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THE EFFECT OF TRADITIONAL GAMES EDUCATION ON PHYSICAL FITNESS, HEALTH AND HAPPINESS LEVELS IN SECONDARY SCHOOL STUDENTS[1]

O EFEITO DA EDUCAÇÃO POR JOGOS TRADICIONAIS NOS NÍVEIS DE APTIDÃO FÍSICA, SAÚDE E FELICIDADE EM ALUNOS DO ENSINO MÉDIO

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ABSTRACT

The effects of traditional games on various aspects of physical fitness need to be revealed for children and adolescents to transform them into lasting behaviors in physical education classes and daily life. This study aims to examine the impact of traditional game education (TGE) and physical education lessons, along with elective sports and physical activity classes (PE + ESPAC), on the physical fitness, health, and happiness levels of middle school students. Within this scope, traditional games were played by the experimental groups for 10 weeks after pre-tests, and post-tests were conducted. In addition to PE the control group received elective sports and physical activity classes (ESPAC). Measurements were taken for height, body weight, body mass index, sit and reach test, double leg standing broad jump, T-test, 30-meter sprint test, and 20-meter shuttle run test in both pre-tests and post-tests. Additionally, participants' perceptions of health and happiness were assessed with two questions. The students were engaged in traditional games such as "capture the flag", "hopscotch", "dodgeball", and "tag". The sample of the research was determined using the easily accessible sampling method, and it consisted of voluntary students from 5th and 6th grades at Barbaros Middle School in the Ereğli district of Konya province. The research design followed an experimental model with pre-test and post-test. Independent T-tests, paired T-tests, and correlation coefficients between variables were calculated for data analysis. Cohen's d was used to determine the effect size within groups. In the comparison of the findings of this study, TGE and PE + ESPAC groups, a significant difference was found in favor of the experimental group in agility and speed skills only in males. In Cohen's d analyses, in the male experimental group, traditional game education had a large effect on speed and agility, a moderate effect on shuttle running and health perception, and a low effect on BMI, double leg standing broad jump (DLSBJ) and happiness perception. In the female experimental group, it has a large effect on agility, a moderate effect on average speed and perception of happiness, and a low effect on body height, flexibility, DLSBJ, shuttle run test and health perception. In boys, PE

[1] This article is the summary of the lead author's master thesis titled " *The Effect of Traditional Game Education on Physical Fitness, Health, and Happiness Levels of Middle School Students"* at Mersin University Institute of Educational Sciences in 2023.

plus ESPAC education has a low effect on body height, average speed, shuttle running, agility, perception of health and happiness, while in girls, it has a moderate effect on average speed and shuttle run test and a low effect on DLSBJ, agility and health perception. While there was a significant relationship between the perception of health and happiness in both genders during the pre-test, this relationship was observed only in the male group in the post-test. In the posttests, structural characteristics between perceptions of health and happiness and physical fitness variables showed a significant negative relationship, while flexibility was positively related to standing double-leg long jump (DLSBJ), mean 30 m speed, shuttle run and agility speed. In conclusion, it is clear that in terms of improving physical fitness and perceptions of health and happiness, the traditional games education in the experimental group is more effective than the the physical education plus elective sports and physical activity lessons in the control group.

Keywords: Traditional games, Physical education, Physical fitness, Health, Happiness.

RESUMO

Os efeitos dos jogos tradicionais em vários aspectos da aptidão física precisam ser revelados para crianças e adolescentes para transformá-los em comportamentos duradouros nas aulas de educação física e na vida diária. Este estudo tem como objetivo examinar o impacto da educação em jogos tradicionais (TGE) e aulas de educação física, juntamente com aulas eletivas de esportes e atividade física (EF + ESPAC), nos níveis de aptidão física, saúde e felicidade de alunos do ensino fundamental. Dentro deste escopo, jogos tradicionais foram jogados pelos grupos experimentais por 10 semanas após os pré-testes, e pós-testes foram conduzidos. Além da EF, o grupo de controle recebeu aulas eletivas de esportes e atividade física (ESPAC). Foram feitas medições de altura, peso corporal, índice de massa corporal, teste de sentar e alcançar, salto em distância com duas pernas, teste T, teste de velocidade de 30 metros e teste de corrida de vaivém de 20 metros em pré-testes e pós-testes. Além disso, as percepções dos participantes sobre saúde e felicidade foram avaliadas com duas perguntas. Os alunos estavam envolvidos em jogos tradicionais como "capturar a bandeira", "amarelinha", "queimada" e "pega-pega". A amostra da pesquisa foi determinada usando o método de amostragem facilmente acessível, e consistiu em alunos voluntários da 5ª e 6ª séries da Barbaros Middle School no distrito de Ereğli, na província de Konya. O desenho da pesquisa seguiu um modelo experimental com pré-teste e pós-teste. Testes T independentes, testes T pareados e coeficientes de correlação entre variáveis foram calculados para análise de dados. O d de Cohen foi usado para determinar o tamanho do efeito dentro dos grupos. Na comparação dos achados deste estudo, grupos TGE e PE + ESPAC, uma diferença significativa foi encontrada em favor do grupo experimental em habilidades de agilidade e velocidade apenas em homens. Nas análises d de Cohen, no grupo experimental masculino, a educação tradicional em jogos teve um grande efeito na velocidade e agilidade, um efeito moderado na corrida de vaivém e percepção de saúde, e um baixo efeito no IMC, salto em distância em pé com duas pernas (DLSBJ) e percepção de felicidade. No grupo experimental feminino, tem um grande efeito na agilidade, um efeito moderado na velocidade média e percepção de felicidade, e um baixo efeito na altura corporal, flexibilidade, DLSBJ, teste de corrida de vaivém e percepção de saúde. Em meninos, educação física mais ESPAC tem um baixo efeito na altura corporal, velocidade média, corrida de vaivém, agilidade, percepção de saúde e felicidade, enquanto em meninas, tem um efeito moderado na velocidade média e teste de corrida de vaivém e um baixo efeito no DLSBJ, agilidade e percepção de saúde. Embora tenha havido uma relação significativa entre a percepção de saúde e felicidade em ambos os sexos durante o pré-teste, essa relação foi observada apenas no grupo masculino no pós-teste. Nos pós-testes, as características estruturais entre percepções de saúde e felicidade e variáveis de aptidão física mostraram uma relação negativa significativa, enquanto a flexibilidade foi positivamente relacionada ao salto em distância de duas pernas em pé (DLSBJ), velocidade média de 30 m, corrida de vaivém e velocidade de agilidade. Concluindo, fica claro que, em termos de melhoria da aptidão física e das percepções de saúde e felicidade, a educação por meio de jogos tradicionais no grupo experimental é mais eficaz do que a educação física mais aulas eletivas de esportes e atividade física no grupo de controle.

Palavras-chave: Jogos tradicionais, Educação física, Aptidão física, Saúde, Felicidade.

Introduction

As an expression of cultural heritage, beliefs, and passions, traditional games reflect the living conditions of their time while playing a significant role in preserving national identities with their modern and traditional features against the efforts of global powers to eliminate national cultures. Research indicates that traditional games provide benefits not only for children's psychological well-being but also for their physical fitness (Parlebas, P. 2010; Ortega, Ruiz, Castillo, Sjostrom, 2008; Janz, Dawson, Mahoney, 2002).

To ensure the survival of traditional games and transform them into lasting behaviors in physical education classes and daily life, it is necessary to reveal their effects on the multifaceted characteristics of children and young people, such as physical fitness, health, and perception of happiness. To popularize traditional games as part of the school curriculum and create a lasting impact on the behavior of children and young people, it is necessary to increase the frequency, duration, and quality of traditional sports and game practices in various educational and social settings.

Similarly, in Iran, although local native games have been introduced and practiced in a socio-cultural context since the past, it has been reported that the effects of these games on Physical Fitness Factors of 7-11-year-old male children have not yet been determined (Sabzi, Torabi, and Akramian Arani, 2023).

