

## Research Article

### Assessment of Academic Performance of Licensed Athletes

Zehra Aycan<sup>1</sup>, Sinem Akgül<sup>2</sup>, Selçuk Gençay<sup>3</sup>, Nuray Kanbur<sup>4</sup>, Orhan Derman<sup>5</sup>

**Received on:**

18-Apr-2019

**Accepted for Publication:**

30-Jun-2019

**Correspondence to:**

Zehra Aycan, Clinics of  
Pediatric Endocrinology,  
Turkey  
veyselnijatbas@gmail.com

**Author's Affiliation:**

1. Clinics of Pediatric Endocrinology, Professor, Ankara University School of Medicine, Clinics of Pediatric Endocrinology, Altındağ.
2. Division of Adolescent Medicine, Ass Professor, Department of Pediatrics, Hacettepe University Faculty of Medicine, Ankara, Turkey.
3. Kahramanmaraş sütçü Imam University Physical Education and Sports Teaching, Professor, Kahramanmaraş.
4. Division of Adolescent Medicine, Department of Pediatrics, Professor, Hacettepe University Faculty of Medicine, Sıhhiye.
5. Division of Adolescent Medicine, Department of Pediatrics, Professor, Hacettepe University Faculty of Medicine, Sıhhiye.

**ABSTRACT****Background**

Physical activity and sports can be used to reduce stress and anxiety by increasing aerobic capacity and muscle endurance, gain positive behavioral changes and improve their self-discipline, use time well, adopt positive lifestyle such as regular eating and sleeping, which will result in an increase in school success.

**Objectives**

There is no comprehensive study that examines the academic performance of licensed student athletes and the factors influencing their success rates. The aim of this study was to evaluate the academic performance and related factors in licensed athletes.

**Methods**

One hundred eleven licensed athletes at junior high school level were enrolled. Participants filled out questionnaires specifically designed to assess for factors affecting academic performance, where personal and familial factors as well as school performance was taken into consideration. Their academic success rates were evaluated out of mean grade points before as well as after professional sports activities. Academic fields that were graded were, namely, mathematics, life sciences, language and grammar studies as well as social sciences. 51 of participants lived in Ankara (Group 1) and the other 60 lived in Kahramanmaraş (Group 2). The effects of sport and other factors that may affect school success in all groups and between the groups, were evaluated before and after sports.

**Results**

The age of the athletes were  $14.1 \pm 2.3$  years, 49.5% were male. The grades of athletes before they started competing in professional sports were  $80.4 \pm 10.6$  for mathematics,  $80.5 \pm 12.5$  for sciences,  $82.7 \pm 9.5$  for language studies and  $83.6 \pm 9.3$  for social sciences. Following a mean period of  $4.3 \pm 3.1$  years of professional sports, the grades of athletes were, with the same order for respective discipline were,  $81.6 \pm 10.9$ ,  $82.4 \pm 11.9$ ,  $84.3 \pm 9.4$  and  $85.5 \pm 8.5$ . Following sports activities, academic performance in life sciences, language and grammar studies as well as social sciences showed a significant improvement where grades for mathematics did not show any significant change ( $p=0.054$ ). The most important factor that improve school performance is the financial status of the family. In Group 1 demonstrated grade improvements following sports activities only in social sciences, whereas Group 2 athletes showed such an improvement for all the disciplines ( $p<0.05$ ).

**Conclusions**

Licensed athletes' school success during the junior high school period showed a significant increase after sports in this study. The most important factors that affected the academic performance was the socioeconomic status of the family.

**Keywords:** Licensed athletes, academic performance

## Introduction

Assessing academic performance in students has its difficulties because there are many factors that can affect school success such as age, gender, characteristics of the individual, geographical region conditions, ethnicity, the physical and educational capacity of the school, proficiency and experience of teachers, socio-economic status of the parents, education level of parents and professions. Nevertheless, when we look at the common outputs of these studies, it is noteworthy that the most important factor affecting the academic performance of the students is the socio-economic status of the family and the education level of the parents (1-4).

