Exergaming for Physical Activity in Online Physical Education

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ABSTRACT

For many the thought of students taking an online course conjures up images of students sitting at a computer desk. Students taking online physical education (OLPE) at home may lack opportunities for competitive or cooperative physical activity that are available to students in a traditional setting. Active video games (exergames) can be played over the internet between students. Exergames allow for a new and possibly effective genre of physical activity that offers OLPE students the opportunity to interact in relevant, engaging, and entertaining physical activity with other students. Secondary student (N=124) heart rates were recorded before exergaming, after playing a non-player character, and after playing another student remotely over the internet. The results show that exergaming between students over the internet can raise student heart rates to moderate levels of physical intensity commensurate with guidelines for Physical Intensity for secondary students. Exergames show promise for physical activity in an OLPE course when played against a non-player character and a remote partner.

KEYWORDS

E-Learning, Online Physical Activity, Online Physical Education, Remote Learning

INTRODUCTION

Literature suggests that if identified trends continue the current generation and part of the next generation of children and adolescents in the United States will mature to become overweight or obese adults by the year 2030 (Wang, Beydoun, Liang, Caballero, & Kumanyika, 2008). This may be due to several ‘obesogenic’ factors (Hill, Wyatt, Reed & Peters, 2003; Huneault, Mathieu & Tremblay, 2011; Popkin, Duffey, & Gordon-Larsen, 2005; Swinburn & Egger, 2002; Wang et al., 2008). Obesogenic factors are defined as environmental factors which lead to obesity. These factors appear in today’s developing world where the environment for living has changed dramatically. The
population of developed countries has shifted from a scarcity of food sources, labor intensive work and physically demanding modes of transportation to living the ‘good life’ (Carrera-Bastros, et al., 2011; Hill et al., 2003).

While embracing the ‘good life’ persons around the world are making food choices that did not exist in the past. Inhabitants in these developed countries presently consume more energy (calories) and expend fewer calories than past generations. Food in these countries is easy to get, tasty, affordable, full of energy (calories), and is being offered up in increased portion sizes (Hill et al., 2003; Huneault, Mathieu & Tremblay, 2011; Popkin et al., 2005). While this has led to an increase in caloric (energy) intake less energy is being expended for work and leisure. Technology and the pursuit of the ‘good life’ have led to changes in the way the people in developed countries interact and move. People in the developed parts of the world now encounter less physically demanding jobs, expend less energy for daily living and have changed their leisure time from activities that required movement such as outdoor games, activities, and events to sedentary activities like sitting in front of a television, browsing the web, engaging in social networking activities or playing video games (Hill et al., 2003; Huneault, Mathieu & Tremblay, 2011; Popkin et al., 2005; Ross, 2006).

Changes in family structure precipitated by an ever increasing number of double income families and single parent families have also led to an increased reliance on convenience (Hill et al., 2003). This emerging pattern has increased the stress on the family unit which is also known to be a contributor to weight gain (Garasky, Stewart, Lohman & Eisenmann, 2009). Secondary students in developed and developing countries live in increasingly stressful settings while participating in all things related to the ‘good life’. This new social reality has led to a populace which sees their immediate needs as more weighty than the long term health impact of poor eating and reduced movement patterns for children and adolescents who fall into the same environmental traps as their parents.

Hill et al. (2003) posits that swapping 100 kcal/day would abate the trend towards increased obesity. This would require a simple combination of 100 kcal/day less energy taken into our bodies or 100 kcal/day more energy usage by our bodies or any combination of the two (Hill et al., 2003). Fortunately, it may be possible to build on the collective developed and developing worldwide focus on things related to immediacy and the ‘good life’ to help with the problem of obesity. The technology which has changed the way we eat, what types of food we eat, and has lightened our work load may also present some useful ways for the human population to reverse the flow of energy into our bodies (Cordain, 2005; Hill et al., 2003).

Exergames rely on video gaming technologies that allow players to interact physically with the game. Video game play has been associated with some of the same problems as television watching in past generations. One problem associated with sedentary television watching is the consumption of food while watching (Swinburn & Egger, 2002). A simple reduction in sedentary television watching which reduces food intake could result in a 100 kcal/day switch in energy flow. This reversal in the energy flow may result in a simple pattern which could grow and expand into other healthy movement choices (Mullins, Tessmer, McCarrol & Peppel, 2012; Washington, 2005). To play the game each player moves their body to move their on screen avatar. This movement can result in greater energy expenditure than seated game play.

Exergames may help to change this energy flow as they prompt students to exchange sedentary video gaming with time spent on exergaming which requires the use of their whole bodies (Simons, Bernaards, & Slinger, 2012). This benefit is magnified when the participant swaps a video game for an exergame since video games are associated with increased blood pressure and increased lipids, common risk factors for cardiovascular disease (Goldfield et al., 2011). Substituting an exergame for a video game can have the greatest benefit for overweight and obese adolescents who are at risk for cardiovascular disease (Goldfield et al., 2011). Perhaps then it is the very technology which has set in motion a worldwide shift in environment contributing to increases in students who are overweight and obese which can start us on a path towards an energy swap which uses exergames to counteract the effects of obesogenic factors (Mears & Hansen, 2009). This investigation will look at exergames
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