Physical fitness plays a crucial role in the health of children and adolescents (Ortega, Ruiz, Castillo, Sjostrom, 2008; Janz, Dawson, Mahoney, 2002). Physical fitness holistically represents the fitness of body systems, and cardiorespiratory, morphological, metabolic, muscular, and motor fitness are reported as the main components of health-related physical fitness (Bouchard, Blair & Haskell, 2006). However, the perspective on health and performance-related physical fitness is changing, and the need for developing each component will vary from the lowest to the highest level for those who improve their physical fitness for health and performance (Ziyagil, 2022). Physical activity (PA) is a fundamental factor contributing to children and young people reaching desired levels of physical fitness

(Hills, Andersen, Byrne, 2011). The relationship between physical activity and physical fitness is complex and bidirectional. Numerous studies have shown a significant relationship between physical activity and cardiorespiratory fitness. This could mean that physical activity increases physical fitness or that individuals with high levels of physical fitness prefer to engage in more physical activity than their less fit peers. Although the physiological response to exercise varies from person to person and is directly influenced by genetic characteristics, regular physical activity improves physical fitness. Clearly, physical activity and physical fitness are independently associated with health and academic performance (Malina et al., 2004; Bouchard, 2012).

Sabzi, Torabi, and Akramian Arani (2023) showed that eight weeks of local traditional games significantly affect physical fitness variables such as agility, speed, flexibility, and explosive power, as well as the perception of physical fitness in 7-11-year-old boys. They recommended coaches and physical education teachers use traditional games training programs to improve children's physical condition.

In this context, the physical activity inherent in traditional games can play an effective role in developing physical fitness. It is a fact that children worldwide are not engaging in sufficient and regular physical activity due to urbanization and technological advancements (Tremblay et al., 2016). The Malaysian School-Based Nutrition Survey showed that 50% of Malaysian schoolchildren aged 10 to 17 are not physically active, with girls being less active than boys (Baharudin et al., 2014).

A study conducted in Turkey on adolescents aged 14-19 showed that 20% of females and 29% of males engaged in regular physical activity for more than six months, while 80% of females and 71% of males did not participate in sufficient physical activity (Çeker, Çekin, Ziyagil, 2015). Similarly, in 2017, the Malaysian Institute of Public Health reported that only 20% of secondary school children met the recommended daily 60 minutes of moderate-to-vigorous physical activity for children and adolescents (IKU. National Health and Morbidity Survey 2017). Lack of activity has been reported to have serious consequences for children's health and is responsible for the rise in childhood obesity. A common aspect of both studies is that they show that only 20% of children are sufficiently active. It is predicted that

increasing physical activity levels will definitely reduce the risk of non-communicable diseases in childhood and adulthood (Lee, Rengasamy, Hooi, 2015).

Reintroducing traditional games into Physical Education classes will not only ensure that the younger generation embraces Malaysia's cultural heritage but will also provide an alternative option for developing physical activity needs and health-related physical fitness among schoolchildren (Zulkifli et al., 2014). Similarly, an intervention study conducted in Iran showed a positive effect of physical education and traditional games in reducing overweight problems among middle school girls (Ali and Ranjbar, 2018). Other studies have reported that playing traditional games improves motor-related fitness, such as agility, speed, and balance, among elementary and middle school students (Abdullah et al., 2013; Charles et al., 2017).

In a meta-analysis study examining the importance of game teaching in physical education in terms of the emotional pleasure experienced by children and adolescents, Mo, Bin Saibon, Li, Li, and He (2024) reported that male participants are more likely to exhibit enjoyable behaviors than female participants in game teaching in physical education classes, and that gender disparities may be affected by variables such as age and the specific sport taught in the class. Furthermore, these researchers emphasized that games can facilitate the achievement of the best results as a tool of physical education and an approach that promotes positive emotional experiences among children.

In a study conducted on elementary school students in Indonesia, it was concluded that while the implementation of learning programs with small and traditional game methods is effective in developing students' physical fitness, small games with modifications focused on students will have a greater impact on improving physical fitness. (Yovira, Barlian, Emral., & Zarya, 2023).

Traditional games are not only associated with the development of physical fitness components through physical activities but also positively correlated with life satisfaction (Maher et al., 2015) and happiness (Zhang and Chen, 2019). Furthermore, Zhang and Chen (2019) reported that physical activity is significantly associated with life satisfaction and happiness in young, middle-aged, and older

adults, while the perception of life satisfaction and happiness increases with age, emphasizing the importance of promoting participation in physical activity.

This study will contribute to determining which game method, at what frequency, duration, and intensity, would be more appropriate for teachers to use in preparing physical education lesson plans aimed at improving physical fitness.

Thus, this study aims to investigate the general characteristics and teaching of traditional games, and their effects on children and young people's physical fitness components, health, and happiness perceptions.

Methodology

The research design is a pre-test-post-test control group experimental design. Two groups were formed by unbiased assignment in both boys and girls: one experimental group participating in traditional game education (TGE) and the other control group participating in classical physical education plus elective sports and physical activities (PE + ESPAC). Independent t-test analyses used in the pre-test measurements showed that there was no significant difference between the experimental and control groups in both genders in terms of all variables, indicating that the groups were homogeneous.

Participants

The participants of this research consisted of 80 students aged 11 and 12, studying at Barbaros Secondary School in Ereğli district of Konya province. In the boys' group, both the experimental and control groups consisted of 21 students each, while in the girls' group, both groups had 19 participants each. Before starting the research, the students were informed about the purpose and scope of the research, and the study was initiated after obtaining consent from the students' parents, school administration, and Konya Provincial Directorate of National Education.

Procedure

The experimental group (TGE) participated in traditional game training sessions on Mondays, Wednesdays, and Fridays of the week, with each session lasting 2 hours (40 minutes + 40 minutes = 80 minutes), totaling 6 hours per week. The games played were as follows: Capture the Flag and Dodgeball with Tag on Mondays, Tag and Dodgeball with Capture the Flag on Wednesdays, and Dodgeball with Tag and Capture the Flag on Fridays.

To equalize the application time with the experimental group, the control group (PE + ESPAC) had 4 hours of physical education and 2 hours of elective sports and physical activities classes on Mondays, Tuesdays, and Thursdays of the week. The control group also had 6 hours of classes per week, with each class lasting 40 minutes, for a total of 3 days. The Physical Education and Sports and elective Sports and Physical Activities classes were conducted in accordance with the curriculum and the annual plan, aligning with the specified learning outcomes. In the extracurricular activity, volleyball training was provided for 2 hours per week. The control group's practices were as follows: physical education on Mondays, basic volleyball training on Tuesdays, and elective Sports and Physical Activities classes on Thursdays.

In physical education classes, the following topics were covered for 5th grade over 10 weeks: movement skills, dribbling and self-assessment, manipulative skills with the ball, stability and balance skills, displacement and balancing skills, movement skills in limited time, traditional children's games, object control with balancing and displacement skills, and body awareness with object control.

Similarly, in physical education classes, the following topics were covered for 6th grade over 10 weeks: dribbling skills in basketball, shooting practice at the wall with wrist movements, layups in basketball, offense and defense in basketball, skill tests and error analysis, forward and backward rolls, effective movement in limited time, distance running, and triple jump.

Furthermore, the control group was taught the following topics in elective sports and physical activities classes over 10 weeks: basic volleyball skills, basic skills and educational games, educational games suitable for volleyball skills,

preparation for national holidays, basic skills of sports branches and educational games related to them, game rules of sports branches, offensive and defensive tactics of various sports branches, participation in tournaments in specific sports branches and accepting the results, and offensive and defensive skills in specific branches.

Over a total of 10 weeks, with the same frequency and duration each week, the effects of traditional game practices and physical education classes within the scope of the MEB (Ministry of National Education) curriculum, along with elective sports and physical activities classes, on students' physical fitness variables, health, and happiness perceptions were investigated.

