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ATTITUDES OF GENERATION Z TOWARD DIGITAL GAMING AND HEALTHY NUTRITION ACCORDING TO REGULAR PHYSICAL ACTIVITY STATUS

ZAINTERESOWANIE POKOLENIA Z GRAMI CYFROWYMI I ZDROWYM ODŻYWIANIEM W ZALEŻNOŚCI OD POZIOMU REGULARNEJ AKTYWNOŚCI FIZYCZNEJ

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Wkład autorów:
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B. Data collection/entry
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C. Data analysis/statistics
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wyszukiwanie i analiza literatury
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Summary

Background. The study aimed to identify the relationship between attitudes toward digital gaming and healthy nutrition according to participation in physical activity.
Material and methods. The sample consisted of 332 (171 female, 161 male) students aged 10 to 14. The Digital Gaming Attitude Scale (DGAS) and Attitude Scale for Healthy Nutrition (ASHN) were used to collect data. After verifying the normal distribution of the data, Pearson correlation analysis and t-test were performed.
Results. The results showed a moderate inverse correlation between DGAS and ASHN scores. Moreover, a moderate inverse correlation was found between the DGAS and ASHN scores of both physically active and sedentary participants. Male participants, regardless of their physical exercise status, had significantly higher DGAS scores than female participants. No significant difference was found in the ASHN scores of those who participated in physical activity and those who did not participate in physical activity according to their gender.
Conclusions. The findings suggested that the increase in the attitude toward digital gaming caused a reduction in the attitude toward healthy nutrition, and participation in regular physical activity diminished the attitude toward playing digital games. Furthermore, the results indicated that male participants had higher digital gaming attitudes than female participants, irrespective of their physical activity status.

Keywords: gaming, physical activity, adolescents, attitude, nutrition

Streszczenie

Wprowadzenie. Celem badań było określenie powiązań pomiędzy zainteresowaniem grami cyfrowymi a zdrowym odżywianiem, w zależności od poziomu aktywności fizycznej.
Materiał i metody. W badaniach uczestniczyło 332 uczniów (171 dziewcząt i 161 chłopców) w wieku od 10 do 14 lat. Do zebrania danych wykorzystano skalę zainteresowania grami cyfrowymi (ang. *Digital Gaming Attitude Scale* – DGAS) oraz skalę zainteresowania zdrowym odżywianiem (ang. *Attitude Scale for Healthy Nutrition* – ASHN). Po zweryfikowaniu normalnego rozkładu danych dokonano analizy korelacji Pearsona i przeprowadzono test t.
Wyniki. Na podstawie wyników badań wskazano na umiarkowaną korelację ujemną pomiędzy punktacją na skali DGAS a wynikami na skali ASHN. Ponadto wykazano umiarkowaną korelację ujemną pomiędzy wynikami na skalach DGAS i ASHN zarówno u uczestników aktywnych fizycznie, jak i tych prowadzących siedzący tryb życia. Chłopcy, bez względu na zakres, w jakim uprawiali ćwiczenia fizyczne, uzyskali znacznie wyższe wyniki na skali DGAS niż dziewczęta. Jeżeli chodzi o wyniki na skali ASHN, nie wykazano znaczących różnic pomiędzy uczestnikami aktywnymi fizycznie a uczestnikami unikającymi aktywności fizycznej, w zależności od płci.
Wnioski. Wnioski z badania sugerują, że wzrost zainteresowania grami cyfrowymi doprowadził do spadku zainteresowania zdrowym odżywianiem, zaś regularna aktywność fizyczna zmniejszała zainteresowanie grami cyfrowymi. Wyniki wskazały ponadto, że chłopcy są bardziej zainteresowani grami cyfrowymi niż dziewczęta, bez względu na poziom aktywności fizycznej.

Słowa kluczowe: gaming, aktywność fizyczna, młodzież, nastawienie, odżywianie

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Introduction

With the ease of access to digital devices and the Internet in recent years, it is observable that the rate of digital gaming has risen significantly. Likewise, the spread of a life-on-the-go mindset has led to increased consumption of unhealthy foods (e.g., fast food, snacks).

