



RESEARCH ARTICLE

Relationship between the Use of Video Games and The Level of Physical Activity of Chilean university students

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ARTICLE INFO	ABSTRACT
Received: May 24, 2024	<p>This research explores the relationship between video games and physical activity, providing insights into how time spent on video games can influence the physical behavior of Chilean university students. The research method is quantitative, ex post facto, correlational, and comparative. The results indicate that men have a significantly higher video GC than women, and video Game Consumption is positively related to socioeconomic status, time spent playing video games, and weekly frequency of video game use, but negatively related to the level of physical activity. In conclusion, higher video GC is associated with lower levels of physical activity among Chilean university students.</p>
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INTRODUCTION

Over the past two decades, video game use has grown exponentially. By 2023, the global number of gamers is estimated to be around 3.38 billion, representing about 40% of the world's population (Wijman, 2023). This phenomenon has particularly affected the university population, with approximately 80% of students at this educational level playing video games (Entertainment Software Association, 2024). However, it is important to note that video games play a significant role in education (Uribe-Delgado, 2023).

This increase in video Game Consumption (GC) has coincided with growing concerns about low levels of physical activity among students (WHO, 2022). The interaction between these behaviors could have negative implications for the health and well-being of this population, as the literature suggests an inverse relationship between video game use and physical activity levels; that is, higher video GC correlates with lower physical activity levels (Pelletier et al., 2020).

Sedentary behavior is a key risk factor in the development of various metabolic, respiratory, and circulatory diseases (Guthold et al., 2020; Strain et al., 2024). According to the WHO (2019), globally, 23% of adults and 81% of adolescents (aged 11 to 17) do not meet the international physical activity

recommendations for health. The WHO highlights several causes of sedentary behavior, including increased sedentary behaviors at work and home, overpopulation, poverty, crime, heavy traffic, poor air quality, and the lack of parks, sidewalks, and sports and recreational facilities.

Research on the relationship between physical activity levels and video GC suggests that low levels of physical activity are associated with factors such as parents' educational level, screen time, and the ownership of electronic devices (Alotaibi et al., 2020). However, some studies have found that professional gamers and eSports enthusiasts tend to exhibit higher levels of physical activity compared to other groups (Aparicio-Chueca & Rodríguez-Rodríguez, 2023). This discrepancy in findings motivates the present study, which aims to analyze the relationship between video GC and the physical activity levels of participants. Based on theoretical analysis and systematic reviews on this topic (Aros et al., 2018; Silva et al., 2018), we hypothesize that lower levels of physical activity are associated with higher video GC.

The contribution of this study lies in understanding the relationship between video games and physical activity by providing insights into how time spent on video games can influence the physical behavior of Chilean university students. This study will expand the existing literature by addressing the observed discrepancies in previous research, particularly regarding the effects of video GC on physical activity.

METHOD

Participants

The sample consisted of undergraduate and graduate students from the following faculties: Faculty of Education, Social Sciences and Humanities; Faculty of Engineering and Sciences; Faculty of Medicine; and Faculty of Legal and Business Sciences, from three higher education institutions in Chile. A total of 412 students were included, of which 171 were men (41.5%) and 241 were women (58.5%), with an average age of 22.72 years ($SD = 4.66$). The selection criterion was to include students enrolled in professional degree programs within Chilean universities.

Procedure

Data collection was carried out through an online questionnaire (<http://goo.gl/itpamA>), accessible via smartphone or computer with an internet connection. The questionnaire was distributed among students in undergraduate and graduate programs at the selected universities. All subjects who met the inclusion criteria participated in the study and provided informed consent. The average time to complete the questionnaire ranged from 7 to 15 minutes, with no significant incidents reported during its administration.

Instrument

The Video GC Habits Questionnaire (CHCVJ) (Becerra, 2012) was used as the main data collection tool. This questionnaire consists of 24 items divided into two sections: a scale measuring video GC habits (19 items) and an additional section collecting descriptive data on the frequency of video game use. Additionally, the Spanish version of the International Physical Activity Questionnaire (IPAQ) (Craig et al., 2003) was used to assess the level of physical activity. To determine socioeconomic status, questions from the National Survey on Physical Activity and Sports Habits of the Population Aged 18 and Over in Chile were included.