Game rules adapted from the study by Gündoğdu and Yücel (2013) were explained and practiced with the students in the week before starting the study. Any deficiencies in the implementation were corrected to ensure that the children fully understood and could apply the games, preparing them for the game.

These games are: capture the flag (kaleli yakan top), hopscotch (istop), dodgeball (sıçratan top) and tag (elim sende/ebelemece). The traditional games were played by the researcher, who is a physical education teacher.

Traditional Games

Capture the Flag (Kaleli Yakan Top): This game is played on a 9m x 18m rectangular field divided into two equal halves by a line in the middle. Participants are divided into two equal teams and take their positions on their respective sides, choosing one player as the goalkeeper (thrower). Goalkeepers try to hit the opposing team's players with the ball from behind the backline of the opposing team's field. All players are active in the game, and those who catch the ball in the air also try to hit the opposing team's players. The team that hits all the opposing team's players wins the set. At the end of the set, the teams and goalkeepers switch sides. The team that wins two sets in total wins the game (Gündoğdu and Yücel, 2013).

Tag (istop): This game starts by choosing a tagger in a designated area. The chosen tagger stands in the middle of a circle formed by the group, shouts "İstop!" (Stop!), says a friend's name, and immediately throws the ball into the air. The named player tries to catch the ball while the others scatter around without leaving the area. The player who catches the ball shouts "İstop!" and everyone freezes. The tagger says a color, and the others try to touch something of that color without leaving the area. Meanwhile, the tagger tries to hit the players who cannot touch the color with the ball. Hit players are out. If the tagger doesn't hit anyone, they are out, and a new tagger is chosen. The game continues until only one person remains (Gündoğdu and Yücel, 2013).

Dodgeball (Sıçratan Top): In this game played with a large group, there is a rope with a volleyball attached to its end inside a net. A tagger is chosen who stands in the middle of a circle formed by the other players. The tagger sits and spins the rope with the ball over their head, making the ball pass under the players' feet. The players jump over the ball to avoid being hit and getting tangled. The player hit by the ball is out. The game continues until only one player remains (Gündoğdu and Yücel, 2013).

Tag (Elim sende/ebelemece): This game is played in a 30-meter area to improve speed and endurance. The group is divided into runners and chasers who line up 3 meters apart. With the start command, the runners run towards the finish line, and the chasers try to tag them. Each player can only tag the person in front of them. A successful tag earns a point. The roles switch after each round, with 8 sets played and 1-minute breaks between sets. The team with the most points wins (Gündoğdu and Yücel, 2013).

Data Collection Tools

Information about the tests was given to the students, and permissions were obtained from their parents, school administration, and Konya Provincial Directorate of National Education. Warm-ups were conducted under the supervision of physical education teachers. Students with health problems during

the tests were excluded. The study and tests were conducted in the schoolyard when the weather permitted, otherwise in the school's multipurpose hall.

Demographic Information: Students were asked about their age, health ("How would you describe your health?" 1: Very Unhealthy to 5: Very Healthy), and happiness ("How happy do you feel?" 1: Very Unhappy to 5: Very Happy) (Albayrak, 2021).

Physical Fitness Measurements

Height and Body Weight Measurement: A stadiometer with 0.01 cm precision and a digital scale with 0.1 kg precision were used. Height was measured with the subject standing upright, heels together, head, lower eye line, and upper ear line parallel to the ground. Weight was measured with bare feet and minimal clothing (Tamer, 2000).

Body Mass Index (BMI): BMI was calculated as weight (kg) / height (m)^2 (Pescatello et al., 2014). BMI < 18.5 was underweight, 18.5-24.99 was normal, 25-29.99 was overweight, and ≥ 30 was obese (Tamer, 2000; Wardle et al., 2008).

Sit-and-Reach Test: This test assesses lower extremity and trunk flexibility using a box (35 cm long, 45 cm wide, 32 cm high). The subject sits with straight legs, pushing a bar as far forward as possible. The distance reached correlates with flexibility (Tamer, 2000). Two trials were conducted, and the best score was recorded.

Double Legs Standing Broad Jump (DLSBJ): This test assesses lower extremity power. The subject jumps forward from a line, and the distance is measured from the starting line to the heel of the closest foot (AAHPERD, 1976). Two trials were conducted, and the best score was recorded.

Agility T-Test: This test assesses agility using 4 cones in a "T" shape and a stopwatch. The subject runs a set pattern, changing directions. The test is performed twice, and the shortest time is recorded. Agility speed is calculated as 40 m / time (Semenick, 1990).

30m Speed Test: This test assesses 30-meter sprint speed using a stopwatch. The subject sprints 30 meters, and the time is recorded. The test is

performed twice, and the best time is recorded. Average sprint speed is calculated as 30 m / time.

20m Shuttle Run: This test assesses aerobic endurance using two lines 20 meters apart and a progressively faster beep signal. The subject runs back and forth between the lines, trying to keep up with the beeps. The test ends when the subject fails to reach a line twice. The final successful shuttle count is recorded (Leger, CIoutier & Massicotte, 1986).

Data Analysis

Kurtosis and skewness coefficients were used to describe the data. Normality is assumed if the skewness measure is between +3 and -3 (or +2 and -2) (Büyükbeşe and Dağ, 2018). Based on the obtained data, the distribution was considered normal. The mean (X) and standard deviation (SD) values of physical fitness variables were compared before and after the 10-week traditional game program using independent t-test analyses for gender and experimental and control groups. Paired Samples T-test and Cohen's d analyses (Cohen, 1988) were used to calculate the difference and effect size between pre-test and post-test measurements of male and female groups. Pearson correlation coefficients were calculated separately for pre-test and post-test to determine the relationships between students' health and happiness perceptions and physical fitness variables. The significance level of the findings was evaluated at 0.05. SPSS software was used for statistical analyses.

Results

The findings of this study are presented as tables. Table 1, compares the physical fitness variables of the experimental and control groups before and after 10 weeks of traditional game education in boys. Table 2 presents the same comparison for girls. Table 3 shows the effect of 10 weeks of traditional game training on the physical fitness variables of the male experimental group, while Table 4 shows the effect on the female experimental group. Table 5 displays the

effect of 10 weeks of classical PE + ESPAC participation on the physical fitness variables of the male control group, and Table 6 shows the same for the female control group. Finally, Table 7 presents the correlation coefficients between health and happiness perception and physical fitness variables during pre-test and post-test.

In boys, after 10 weeks of traditional game training, there were significant differences ($p<0.05$) in favor of the experimental group only in the post-test average speed and average agility speed (Table 1). In girls, there were no significant differences between the experimental and control groups in either the pre-test or post-test (Table 2). The addition of 10 weeks of traditional game training to classical physical education lessons significantly changed the variables of flexibility, average speed, shuttle run, average agility speed, and health perception in the male experimental group between pre-test and post-test measurements. Cohen's d analyses showed that 10 weeks of traditional game training had a low-level effect on BMI, SLJ, and happiness perception, a medium-level effect on shuttle run and health perception, and a high-level effect on the development of average speed and average agility speed (Table 3).

The addition of 10 weeks of traditional game training to classical physical education lessons significantly changed the variables of height, body weight, flexibility, DLSBJ, average speed, shuttle run, and average agility speed in the female experimental group between pre-test and post-test measurements. Cohen's d analyses showed that 10 weeks of traditional game training had a low-level effect on height, flexibility, DLSBJ, shuttle run, and health perception, a medium-level effect on average speed, happiness perception, and health perception, and a high-level effect on the development of average agility speed (Table 4).

In the male control group, which participated only in classical PE + ESPAC, significant differences were found between pre-test and post-test measurements in the variables of height, body weight, flexibility, average 30m speed, shuttle run, average agility speed, and health perception. Cohen's d analyses showed that 10 weeks of classical physical education lessons had a low-level effect on the

development of height, body weight, flexibility, average 30m speed, shuttle run, average agility speed, health perception, and happiness perception (Table 5).

