Digital health communities: The effect of their motivation mechanisms

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ABSTRACT

Health-related online social networks are starting to play a role in many people's daily lives by enabling them to monitor their diet and motivating them to change their lifestyles. These social networks provide different motivation mechanisms. However, little research has been done on the effectiveness of these motivation mechanisms. This research analyzes data collected from a digital health community to examine what mechanisms can help motivate people. The results suggest that there is a high level of correlation between users' exercise activities and their participation in these digital health communities. This research benefits the digital health communities by providing insights into the design of motivation mechanisms.

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1. Introduction

Healthcare is one of the most important industries in the U.S. With the development of electronic commerce, we have seen incredible transformations in banking, music, travel, and many other industries. The healthcare industry, however, still mostly runs on paper [21]. But in recent years, there has been a big push by the government, major healthcare organizations, and consumer advocacy groups to invest more in healthcare-related information technology and to move healthcare online. The federal government has invested a lot of money to encourage hospitals and physicians to automate their processes. Implementing modern information systems is expected to improve the efficiencies of hospitals and physicians' offices. It can also significantly improve the quality of healthcare.

With the growing popularity of web 2.0 technologies such as blogs, podcasts, and wikis, many healthcare organizations and professionals are embracing social media. Social media refer to blogs, social networks, and other media for social interaction. The use of social network software and its ability to promote the connection between patients and the rest of the medical industry has been dubbed "Health 2.0," and the number of organizations adopting Health 2.0 is growing. The Centers for Disease Control and CIGNA, for example, have active pilots in virtual worlds, such as Second Life, to test whether social media can help spread the word about issues like nutrition awareness, cancer screening, and infectious-disease prevention. American Red Cross uses Twitter to update information on natural disasters. Medscape, a social network for doctors, offers specialists, primary care physicians, and other health professionals integrated medical information and educational tools, and allows them to discuss, post, and answer questions about diseases and treatments.

The social-networking revolution is also coming to healthcare on the consumer side. The Internet technology and social media are making it easier than ever for consumers to find timely, personalized healthcare information online. Previously connected mainly through email discussion groups and chat rooms, now patients are able to build more sophisticated virtual communities that enable them to share information about treatments and support, and build online personal networks of friends. Patientslikeme.com is a platform that enables people to share information that can improve the lives of patients diagnosed with life-changing diseases. Patients can chat on the website, blog about their illness, and support each other with recommendations. DailyBurn and myfitnesspal.com, on the other hand, focus on fitness and healthy lifestyles instead of diseases. Registered members can update their health information and the websites provide suggestions tailored to the user's particular health/fitness needs, such as daily calorie intake and customized exercise plans. People can exercise together with their friends and participate in various fitness challenges.

Researchers have started to investigate the benefits of these health-related online social networks from different perspectives. Ni and Sun [30] study why doctors are willing to participate in online information platforms and how they benefit through participation. Kane and Ransbotham [22] analyze how people work together to create peer-produced medical information in social media platforms. Yan and Tan [51] propose an inhomogeneous Partially Observed Markov Decision Process model to study the helpfulness of an online healthcare community to patients' health condition dynamics. Xiao et al. [50] examine factors that influence patients' online health information search and find that perceived health status could affect patients' online health search frequency as well as diversity. The privacy concern, trust and information sensitivity are factors that have an impact on people's decision on providing their health information online [4].

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Decades of research indicate that physical activity is an important behavior for health promotion and disease prevention [18,42]. Despite widespread dissemination of information supporting the health benefits of physical activities, the percentage of sedentary American adults reaches almost 35% [3], and over half do not exercise regularly [33]. Therefore, it is important to study what motivation mechanisms really work. According to the new physical activity guidelines announced by the U.S. Department of Health and Human services in 2008, two and a half hours a week of moderate aerobic physical activity can help adults gain substantial health benefits, and children can benefit from an hour or more of physical activity a day. The National Prevention and Health Promotion Strategy, developed by the Surgeon General's National Prevention and Health Promotion Council, is shifting the nation from a focus on sickness and disease to one based on prevention of disease and promotion of wellness, which will help lead to longer, healthier, and more productive lives for all Americans.

Many digital health communities have emerged to do exactly that: promoting a healthy lifestyle and encouraging people to exercise more. They provide different motivation mechanisms to help achieve the goal. However, little research has been done on whether these motivation mechanisms are effective. The objective of this study is to analyze the effect of health-related social networks and their motivation mechanisms using data collected from a digital health community. Our two main research questions are:

- Does active participation in health-related online social networking motivate people to exercise more?
- What motivation mechanisms used in digital health websites motivate their users to exercise more?

The rest of the paper is organized as follows. In Section 2, we review the literature on motivation theory in sports and the relationship between social networking and health. Data and regression results are provided in Section 3. Section 4 concludes the paper with future research directions.