Data analysis

Data analysis was performed using SPSS v25 software. Descriptive statistics were calculated for each item in the sample ($n = 412$). The internal consistency of the instrument was assessed using Cronbach's alpha coefficient ($\alpha = 0.958$). Group differences were analyzed using the Mann-Whitney

U test, as normality of the sample, evaluated with the Kolmogorov-Smirnov test, showed a p-value of < 0.05 .

RESULTS

The results are presented starting with the descriptive data of the sample (Table 1). An analysis of variance (ANOVA) was conducted with the level of physical activity and socioeconomic status of the participants as dependent variables, and the level of video game use (low, medium, and high) as the factor. Additionally, correlations between video game use, physical activity level, socioeconomic status, and time spent on video games were calculated.

Table 1: Sample descriptives

	N	%
Gender		
Male	171	41,5
Female	241	58,5
Occupation		
Studying	256	62,1
Studying and Working	132	32
Other	24	6,8
Socioeconomic Status		
Low	125	30,3
Meddle	161	39,1
High	126	30,6
Physical Activity Level		
Low	179	43,4
Meddle	141	34,2
High	92	22,3
Economic Status		
Low	125	30,3
Meddle	161	39,1
High	126	30,6
Gaming Platform		
Computer	116	28,2
Nintendo	13	3,2
No Gaming	108	26,2
PlayStation	55	13,3
Smartphone and/or Tablet	104	25,2
Xbox	16	3,9

Source: Own elaboration

Video GC habits and gender

As in the validation study of the Video Game Usage Habits Questionnaire (Becerra, 2012), gender differences were examined in the sample. In both Becerra's study and the present study, the normality of the sample, assessed using the Kolmogorov-Smirnov test, resulted in a p-value of < 0.05 ,

leading to the use of the non-parametric Mann-Whitney U test for group comparisons (see Table 2). The results revealed a significant difference between men and women, showing that men have a significantly higher video GC than women (Mann-Whitney U = 8244.5, mean for men = 272.22, mean for women = 155.21, Z = -11.129, $p < 0.05$).

Table 2: Video GC habits by gender

U de Mann-Whitney	8244,5
Z	-11,129
Significance	0,00
Source: Own elaboration	

Differences and effects of video GC on physical activity levels

A statistically significant effect of video GC on physical activity levels, as measured by the IPAQ, was found ($F(2, 406) = 7.963$, $p < 0.05$, $\eta^2 = 0.038$). Multiple comparisons (Table 3) indicated significant differences in physical activity levels between the groups with low or no video GC and those with high video GC ($t(406) = 3.81$, $p < 0.05$); as well as between the groups with low or no consumption and medium consumption ($t(406) = -2.45$, $p < 0.05$). No significant differences were found between the groups with medium and high video GC ($t(406) = -1.56$, $p > 0.05$).

Table 3: Multiple comparisons

Variable dependiente			Sig.
Physical Activity Level	Low or No Video GC	Medium Video GC	0,04
		High Video GC	0,00
	Medium Video GC	Low or No Video GC	0,04
		High Video GC	0,36
	High Video GC	Low or No Video GC	0,00
		Medium Video GC	0,36
Socioeconomic Status	Low or No Video GC	Medium Video GC	0,11
		High Video GC	0,04
	Medium Video GC	Low or No Video GC	0,11
		High Video GC	1,00
	High Video GC	Low or No Video GC	0,04
		Medium Video GC	1,00

Source: Own elaboration

Regarding the socioeconomic status of the participants (Table 4), a significant difference was identified between the groups with low or no video game consumption and those with high consumption ($t(406) = -2.48$, $p < 0.05$). No significant differences were observed between the groups with low or no consumption and medium consumption ($t(406) = -2.09$, $p > 0.05$), nor between the groups with medium and high consumption ($t(406) = -0.61$, $p > 0.05$).

