

## Two-Player Partnered Exergame for Obesity Prevention: Using Discrepancy in Players' Abilities as a Strategy to Motivate Physical Activity

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### Abstract

#### *Background:*

Physical inactivity is associated with obesity and type 2 diabetes. A key obstacle to physical activity is lack of motivation. Although some interactive exercise games (i.e., exergames—video games that require physical exertion in order to play) motivate players to exercise more, few games take advantage of group dynamics to motivate players' duration of exercise. In a test of the Köhler motivation gain effect, this study varied the ability level of a virtually presented partner in an interactive exergame that focused on abdominal strength to identify effects on a subject's (S) persistence with the task.

#### *Method:*

Male ( $n = 63$ ) and female ( $n = 72$ ) undergraduate students were randomly assigned to one of four conditions (individual control or low-, moderate-, or high- partner discrepancy) in a conditions  $\times$  gender factorial design and tested on a series of isometric abdominal exercises using PlayStation 2 EyeToy: Kinetic software. They performed the first series of five exercises alone (trial block 1), and after a rest period, those in the partner conditions performed remaining trials (trial block 2) with a same-sex virtually presented partner whom they could observe during their performance, while those in the individual control condition performed the remaining trials alone. In the partner conditions, the partner's performance was manipulated to be always better than the S's, the exact difference depending on the discrepancy condition. The partnered tasks were conjunctive; that is, success in the game depended on the performance of the weaker team member. Persistence, the outcome measure for this study, consisted of the total number of seconds the S held the exercise position.

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**Abbreviations:** (HR) heart rate, (RPE) ratings of perceived exertion, (S) subject, (VPA) vigorous physical activity

**Keywords:** conjunctive task, dyad interactive exercise, exergame, persistence motivation, virtual partner

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**Abstract cont.**

**Results:**

Using planned orthogonal contrasts on difference scores between blocks 1 and 2, results showed that persistence was significantly ( $p < .001$ ) greater in all experimental conditions with a virtually presented partner ( $M = 33.59$  s) than in the individual control condition ( $M = -49.04$  s). Subjects demonstrated more persistence in the moderate-discrepancy condition ( $M = 51.36$  s) than in the low-discrepancy condition ( $M = 22.52$  s) or the high-discrepancy condition ( $M = 26.89$  s). A significant quadratic trend confirmed the expected inverted-U function relating partner discrepancy and persistence ( $p = .025$ ). Although Ss persisted longer and had higher heart rate in partnered conditions, they did not perceive their exertion to be any higher than those in the individual condition.

**Conclusions:**

Virtually presented partners who are moderately more capable than participants are the most effective at improving persistence in exergame tasks.

*J Diabetes Sci Technol* 2012;6(4):820-827