# Factors that Affect Success in Group Behavior Change Applications

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**Abstract:** Group fitness applications are increasingly popular in health care research. Many of these applications offer users with a daily challenge. Group members can share how they completed the daily challenges, and they can collaborate or compete with their fellow group members. The applications have been shown to be effective in supporting fitness behavior change but little is known about factors that affect an individual's success in these applications. Through a survey and interview study with 23 participants, we identified that successful users believe their personal success is affected by often their fellow group members participate in challenges and how often they interact. They therefore devise strategies to ensure high participation of others.

**Keywords:** Behavior change, Group intervention, Fitness application, Wellbeing

## 1. Introduction

Over one-third of the global adult population is overweight, with around 13% of world adults being obese [1]. Both overweight and obesity significantly increase the risk of developing chronic diseases, which account for more than 50% of global deaths [2], specifically, by engaging in increased physical activity (150 minutes of moderate intensity physical activity each week), decreasing intake of fats and sugars and increasing intake of fruits, vegetables and whole grains [3].

Several smartphone applications for physical activity and healthy eating behavior change exist. These applications typically focus on setting a personalized calorie and/or physical activity goal and self-monitoring as the main strategies to promote behavior change. Self monitoring involves recording daily food intake and physical activity and their corresponding calories [4]. The application then provides daily, real-time feedback on progress towards the calorie goal, and graphs of trends (weekly calorie intake and use etc.) to support the user's reflection on their performance. Self-monitoring is considered a key behavior change strategy, but many people find it tedious and confusing [5], and this leads to many people quitting these applications. Social support is an evidence-based strategy for supporting adherence to behavior change and many fitness applications have included social features to support user motivation [4]. An increasingly popular means of providing support is to provide behavior change interventions to groups instead of individuals. The members of a group usually interact through sharing their progress, collaborating and/or competing towards accomplishing their fitness goals ([6], [7], [8] etc.). Studies on group fitness applications have shown indications of a good level of user acceptance and the approach has been shown to be more effective than offering interventions to individuals.

Most of these studies on group-based health and fitness interventions focus on a quantitative analysis of the effect of group fitness applications on behavior. Little is known about what factors contribute to this success i.e. what factors make some individuals (and groups) more successful than others in these studies. This knowledge is important, as it can help researchers and developers of group fitness applications to determine what features and individual/group interventions are needed to ensure a majority of the groups formed in the applications are effective. Our work addresses this gap. In this paper, we present results from a qualitative study consisting of a survey and interview to determine factors that affect success in group fitness applications.

## 2. Related work

A popular means applications have sought to provide social support is to connect users to a support network either via in-application social features or connecting to social network services (SNS) where users can share updates and get supportive feedback. Commercial applications using the former strategy include Nike+ and Endomondo. Research applications using this approach include Shakra [9] and Houston [10]. The latter approach has been used in FitBit and MyFitnessTeam as well as [11]. Several challenges have been identified with the sharing approach. Users often receive little or no feedback on their shared posts [12] and most platforms automatically shared to the user's entire social circle, but users were interested in the ability to customize who receives certain health & fitness updates [13]. Most SNS networks now allow users to create subnetworks of friends who will receive each update.

Khot et al [14] used a semi-public, physical display to provide

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physical activity feedback to pairs of users. They created a machine that created a personalized sports drink based on the type and duration of physical activity of each user. They found physical, shared displays allowed individuals to jointly reflect on and discuss individual performance. They also found that the display prompted competition. Other studies have provided interventions privately to groups of individuals. In HealthyTogether [7], people were paired up and shared their FitBit step count to win badges. They either collaborated (contributions are equally weighted), assisted each other (user's personal steps contribute more than the other player) or competed against each other. Competition was least effective. In [6], [8] and [15], participants received daily challenges and they shared updates with their group mates. All studies found the social conditions to be more effective than individual conditions, and [8] found groups which shared more social messages (messages not related to activities done for the daily challenges) were more likely to be successful.