Digital games refer to games that operate on visual and virtual platforms, utilizing digital devices such as monitors, keyboards, and joysticks [1]. These games require specific hardware, such as mobile phones, tablets, and computers, and they follow predefined rules and objectives [2]. Digital games appeal to individuals across different age groups; however, they have a more pronounced impact on Generation Z. As this generation's interest in digital games grows, its members also devote more time to playing them [3]. The advancement of Internet technology, along with other technological developments, has a profound influence on the lives of individuals, especially Generation Z, and provides them a basis to engage in digital games. Individuals turn to digital games for such reasons as a distraction, enjoyment, avoidance of personal interaction due to social maladjustment and communication challenges, isolating themselves from their surroundings, expending prodigious amounts of time on and seeking rewards and gratification (e.g., trophies, power) in games [4]. "Widespread technological products that penetrate the whole world by providing access to diverse digital game genres" are becoming increasingly attractive over time. It is apparent that individuals who are drawn to this appeal and spend a significant portion of their daytime on digital games tend to develop asocial personalities and unhealthy eating habits over time [5]. Excessive use of digital devices may result in digital games impairing the individual's mobility, diverting their attention from healthy eating and exposing them to the risk of obesity [6]. Digital games negatively affect healthy life-development, cause obesity as a result of unhealthy nutrition, and reduce interest in physical activity [7].

A healthy diet means to fulfill nutritional needs with a sufficient intake of nutrients according to age, gender, and physiological condition. In this context, maintaining a diet of foods low in fat and high in fiber and consuming sufficient amounts of fruits and vegetables on a regular basis constitute the concept of healthy nutrition [8]. In our era, where unhealthy nutrition is growing by the day with the prevalence of fast food that accompanies industrialization [9], it is essential to reinforce the healthy eating behaviors of Generation Z.

Attitude is the positive or negative feelings of individuals regarding a person, an object, or a subject [10]. In addition, it is a state of cognitive readiness shaped by experiences influencing the individual's reactions to a situation [11]. Therefore, attitude exerts its influence by creating congruence among the feelings, thoughts, and behaviors of individuals [12]. The stage of life that Generation Z is experiencing is the stage when healthy eating attitudes and behaviors become habitual and evolve [13]. In this stage, the prevention of obesity that may result from unhealthy nutrition can be attained through physical activity and regular exercise. However, recent studies indicate that the frequency of physical exercise of Generation Z has declined and has been replaced by pursuits with low rates of physical activity [14].

Literature review

There is a research gap in the literature regarding the association between digital gaming attitudes and healthy eating attitudes. However, there are studies that are close to the research topic. For instance, it has been reported that individuals' body mass index increases proportionally to the time they spend playing digital games. Prolonged digital gaming reduces physical activity levels and leads to issues such as unhealthy diet and uncontrolled weight gain [15]. Moreover, Vandewater et al. [16] argued that digital platforms induce serious inactivity. In this regard, there is a significant correlation between a sedentary lifestyle and the amount of time spent on the digital platform [17]. On the other hand, the term "couch potato" is used to describe the link

between obesity and individuals who spend time on digital platforms by consuming unhealthy snacks and remaining inactive [18,19]. The reason for this is the increase in calorie intake, unhealthy diet, and inactivity of individuals who spend large amounts of time in front of a screen, resulting in excessive weight gain [20,21]. It has been suggested that individuals who spend a long time on a digital platform and snack when they are hungry may experience a slowdown in their metabolism [22]. Uncontrolled digital gaming and device use cause individuals to fail to take time required to eat proper meals and thereby subject themselves to malnutrition [23].

Importance and purpose of the research

Today, the heavily regimented daily lifestyle of individuals in Generation Z (e.g., school hours, private tutoring hours [private lessons such as mathematics, physics, and so forth]) may result in the need to escape from their surroundings. Individuals may prefer to spend time playing digital games to get away from their daily responsibilities. Those who seek freedom from such demands by playing digital games may fail to observe mealtime by immersing themselves in gaming and may satisfy their hunger with packaged foods and sweets (e.g., biscuits, chocolate), skip their meals, or opt for fast food. Unfortunately, this situation may become habitual over time and the duration of individuals' immersion in digital games may lead to an undesirable relationship between their attitudes toward digital games and healthy eating habits. These two situations imposed by modern, fast-paced, and technology-driven life in recent years, can be regarded as the precursors of serious problems such as digital game addiction and obesity. To break this cycle, it is crucial that individuals, especially those in Generation Z, adopt a regular physical activity manner that inhibits digital gaming and fosters healthy dietary habits. To ensure that the potentially bright future of our society – Generation Z – is not darkened by the shadow of digital gaming and unhealthy eating, it is vital to monitor their cognitive, affective, and behavioral patterns regarding digital games and healthy eating in relation to their regular physical activity status and to be vigilant in this regard.

Aim of the work

In this context, this study aims to investigate the relationship between the attitudes toward digital gaming and healthy nutrition among individuals in Generation Z. The study involved Generation Z subjects who engage in digital gaming for at least half an hour per week, some of whom engaged in regular physical activity, and some of whom did not engage in physical activity.