Table 4: Analysis of variance (ANOVA)

Variable	F	Sig.
Physical Activity Level	7,963	0,00
Socioeconomic Status	3,941	0,02
Source: Own elaboration.		

Bivariate correlations

This section presents the results of the correlations between video game consumption, physical activity level ($r = -0.194$, $p < 0.01$), socioeconomic status ($r = 0.134$, $p < 0.01$), time spent on video games ($r = 0.772$, $p < 0.01$), and weekly frequency of video game consumption ($r = 0.755$, $p < 0.01$).

Table 5: Correlations between variables

	Video game consumption	Physical activity level	Socioeconomic status	Time spent on video games	Weekly frequency of video game consumption
Video Game Consumption	1				
Physical Activity Level	-0.194**	1			
Socioeconomic Status	0.134**	-0.027	1		
Time Spent on Video Games	0.772**	-0.105*	0.105*	1	
Weekly Frequency of Video Game Consumption	0.755**	-0.072	0.112*	0.783**	1
**Correlation is significant at the 0.01 level.					
*Correlation is significant at the 0.05 level.					

The results in the table indicate that video game consumption is positively related to socioeconomic status, time spent on video games, and weekly frequency of video game consumption, but negatively related to physical activity level.

DISCUSSION AND CONCLUSIONS

The results suggest that the level of physical activity among participants does not significantly vary according to their socioeconomic status, which contrasts with previous research in the Temuco population (Serón et al., 2010). This discrepancy might be attributed to the fact that the participants are university students, which homogenizes their educational level a factor identified as influential in the National Survey of Physical Activity Habits in Chile (Ministry of Health, 2017).

Regarding the relationship between physical activity level and video game consumption, the results show a negative, albeit weak, correlation, in contrast to Carrillo's (2011) study, which did not find a significant relationship between these two factors. Despite the weak correlation, our study suggests that higher video game consumption is associated with lower physical activity levels, which aligns with previous studies (Chan et al., 2022; Puolitaival et al., 2020).

The positive relationship between video game consumption and sedentary behavior is evident: as the time and frequency of video game use increase, so does sedentary behavior, consistent with research conducted over the past 15 years (Chan et al., 2022; Puolitaival et al., 2020).

Given the high video game consumption among young people and adults, future research should focus on exploring the potential benefits of video games, especially in educational contexts and value promotion. It is crucial not only to document the negative effects on physical and mental health but also to investigate how active video games could contribute to increasing daily energy expenditure, among other desirable benefits.

For future studies using the Video Game Consumption Habits Questionnaire, it would be advisable to update the questions to better reflect current consumption media, differentiating between active and sedentary video games, and complementing the information with data on mobile phone and internet use across various platforms.

Moreover, it is necessary for physical activity professionals to collaborate with the innovative video game industry, participating in the development of games that integrate movement, interaction, and screen technology. Additionally, advances in virtual reality offer new opportunities for creating active video games (Puolitaival et al., 2020; Yen & Chiu, 2021).

The increasing access to video games, many of which are free and available on multiple platforms, has driven the expansion of the industry (Wijman, 2023). eSports have fostered competitive interest, facilitating participation among both players and spectators (Yoo et al., 2017). However, the use of active video games remains limited compared to sedentary video games (Carrillo, 2011; Chan et al., 2022).

This presents the challenge of mitigating the negative effects of sedentary behavior associated with video game consumption by promoting physical activity in a way that allows video games and exercise to coexist in a balanced manner (Biddle et al., 2003). In line with this reflection, it is suggested to investigate the effectiveness of video games incorporating physical movement, such as exergames; compare various strategies to reduce sedentary behavior related to video game use; and explore gamification of physical activity as a means to encourage exercise. It was also identified during data collection that one of the issues observed by educators is screen exposure time and its various uses, and how these can interfere with physical activity levels and academic performance of students.

In conclusion, the results of our research confirm the proposed hypothesis: higher video game consumption is associated with lower levels of physical activity among Chilean university students.

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