2. Background and theoretical foundation

Although the links between physical exercise and well-being are well documented [24,31], almost half of American adults are not active enough to accrue health benefits. Understanding what motivates people to engage in physical activity and how to facilitate adherence to regular exercise has been a central research topic in sports and exercise science [11,12,26,35]. Deci and Ryan [11,12] propose a multidimensional conceptualization of motivation which categorizes motivation into two types: extrinsic motivation and intrinsic motivation. Extrinsic motivation refers to external means that regulate behaviors, such as monetary rewards or grades, or threat of punishment. Intrinsic motivation is the happiness and satisfaction derived simply from exercising. There are three types of intrinsic motivation: intrinsic motivation to know, to accomplish things, and to experience stimulation. Vallerand and Losier [43] propose a motivational sequence that integrates much of the intrinsic and extrinsic motivation literature in sports. This sequence starts from social factors, leads to psychological mediators and types of motivation, and ends with consequences. They argue that the type of motivation that underlies athletes' behavior is determined in a large part by various social factors.

Given the fact that the motivation for engaging in a certain activity is a function of both intrinsic and extrinsic motivating factors [14,46], self-determination theory provides a unique framework for studying and understanding motivations in the adoption of exercise, or physical activity. Self-determination theory argues that a critical issue in the effects of goal pursuit and attainment concerns the degree to which people are able to satisfy their basic psychological needs as they pursue and attain their valued outcomes [13]. The theory has been extensively used in sports motivation research. Wankel [45], for example, views intrinsic motivation as a key factor in exercise adherence. He states that social

motives, although extrinsic to the activity, may contribute to adherence because social interaction can add to one's enjoyment—an intrinsic motivation—in participating in the exercise activities. A study by Ryan et al. [35] reveals that adherence to exercise was associated with motives focused on enjoyment and social interaction. Based on self-determination theory, Li [26] develops and validates a multidimensional Exercise Motivation Scale to assess motivational tendencies in the exercise context. One dimension in the scale is the social dimension.

Allen [2] analyzes motivation from a social orientation perspective and identifies three sources of motivation: social validation of oneself, affiliation experience, and perceptions of belonging. Social validation of oneself is about getting recognition from others, in the form of social approval, social acceptance, and social status. Affiliation experience and perceptions of belonging, on the other hand, motivate people to exercise because they want to make friends and be part of a social group which shares the same interests.

In studies by McCullagh et al. [28] and Passer [32], participants report social reasons for engaging in physical activity. These reasons include affiliation, being part of a team, and social status. Positive effects come from social sources such as friendship opportunities, social recognition, and parental pressure [37]. Scanlan et al. [38] point out that individuals' motivation in sports may be related not only to a desire to develop physical ability, but also to develop social networks.

Social networks are the social connections that surround an individual. An individual can get social support, such as emotional, instrumental, and financial aid, from his social network. Social support has been linked to a number of health outcomes, and appears to be an important determinant of success in changing health habit [36]. Berkman [5] examines in detail the evidence linking social networks and social supports to health outcomes, and finds that social networks seem to have a remarkable relationship with disease states.

There are six functions of social relationships [47]. They are intimacy, social integration, opportunity for nurturant behavior, reassurance of worth, assistance, guidance and advice, and access to new contacts and diverse information. Intimacy is an emotional climate in which individuals can express their feelings freely and without self-consciousness. Social integration means that participants share their experience and ideas through their relationships because of similar situations or similar objectives. Opportunity for nurturant behavior emphasizes the value to self of obligations and duties toward others. Many people in different relationships provide assistance to each other. Network members may provide valuable advice and guidance to help other members to handle their problems. Social ties can also help members to find new sources of information and new contacts that may be helpful in the future.

One way social networks can help healthcare is through access to new information, advice, and contacts. Through this "pro-medical care" process, individuals learn how to get relevant information and how to utilize the information; therefore, they get better health care and improve their physical health. In addition, social networks can also exert social control and peer pressure. Individuals in a network may feel that they should behave in the way that their peers behave. People who have connections with people who exercise regularly may follow the patterns of their group simply to maintain their group identity.

Social network websites are part of our daily life now. Several studies exist that take Facebook networks as a stand-in for the "real" social networks of individuals. Traud et al. [40] and Lewis et al. [25], both using Facebook data, assert that Facebook networks are a reliable proxy for the physical networks of active ties. Mayer and Puller [27] report that only 0.4% of the Facebook friendships they studied appeared to reflect "merely online interactions." Ellison et al. [17] support this finding, stating that Facebook is used primarily to maintain or reinforce existing offline relationships rather than to meet new people. Online social networks are in many ways similar to social networks in the physical world. Participants are primarily communicating with people who are already a part of their extended