## 3. Method

We conducted a qualitative study, consisting of an online survey and interview with participants who used a group fitness application that we developed, MyFitnessTeam, for four weeks. Twenty-three participants (16 males, average age: 26.80 years) took part in our study. All participants were full-time graduate students in Japan recruited via email. Participants self-divided into 5 groups (n=5, n=3, n=6, n=5 and n=4).

MyFitnessTeam is an iOS and Android application that provides groups of users with daily challenges (a daily physical activity task and healthy eating task). Users in each group uploaded photos of how they completed the challenge. Users could create a new group or join an already existing group (created by other users), and each group could have up to 6 members. In addition to posting photographs, users could also comment on each other's photos and select a favorite photo on each day. A leaderboard was provided to support inter-group comparison and competition. The challenges in MyFitnessTeam were developed by a fitness trainer and a nutritionist.

In the survey, participants answered multiple-choice questions on the strategies they used to ensure their individual and group success, as well as what features in the application, and what group interactions motivated their participation in challenges. They also provided open-ended responses on their experiences, and factors that affected their participation in challenges and their interactions with their group mates. We measure success as completing three or more challenges a week, as this corresponds to the minimum level of physical activity required to meet existing guidelines.

## 4. Results

A majority of the participants (n=14, 60.87%) did not have a particular strategy to ensure their success. They only attempted challenges when they were free to do the physical activity tasks, or they exercised according to their own schedule and posted photos whenever the physical activity task was similar to the photos they had taken from their exercise sessions. The remaining nine participants (39.13%) felt their individual success would depend on how well they could sustain their motivation, and they felt that an active group i.e. one where group members frequently posted photos and interacted with each other would help them sustain their motivation. To ensure their groups remained active, five participants (21.74%) decided to attempt a challenge everyday (and therefore post at least one photo everyday) and to comment on each photo uploaded by their group mates. One participant organized his group mates to attend the gym with him and the remaining three participants (13.04%) attempted a challenge whenever their group mates posted a photo (reciprocate), in addition to when they were free.

We found the top five participants all believed their individual success depended on how active their group was. They therefore used the strategies highlighted above. In addition, they shared the following characteristics:

- They felt their current physical activity and healthy eating behaviors required significant improvements, and they believed in their ability to improve with the support of the fitness plan and their group mates
- They firmly believed that the daily challenges met existing guidelines on physical activity and nutrition and would help them achieve their fitness goals.

The bottom three participants shared the following characteristics:

- They belonged in groups where individual members were not concerned with the performance of their fellow group mates. These groups therefore rarely commented on each other's photos, and did not attempt more challenges than required for meeting their personal goals.
- They felt their current physical activity and healthy eating behaviors were inadequate but did not believe in the necessity of significant improvements or in their ability to achieve the required changes even within the support structure in the application (i.e. low self-efficacy).

Participants who had high levels of baseline physical activity and healthy eating only had slight improvements in their fitness behaviors. This is mostly because they did not feel the need for improvement and therefore did not extend much effort to complete more challenges or to interact with other group members.

Three of the top five participants were good friends with their fellow group mates. They therefore felt comfortable discussing both the daily challenges and their individual photos within and outside the application, and they frequently initiated these discussions. These conversations ranged from exchange of information such as giving each other tips and correcting each other's misconceptions to providing emotional support such as praise and encouragement. The other two participants were strangers or acquaintances with their group mates. They reported being uncomfortable exchanging unsolicited advice and tips, and emotional support. They felt the former may be perceived as "intruding", and they were unsure when and how to offer emotional support. They therefore relied more on attempting as many challenges as possible than on interacting with other group mates to keep their groups active.

# 5. Conclusion

We presented results from a qualitative study on factors that affect an individual's success in group fitness applications. Recognition of the importance of an active group in supporting an individual's motivation and self-efficacy in the ability to reach fitness goals due to social support were the main characteristics of successful participants. Future works should conduct a quantitative analysis to determine the extent to which these 2 factors are correlated with success. The effect of imparting users of group fitness applications with the knowledge on the importance of supporting others to participate more can also be assessed.

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