One of the focus points of recent years on the factors that affect school success is physical activity and sport. Studies on the impact of physical activity on academic achievement in children and adolescents have reported that physical activities do have positive effects on mathematics, linguistics and science. In adolescents and children physical activity and sports can be used to reduce stress and anxiety by increasing aerobic capacity and muscle endurance, gain positive behavioral changes and improve their self-discipline, use time well, adopt positive lifestyle such as regular eating and sleeping, which will result in an increase in school success (5-7). It has also been found that physical activity improves cognitive functions in children, particularly by increasing basal ganglia and hippocampal volume that play an important role memory (8). Although there are many studies emphasizing the positive effects of physical activity on academic achievement, studies on school success in professional athletes are lacking. Families have concerns that professional athletes will spend less time studying and devoted more time to sports, which will eventually lead to a fall in school success. In the literature, there are no comprehensive studies evaluating school success and the environmental factors affecting academic performance in licensed athletes

In this study, we aimed to investigate the academic success of licensed athletes in junior high school students, the effects of sports and other factors affecting school achievement.

## Material and Methods

The study included licensed athletes at junior high school level who were followed at Hacettepe University division of adolescent medicine, Ankara and those who were trained at Kahramanmaraş Sütçü İmam University Physical Education Faculties. Licensed athletes from 2 different cities were chosen to increase socioeconomic diversity. Ankara has a higher socioeconomic status when compared to Kahramanmaraş. Being a licensed athlete was defined according to the license, registration, visa and transfer Directorate published in the Turkish National newspaper (Published on 23/12/2001, modified on 23/09/2005). According to this definition; A certified athlete can compete in sporting events and other activities to be carried out by the federations. Only licensed athletes were enrolled in this study. They were comprised of swimmers, pentathlons and soccer players. A survey was conducted to evaluate licensed athletes who voluntarily agreed to participate in the study and the factors that affect school achievement.

The questionnaire consisted of questions that were developed by the researcher and included school and non-school factors that were reported to be able to influence the school's success.

The questions were classified into three parts. The first part was about the participant and his/her family, the second part was about school related questions. In the third part, the athlete was asked to evaluate their academic success and questions were asked about the effects of the lifestyle of being a licensed athlete on school success.

In the first part of the questionnaire, personal and family, questions were asked that might be related to school achievement. The following questions were asked using multiple choice and open-ended questions: Age, gender, who lived at home with them, number of siblings, whether or not they had a separate room, education occupation and salary of parents, amount of pocket money they are given, how many years they have been doing sports, the number of weekly workouts (days and hours), how many hours a day they were doing sports, whether they have a chronic disease or any other health

problems, daily sleep time, nutritional status, whether or not they had a sports related accident, whether or not his/her family supports him/her doing sports.

In the second part of the questionnaire in which school-related factors, another influential factor in school success the following were asked using multiple choice: Which school they went to, whether it was a private or state school, how they went to school, how long it takes to get to school, number of students in the class, whether teachers and school administrators support sports.

In the third part licensed athletes' evaluated their own school achievements this was composed of two parts the first was open-ended questions and the second was multiple choice questions. In this section, the athlete was asked how they evaluate their own school success, whether or not there is a change in school success after the start of the sport, if the success has increased or decreased, what might be the reasons for this, whether being a licensed athlete affects the school's continuity, the effect of physical tiredness on school success, whether the coach considered school success an important factor and the amount of studying was questioned.

After the questionnaire was finished, students were asked to write their grades before and after the start of the sports. As recommended by educational scientists, scorecard grades are composed of four parts: mathematics, science, language, and social science. The study was approved by Hacettepe University Ethical Committee. Face-to-face interviews were conducted with licensed athletes who agreed to take part in the study.

Exclusion criteria were as follows: those who refused to enter the study, those who could not remember their report grades, those who do not fully respond to the questionnaire, those who have additional health problems, those who quit sports less than 6 months, those who started sports as preschoolers and primary school students aged 7-10 years.

When the criteria for the exclusion were taken into account, a total of 111 licensed athletes were included in the survey: 51 of 128 athletes from Ankara (Group 1) and 60 (Group 2) of 100 athletes from Kahramanmaraş.

Statistical analysis: Analysis were performed on the SPSS 21 packet program. As a statistical analysis; Descriptive statistics (frequency, percentage distribution) were used. Mean values were given with standard deviation and median values with min-max values. Chi-square test was used to compare categorical data. If continuous data were compared, within the group; T-test in dependent groups, and T-test in independent groups.

