

## NÍVEL DE MOTIVAÇÃO DE ADOLESCENTES APÓS SEIS SEMANAS DE TREINAMENTO DE BOXE EM AMBIENTE VIRTUAL

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### RESUMO

A adesão ao exercício físico depende fortemente de fatores motivacionais. Novas práticas de exercícios físicos, como video games ativos (VGA), são utilizadas como forma de elevar os níveis de atividades físicas também em adolescentes. O objetivo do presente estudo foi analisar o prazer de adolescentes praticantes de treinamento de boxe em um ambiente virtual ativo e analisar descritivamente a pontuação do jogo. Sete homens participaram do estudo, a motivação foi medida através da escala analógica de motivação visual antes e após seis semanas de treinamento em vídeo game ativo (Kinect Sports Boxing - três sessões por semana). Eles foram caracterizados como motivados e muito motivados no início do estudo. Teste t e cálculo para o tamanho do efeito ( $p < 0,05$ ) foram utilizados. Os resultados mostraram que o nível de motivação aumentou em todos os indivíduos. O subgrupo motivado aumentou mais do que o muito motivado. Seis semanas de treinamento de boxe no VGA é muito prazeroso e aumenta os níveis de motivação dos praticantes.

**Palavras-chave:** Motivação. Exercício físico. Boxe. Aderência.

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### ABSTRACT

Adolescent's enjoyment level after six-week boxing training in active videogame

Adherence to physical exercise depends tightly on motivational factors. New physical exercise practices like active video games (AVG), are used as way to raise levels of physical activities also in adolescents. The aim of the present study was to analyze enjoyment of adolescent's practitioners of boxing training in an active virtual environment and analyze descriptively the score of the game. Seven males participated in the study, motivation was measured through visual motivation analog scale before and after six weeks of training in active video game (Kinect Sports Boxing - three sessions per week). They were characterized as motivated and very motivated in a baseline. T-test and calculation for effect size ( $p < 0.05$ ) was used. Results showed level of motivation increased in all individuals. The motivated subgroup increased more than the very motivated one. Six-week boxing training in AVG is very enjoyable and raise practitioners' levels of motivation.

**Key words:** Motivation. Physical exercise. Boxe. Adherence.

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## INTRODUCTION

During the last decades, the scientific community around the world has been exhaustively alerting about the increase of physical inactivity happening in society. The (Sales-Nobre, Jornada-Krebs and Valentini, 2009), time spent watching television, working on a computer and playing video games have raised too much and is characterized as screen time (Christie and Trout, 2007).

This phenomenon has been associated with cultural changes coming from technology (Alves, 2003), estimates are 80% of Brazilian are inactive or insufficiently physically active IBGE (2010).

On the other hand, video games have changed over time, becoming more active (AVG), providing an interaction between individual and electronic gadget (Epstein et al., 2007).

Thus, AVG can be used as a tool of exercise for population used to spend much time in screen time (teenagers and young adults), providing an increase in levels of physical activity of these players (Thivel et al., 2013).

According to (Finco, 2010), AVG has turned a useful tool for general health, beyond having good levels of motivation, once they are very attractive (Brito-Gomes, 2015).

Human behavior is very complex, but theories about motivation may help us understand it (Malavasi and Both, 2005).

For example, the theory of self-determination, very utilized in many fields of study, including sports and physical activity, which explain different motivational factors/dimensions, making the individual join or leave the practice of physical activity (Reis, 2012).

Someone can get involved in a physical activity, intrinsically or extrinsically motivated (Massarella and Winterstein, 2009).

The intrinsic reasons are resulting of individual self-will, while extrinsic reasons depends on external factors (Malavasi and Both, 2005), (Sena and Coelho, 2012).

Extrinsic motivation usually results in greater tension, pressure, and high levels of anxiety and stress. On the other hand, intrinsic motivation is usually associated to long lasting and more stable Behaviors.

There is even individuals that do not see physical activity as something capable of bring any benefit, and are classified as

unmotivated according to TDA (Massarella and Winterstein, 2009).

A great difficulty when someone begins a physical activity program is to keep adherence in long term (Malavasi and Both, 2005).

Knowing motivation is a factor capable of maintaining the individual more time in activity (Dishman et al., 2005) many studies emerge investigating motivation and physical activity (Malavasi and Both, 2009), (Massarella and Winterstein, 2009), (Murray, 1978), Massarella and Winterstein, (2005), Balbim and Vieira (2011).