Similarly, in the female control group that only participated in classical PE + ESPAC, significant differences were found between pre-test and post-test measurements in the variables of height, body weight, SLJ, shuttle run, and average agility speed. Cohen's d analyses showed that 10 weeks of classical physical education lessons had a low-level effect on DLSBJ, average agility speed, and health perception, while having a medium-level effect on the development of average 30m speed, body weight, flexibility, and shuttle run (Table 6).

Similarly, during the pre-test, there was a high-level positive correlation between health and happiness in both males and females, while a low-level negative correlation was observed between health perception in males and happiness perception in females with body weight and BMI. On the other hand, during the post-test, an increasing positive high correlation was observed between health and happiness perceptions in males, while health perception showed a negative low-level correlation with decreasing body weight and BMI, and a low-level positive correlation with average speed. In the post-test, males' happiness perception showed a low-level negative correlation with BMI and a high-level positive correlation with SLJ, average 30m speed, shuttle run, and average agility speed. During the post-test, girls' health perception was positively correlated with average 30m speed at a high level and with shuttle run at a low level, while happiness perception was positively correlated with flexibility, SLJ, and average agility speed at a low level (Table 7). In the control group, it can be said that for all participants, speed ability was moderately affected, while power, endurance, and agility were affected to a small degree.

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Table 1 – Comparison of physical fitness variables of the experimental and control groups before and after 10 weeks of traditional game education in boys

			Pre test					Post Test				
Variables	**Groups**	**N**	**X̄**	**S.D.**	**df**	**t**	**Sig.**	**X̄**	**S.D.**	**df**	**t**	**Sig.**
Age (Years)	Experimental	**21**	11,43	0,51	40	,000	1,00	11,43	0,51	40	,000	1,000
	Control	**21**	11,43	0,51				11,43	0,51			
	Total	**42**	11,43	0,50				11,43	0,50			
Body Height (cm)	Experimental	**21**	144,43	9,16	40	,401	,690	145,81	9,07	40	,548	,586
	Control	**21**	143,52	4,77				144,57	4,98			
	Total	**42**	143,98	7,23				145,19	7,25			
Body Weight (kg)	Experimental	**21**	37,48	7,08	40	,857	,397	38,19	7,09	40	,719	,477
	Control	**21**	35,52	7,67				36,57	7,51			
	Total	**42**	36,50	7,36				37,38	7,26			
Body Mass İndex (BMI)	Experimental	**21**	17,86	2,30	40	,858	,396	17,82	1,99	40	,552	,584
	Control	**21**	17,14	3,10				17,40	2,81			
	Total	**42**	17,50	2,72				17,61	2,41			
Sit and Reach (cm)	Experimental	**21**	26,05	8,10	40	-,88	,382	27,43	7,92	40	,068	,946
	Control	**21**	27,95	5,64				27,29	5,58			
	Total	**42**	27,00	6,96				27,36	6,77			
Standing Double Leg Broad Jump (cm)	Experimental	**21**	139,48	23,63	40	,007	,995	144,67	18,19	40	1,428	,161
	Control	**21**	139,43	21,08				135,67	22,44			
	Total	**42**	139,45	22,12				140,17	20,68			
Mean 30 m Sprint Speed (m/sn)	Experimental	**21**	4,78	0,32	40	,051	,960	5,14	0,36	40	2,326	**,025***
	Control	**21**	4,78	0,35				4,91	0,28			
	Total	**42**	4,78	0,29				5,02	0,34			
Shuttle Run (20 m repitetion)	Experimental	**21**	22,43	9,97	40	-,29	,769	30,43	12,39	40	1,191	,241
	Control	**21**	23,33	9,89				26,05	11,43			
	Total	**42**	22,88	9,82				28,24	11,98			
Mean Agility Speed (m/sn)	Experimental	**21**	2,87	0,18	40	-,97	,336	3,15	0,17	40	2,324	**,025***
	Control	**21**	2,93	0,23				3,02	0,19			
	Total	**42**	2,90	0,21				3,09	0,19			
Health perception (1-5 Points	Experimental	**21**	3,76	1,09	40	-,91	,365	4,33	0,66	40	,000	1,000
	Control	**21**	4,05	0,92				4,33	0,66			
	Total	**42**	3,90	1,01				4,33	0,65			
Mutluluk Algısı (1-5 Puan)	Experimental	**21**	4,00	0,63	40	-,18	,857	4,29	1,15	40	,428	,671
	Control	**21**	4,05	1,02				4,14	1,01			
	Total	**42**	4,02	0,84				4,21	1,07			

* There is a significant difference between the two groups at the 0.05 level.
** There is a significant difference between the two groups at the 0.01 level.

Table 2 – Comparison of physical fitness variables of the experimental and control groups before and after 10 weeks of traditional game education in girls

			Pre test					Post Test				
Variables	**Groups**	**N**	**X̄**	**S.D.**	**df**	**t**	**Sig.**	**X̄**	**S.D.**	**df**	**t**	**Sig.**
Age (Years)	Experimental	**19**	11,42	0,51	36	,000	1,00	11,42	0,51	36	,000	1,00
	Control	**19**	11,42	0,51				11,42	0,51			
	Total	**38**	11,42	0,50				11,42	0,50			
Body Height (cm)	Experimental	**19**	146,32	5,73	36	-,474	,639	147,84	6,08	36	-,400	,691
	Control	**19**	147,47	8,99				148,84	9,04			
	Total	**38**	146,89	7,46				148,34	7,62			
Body Weight (kg)	Experimental	**19**	40,42	9,01	36	,204	,840	41,79	8,57	36	-,033	,974
	Control	**19**	39,74	11,52				41,89	11,21			
	Total	**38**	40,08	10,20				41,84	9,84			
Body Mass İndex (BMI)	Experimental	**19**	18,85	4,04	36	,661	,513	19,10	3,78	36	,382	,704
	Control	**19**	18,04	3,49				18,66	3,24			
	Total	**38**	18,44	3,75				18,88	3,48			
Sit and Reach (cm)	Experimental	**19**	28,32	6,34	36	-,571	,572	29,84	6,49	36	,025	,980
	Control	**19**	29,47	6,16				29,79	6,53			
	Total	**38**	28,89	6,19				29,82	6,42			
Standing Double Leg Broad Jump (cm)	Experimental	**19**	127,26	18,16	36	-1,11	,274	133,47	11,73	36	1,050	,301
	Control	**19**	133,16	14,34				128,74	15,79			
	Total	**38**	130,21	16,41				131,11	13,93			
Mean 30 m Sprint Speed (m/sn)	Experimental	**19**	4,61	0,34	36	1,079	,288	4,83	0,26	36	,979	,334
	Control	**19**	4,49	0,35				4,73	0,34			
	Total	**38**	4,55	0,35				4,78	0,30			
Shuttle Run (20 m repitetion)	Experimental	**19**	18,11	7,14	36	,683	,499	21,63	7,05	36	,155	,878
	Control	**19**	16,53	7,11				21,21	9,52			
	Total	**38**	17,32	7,07				21,42	8,26			
Mean Agility Speed (m/sn)	Experimental	**19**	2,72	0,16	36	-,379	,707	3,00	0,23	36	1,831	,075
	Control	**19**	2,75	0,28				2,86	0,24			
	Total	**38**	2,74	0,23				2,93	0,24			
Health Perception (1-5 Points	Experimental	**19**	3,79	1,27	36	-1,082	,287	4,11	0,94	36	,770	,446
	Control	**19**	4,16	0,76				3,89	0,74			
	Total	**38**	3,97	1,05				4,00	0,84			
Happiness Perception (1-5 Puan)	Experimental	**19**	3,89	1,41	36	-,715	,479	4,47	0,70	36	1,233	,226
	Control	**19**	4,16	0,76				4,11	1,10			
	Total	**38**	4,03	1,13				4,29	0,93			

SDLBJ=Standing Double Leg Broad Jump

* There is a significant difference between the two groups at the 0.05 level.

