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Marketing, Technology, and Medicine: Recommendations on How to Incorporate Psychological Principles into New Technologies to Promote Healthy Behaviors

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Abstract

Although technologies have provided new forms of entertainment and improved our work efficiency, they have also reduced our need to engage in healthy physical activities. We believe that the psychological principles that make sedentary entertainment technologies (such as television and video games) engaging can be incorporated into new technologies to make new technologies both engaging *and* promote healthy behaviors. This short report aims to 1) describe how technology has traditionally reduced motivation to engage in health behaviors, 2) discuss key elements that may make sedentary technology (in this case, television) engaging, and 3) provide examples of how these same elements can be incorporated into new technologies to increase engagement and promote health behaviors.

Technology development, including the creation of televisions, computers, and smartphones, has remarkably impacted our daily routines by increasing our work efficiency and providing new forms of entertainment. The benefits of new technologies are very clear: we can exert less effort on work activities requiring physical activity and use that free time for other forms of work or entertainment. However, in reducing our need to engage in physical activity, technologies have also negatively impacted people's likelihood of engaging in healthy behaviors, such as exercise (Bruegmann, 2005). We believe that by studying the psychological principles that make sedentary entertainment technologies (such as television and video games) engaging, we can incorporate those principles into new technologies to develop them to be both engaging *and* promote healthy behaviors. This short report aims to 1) describe how technology has traditionally reduced motivation to engage in healthy behaviors, 2) discuss key elements that may make sedentary technology (in this case, television) engaging, and 3) provide examples of how these elements can be incorporated to increase engagement and promote health behaviors.

How Technology Has Decreased Physical Activity

Modern technology decreases the amount of physical effort required for both work and leisure activities and allows us to complete most of our daily tasks in our offices and homes. Considering how easy and enjoyable a sedentary lifestyle can be, it is not surprising that as of 2008, only 41% of children (6 – 11 years of age), 8% of adolescents (12 – 19 years old), and less than 5% of adults (20 years of age and above) engaged in the recommended 30 minutes of moderate-intensity exercise most days of the week (Troiano, 2008).

Physical activity has evolved from a daily necessity to a personal choice. Before the 20th century, communities were localized around city centers, and residents were accustomed to walking to obtain most goods and services. As affordable public transportation was introduced, such as buses and cars, families moved to the outskirts of cities and began relying on new forms of transportation rather than having to engage in physical activity for mobility (Bruegmann, 2005). Over time, technology further developed to make daily tasks even less physically effortful. Owen and his colleagues (2010) explain that “work sites, schools, homes, and public spaces have been (and continue to be) re-engineered in ways that minimize human movement and muscular activity” (p. 1138).

How, then, can people be motivated to take an activity that was once done out of necessity and adopt it for leisure? This task is particularly challenging in light of the sedentary leisure-time activities (e.g. playing video games and watching television-watching) that have already become habitual to many Americans. In motivating new leisure activities, we not only need to be creative in marketing the benefits of exercise, but also need to be able to present exercise as more appealing than more sedentary options.

Applying Principles from Leisure Activities to Promoting Exercise

Mobile apps and activity-tracking devices are widely used in exercise motivation. In February of 2011, there were 3,336 paid, English language apps available from the Apple Store aimed at motivating physical activity. Of these apps, 44 percent were related to measuring, logging, and automatically recording physical activity (West, et al., 2011).

One way researchers and designers have gone about building motivational interfaces for fitness apps is examining how users interact with the technologies that occupy their leisure time. For example, in what has come to be known as gamification, designers evaluate videogames in order to integrate game mechanics and game thinking into non-game activities (Liu, Alexandrova, & Nakajima, 2011). Gamification principles can be seen in many persuasive technologies for motivating physical activity (e.g. Chan, et al., 2004; Consolvo, et al., 2006; Consolvo, et al., 2008; Munson & Consolvo, 2012, Nachman, 2010).

Although gamification has gained popularity in exercise motivation, researchers should not stop at examining videogames for inspiration. Directly assessing the long-term benefits of fitness interventions is difficult without longitudinal data (Klasnja, Consolvo, & Pratt, 2011). In order to build a unique design toolkit, we suggest working in parallel with this line of research and deriving principles from other forms of entertainment that attract users as well. In this report, we highlight elements that make television psychologically engaging

(Aguiar & Hurst, 2007), and suggest how to apply these engagement principles to guide development of technologies aimed to increase exercise and healthy behaviors.

According to a review of 2013 NDP Group data, the digital fitness device market was worth \$330 million in 2013 (<http://mobihealthnews.com/28825/fitbit-jawbone-nike-had-97-percent-of-fitness-tracker-retail-sales-in-2013/>). Fitbit devices accounted for the majority of those sales, representing 68% of devices sold. The Fitbit is a wearable device that allows users to track their activity levels and interact with and share those data via a mobile application. In this section we will present our recommendations for motivating physical activity from research in television marketing and align those recommendations with what we see in the interface that corresponds with the most popular fitness tracker.