Besides, the practice of AVG seems to bring more enjoyment than classical activities, like aerobic training (Soltani and Salesi, 2013).

According to a recent review (Brito-Gomes, 2015), 60% of studies using AVG are adept of the boxing modality.

The aim of this study was to analyze in a short-term (6 weeks), enjoyment level of practitioners of boxing modality in an active virtual environment, and analyze descriptively scores of the games, starting from motivated and very motivated individuals.

Study hypothesis is motivation will remain mean/high or will increase in the end and individuals with a greater rise in motivation will present better scores in the game.

## MATERIALS AND METHODS

### Type of research and ethical aspects

An experimental and correlational study (Thomas, Nelson and Silverman, 2012).

Which is part of a larger study that was appreciated and approved by research ethics committee of University of Pernambuco, attending requirements of resolution 466/12 of the national health council, number: 858.209.

All participants received previous instructions about purposes, procedures, dates confidentiality, and risks involving the study. Beyond this, they all agreed in voluntarily participate and signed a term of consent.

### Sample selection and inclusion and exclusion criteria

Sample was initially composed of eight health (Questionnaire Par-q) volunteers, Young adults, university students that were recruited through social media, posters and invites distributed through health campus of University of Pernambuco.

Were included males, without any joint/muscle restriction, and aged between 18 and 25 years old, the participants could not be involved in systematized physical activity or continuously taking any medicine, and did not have previous experience with boxing modalitie in game Kinect of console Xbox 360°. Were excluded those who missed sessions (15%), initiated any program of physical exercise during the study analyzes period, or acquire any joint/muscle restriction that enables achievement of tasks.

### Study design

First was fulfilled an evaluation of anthropometric measures, after, a session of familiarization in the boxing game was carried on. Following, individuals started an intervention that lasted for 6 weeks, where they made 3 sessions/week with a total duration of 30 minutes (according to recent recommendations of ACSM).

At the end of first and last sessions, motivational perception was measured. All phases of study were performed in human performance evaluation laboratory (CENESP-PE) of University of Pernambuco with temperature of  $24 \pm 2$  °c, 40-60% air relative humidity, and atmospheric pressure approximately 760mmHg.

### Video system, audio and AVG console

Video system used in sessions was through a projector multimedia Power lite S10+ (EPSON) indexed in the room ceiling, connected to console projecting an image of

approximately 1,3 meters high, by 1,6 meters width (about 86 inches).

The audio system used was an amplified box multiuse OCM 126 (ONEAL, Brazil) connected to console. The used console was the Kinect from Xbox 360° (Microsoft, EUA).

Kinect equipment is composed by cameras with infrared sensors and an engine that can move itself to detect body movements produced, further, voice recognition through microphones linked to console.

### Experimental protocol

Body mass and height were evaluated. Body mass in kilograms was measured in digital weighing-machine (Filizola, Brazil), within a precision of 0,1kg and height in centimeters, using the wood stadiometer, with scale in millimeters.

These technics are in according to international padronized technics (Reis, 2012), (Stewart et al., 2011) within technical measure error acceptable for the investigated population (Norton, Olds and Albernaz, 2005).

Familiarization session of the game was composed by the game presentation and introductory videos to guide the best performance during session (20 minutes). Experimental sessions were composed by playing 3 times per week, with 30 minutes of total duration for a period of 6 weeks intervention.

The variable analyzed in the AVG during experimental sessions was enjoyment/satisfaction (analog visual scale) adapted to AVG (Brito-Gomes, 2015) like following illustration:



Figure 1 - Illustration of the adapted enjoyment/satisfaction to practice scale of AVG.

### Enjoyment level of the AVG practice

Motivation perception was measured trough the variable enjoyment/satisfaction in the games, and was determined by visual analog scale (Ahearn, 1997) adapted to AVG's (Thin, Brown, and Meenam, 2013) and validated for adults (Kontou, Thomas, and Lincoln, 2012).

The scale has a space of 100 mm, being classified 0 as "very boring" and 100 as "very motivating", measure was performed in the end of first and the last session, and consisted in exhibition of the visual analog scale to the individual, after this, the individual pointed out (with a trace in the scale) his perception, enjoyment/satisfaction of playing AVG's. After this trace, an enjoyment measure

was made through a ruler that quantify reported individual value. The evaluator did not interfere in player opinion. This procedure was properly explained to subjects before the session.