** There is a significant difference between the two groups at the 0.01 level.

Table 3 – The effect of 10-week traditional game education on the physical fitness variables of the experimental group in boys

Variables	Pre Test		Post Test				t	p	Cohen's *d*
	X̄	SD.	X̄	SD.	Diff.	% Diff.			
Body Height (cm)	144,43	9,16	145,81	9,07	1,38	0,96	-6,874	,000	0.151
Body Weight (kg)	37,48	7,08	38,19	7,09	0,71	1,89	-2,430	,025	0,100
Body Mass İndex (BMI)	17,85	2,30	17,81	2,,00	-0,04	-0,22	,283	,780	**0.245+**
Sit and Reach (cm)	26,04	8,10	27,42	7,92	1,38	5,03	-3,360	**,003***	0.172
Standing Double Leg Broad Jump (cm)	139,47	23,63	144,66	18,19	5,19	3,59	-1,904	,071	**0.246+**
Mean 30 m Sprint Speed (m/sec)	4,78	0,32	5,14	0,36	0,36	7,53	5,766	**,000***	**1.056‡**
Shuttle Run (20 m repitetion)	22,42	9,97	30,90	12,57	8,48	27,44	-3,737	**,001***	**0.747†**
Mean Agility Speed (m/sec)	2,87	0,18	3,15	0,17	0,28	9,76	7,867	**,000***	**1.600‡**
Health Perception (1-5 Points)	3,76	1,10	4,33	,66	0,57	13,16	-2,434	**,024***	**0.628†**
Happiness Perception (1-5 Puan)	4,00	,63	4,28	1,15	0,28	6,54	-1,142	,267	**0.301+**

Effects Size (ES) =0.20 < 0.50 small effect size (+), ES=0.50 <0.80 medium effect size (†), ES=0.80 > *large effect size* (‡).

Table 4 – The effect of 10-week traditional game education on the physical fitness variables of the experimental group in girls

Variables	Pre Test		Post Test				t	p	Cohen's *d*
	X̄	SD.	X̄	SD.	Diff.	% Diff.			
Body Height (cm)	146,32	5,73	147,84	6,08	0,09	3,07	-5,091	**,000****	**0.257+**
Body Weight (kg)	40,42	9,01	41,79	8,57	1,52	1,04	-4,923	**,000****	0,155
Body Mass İndex (BMI)	18,85	4,04	19,10	3,78	1,37	3,39	-1,684	,109	0.063
Sit and Reach (cm)	28,32	6,34	29,84	6,49	0,25	1,33	-3,887	**,001****	**0.236+**
Standing Double Leg Broad Jump (cm)	127,26	18,16	133,47	11,73	1,52	5,37	-2,629	**,017***	**0.406+**
Mean 30 m Sprint Speed (m/sec)	4,61	0,34	4,83	0,26	6,21	4,88	-3,626	**,002****	**0,726†**
Shuttle Run (20 m repitetion)	18,11	7,14	21,63	7,05	0,22	4,77	-2,474	**,024***	**0.496+**
Mean Agility Speed (m/sec)	2,72	0,16	3,00	0,23	3,52	19,44	-6,409	**,000****	**1.433‡**
Health Perception (1-5 Points)	3,79	1,27	4,11	0,94	0,28	10,29	-,972	,344	**0.286+**
Happiness Perception (1-5 Puan)	3,89	1,41	4,47	0,70	0,32	8,44	-1,603	,126	**0.521†**

Effects Size (ES) =0.20 < 0.50 small effect size (+), ES=0.50 <0.80 medium effect size (†), ES=0.80 > large effect size (‡).

Tablo 5 – The effect of participation in elective sports and physical activities classes (PE + ESPAC), in addition to classical physical education lessons, for only 10 weeks on the physical fitness variables of the boys control group

	Pre Test		Post Test				t	p	Cohen's *d*
Variables	**X̄**	**SD.**	**X̄**	**SD.**	**Diff.**	**% Diff.**			
Body Height (cm)	143,52	4,77	144,57	4,98	1,05	0,73	-6,874	**,000 ****	**0.215+**
Body Weight (kg)	35,52	7,67	36,57	7,51	1,05	2,96	-2,430	,025	0,138
Body Mass İndex (BMI)	17,14	3,10	17,40	2,81	0,26	1,52	,283	,780	0.087
Sit and Reach (cm)	27,95	5,64	27,29	5,58	-0,66	-2,36	-3,360	**,003***	0.117
Standing Double Leg Broad Jump (cm)	139,43	21,08	135,67	22,44	-3,76	-2,70	-1,904	,071	0.172
Mean 30 m Sprint Speed (m/sec)	4,78	0,35	4,91	0,28	0,13	2,72	5,766	**,000***	**0,356+**
Shuttle Run (20 m repitetion)	23,33	9,89	26,05	11,43	2,72	11,66	-3,737	**,001***	**0.266+**
Mean Agility Speed (m/sec)	2,93	0,23	3,02	0,19	0,09	3,07	7,867	**,000***	**0.427+**
Health Perception (1-5 Points)	4,05	0,92	4,33	0,66	0,28	6,91	-2,434	**,024***	**0.3503+**
Happiness Perception (1-5 Puan)	4,05	1,02	4,14	1,01	0,28	6,54	-1,142	,267	**0.276+**

Effects Size (ES) =0.20 < 0.50 small effect size (+), ES=0.50 <0.80 medium effect size (†), ES=0.80 > large effect size (‡).

Table 6 – The effect of participation in elective sports and physical activities classes (PE + ESPAC), in addition to classical physical education lessons, for only 10 weeks on the physical fitness variables of the girls control group

	Pre Test		Post Test				t	p	Cohen's *d*
Variables	**X̄**	**SD.**	**X̄**	**SD.**	**Diff.**	**% Diff.**			
Body Height (cm)	147,47	8,99	148,84	9,04	1,37	0,93	-5,121	**,000 ****	0.122
Body Weight (kg)	39,74	11,52	41,89	11,21	2,15	5,41	-3,441	**,003 ****	0,189
Body Mass İndex (BMI)	18,04	3,49	18,66	3,24	0,62	3,44	-2,089	,051	0.184
Sit and Reach (cm)	29,47	6,16	29,79	6,53	0,32	1,09	-1,455	,163	0.050
Standing Double Leg Broad Jump (cm)	133,16	14,34	128,74	15,79	-4,42	-3,32	2,827	**,011 ***	**0.293+**
Mean 30 m Sprint Speed (m/sec)	4,49	0,35	4,73	0,34	0,24	5,35	-5,361	**,000 ****	**0,695†**
Shuttle Run (20 m repitetion)	16,53	7,11	21,21	9,52	4,68	28,31	-3,945	**,001 ****	**0.545†**
Mean Agility Speed (m/sec)	2,75	0,28	2,86	0,24	0,11	4,00	-2,791	**,012 ***	**0,421+**
Health Perception (1-5 Points)	4,16	0,76	3,89	0,74	-0,27	-6,49	1,424	,172	**0.359+**
Happiness Perception (1-5 Puan)	4,16	0,76	4,11	1,10	-0,05	-1,20	,181	,858	**0.052**

Effects Size (ES) =0.20 < 0.50 small effect size (+), ES=0.50 <0.80 medium effect size (†), ES=0.80 > large effect size (‡).

Kontrol grubunda ise tüm katılımcılarda; sürat becerisini orta düzeyde, güç, dayanıklılık ve çeviklik becerisini küçük düzeyde etkilediği söylenebilir.

