An Examination of Physical Literacy of High School Students

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Abstract
The aim of this study is to examine the physical literacy of high school students. Since the high school age group is between 14-18, it is designed for adolescents. Physical literacy emerges as a concept that does not date back very much. When the literature is examined, it is seen that the number of studies related to this concept is low in Turkish context. A total of 260 high school students residing in the province of Ankara participated voluntarily for this purpose. Regarding the gender distribution of the participants, 163 were female and 97 were male. Demographic information and Perceived Physical Literacy Scale for Adolescents were conducted via Google form. The scale developed by Sum et al. (2018) was adapted into Turkish by Yılmaz and Kabak (2021) has also been used for data collection. Data were collected from the accessible group by simple random sampling method. Descriptive statistics were used in the analysis of the findings. Since the groups showed normal distribution, one-way ANOVA and independent groups t-test were used in the analyses. As a result, no difference was found in the gender variable. At the grade level, significant differences were found between 9th and 11thgrades, and between 9th and 11thgradesagainst 9th.According to the status of doing sports, a significant difference was found in favor of those who do sports. According to the statistics made among those who do sports regularly every week, it was found that as the number of days of exercise increased, physical literacy also increased. The findings are discussed in the light of the relevant literature.
Keywords: Physical Literacy, Sports, High School

Introduction

Adolescence is an intermediate period between childhood and adulthood (Yavuzer, 2003). The World Health Organization (WHO) defines the age range of 10-19 as the period of adolescence (WHO, 2020). On average, boys are considered adolescents at the age of 13-14, while girls can be defined as adolescents at the age of 11-12 (Nieuwenhuis et al. 2020). Adolescence is the transition period from childhood to adulthood in which many emotional, biological and physical developments and changes in mental and social maturation are experienced (Aslan & Zihni, 2018). This is a challenging period in which children undergo multiple great changes(Selçuk & Aslan; 2022). In adolescence, a rapid and long-term developmental stage for individual, childlike attitudes and behaviors of the individual are replaced by more mature and broad perspective compared to adult behaviors (Yılmaz, 2022). Adolescence can be expressed as a period of physical maturity and social immaturity (Simmons, 2017). Adolescence is a critical period for individual development. Helping adolescents develop non-cognitive skills benefits them for the rest of their lives (Abbasi et al., 2022). Adolescence is the period between childhood and adulthood. Rapid developments for the nervous and muscular systems are experienced during this period(Sawyer et al. 2018). At the same time, adolescents have to keep up with a rapid development and change process. In this sense, support from the environment is crucial (Yıldız, 2021).

Along with the benefits technology brings to human life, the conveniences it provides have also negatively affected people causing immobilization and alienation from vitality (Musab, 2022). Regular sport activities make a very important contribution to the healthy growth and development of children. It essential for not only in the physical sense, but also in the spiritual, cognitive, social and personal development. For children, sports provide a disciplined life and stress management during adolescence (Peker & Yüksel 2022).Sports participation increases physical maturation in adolescent children, and these children achieve improved balance control (Chalatzoglidis et al. 2021). Whitehead (2013) emphasized the importance of distinguishing between physical literacy and physical activity. The concept of physical literacy was first encountered in the U.S. physical education literature about 80 years ago (Robinson et al., 2018). The term physical literacy is attracting attention as a new target for physical education in many countries and institutions. Physical literacy studies, which seem to be emerging for Turkish context, are included in education programs around the world (Şentürk, 2019). Physical literacy includes the child's having basic movement skills and knowledge, including body awareness, and developing a positive attitude towards physical activities and especially sports (Whitehead, 2007). The literature on physical literacy refers to the lifelong journey individuals undertake to participate in and maintain physically active life styles (Edwards et al., 2017). The concept of physical literacy should be the basis of the models put forward for Physical Education courses(Kirk, 2013). When we look at the benefits of physical literacy, it is apparent that it has many benefits for individual and sociological aspects. For example, being physically active improves an individual's motivation, self-confidence, self-awareness and social skills (Hakan & Altunsöz, 2021). Understanding what physical literacy is and what components it consists of has an important place in developing and supporting individuals' physical literacy (Liu &Chen, 2021). There are very few studies on physical literacy in Turkish context (Başoğlu, 2018; Hakan, & Altunsöz, 2021; Munusturlar & Yıldızer, 2020; Yılmaz, & Kabak, 2021). Considering the research gap on this issue, the present study was designed with the aim of examining the physical literacy of students studying in secondary education.