The motivation level was split, like a previous study with similar population<sup>26</sup>, and the level  $>0.7$  was considered as "very motivated", while the level "motivated" was considered between 5.0 and 7.0 points.

### Active video game characteristics

The active video game chosen was the boxing (DVD Kinect Sports), in which, first intensity was beginner (amateur), however, according to individual and his adaptation, the game it's own elect a discreet progression, with raise of opponent reaction velocity, difficulty in performing tasks by raising motor complexity and/or decrease in time of task.

For anthropometric measures, volunteers were properly dressed and did not were involved in any moderate or extenuos physical activity in the 24 hours previous to data collection, they fed minimally 3 hours before measurement and did not use alcohol or smoking in the previous day.

### Data analysis

The data were tabulated in Excel software (Microsoft, EUA). Was used a normality test (Shapiro-Wilk test) and homogeneity (Levene test).

Also, was performed a T student test to verify enjoyment level of virtual boxing practitioners before and after: Motivated and very motivated. A value of  $p < 0.05$  was determined.

The describing analysis also verified in the game, the score of the motivated and very motivated subjects. As an additional analysis, was performed the effect size through the software Gpower 3.0, being considered no effect between 0.0-0.2, low effect between 0.2-0.4, moderate 0.4-0.7 and high  $>0.7$ .

### RESULTS

The initial sample of 8 volunteers was reduced, after one withdrawal (external factors to research), 7 subjects remained (Age:  $19.1 \pm 1.2$  years; weight:  $75.5 \pm 10.7$  kg; BMI:  $23.9 \pm 2.5$  kg/m<sup>2</sup>), which were characterized in the following Table 1.

Table 1, Individual and general descriptive characteristics of the sample (n=7), Recife, 2015.

**Table 1-** Individual and general descriptions of volunteers (n=7).

Individual data	Baseline		After six weeks		Score
	Motivation	Score	Motivation	Score	
Volunteer 1	8.0	2	9.8		33
Volunteer 2	8.0	2	9.8		37
Volunteer 3	6.2	2	9.9		32
Volunteer 4	8.3	3	9.8		32
Volunteer 5	7.0	3	10		41
Volunteer 6	6.9	2	10		36
Volunteer 7	6.9	3	10		39
General data	Begin of study	After six weeks	Delta variation (%)		
Motivation (points)	$7.3 \pm 0.8^a$	$9.90 \pm 0.1^a$	$25.9 \pm 8.4$		
Score (points)	$2.4 \pm 0.5$	$35.7 \pm 3.5$	$35.6 \pm 3.5$		

Note: t student test:  $a p=0.000$ ; Score: Analyzed by the end of session.

**Table 2 -** Analyze of motivation and score divided for groups with high and low initial scores. Recife, 2015.

Variable	Baseline	After six weeks	Motivation	p	Delta variation
	average	average	Delta (%)		(%) Score
Sub Groups					
Very motivated (n=3)	8.1	9.8	17.3	0.003	33.9
Motivated (n=4)	6.1	10	32.3	0.000	36.9

Note: T student test.

In table 2, subjects were divided into two subgroups, very motivated and motivated; the very motivated subgroup raised their

motivation at the end of the study. As well as the motivated subgroup, however, the last one had great increase when compared to the very

motivated subgroup. Results showed subjects that have had the largest percentage of affect scored more points in the game.

For extra analyze, was verified the effect size, for which enjoyment level variable was considered with high large effect size  $>0.7$  (exactly value: 0,999).

## DISCUSSION

The aim of this study was to analyze in a short-term period (6 weeks) the motivation levels of practitioners of the boxing modality in an active virtual environment, and descriptively analyze the scores of very motivated and motivated subjects.

It was verified that the individuals started the study in a level of motivation of (mean  $7.3 \pm 9.9$ ), and at the end of the study was a rise of the motivation (mean  $9.9 \pm 0.1$ ) ( $p=0,000$ ).

After this note, the initial group was divided into 2 groups (very motivated and motivated), this was made to try to verify the hypothesis of the relationship between enjoyment level and the amount of score reached in the game. In this case, the hypothesis that the players who had a large increase in motivation would be the ones with high scores in the game was confirmed.

The use of VGA's has been studied mostly in young and adults populations, noticing its effects against the sedentary behavior (Finco, 2010), (Perrier-Melo et al., 2016) and (Siegel et al., 2009), Becoming an alternative as physical exercise (Brito-Gomes, 2015).

