96.32	0.012
Do not take butter in breakfast today.	3.02 (1.37)	3.69 (1.20)	-2.60	96.70	0.011

Fig. 1. Independent Sample T-test: Comparing Source Credibility

Further, as mentioned in the section one, four message categories were created out of the thirty-one messages based on the inherent nature of the messages. Cronbach’s alpha was employed in order to measure the reliability of the categories. All the alphas (see table 3) are higher than 0.80. Table 4 compares the responses to the content of the four message categories. A portion of Table 4 is depicted below in Figure 2.

No	Message	Mean	SD
1	Drink water (Assume that you have water with you).	4.11	0.97
2	Get some fresh fruits and vegetables. It will help you make healthy lunch and snacks.	4.05	1.05
3	Please avoid regular soda today and get water or diet soda	3.93	1.18

Fig. 2. Response to the Messages

4 Discussion

As mentioned in the results section, only ten out of the thirty one messages had significant or marginally significant mean difference in their responses from both the groups, however, it would be an overstatement that the participants found the messages received on their cell phones as credible as the ones from a healthcare expert. Further, out of the thirty-one messages twenty-nine messages had higher means for experts and two messages had higher means for SMS (Table 4). We statistically tested it with a binomial test and it can be concluded that the higher response to the messages from an expert was not random. The second analysis of the study involved investigating the difference in the response to the content in the four message categories described above. Fourteen out of the top fifteen means belonged to the messages that fall in the two categories: a) Messages asking for simple activities, and b) Messages suggesting equivalent healthy alternatives. Based on this finding, we can say that the content of “just-in-time” motivational messages should not include negative enforcement and complex activity suggestions. Here, the finding that the users prefer tasks

that are simple and does not require substantial effort poses a challenge as physical activities often require substantial effort.

5 Conclusion and Limitations

This study investigated the persuasiveness of the messages that can be delivered through an interactive media. The study found that the participants did not consider the messages on cell phones as credible as the phone calls from healthcare experts. Further, they preferred the messages asking for simple activities and suggesting equivalent healthy alternatives over the messages that ask the users to take actions requiring significant effort, and the messages that negatively enforce the users to take any actions. The study is subject to the limitation of assumption as the participants were asked to assume the location and time of the event for responding to the message. Besides, the study sample omitted people with low literacy skills and did not include significant number of African Americans and Native Americans.

References

1. Clinical guidelines on the identification, evaluation, and treatment of overweight and obesity in adults: The evidence report, National Institute of Health - National Heart, Lung, and Blood Institute, Bethesda NIH Publication, pp. 4083–4098(1998)
2. The Retirement Prospects of the Baby Boomers (Accessed 2007)
<http://www.cbo.gov/ftpdocs/cfm?index=5195>
3. Intille, S.: Ubiquitous computing technology for just-in-time motivation of behavior change. In: Proceedings of the 11th World Congress on Medical Informatics San Francisco California, pp. 1434–1437 (2004)
4. Maheshwari, M., Hassan, T., Chatterjee, S.: A Framework for Designing Healthy Lifestyle Management Information System. In: Proceedings of AMCIS, pp. 2811–2817 (2006)
5. Bettinghaus, E.P.: Health Promotion and the Knowledge-Attitude-Behavior Continuum. *Preventive Medicine* 15, 475–491 (1986)