Subproblems:

1. Is there a significant relationship between Digital Gaming Attitude Scale (DGAS) and Attitude Scale for Healthy Nutrition (ASHN) scores?
2. Is there a significant relationship between DGAS and ASHN scores according to regular physical activity status?
3. Is there a significant difference in DGAS and ASHN scores according to the gender of those physically active and sedentary?

Material and methods

Research model

The relational screening model, one of the quantitative research methods, was used in the research. The relational screening model is a research model that aims to determine whether there is a change and/or the

degree of change between two or more variables [24,25]. This model was used to determine the relationship between digital games and attitudes towards nutrition.

Study group

The study sample consisted of 332 students (171 female, 161 male) from the age group of 10-14, who played digital games (sedentarily on the phone, computer, etc.) for at least half an hour per week. 187 Participants (93 female, 94 male) participated in regular physical activity, and 145 (78 female, 67 male) did not participate in physical activity. Before completing the data collection instruments, the participants were informed about the study (the fact that it would be used for scientific research, and that no names would be collected) and that their participation in the study was voluntary. The data from the participants were collected in compliance with ethical standards. The demographic information form presented to the participants includes questions about participation in physical activity, frequency of physical activity, and duration of physical activity. The MET value was taken as basis when determining physical activity status. MET (metabolic equivalent) is a measure of the amount of oxygen consumed per kilogram per unit time. According to MET classification, physical activity status is light (activities between 1-2 METs, walking, etc.), moderate (activities between 3-6 METs, running, etc.) and vigorous (activities between 6 METs and more, football, etc.) [26-28]. In this context, moderate and vigorous MET values were taken as basis for the participants included in the study. Based on the G power analysis, the effect size of the study group was estimated to be 98% [29].

Data collection tools

The study employed DGAS and ASHN as data collection instruments and administered a demographic information form to establish the age, gender, regular physical exercise status, and digital gaming duration-frequency of the participants. However, before collecting data, the participants were informed about the aim of the study, assured that the data would be used solely for academic purposes, and were asked for their consent to participate in the research under ethical guidelines. Data were collected face-to-face from the participants. The DGAS and ASHN used in the research are as follows:

- Digital Gaming Attitude Scale (DGAS): The scale developed by Demir & Bozkurt [4] comprises 18 items. The scores were graduated based on the lowest points and multiples that the participants could get from the scale. Accordingly, the scores of the participants indicated their digital gaming attitudes as follows: 1-18 very low; 19-37 low; 38-54 moderate; 55-72 high; 73-90 very high. The Cronbach Alpha reliability coefficient of the total score of the scale was calculated as 0.93.
- Attitude Scale for Healthy Nutrition (ASHN): The scale developed by Gönül Tekkurşun Demir & Halil Ibrahim Cicioğlu [5] comprises 21 items. The minimum and maximum scores that could be obtained from the scale were 21 and 105, respectively. The scores of the participants reflected their attitudes toward healthy nutrition as follows: 21 very low, 23-42 low, 43-63 moderate, 64-84 high, and 85-110 ideally high. The Cronbach Alpha reliability coefficient of the total score of the scale was calculated as 0.94.

Data Analysis

The study assessed the normality of the data distribution for each variable based on the Skewness-Kurtosis intervals. The analysis revealed that the data were distributed within ±1. Parametric tests were employed to analyze the normally distributed data. Accordingly, Pearson Correlation analysis and t-test were used in the data analysis of the study. The significance level was set at 0.05.

Results

The statistical results of the data analysis are presented and discussed in this section. Table 1 displays the mean DGAS and ASHN scores of physically active and sedentary participants. The results indicated that the participants who engaged in regular physical activity had moderate mean scores on DGAS and very high mean scores on ASHN. Moreover, the participants who did not participate in physical activity had high mean scores on both DGAS and ASHN.

Table 1. DGAS and ASHN scores of the participants

Participation in physical activity	Scale	N	$\bar{x}$±ss
Yes	DGAS	187	49.70±11.27
	ASHN	187	73.65±10.50
No	DGAS	145	55.29±9.17
	ASHN	145	71.48±9.20

Table 2 shows the results of the Pearson Correlation test that was conducted to examine the relationship between DGAS and ASHN scores. The analysis indicated a moderate inverse correlation between DGAS and ASHN scores (r=-0.373; p<0.05).

Table 2. The relationship between DGAS and ASHN

Scales		DGAS	ASHN
DGAS	***r***	1	-0.373
	p	-	0.00*
ASHN	***r***	-0.373	1
	p	0.00*	-

Notes: *p<0.05.