Table 7 – Correlation coefficients between health and happiness perception and physical fitness variables of boys and girls during pre-test and post-test, without considering experimental and control groups

Variables	Pre-test Boys		Post-test Boys		Pre-test Girls		Post-test Girls	
	Health	Happiness	Health	Happiness	Health	Happiness	Health	Happiness
Happiness	**,521****		**,560****		**,684****		,000	
Age	,091	-,257	,075	,188	-,086	-,214	-,193	,196
Body Height	-,158	-,237	-,174	-,015	-,007	-,096	-,059	,123
Body Weight	-,207	**-,444****	**-,332***	-,259	-,136	**-,322***	-,295	,079
BMI	-,139	**-,427****	**-,361***	**-,375***	-,194	**-,355***	-,311	,033
Sit and Reach	-,038	,025	-,061	**,060**	,219	,248	,286	**,336***
SDLBJ*	,050	,157	,282	**,412****	,149	-,051	,238	**,355***
Mean 30 m Speed	,007	,172	**,315***	**,463****	,292	,194	**,413****	**,250**
Shuttle Run	-,124	,116	,177	**,441****	,161	,074	**,402***	,047
Mean Çeviklik Speed	,089	,262	,186	**,441****	,256	,083	,310	**,370***

* **SDLBJ=**Standing Double Leg Broad Jump

Discussion

Physical literacy consists of four main components: fundamental movement skills, knowledge about movement, positive attitudes towards physical activity such as motivation and confidence, and understanding the importance of an active lifestyle that includes regular participation in physical activities (Whitehead, 2010). The development of fundamental motor skills at an early age is crucial as it can help children become more confident in participating in sports or other physical activities in the future. Physical education helps children develop their fundamental motor skills and understand the value of physical activity (Barnett et al., 2016). In this context, Malina (2001) suggests that physical activity and physical fitness during childhood and adolescence can affect health status both during those periods and throughout adulthood. He reported that there were generally low to moderate relationships between physical activity and health in childhood and adolescence, and similar relationships are observed between physical activity and health in adulthood. Thus, this study aims to investigate the effects of traditional games on adolescents' physical fitness levels, health, and happiness perceptions.

In our study, the comparison of pre-test and post-test results of the experimental and control groups shows that 10 weeks of traditional game training is effective in improving physical fitness in boys, unlike girls. This may be due to the fact that girls did not exert enough effort to change their physical fitness levels during this training (Tables 1 and 2). In boys, 10 weeks of traditional game training had a low-level effect on BMI, SDLBJ, and happiness perception, a medium-level effect on shuttle run and health perception, and a high-level effect on the development of average speed and average agility speed (Table 3). In girls, participation in 10 weeks of traditional game training was observed to have a low-level effect on height, flexibility, SDLBJ, shuttle run, and health perception, and a high-level effect on the development of average speed, happiness perception, and average agility speed (Table 4). In the male control group, participation in only classical physical education lessons had a low-level effect on the development of height, body weight, flexibility, average 30m speed, shuttle run, average agility speed, health perception, and happiness perception (Table 5). In the female control group, participation in only classical physical education lessons had a low-level effect on SDLBJ, average agility speed, and health perception, while having a medium-level effect on the development of average 30m speed, body weight, flexibility, and shuttle run (Table 6).

Studies showing the effect of games on adolescents' physical fitness indicate that interventions using physical games provide beneficial results in terms of increasing the enjoyment experienced by children and adolescents, and the effectiveness of these applications aimed at increasing enjoyment among children and adolescents is influenced by factors such as gender, age, duration, frequency, and intensity of physical activity (Mo et al., 2024).

Combining fun components with traditional physical education is not only effective in motivating students who do not participate in sports competitions to actively participate in physical education classes, which is not possible to achieve with organized sports (Azlan et al., 2021), but also increases students' satisfaction with Physical Education classes, facilitates skill development, creates a relaxed game

environment, encourages interpersonal interaction, and provides opportunities for cooperation and socialization (Liao et al., 2023).

It is observed that the implementation of TGE and PE + ESPAC in the experimental and control groups, respectively, improves physical fitness variables more in boys compared to girls. Research supporting these results of our study shows that while the gender variable is mostly associated with objectively measured physical activity in studies conducted on young people (Bauman et al., 2012, Trost et al., 2002), boys are on average more physically active than girls (Cooper et al., 2015). Since activity levels in childhood tend to progress into later life (Hallal et al., 2006), such differences may have lasting effects on gender inequalities in later health (Guthold et al., 2018).

Gipit et al. (2017) investigated the effect of a traditional children's games program (Buat Rumah Batu, Tok Harimau, and Tor Duduk) applied to school-aged children in Malaysia on motor skills and concluded that the traditional game training program improved speed and agility skills in children. Kamaruddin et al. (2023) stated that traditional games improve gross motor skills in 1st and 2nd-grade students. Akın (2015) stated that educational games develop basic motor skills in 5-6-year-old children. Karaman and Süel (2020), in their study examining the effect of physical activity-based games played in preschool educational institutions on children's psychomotor development, found no significant difference in flexibility skills but found a significant difference in favor of the post-test in power, speed, and agility parameters.

Exercise and health are two important components of happiness in humans (Proctor, Linley, Maltby, 2008; Rasciute, Downward, 2010; Richards, Jiang, Kelly, Chau, Bauman, Ding, 2015). This view suggests that promoting health through exercise can also promote happiness in individuals (Cheon & Lim, 2020). The World Health Organization (WHO) has divided health into three dimensions: physical, mental, and social (Kelman, 1973). Research reports that exercise positively affects all three aspects of health [Cheon & Lim, 2020; Hallal, Victora, Azevedo, Wells, 2006; Ruegsegger, Booth, 2018).

Kaya (2023) reported that the 8-week game-based exercise program significantly affected body composition in 10-13-year-old boys, and Ügüten (2023) reported that educational game activities significantly affected body composition in 9-10-year-old boys. Contrary to these two studies, Başal and Yüksel (2021) investigated the effect of educational games on the development of physical characteristics in 12-13-year-old girls and showed that educational games did not cause a significant difference in BMI values. On the other hand, Akbari et al. (2009) concluded in their study that traditional games improve fundamental motor skills in 7-9-year-old male students. Similarly, Yılmaz and Bozkurt (2017) investigated the effect of 6 weeks of game and physical activity classes on motor skills in elementary school students and reported that the classes provided a significant change in students' speed and agility skills, as well as a statistically significant improvement in flexibility, strength, and endurance skills.

During the post-test, an increasing positive high correlation was observed between health and happiness perceptions in males, while health perception showed a negative low-level correlation with decreasing body weight and BMI, and a low-level positive correlation with average speed. In the post-test, males' happiness perception showed a low-level negative correlation with BMI and a high-level positive correlation with SDLBJ, average 30m speed, shuttle run, and average agility speed. During the post-test, girls' health perception was positively correlated with average 30m speed at a high level and with shuttle run at a low level, while happiness perception was positively correlated with flexibility, SLJ, and average agility speed at a low level (Table 7). Physical activity is positively associated with life satisfaction (Maher, Pincus, Ram, Conroy, 2015) and happiness (Zhang and Chen, 2019). Furthermore, Zhang and Chen (2019) reported that physical activity is significantly associated with life satisfaction and happiness in young, middle-aged, and older adults, while the perception of life satisfaction and happiness increases with age, emphasizing the importance of promoting participation in physical activity. Therefore, it can be said that game training increases happiness. TGE seems to have a large effect on speed and agility in boys and only on agility in girls.

The results of this study highlight the significant potential of traditional games in promoting physical fitness and overall well-being in adolescent students. The 10-week traditional game education (TGE) program demonstrated notable improvements in various physical fitness components, particularly speed, agility, cardiovascular endurance, and flexibility, among male participants (Table 3). These findings supported previous research indicating the positive influence of physical games on enhancing physical fitness in children and adolescents (Gipit et al., 2017; Kamaruddin et al., 2023; Yılmaz & Bozkurt, 2017). Notably, while the observed effects were more pronounced in boys than in girls (Tables 1 and 2), possibly due to differing exertion levels or inherent gender-based activity patterns (Cooper et al., 2015), both genders reported positive changes in health and happiness perceptions. This underscores the holistic benefits of TGE in fostering not only physical health but also psychological well-being, consistent with research linking physical activity to increased life satisfaction and happiness (Maher et al., 2015; Zhang and Chen (2019).

