Chapter 11

Buddy Up for Exergames: How Group Dynamics Principles Can Be Applied to Active Health Games

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ABSTRACT

Many adults and children in the U.S. are not active enough to meet the U.S. Department of Health and Human Services guidelines for physical activity to maintain health and reduce the risk of chronic disease. Exergames (exercise video games) have the potential to promote physical activity, and researchers have examined ways for improving motivation to exercise for longer and at higher intensities with these types of games. This chapter considers group dynamics principles as one way to influence motivation within exergames to help realize better health outcomes. We illustrate how group dynamics principles can be applied to exergames and how different task structures within groups (e.g., conjunctive, additive, and coactive tasks) can influence motivation. One group dynamic principle, the Köhler motivation gain effect, has been the basis of a series of research studies that we have conducted within exergames. We summarize this research, discuss the issues, controversies, and problems with using group dynamics in exergames, and provide possible solutions and recommendations.

INTRODUCTION

Insufficient physical activity (PA) is a primary risk factor for a number of chronic diseases (e.g., type 2 diabetes, coronary heart disease, stroke, and osteoporosis). Additionally, being physically active can help in daily living, such as by improving sleep and cognition, feeling better emotionally and mentally, and maintaining range of motion in functional skills (e.g., putting away groceries, using the stairs, or washing one’s hair). However, many adults (over 95%) and children (58%) in the...
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U.S. are not active enough to meet the U.S. Department of Health and Human Services (DHHS) (2008) guidelines for PA to maintain health and reduce the risk of chronic disease (Troiano et al., 2008). These guidelines for adults consist of at least 150 min per week of moderate aerobic PA, or 75 min per week of vigorous aerobic activity, or some combination (Garber et al., 2011) and 60 min or more of moderate-to-vigorous PA daily for children.

A key issue to maintaining PA is motivation. Even among those who initiate an exercise regimen, research has consistently reported about a 50% drop out rate within the first 6 months (Dishman, 2001). Motivation can be even harder to maintain when increased exercise intensity is required, especially in unsupervised exercise programs (Dishman, 2001). Higher levels of intensity in exercise are important for several aspects of physical fitness and rehabilitation. When fat reduction is a goal, increasing the intensity of exercise from low to moderate (~ 60% of aerobic capacity) is most effective (Bergman et al., 1999; Jakicic, Marcus, Gallagher, Napolitano, & Lang, 2003). When aerobic fitness and cardioprotective benefits are the goals, vigorous physical activity (> 60% aerobic capacity) is more effective than moderate intensity exercise (Swain, 2006). In terms of diabetes risk, high intensity interval training improves insulin action and glucose clearance (Babraj et al., 2009). Additionally, high intensity strength training improves muscle mass, strength, and balance for older adults (Fiatarone et al. 1990), bone density in post-menopausal women (Kerr, Morton, Dick, & Prince, 1996), and strength, pain, and fatigue in arthritis/rheumatoid patients (Rall, Meydani, Kehayias, Dawson-Hughes, & Roubenoff, 1996). Unfortunately, the longer and more vigorous the physical activity needed to increase fitness or therapeutic benefits, the lower one’s chances for intervention success (Dishman, 2001). Individuals may become bored with training regimens over time or find them less enjoyable if they do not have other strategies to maintain their motivation (Ockene, Hayman, Pasternak, Schron, Dunbar-Jacob, 2002).

Exercise video games (commonly called ‘exergames’ or ‘active video games’) have become a popular way to try to boost motivation that avoids the scheduling problems of joining exercise programs and social physique anxiety that can be associated with exercising in public (Bain, Wilson, Chaikind, 1989; Brunet & Sabiston, 2009). Several studies have found that people are motivated to exercise with active games that are entertaining, engaging, and interactive (Lieberman, 2006). However, some exergames may not be vigorous enough to meet guidelines as recommended by DHHS (Bailey & McInnis, 2011; Graves, Ridgers, Williams, Stratton, & Atkinson, 2010; Peng, Lin, & Crouse, 2011). Further, although exergames are popular, strategies are needed to sustain users’ interest to continue participation (Gao & Chen, 2014), especially when striving to maintain higher performance intensity levels. For instance, exergames can become boring when played in isolation (Madsen, Yen, Wlasiuk, Newman, Lustig, 2007), but those that facilitate social support for exercise (e.g., sharing step counts among fellow users) have shown better success in exercisers reaching their goals (Consolvo, Everitt, Smith, & Landay, 2006.). However, there has been little attempt to analyze the interpersonal interactions that would best motivate people to use and continue exercising with these games.

Few exergames take advantage of the potential of group dynamics to motivate play (and to achieve its associated health benefits), such as creating interdependence among exercisers where their progress and/or outcomes are mutually determined. In this chapter, we examine how group dynamics principles can influence motivation in exergames to realize better health outcomes.