A moderate inverse correlation was found between DGAS and ASHN scores of individuals participating in physical activity (r=-0.413; p<0.05). A moderate inverse correlation was found between DGAS and ASHN scores of the participants who were sedentary (r=-0.277; p<0.05) (Table 3).

Table 3. The relationship between DGAS and ASHN by the regular physical exercise status

Participation in physical activity			ASHN
Yes (N=187)	DGAS	*r*	-0.413
		p	0.00*
No (N=145)	DGAS	*r*	-0.277
		p	0.00*

Notes: *p<0.05.

Table 4 indicates that regarding the status of doing physical activity regularly, the DGAS score of male participants ($\bar{x}$ =53.72) was significantly higher than the score of female participants ($\bar{x}$ =45.63) (t=-5.242; p<0.05). Likewise, the DGAS score of male participants who were sedentary ($\bar{x}$ =55.47) was significantly higher than the score of sedentary female participants ($\bar{x}$ =49.56) (t=-4.073; p<0.05). Moreover, the ASHN scores of the participants did not differ significantly by gender, regardless of their regular physical activity status.

Table 4. Analysis of DGAS and ASHN by the gender and regular physical activity status

Participation in physical activity	Variable	Gender	N	$\bar{x}$	SD	t	*p*
Yes	DGAS	Female	93	45.63	11.45	-5.242	0.00*
		Male	94	53.72	9.57		
	ASHN	Female	93	75.13	10.18	1.940	0.06
		Male	94	72.18	10.66		
No	DGAS	Female	78	49.56	8.53	-4.073	0.00*
		Male	67	55.47	8.91		
	ASHN	Female	78	72.28	9.73	1.120	0.26
		Male	67	70.56	8.51		

Notes: *p<0.05.

Discussion

The research, which aimed to examine attitudes toward digital gaming and healthy nutrition according to regular physical activity status, recruited participants from Generation Z, who have grown up with digital devices.

The initial finding of the study examined the DGAS and ASHN mean scores of the participants who engaged in regular physical activity and those who were sedentary. The results showed that those who participated in regular physical activity had moderate DGAS and very high ASHN scores, while those who did not participate had high DGAS and high ASHN scores. These results suggest that regular physical activity reduces the tendency to play digital games and enhances healthy eating attitudes in cognitive, behavioral, and affective domains. In parallel with the findings [30] that physically active participants had lower motivation to play digital games. Alagöz [31] reported an inverse correlation between digital gaming and physical activity among students, indicating that more physically active students tended to devote less time to playing digital games. There are also studies reporting that digital gaming affects participation in physical activity. In a study conducted in this direction, it was reported that those who spent less than two hours on digital games participated more in physical activity [32]. According to Ballard et al. [15] and Fullerton et al. [33], the time spent with digital devices and digital games leads to a sedentary lifestyle and insufficient physical activity among youth. In a similar study, Altay and Haluk [34] reported a positive and significant relationship between the motivation for physical exercise and the motivation for digital gaming. In the study titled "Investigation of the relationship between digital game addiction and physical activity levels of secondary school students", it is claimed that daily digital gaming time does not affect the level of physical activity [35]. The literature also includes studies that examined the effects of regular exercise on dietary habits and obesity. Berberoğlu [36] stated that preventing obesity requires replacing unhealthy diet and exercise habits with healthy behavioral principles. Derman et al. [37] suggested that swimming regularly leads to positive changes in the eating habits of adolescents.

The study revealed a moderate inverse correlation between DGAS and ASHN scores. This implies that a higher attitude toward digital gaming is associated with a lower attitude toward healthy eating. A possible explanation for this finding is that the increase in knowledge, interest, and engagement in digital gaming induces a decrease in knowledge, interest, and engagement in healthy nutrition. As a matter of fact, it is stated that attitude consists of the individual's knowledge, interest, and engagement in a situation [38]. Therefore, individuals who have positive attitudes toward digital gaming may spend more time playing games and neglect their nutritional needs. It is indicated that individuals in Generation Z, may experience such problems

as insufficient food intake, skipping meals, overeating high-calorie foods, and forgetting or ignoring healthy eating while playing games [5]. Immoderate and unhealthy snacking during screen time may result in excessive calorie intake, thus obesity may occur [39]. Griffiths and Meredith [40] also argued that the transformation of digital gaming into problematic gaming behavior can lead to undernutrition or overnutrition problems. Consequently, inadequate eating or overnutrition resulting from problematic gaming behavior increases the prevalence of weight issues among individuals [35]. Bozkurt et al. [41] likewise expressed that digital gaming promotes a sedentary lifestyle and obesity. Unlike the aforementioned research findings, Wack and Tantleff-Dunn [42] and Eyimaya et al. [43] did not find a relationship between healthy eating and obesity depending on digital gaming.