Studies on television viewing behavior have traditionally been examined solely for the purpose of learning how to market to potential television consumers. However, because of the high engagement in television viewing, data on television viewing may also be applied to improve engagement in other behaviors. We will focus on three key findings from this research: 1) When watching television, users spend the majority of their time channel surfing (Cha, et al., 2008), 2) television is often the focal point of coordinated social activities (Masthoff, 2003), and 3) television program scheduling is relatively consistent (Rosenstein & Grant, 2007). After describing these findings, we offer a method of incorporating these principles into the design of technologies to motivate health behavior change.

1) Channel Surfing

Television gives users the freedom to explore various types of entertainment amidst one structured activity. A 2008 analysis of Internet TV data showed that viewers spend 60% of their television viewing time channel-surfing in search of a desired program (Cha, et al., 2008).

How to incorporate this approach to motivate health behavior change: Health technology designers should consider approaches for helping users integrate versatility into exercise sessions. For example, consider a jogger using a mobile application to compare her running speed on a certain course with her previous performances. If she decides mid-session that she would rather walk, jog backwards, or run hill repeats, the application can allow her to switch modes and measure her progress based on the new activity. Rather than committing to one type of workout, users should be able to switch their routines within health technologies.

At the moment, users can track their number of steps, pace, and steps climbed with FitBit fitness trackers. This is a great approach to helping users vary their exercises without penalty. We suggest extending this idea allow users to flag and measure their progress in other variants of walking and jogging (e.g. powerwalking, jogging backwards, or sprinting).

2) Social Coordination

Social activities have often been centered around television viewing. It is the medium most often shared within families and a popular topic of discussion amongst friends (Masthoff, 2003).

How to incorporate this approach to motivate health behavior change: Health technologies should help users identify the fitness activities that can be integrated into social activities. One particular challenge with socially integrated fitness programs is being able to set goals that are both motivational and social. One study showed that while two groups of exercisers preferred individual goals, one group wanted similar goals to increase competition within the group (Consolvo, et al, 2006).

By tracking different types of exercises, a fitness application could help users track when their fitness levels match their friends or when they share a similar interest. For example, a new jogger may receive a notification when her pace matches that of a more veteran runner, or a yoga enthusiast may receive a notification when one of his friends signs up for a new yoga class.

For example, Fitbit allows users to join groups that meet their interests (e.g. “Bellydancers,” “65 AND FIT,” and “Fitbit’ers with Desk Jobs”) and work collaboratively to achieve physical activity goals. While this helps to integrate fitness into a social activity, there is wide disparity in activity levels for members within each group. For example, the average step count for each member of the Bellydancers group ranges from 649 to 29,639 steps per day. More advancements can be explored to help users find groups that match their activity levels.

3) Consistency

According to Rosenstein and Grant's (2007) model on how television habits develop, people will initially tune into a television program to achieve a specific reward, like relaxation. If the desired reward is granted, they will likely tune into the program the next time the need presents itself. These cycles of rewards will repeat until they become habitual. The type of programming viewers can anticipate finding, is often consistent across time of day and day of the week, making it easier for viewers to predict when their desired reward (a specific program or type of program) will be available (Rosenstein & Grant, 2007).

How to incorporate this approach to motivate health behavior change: Physical activity has the potential to be predictively rewarding, but the rewards schedule can be disrupted by the punishment than can result from overexertion. For example, Ekkekakis, et al. (2005) demonstrate that severely intense exercise (activity levels between the lactate steady state and maximum exercise capacity) is generally unpleasant across groups, so pushing users too hard has a high chance of resulting in a negative experience. Rather than increasing rewards with physical effort, rewards should be capped at the minimum level of physical activity required for good health. If users would like to push themselves harder, that experience should be outside of the realm of what the technology rewards. By weakening the link between a particular fitness program and overexertion, virtual rewards for maintaining

positive health behaviors may have a more positive impact than if they have to rival physical discomfort.

Some FitBit's fitness tracker interfaces offer badges when users have walked a certain number of steps in one day. Badges are rewarded when a user reaches 5,000 steps and increase indefinitely at 5,000-step increments. While it may be rewarding to receive a badge, for example, for walking 35,000 steps in one day, the impact of the reward may be degraded by the physical fatigue.

Conclusion

Collaboration between health, marketing, psychology, and technology professionals has presented opportunities to create tools that encourage users to exercise, instead of simply encouraging sedentary behaviors. As we develop motivational programs, we can learn from the principles of existing engaging technologies. We challenge researchers and designers to look to these activities and how to use psychology and behavior change science to explore ways to motivate healthy levels of physical activity.

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