Conclusion

The present study contributes to the growing body of evidence supporting the integration of traditional games into physical education curricula. It demonstrates their efficacy in enhancing physical fitness and promoting a positive perception of health and happiness in adolescents. By providing a fun and engaging alternative to conventional exercise, traditional games can motivate students to participate in physical activity, ultimately leading to improved overall well-being. However, further research with larger, more diverse samples is warranted to confirm these findings and delve into the long-term effects of TGE, as well as to explore the optimal parameters (duration, frequency, intensity) for maximizing its benefits across different age groups and genders.

In conclusion, it is thought that giving more space to fun and active traditional games in the physical education and sports curriculum will positively affect students' physical fitness components, health, and happiness perceptions.

Further research is needed to assess the developmental levels in both genders through experimental studies conducted with a large number of randomly selected participants throughout the developmental stages to determine the effects of traditional game training on physical fitness components, health, and happiness perception.

REFERENCES

Abdullah, B., Amri, S., Yee, K.L., Samah, B.A. (2013). The impact of traditional games on the gross motor skill development of an early childhood. The Social Sciences. 2013;8(6):590–5. https://doi.org/10.3923/sscience.2013.590.595

AAHPERD Youth Fitness Test Manual (1976). Revised by Paul Alfred Hunsicker & guy G. Feiff. American Alliance for Health, Physical Education, Recreation and Dance.

Akbari, H., Abdoli, B., Shafizadeh, M., Khalaji, H., Hajihosseini, S., Vahid Ziaee, V. (2009). The effect of traditional games in fundamental motor skill development in 7-9 year old boys. Iranian Journal of Pediatrics, 19 (2), 123-129.

Akın S. (2015). Okul Öncesi 60-72 Aylık çocukların temel motor beceri gelişiminde eğitsel oyunların etkisi, [Yayımlanmamış Doktora Tezi]. Dumlupınar Üniversitesi.

Albayrak, K., D. (2021). Üniversite Öğrencilerinin egzersiz davranışı düzeyleri ile vücut kompozisyonuna yönelik bilgi ve tutumları arasındaki ilişki, [Yayımlanmamış Yüksek Lisans Tezi]. Hitit Üniversitesi.

Ali S.K.S., Ranjbar, Z. (2018). The effect of traditional games intervention on overweight among secondary school students in Iran. Advanced Science Letters. 2018;24(7):5434–7. https://doi.org/10.1166/asl.2018.11751.

Azlan, A.B., Ismail, N., Fauzi, N.F.M., and Abd T.R. (2021). Playing traditional games vs. free-play during physical education lesson to improve physical activity: a comparison study. Pedagogy Phys Cult Sports. 25(3):178–187.

Baharudin, A., Zainuddin, A.A., and Ahmad, N.A. (2014). Factors Associated With Physical Inactivity Among School-Going Adolescents: Data From the Malaysian School-Based Nutrition Survey 2012. Asia Pacific Journal of Public Health. 26: Issue 5-suppl, https://doi.org/10.1177/1010539514543682.

Barnett, L. M., Stodden, D., Cohen, K. E., Smith, J. J., Lubans, D. R., Lenoir, M., Morgan, P. J. (2016). Fundamental Movement Skills: An Important Focus.Journal of Teaching in Physical Education, 35(3), 219–225.https://doi.org/10.1123/jtpe.2014-0209

Başal, V. & Yüksel, M., F. (2021). 12-13 yaş grubu kız çocuklarının fiziksel özelliklerinin gelişiminde eğitsel oyunların etkisi. Beden Eğitimi ve Spor Bilimleri Dergisi, 15(3), 412-428.

Bauman, A.E., Reis, R.S., Sallis, J.F., Wells, J.C., Loos, R.J.F., Martin B.W., Alkandari, J.R., Andersen, L.B., Blair, S.N., Brownson, R.C., Bull, F.C., Craig, C.L., Ekelund U., Goenka S., Guthold, R., Hallal, P.C., Haskell, W.L., Heath, G.W., Inoue, S., Sarmiento, O.L. (2012). Correlates of physical activity: Why are some people physically active and others not? Lancet. 380(9838):258–71.

Bouchard, C. (2012). Genomic predictors of trainability. Experimental Physiology 97(3):347-352.

Bouchard, C., Blair, S. N., & Haskell, W. L. (2006). Physical activity and health. Champaign, IL: Human Kinetic.

Büyükbeşe, T. ve Dağ, K. (2018). Etik liderliğin örgütsel adalet algısına etkisinde örgütsel güvenin aracı rolü. Social Sciences Studies Journal, 4(15), 979-94.

Charles, M.A.G., Abdullah, M.R., Musa, R.M., Kosni, N.A. (2017). The effectiveness of traditional games intervention program in the improvement of form one school-age children's motor skills related performance components. Journal of Physical Education and Sport. 2017;17:925–30. https://doi.org/10.7752/jpes.2017.s3141.

Cheon, H.; Lim, S. (2020). Pursuing sustainable happiness through participation in exercise for South Korean students: Structural relationships among exercise, mental health factors, school satisfaction, and happiness. Sustainability. 12, 3797.

Cohen, J. (1988). Statistical power analysis for the behavioral sciences, 2nd edn. Á/L: Erbaum Press.

Cooper, A. R., Goodman, A., Page, A. S., Cooper, A., & Hillsdon, M. (2015). Objectively measured physical activity and sedentary time in youth: a systematic review. International Journal of Behavioral Nutrition and Physical Activity, 12(1), 1-20.

Cooper, AR., Goodman A., Page A.S., Sherar, L.B., Esliger D.W., van Sluijs, E.M.F., Andersen, L.B., Anderssen, S., Cardon, G., Davey, R., Froberg, K., Hallal, P., Janz, K.F., Kordas, K., Kreimler, S., Pate, R.R., Puder, J.J., Reilly, J.J., Salmon, J, Ekelund, U. (2015). Objectively measured physical activity and sedentary time in youth: The International children's accelerometry database (ICAD). Int J Behav Nutri Phys Act.,12(1):1–10.

Çeker, A., Çekin, R., ve Ziyagil, M. A. (2013). Farklı yaş gruplarındaki kadın ve erkeklerin düzenli fiziksel aktiviteye katılım davranışının değişim basamakları (Stages of change in regular physical activity participation behavior of women and men in different age groups). CBÜ Beden Eğitimi ve Spor Bilimleri Dergisi, 8(1), 11-20.

Gipit, M., A., Charles, M., R., A., Musa, R., M., Kosni, N., A. & Maliki, A., B., H., M. (2017). The effectiveness of traditional games intervention programme in the improvement of form one school age children's motor skills related performance components. Movement, Health & Exercise, 6(2), 121-129.

Guthold, R, Stevens G.A., Riley, L.M., Bull, F.C. (2018). Worldwide trends in insufcient physical activity from 2001 to 2016: a pooled analysis of 358 population-based surveys with 1·9 million participants. Lancet Glob Health., 6(10):e1077–86.

Gündoğdu, C. ve Yücel, A. S. (2013). İlköğretim ve ortaöğretimde geleneksel çocuk oyunları (Children's traditional games in primary and secondary education). Ankara: Nobel Akademik Yayıncılık.

Hallal, P.C., Victora, C.G., Azevedo, M.R., Wells, J.C.K. (2006). Adolescent physical activity and health: A systematic review. Sports Med.;36(12):1019–30. 27.

Hills, A.P., Andersen, L.B., Byrne, N.M. (2011) Physical activity and obesity in children. British Journal of Sports Medicine. 45(11):866–70. https://doi.org/10.1136/bjsports-2011-090199.

IKU. National Health and Morbidity Survey (2017). Adolescent Nutrition Survey 2017, Malaysia. Kuala Lumpur: Institute Kesihatan Umum, 2017. [cited 2020 June 23]. Availablefrom: http://iku.moh.gov.my/nhms-2017.