Method

Research Model

The study is designed as a quantitative research in which the data were collected from the accessible group by simple random sampling method(Özmen & Karamustafaoğlu, 2019).

The Participants

A total of 260 high school students living in the province of Ankara participated in the research voluntarily. The group, consisting of 163 women and 97 men, was reached via Google form. The age span of the group ranged between 14 and 18.

Table 1 Demographical Information of the Participants

	Class	N	Mean±Std. Dev.	Median(min-max)
Male	class 10	36	35,2 ± 5,9	35 (20 - 44)
	class 11	36	36,8 ± 4,6	37 (27 - 45)
	class 12	15	34,5 ± 6,5	36 (17 - 44)
	class 9	10	34,6 ± 4,1	36 (25 - 40)
	Total	97	35,6 ± 5,4	36 (17 - 45)
Female	class 10	35	33,6 ± 4,2	34 (24 - 42)
	class 11	51	34,1 ± 4,4	33 (24 - 44)
	class 12	49	35,2 ± 4,6	36 (22 - 44)
	class 9	28	31,2 ± 4,7	31 (24 - 43)
	Total	163	33,8 ± 4,6	34 (22 - 44)

Total	class 10	71	34,4 ± 5,2	35 (20 - 44)
	class 11	87	35,2 ± 4,7	35 (24 - 45)
	class 12	64	35 ± 5,1	36 (17 - 44)
	class 9	38	32,1 ± 4,7	32 (24 - 43)
	Total	260	34,5 ± 5	35 (17 - 45)

According to the table, a total of 28 students in class 9, a total of 35 students in class 10, a total of 51 students in class 11, and a total of 49 students in class 12 participated in the study.

Data Collection

Personal information form and Perceived Physical Literacy Scale for Adolescents (PPLSA) were used as data collection instruments.

Perceived Physical Literacy Scale for Adolescents (PPLSA)

The scale developed by Sum et al. (2018) was adapted into Turkish by Yılmaz and Kabak (2021). The scale has 3 sub-dimensions: Sense of self and Self-confidence, Self-expression and Communication with others, Knowledge and Understanding. The scale is formed in Likert type.

Analysis of Data

The data were analyzed in SPSS 25.0 package program. As a result of the data analysis, the Cronbach's Alpha value of the scale was found to be ,751.According to the normality test results; Skewness -0.251, Kurtosis 0.104 values were found. Since it is between +1 and -1, it is concluded that the data are normally distributed. In the light of these results, normal tests were applied(Hair et al., 2013). Since the groups showed normal distribution, one-way ANOVA, which is one of the parametric tests, and independent groups t-test were used in the analyses. As a result of the significant difference after the comparisons, the source of the difference was determined by using the Bonferroni test.

Ethics of Research

The ethics committee of this research was obtained from Bartın University on 23.11.2022 with the approval number 2022-SBB-0538.

Findings

Table 2 Physical Literacy Levels by Gender Variable

Gender	Female (n=97)	Male(n=163)	t	P1
Self-expression and Communication with others	11,4 ± 2,4	10,4 ± 2,4	3,239	0,001
Sense of self and Self-confidence	11,2 ± 2,2	10,8 ± 2,1	1,552	0,122
Knowledge and Understanding	12,9 ± 2,2	12,6 ± 1,9	1,451	0,148
Total	35,6 ± 5,4	33,8 ± 4,6	2,845	0,05
1*Independent samples t-test, mean±sd				

According to table 2, the total values of the physical literacy scale do not differ according to gender. (p=0,005). As a result of the analysis made according to the scale sub-dimensions, a significant difference was found in favor of females in the sub-dimension Self-expression and Communication with others. (p=0,001). There was no difference in the sub-dimensions of Sense of self and Self-confidence and Knowledge and Understanding.

According to Table 3, a significant difference exists in the physical literacy scale Self-expression and Communication with others sub-dimension at the grade level. According to the results of the post-hoc Bonferroni test, conducted to explain between which groups this difference is, there is a significant difference between the 9th and 11th grades in favor of the 11th grades. When other sub-dimensions were examined, there was a significant difference in the Knowledge and Understanding sub-dimension, but no difference was found between the groups. When we look at the results of the scale, a significant difference has emerged between the grade level and physical literacy(p=0,011). According to the results of the Bonferroni test performed to determine

between which groups this difference exist, significant differences were found between 9th and 11thgrades , and between 9th and 12th grades against 9th.

