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SHORT REPORT

The motivation of children to play an active video game

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Summary The purpose of this pilot study was to evaluate the effect of a weekly multiplayer class on the motivation of children aged 9—12 years to play an interactive dance simulation video game (IDSVG) at home over a period of 12 weeks. A sample of 27 children was randomly assigned to (1) a home group instructed to play the IDSVG at home; (2) a multiplayer group instructed to play the IDSVG at home and to participate in a weekly IDSVG multiplayer class. Participants were asked to play the IDSVG as often as they liked and report the playing time daily on a calendar for a 12-week period. Motivation to play was assessed by the playing duration of IDSVG in minutes and the dropout during the study. Mean age of the 16 children who completed the study was 10.6 ± 0.8 years. During the 12-week intervention period, the multiplayer group played approximately twice as many minutes (901 min) as the home group (376 min, $p = 0.13$). Dropout was significantly ($p = 0.02$) lower in the multiplayer group (15%) than in the home group (64%). Our findings suggest that multiplayer classes may increase children's motivation to play interactive dance simulation video games.

Introduction

The prevalence of obesity is increasing at especially alarming rates among children, impacting on short- and long-term health.[1] An important factor in the development of overweight is insufficient physical activity.[2] As there are many barriers for children to participate in regular physical activity,[3] any intervention that will help to increase overall levels of daily activity of children should be welcomed.

In our current western society children spend an increasing amount of time in sedentary behaviour (e.g. playing video games).[4] Thus, one potential contribution to the solution of the problem of phys-

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ical inactivity in children may lie in the use of physically active video games.

An interactive dance simulation video game (IDSVG) might be a safe way to motivate sedentary videogame-playing children to get-up and dance while playing a videogame. Players of IDSVG follow a sequence of arrows on a computer screen by stepping on a foot switch panel in time with music. The game can be played alone or with more players.

The aim of this study is to evaluate the effect of a weekly multiplayer class on the motivation of children aged 9—12 years to play IDSVG at home over a period of 12 weeks.

Methods

Design

This pilot study is a randomised controlled trial of 12 weeks among 27 children from four Dutch primary schools. Informed consent was obtained from all participants and their parents. The Medical Ethical Committee of the VU University Medical Center approved the study protocol.

Participants

All children aged 9—12 years old of four primary schools were invited to participate in a shuttle run test,[5] carried out during a regular PE class. Due to limited size of the sport halls, the running distance of the Shuttle run test was 18 m. The least fit children (i.e. a score below the median for age and sex group) were selected for participation in the trial and randomly assigned to a home group and a multiplayer group.

Intervention

The home group ($n = 14$), i.e. comparison group, received the IDSVG for home use, and was instructed to practice as often as they liked with the IDSVG, and to write down the playing time on the IDSVG calendar.

The multiplayer group ($n = 13$) also received the IDSVG and the same instructions as the home group. Additionally, they were invited to participate once weekly in a 60-min multiplayer class at a fully-equipped sports and fitness centre within 6 km of their school. In a multiplayer class, 20 children train together and play against each other under supervision of an instructor. The aim of these classes was to enhance enjoyment in playing IDSVG by adding elements of competition and interaction with other players.

Measurements

Measurements were performed at baseline, after 6 and 12 weeks intervention. Aerobic fitness was assessed by the Shuttle run test.[5] Body weight was measured using a digital balance scale accurate to the nearest 0.2 kg and body height using a stadiometer accurate to the nearest 0.1 cm; BMI (kg/m^2) was calculated. Thickness of four skinfolds (triceps, biceps, subscapular and anterior suprailiac) was measured on the right side of the body by a Harpenden calliper and recorded to the nearest 0.1 mm using standardized procedures.

Physical activity and sedentary behaviour was assessed by questionnaire, recalling physical activity and sedentary behaviour over the past week. The perceived competence in sports was measured by the CBSK-M,[6] a perceived competence scale for children.[7]

Motivation to play IDSVG

Motivation to play IDSVG was reflected by the reported playing time over the 12-week period, reported on the IDSVG calendar (min/day). Dropout during the study was defined as not providing information on either of the follow-up measurements. After the last measurement, the children participated in focus group discussions about reasons for playing or not, their opinion about the game, and positive and negative experiences with the game.

Statistical analyses

Between-group differences at baseline were tested by an independent *t*-test. The difference in self-reported playing time between both groups was tested by a Kruskal—Wallis test. A Wilcoxon signed rank test was carried out to test the difference in total playing time between the first and the last 6 weeks of the intervention. Dropout during the study was compared between the intervention groups with a Cramer's *V*-test.

Results

Of the 27 randomised children, 11 dropped out during the study. This resulted in a total of 16

children (14 girls and 2 boys) who completed the study. No major adverse events occurred during this study.

Dropout rate

During the intervention period dropout was significantly lower in the multiplayer group (15%) compared to the home group (64%) ($p = 0.02$). Reported reasons for dropping out were technical difficulties with IDSVG, illness and inability to attend measurement sessions. During the 12-week intervention period, the multiplayer group played more (901 min) than the home group (376 min). However, this difference was not statistically significant.

In the home group, the median self reported playing duration decreased from 228 min in the first 6 weeks to 0 min in week 6—12 ($p = 0.18$). In the multiplayer group, playing duration increased from 475 min in week 0—6 to 601 min in week 6—12 ($p = 0.65$).

In the focus groups, a large number of technical problems with the IDSVG were reported as a barrier for playing. In addition, many children thought the IDSVG became boring after a while. Nevertheless, 7 children who were very enthusiastic about the game bought the IDSVG after the study.

Discussion

This is, to our knowledge, the first intervention study on children's motivation to play an interactive video dancing game. The aim of this pilot study was to evaluate the effect of a multiplayer class on playing motivation in children aged 9—12 years over a 12-week period. Dropout was significantly lower in the multiplayer group (15%) compared to the home group (64%). In addition, the multiplayer group played IDSVG approximately twice as much as the home group (non-significant). While the median of playing duration during week 6—12 decreased to zero in the home group, playing duration increased in the multiplayer group. Since the multiplayer group was leaner than the home group, this might explain part of this difference. Though, our findings suggest that adding a multiplayer class reduces dropout and improves playing duration over a period of 12 weeks.

Reasons for not playing the IDSVG regularly, which were mentioned more than once, were; technical mistakes in the videogame, the need for a computer and space in front of the computer to play the IDSVG, dull music, and boredom. Other than the barriers to IDSVG, the children also reported competing interests and commitments such as after-school sports activities. To motivate children for a longer period, these factors have to be counteracted.

Limitations of this study include the small sample size, including a majority of girls. Also, we have no direct measure of motivation to play, but used self-reported playing time and dropout rate as proxy measures. The self-reported playing time may be exaggerated, however, this holds for both groups. Other limitations of this study are the earlier mentioned technical problems with the IDSVG. Some of these problems were the result of using a computer to play the videogame. In future studies the game should preferably be played on a video game console, especially designed to play video games. Furthermore, we recommend a large variety of songs that are up to date, to diminish dullness. A strong aspect of this study is that we conducted an effectiveness study examining the motivation to play the game in real life circumstances.

If the technical problems with the IDSVG are solved, and a weekly multiplayer class is offered, the IDSVG seems a promising means to promote a physically active lifestyle among children aged 9—12 years old.

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