Janz, K.F., Dawson, J.D., Mahoney, L.T. (2002). Increases in physical fitness during childhood improve cardiovascular health during adolescence: the Muscatine Study. Int J Sports Med. 2002;23 Suppl 1:S15-21.

Kamaruddin, S. N. S., Sulaiman, S. N. A., & Mohd Noor, N. S. (2023). The effectiveness of traditional games in improving gross motor skills of primary school children. International Journal of Early Childhood Special Education, 15(1), 863-875.

Karaman, B. ve Süel, E. (2020). Okul öncesi eğitim kurumlarında oynatılan fiziksel etkinliğe dayalı oyunların psikomotor gelişimi üzerine etkisi (The effect of physical activity-based games played in preschool institutions on psychomotor development). Beden Eğitimi ve Spor Bilimleri Dergisi, 14(3), 529-539.

Kaya, E. (2023). Çocuklarda eğitsel oyun egzersizlerinin fiziksel uygunluk

parametreleri üzerine etkisi (The impact of educational game exercises on physical fitness parameters in children). [Yayımlanmamış Yüksek Lisans Tezi]. Balıkesir Üniversitesi.

Kelman, S. (1973).The social nature of the definition of health. In Health and Medical Care in the US: A Critical Analysis; Navarro, V., Ed.; Routledge: New York, NY, USA, pp. 3–20.

Lee, W.A., Rengasamy, S., Hooi, L.B. (2015). The level of intrinsic motivation among 13, 14 and 16 years old school students in physical education lessons. Asian Journal of Physical Education and Computer Science in Sports. 12(1):116–121.

Leger, L.A., CIoutier, J. and Massicotte, D. (1986) Energy cost of running, cycling and stepping during growth. In Kinanthropometry III- Proceedings of the VIII Commonwealth and International Conference on Sport, Physical Education, Dance, Recreation and Health (Glasgow, July 18-33, 1986, edited by T. Reilly, J. Watkins and J. Borms), pp. 138--45, London: E. & F.N. Spon.

Liao, C.C., Hsu, C.H., Kuo, K.P., Luo, Y.J, Kao, C.C. (2023). Ability of the sport education model to promote healthy lifestyles in university students: a randomized controlled trial. Int J Environ Res Public Health. 20(3), 1-20.

Maher, J. P., Pincus, A. L., Ram, N., & Conroy, D. E. (2015). Associations of physical activity with self-concept, life satisfaction, and happiness in a nationally representative sample of adolescents. Mental Health and Physical Activity, 8, 16-22. https://doi.org/10.1016/j.mhpa.2014.12.002.

Maher, J.P., Pincus, A.L., Ram, N. and. Conroy, D.E. (2015). Daily Physical Activity and Life Satisfaction Across Adulthood. Dev Psychol. Oct;51(10):1407-19. doi: 10.1037/dev0000037. Epub 2015 Aug 17.

Malina, R.M. (2001). Physical Activity and Fitness: Pathways From Childhood to Adulthood. American Journal of Human Biology. 13:162–172.

Mo, W., Bin Saibon, J. Li, Y., Li, J. and He, Y. (2024). Efects of game-based physical education program on enjoyment in children and adolescents: a systematic reviewand meta-analysis. BMC Public Health, 24:517. https://doi.org/10.1186/s12889-024-18043-6.

Ortega, F.B., Ruiz, J.R., Castillo, M.J., Sjostrom, M. (2008). Physical fitness in childhood and adolescence: a powerful marker of health. Int J Obesity. 32(1):1-11.

Parlebas, P. (2010). “Articulations of Motor Praxiology with the Citical-Emancipatory Approach.” Movimiento Porto Alegre 16 (1): 131-48.

Proctor, C.L.; Linley, P.A.; Maltby, J. (2008). Youth life satisfaction: A review of the

literature. J. Happiness Stud., 10, 583–630.

Rasciute, S.; Downward, P. (2010). Health or happiness? What is the impact of physical activity on the individual? Kyklos., 63,256–270.

Richards, J.; Jiang, X.; Kelly, P.; Chau, J.; Bauman, A.; Ding, D. (2015). Don't worry, be happy: Cross-sectional associations between physical activity and happiness in 15 European countries. BMC Public Health., 15, 53.

Ruegsegger, G.N.; Booth, F.W. (2018). Health benefits of exercise. CSH Perspect. Med. 8, a029694.

Sabzi, A.H., Torabi, F., Akramian Arani, Z. (2023). The Effect of Local Indigenous Games on children's Physical and Perceived Fitness. Int J Pediatr. 11 (05): 17749-17758. DOI: 10.22038/ijp.2023.70576.5194

Tamer, K. (2000). Sporda Fiziksel–Fizyolojik performansın Ölçülmesi ve Değerlendirilmesi (Measurement and Evaluation of Physical-Physiological Performance in Sports), Bağırgan Yayınevi.

Tremblay, M.S., Barnes, J.D., González, S.A., Katzmarzyk, P.T., Onywera, V.O., Reilly, J.J. et al. (2016). Global Matrix 2.0: report card grades on the physical activity of children and youth comparing 38 countries. Journal of Physical Activity and Health.;13(11 Suppl 2):S343–S66. https://doi.org/10.1123/jpah.2016-0594

Trost, S.G., Pate, R.R., Sallis, J.F., Freedson, P.S.., Taylor, W.C., Dowda, M., Sirard, J. (2002). Age and gender diferences in objectively measured physical activity in youth. In Med Sci Sports Exerc., 34(2):350–5 http://www.acsm-msse.org.

Ügüten, H. (2022). 10-13 yaş arası çocuklarda oyun temelli voleybol egzersizinin fiziksel uygunluk parametrelerine etkisi (The effect of game-based volleyball exercises on physical fitness parameters in children aged 10-13), [Yayımlanmamış Yüksek Lisans Tezi]. Mersin Üniversitesi.

Wardle, J., Carnell, S., Haworth, C.M., Plomin, R. (2008). Evidence for a strong genetic influence on childhood adiposity despite the force of the obesogenic environment. Am J Clin Nutr. 2008;87(2):398Y404.

Whitehead, M. (2010). Physical Literacy: Throughout the Lifecourse. New York: Routledge Taylor & Francis.

Semenick, D. (1990). The T-test. NSCA J. 12(1):36–37.

Yılmaz, M.O.., & Bozkurt, S. (2017). Oyun ve Fiziki Etkinlikler Dersinin İlkokul Öğrencilerinin Motorik Özelliklerinin Gelişimine Etkisi (The Effect of Games and Physical Activities Class on The Development of Motoric Features of Elementary

School Students) Marmara Üniversitesi Spor Bilimleri Dergisi Marmara University Journal of Sport Science) 2:2, ISSN 2536-5150, ss. 49-55. DOI: 10.22396/sbd.2017.30

Yovira, M. N., Bafirman, HB, Barlian, E., Emral., & Zarya, F. (2023). Comparison of the Impact of Traditional Games and Small Games on Students' Physical Fitness: A Study at Elementary school. Journal of Physical Education, Sport, Health and Recreation, 12 (3), 308-315.

Zhang, Z., & Chen, W. (2019). A systematic review of the relationship between physical activity and happiness. Journal of Happiness Studies: An Interdisciplinary Forum on Subjective Well-Being, 20(4), 1305–1322. https://doi.org/10.1007/s10902-018-9976-0

Ziyagil, M.A. (2022). Fiziksel Uygunluk ve Wellness Bileşenlerinin Geliştirilmesi (Improving Physical Fitness and Wellness Components), "Spor Bilimlerine Genel Bakış (Eds. Süleyman Gönülateş, Tansu Yağan), s., 1-9.

Zulkifli, M., Putra, A., Yusof, M., Anuwar, S., Norzaman, N.Z.A., Razali, A.F. (2014). Re-creation of Malaysian traditional game namely 'Baling Selipar': A Critical Review. International Journal of Science, Environment and Technology. [cited 2020 June 23] 2014;3(6):2084–9. Available from: http://www.ijset.net/journal/451.pdf.