Table 3 Physical Literacy Levels by Grade Level

Scale and Sub dimensions	Class	N	Mean±Sd.	Source of variance	Sum of Squares	df	Mean Squares	f	p.	Sig.
Self-expression and Communication with others	class 9(1)	38	9,7 ± 2,6	Between Groups	62,305	3	20,768	3,578	0,015	1>3
	class 10(2)	71	10,9 ± 2,4	In-group	1486,08	256	5,805			
	class 11(3)	87	11,2 ± 2,2	Total	1548,385	259				
	class 12(4)	64	10,9 ± 2,7							
Sense of self and Self-confidence	class 9(1)	38	10,2 ± 2	Between Groups	24,298	3	8,099	1,781	0,151	
	class 10(2)	71	11,2 ± 2,1	In-group	1164,052	256	4,547			
	class 11(3)	87	11 ± 2,3	Total	1188,35	259				
	class 12(4)	64	11,1 ± 2,1							
Knowledge and Understanding	class 9(1)	38	12,2 ± 2,3	Between Groups	36,508	3	12,169	3,005	0,031	
	class 10(2)	71	12,3 ± 2,2	In-group	1036,858	256	4,05			
	class 11(3)	87	13 ± 1,9	Total	1073,365	259				
	class 12(4)	64	13,1 ± 1,8							
Total	class 9(1)	38	32,1 ± 4,7	Between Groups	275,044	3	91,681	3,783	0,011	1>3, 1>4
	class 10(2)	71	34,4 ± 5,2	In-group	6203,71	256	24,233			
	class 11(3)	87	35,2 ± 4,7	Total	6478,754	259				
	class 12(4)	64	35 ± 5,1							

Table 4 Physical literacy levels according to the status of doing sports

Do you do sports?	Yes(151)	No(109)	t	P1
Self-expression and Communication with others	11,5 ± 2,2	9,9 ± 2,5	5,296	>0,001
Sense of self and Self-confidence	11,4 ± 2,1	10,4 ± 2	3,636	>0,001
Knowledge and Understanding	13,5 ± 1,8	11,6 ± 1,9	8,291	>0,001
Total	36,3 ± 4,7	31,9 ± 4,3	7,745	>0,001
1*Independent samples t-test, mean±sd				

When Table 4 is examined, it has been revealed that there is a significant relationship between those who do sports (n=151) and those who do not (n=109) in line with the answers given to the question "Do you do sports" (>0.001).Physical literacy levels of those who do sports in all sub-dimensions and in the whole scale are higher than those who do not.

Table 5 Physical Literacy Levels of those who do Sports According to the Frequency of Doing Sports

Scale and Sub dimensions	Doing sports	N	Mean±Sd.	Source of variance	Sum of Squares	df	Mean Squares	f	p	sig
Self-expression and Communication with others	1 per week (1)	55	10,6 ± 2,8	Between Groups	55,287	3	18,429	3,604	0,015	1--4
	2 per week (2)	29	11,5 ± 1,7	In-group	792,537	155	5,113			
	3 per week (3)	24	11,7 ± 1,9	Total	847,824	158				
	4 days a week or more (4)	51	12 ± 2,1							
Sense of self and Self-confidence	1 per week (1)	55	10,8 ± 2,1	Between Groups	35,441	3	11,814	2,561	0,057	
	2 per week (2)	29	11 ± 2,2	In-group	714,836	155	4,612			
	3 per week (3)	24	11,6 ± 2,1	Total	750,277	158				
	4 days a week or more (4)	51	11,9 ± 2,2							
Knowledge and Understanding	1 per week (1)	55	12,3 ± 2,1	Between Groups	91,604	3	30,535	9,765086	<0,00	1-2,1-3,1-4
	2 per week (2)	29	13,4 ± 1,4	In-group	484,673	155	3,127			
	3 per week (3)	24	13,9 ± 1,3	Total	576,277	158				
	4 days a week or more (4)	51	14 ± 1,7							

Total	1 per week (1)	55	33,8 ± 5,2	Between Groups	503,899	3	167,966	7,668468	<0,00	1-3, 1-4
	2 per week (2)	29	35,9 ± 4,2	In-group	3395,044	155	21,904			
	3 per week (3)	24	37,2 ± 3,5	Total	3898,943	158				
	4 days a week or more (4)	51	38 ± 4,8							

According to Table 5, a significant difference has emerged in the physical literacy scale Self-expression and Communication with others sub-dimension at the grade level (p=0,05).According to the Bonferroni test results conducted to explain between which groups this difference exists, a significant relationship was found between those who do sports once a week and those who do sports 4 or more times a week. This relationship is in favor of those who do sports 4 days a week or more. No significant relationship was found in the Sense of self and Self-confidence sub-dimension. In the Knowledge and Understanding sub-dimension, those who did sports once a week had the lowest score. Considering the total scores, it was determined that there was a significant difference between 1 and 3, and 1 and 4. This difference was found to be in favor of 3 and 4.