Another finding of the study was a moderate inverse correlation between DGAS and ASHN scores of the participants who participated in physical activity and those who did not. This suggests that a higher score for attitude toward digital gaming is related to a lower score for attitude toward healthy eating regardless of physical activity status, and thus, the physical activity status does not make a difference between these two variables. This also implies that engagement in digital gaming has a detrimental effect on healthy nutrition. Chen and Kennedy [44] reported that sedentary digital games may lead to unhealthy dietary habits. Vandewater et al. [16] indicated that digital games can increase the risk of obesity. Park [45] also argued that individuals who play digital games for long periods are likelier to have unhealthy eating habits and to tend towards obesity and to avoid physical activity.

The last finding of the study was that male participants, irrespective of their physical activity status, had significantly higher attitude scores than female participants toward digital gaming. This may be attributed to the fact that men in Generation Z, regardless of their physical activity status, are more interested in high-technology devices than women and that women spend less time on digital games because they have more responsibilities and duties in their domestic life. Griffiths and Davies [46] argued that men are more inclined to play digital games than women. They attributed this to the fact that digital games are designed to appeal to men, they feature intensively masculine images, and men have higher success than women in such games. Similarly, Namli and Demir [7] found that men have significantly higher digital gaming attitudes than women. Sherry et al. [47] reported that men play digital games more than women. A study conducted with 11 male and 11 female students at the Stanford University School of Medicine showed that men have more brain activity related to digital gaming enjoyment than women, which is said to increase the susceptibility of men to digital gaming addiction [48]. Considering that men use digital devices such as computers more frequently than women and have easier access to digital media and materials, they may have higher attitude scores toward digital games [49]. Moreover, it was a noteworthy finding that the attitude scores toward digital gaming of male and female participants, who engaged in regular physical activity, were lower than those who did not engage in physical activity. Thus, the influence of physical activity on this situation comes to the forefront. The current research results are supported by the findings of Yazıcıoğlu Çalışan et al. [50], who examined the digital gaming attitudes of children attending summer sports school. In this regard, they determined that male students who engaged in regular physical exercises and games in summer school had higher digital gaming attitudes than female students. Likewise, Hazar [51] investigated the change in the level of digital game addiction before and after children's regular participation in physical activity and discovered that the inclination to play digital games decreased after regular physical activity. In addition, according to the gender variable, the current study did not find a difference in the healthy eating attitudes of the physically active participants and those who were sedentary. This indicates that men and women who participate in physical activity or do not participate in physical activity regularly have similar knowledge, interest, and behavioral patterns regarding healthy nutrition. Kostopoulos et al. [52] also explored the nutritional habits of basketball

players and individuals participating in physical activity and observed a significant difference in favor of basketball players. Üstün [53] found that the healthy nutrition levels of those who engaged in sports were significantly higher than those who were not physically active. Additionally, they reported that the level of malnutrition of those who did not exercise regularly was higher than those who did sports. Üstün et al. [54] investigated the healthy nutrition attitudes of athletes and sedentary individuals and did not find a significant difference in the healthy eating attitudes of the participants.

Conclusions

The research results indicated that those who participate in regular physical activity had moderate DGAS score averages and very high ASHN score averages, and those who did not participate in regular physical activity had very high DGAS and ASHN score averages. A moderately significant inverse correlation was detected between DGAS and ASHN. A moderate significant inverse correlation was observed between the DGAS and ASHN scores of the participants who participate in regularly physical activity. A moderate significant inverse correlation was found between the DGAS and ASHN scores of those who participate in regular physical activity. It was established that men who were sedentary or physically active had higher DGAS scores than women. Regarding healthy nutrition, it was identified that the knowledge, interest, and behavior patterns of those men and women who did engage in regular exercise, and of those who did not engage in physical activity, were similar.

Recommendations

Based on these results, it is suggested that educational programs on the adverse effects of digital games, the significance of healthy nutrition, and the habits of healthy eating should be provided specifically for Generation Z, through seminars and activities to be organized by the Ministry of National Education and the Ministry of Youth and Sports. It is also recommended that projects be devised to inform parents of Generation Z children about the benefits of adequate and correct use of digital games and about the harm consequent to the overly intensive use of such games. Furthermore, they should be encouraged to be role models for their children. Furthermore, due to the cross-sectional design of the current study, it is recommended to conduct longitudinal studies with fewer limitations.

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