Matsui and Maristela, (2007), affirms that the video game is a product of consuming, an instrument of recreation and entertainment, which reach is increasing. According to (Moran et al., 2014), physical activities with high motivation are important tools to stimulate the accomplishment of physical exercise, including in other age groups.

Few studies mention motivation in an active virtual environment. However, (Brito-Gomes, 2015), analyzed 6 weeks of virtual active training (3 sessions week), with one group playing boxing modality and other group playing the modality Nike Kinect Fitness.

Was verified, that even not presenting significant difference, motivation levels remained medium/high (between 6-7 points) during 18 sessions in the 6 weeks of the study.

In the end, the study was noted a significant elevation considering all sessions,

similarly to other common modalities of physical activities.

For example, in a study of enjoyment level to practice street running was verified the adherence of participants in a long period through a half structured interview (Massarella and Winterstein, 2009).

(Fontana et al., 2013), analyzed 66 female young athletes of rhythmic gymnastics (RG), through a questionnaire about enjoyment level and regular practice of RG, and find out that the required time to formation of a high-level athlete is about 8-10 years, and during this time, many athletes lost their motivation because of physical and mental efforts required in the sport. Keeping this population motivated is a key point to reduce bad results in competition.

Another study by (Souza, Oliveira and Espirito-Santo, 2012) investigated the motivation in strength training with a sample of 91 subjects, 76.9% female, and 23.1% male, demonstrated 71 individuals improved muscle strength after practice of strength training, with high levels of motivation (mean 85.7%) in a scale of 0 up to 100%.

In the sports field (Braz et al., 2007) analyzed 20 soccer athletes using the cooper 12 minutes test (3500m), this test evaluates aerobic resistance of the subject.

The same test was performed 6 times, the first one was performed following protocol without any motivational influence (mean 2845m), the second one was performed after a negative behavior from the coach (bad mood and discouragement) without any positive motivation (mean 2468m), the third test was performed using goals for training (mean 2955m), the fourth test, was performed using punishment (mean 2958m), the fifth used self-motivation techniques, where the athletes were highly motivated (mean of 3033m). In the last test were stipulated extrinsic rewards (mean 3001m). These results show the best performance was acquired when subjects were very motivated (mean of 3033m).

In the present study, and in the above mentioned before, subjects of the motivated group (Initial motivation level: 6.1/ motivation level at the end of study: 10), this group had a delta variation (%) of score 36.9 larger than the very motivated group (initial motivation level: 8.1/ motivation level at the end of the study: 9.8), 33.9%. This suggest the more motivated, the best is the performance. Such a result is strong since the effect size presented values



considered high, despite the low number of subjects.

On others results verified in the present study, one can notice that even dividing the individuals into two distinct groups (very motivated and motivated) still, both groups raised their motivation levels at the end of the studies. When it comes to performance, many modalities of training can benefit from high levels of motivation, like the already mentioned strength training and street running (Truccolo, Maduro and Feijó, 2008), (Massarella and Winterstein, 2009).

This is interesting for the population of this study because it shows there are many possibilities to oppose sedentary behavior, and the motivation factor makes difference in results of practice.

Another relevant aspect is that this kind of intervention may facilitate positive affective response to physical activity (Lee, Emerson and Williams, 2016) promoting adherence to training program, positive affective response is motivated by characteristic of VGA's, that is easily related to fun and joy. In addition, the score counting is stimulating, and makes the individuals want to improve more and more.

Is important to relate in this study there was no previous training, which could have facilitated the practice of activity and conditioned subjects, and since the study is about a game that stimulates reactions and reflections, if players were previously training, they could have done faster movements, which could rise discussion about results.

A limitation of this study was the use of only one modality of the game and only male subjects, what does not make possible to expand results to other modalities of games and to the female gender.

The menstrual cycle can affect mood, which is causally linked with motivation, this is the reason why we only used males for this research. Beyond this, the study was relatively short, and we suggest to another researchers interested in this topic, to future investigate females subjects and for longer period.

In conclusion, 6-week boxing training in an active video game is very enjoyable. Thus, boxing on an AVG could be an important key to low the levels of sedentary behavior, since a large interest is associated with adherence to physical training.

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## ISSN 1981-9900 *versão eletrônica*

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Recebido para publicação 22/07/2019

Aceito em 06/05/2020