Discussion

There was no difference in the gender variable regarding the research results. According to the results in the sub-dimensions, a significant difference was found in favor of Females in the sub-dimension Self-expression and Communication with others.

Looking at the average scores, it was revealed that females had higher scores than males. Gilic et al., (2022), in their study on the sample of adolescents, did not find a difference in the physical literacy dimension regarding the genders. Güçlü (2022) found no difference in the gender variable of physical literacy in his study. Çuhadar (2021) found that physical education and sports teachers' perceptions of physical literacy did not differ significantly according to the gender variable. Gerger (2022) reached a difference in the Self-expression and Communication with others sub-dimension on the same scale, supporting our findings, but did not reach a difference in other sub-dimensions. In the light of these data, the findings of the study turned out to be at a level supported by the literature. The reason why there is no significant difference in the gender variable may be due to the rapid access of individuals to information with the development of technology, and the fact that the access of information is now in an equal structure for everyone.

There was a significant difference in the sub-dimensions of Sense of Self and Knowledge and Understanding at the grade level, which is another variable of our study. When we look at the results of the scale, there was a significant difference between grade level and physical literacy(p=0,01).The difference between which groups was measured with the post-hoc Bonferroni test. Significant differences were found between 9th and 11th grades, and between 9th and 12th grades against 9th.In general, there is an increasing level of physical literacy as the grade level increases. In line with these results, when the relevant literature is examined, Valadi and Hamidi (2020) stated that as students' grade levels increase, their physical literacy levels also increase. In another study conducted on adolescents, a significant relationship was found between high school students' grade levels and physical literacy levels (Choi et al., 2018). Contrary to these results, Gerger (2022) did not find a difference in physical literacy at the class level in his study. The relevant literature has some supporting finding for the present study. Also, some

of the existing studies do not converge with current findings. In our study, the reason for the increase in physical literacy level with the increase in class level may be the positive changes in the thoughts of individuals with maturation.

When we look at the research findings, the physical literacy level of those who do sports is higher and more significant in all sub-dimensions than those who do not. In the light of these results, it can be said that the concepts of sport, physical activity and physical literacy are related to each other. When the relevant literature is examined, it is apparent that the physical literacy is also a concept that represents physical activity and sports. (Lundvall, 2015). Belanger et al., (2018) found a positive relationship between physical activity and physical literacy. Belton et al., (2019) revealed in their study that there is a positive relationship between physical activity and physical literacy. As a result of their study, Barnett et al., (2019) revealed that physical literacy should also be applied in areas such as sports, entertainment and health. Lang et al.,(2018) discussed the physical literacy and cardio respiratory fitness level of adolescents. It revealed a positive relationship between physical literacy and cardio respiratory fitness level. Pastor-Cisneros et al., (2021) revealed that as fitness increases, physical literacy also increases. Blain et al., (2021), in their study of a sample of adolescents, show that physical literacy contributes to a range of adaptive outcomes, including physical education participation, leisure exercise behavior, and psychological well-being. Brian et al., (2019) revealed that physical education makes a positive contribution to the development of physical literacy. The finding by Güçlü (2022) highlights that there was a statistically significant difference between the weekly exercise duration of the participants and their pedagogical and physical literacy levels. As a result, doing sports and doing physical activities increase the level of physical literacy. As the frequency of doing sports increases, it is a finding that increases in the rate of physical literacy. In other words, doing sports increases the physical literacy of individuals.

Conclusion and Suggestions

This study tried to explain the relationship between physical literacy and high school adolescents. Future studies can be designed on different sample groups. Future research is suggested to apply pre-test and post-test in experimental research designs. The subject of physical literacy can be applied to teachers and teacher candidates. More research can be conducted with different measurement tools. The physical literacy levels of children in online education institutions can be investigated for future sudies. The information network in this area can be expanded by supporting qualitative studies in which personal opinions will also be included. Inventories can be developed to measure different groups of physical literacy. Necessary infrastructure should be created for inclusion in the education curricula. Informative seminars for physical literacy can be held for teachers and teacher candidates.

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