In the correlation test, logistic regression analysis was performed by taking the variables of a p value up to 0.2, and the factors related to school success were found. Statistical analysis showed  $p < 0.05$  significant.

## Results

Mean age of licenced athletes were  $14.1 \pm 2.3$  years (10-23 years) and 49.5% were male . When the first part of the questionnaire concerning personal and familial factors was evaluated; 91% of the athletes live with their parents, 82% have at least one sibling and 87.4% of them have a separate room at home. Other personal and familial characteristics (eg. income level of parents, educational and occupational characteristics of parents) are shown in Table 1. The average duration of their licensed sport was  $4.3 \pm 3.1$  years (1-14 years) and the median was 3 years. The weekly training of the athletes was  $4.5 \pm 1.4$  days (1-7 days) and the daily training was  $2.8 \pm 1.0$  hours (1-7 hours). The athletes were sleeping on average  $8.3 \pm 2.4$  hours per day (5-12 hours). When eating habits were evaluated; 51 athletes (45.9%) reported that they did not receive additional nutrition whereas 38 (34.2%) did and they regulated this on their own, 22 (19.8%) reported that there supplementation was supervised by a dietitian. When asked if they skipped meals due to sports or training, 58% said they did not miss meals, and 42% occasionally missed meals. When asked about injuries during training /competition, 72.1% stated that they had never been injured, 22.5% were mildly injured and completely recovered, and 5.4% stated that the injuries continued when the study took place. 80% of the families supported their child taking part in sports, while the others did not.

When we look at the findings in the second part of our questionnaire about school related information; 52% of athletes attended middle school, 48% were in high school and 81% were in grades 6-10. While 74% of students attended public school 36% attended private school. 61% attended a full day school program whereas 39% attended a half a day program. Only 27% of the athletes had a class size below 25 students. Half of the students walked to school and the other half went with a school bus and 90% of the students were under an hour away from school. 86% of teachers supported their students participation in sports.

In the third part of the questionnaire, the success of the athletes in school and the factors affecting them were examined. First of all, when athletes are asked to evaluate their own achievements, 49.5% of licensed athletes evaluated themselves as successful, 27% as very successful, 21.6% as moderately successful and 1.8% as unsuccessful. 75 (67.5%) of the students thought that their school achievement did not change after starting to play sports. 30 students (27%) stated that school success increased after the start of the sport whereas 6 (5.5%) stated a decline. Students indicated that the increase in school success was due to a more disciplined life after the start of the sport, while the fall in achievement was due to the inadequacy of time and their parents' inability to support it. 79% of the students thought that physical fatigue did not affect their academic achievement. In addition, 62% of trainers paid attention to school grades and success.

The report card grades of licensed athletes before and after the start of the sport are given in Table 2. When we compared the grades before and after the sport, there was no statistically significant difference in the mathematics grades ( $p = 0.054$ ) whereas there was a statistically significant increase in success of science, language, and social science grades (respectively  $p=0.008$ ,  $p=0.009$ ,  $p=0.004$ ). When the factors that increase the school success were examined, the monthly income of the family was positively correlated with the school achievement. As monthly income increases, school performance increases 2.2-fold (confidence interval: 0-0,  $p = 0.03$ ). The duration of the daily sport was also an influential factor in academic success. There was a positive correlation between the daily

training time and school achievement. As the amount of time spent doing sports per day increased, school performance increased 2.5-fold (confidence interval: 0.02-0.19  $p = 0.013$ ). In the analysis of roc to determine the peak value of the correlation between the daily sports duration and the school performance, the limit value was found to be 2.5 hours, but it was not statistically significant. We evaluated whether when the time spent for daily training or sports exceeded 2.5 hours if the success would diminish and we found it did not decrease the success. When the most important factors affecting school success in licensed athletes were evaluated by multiple regression, the monthly income level of the family was found to be the most important factor affecting school success.

When the factors affecting the academic success of students living in Ankara (Group 1) and Kahramanmaraş (group 2) were evaluated as 2 separate groups; The mean age of group 1 ( $14.9 \pm 2.5$  years) was significantly higher in Group 2 ( $13.5 \pm 1.8$  years) and the sexes were similar. Monthly income of the family, the allowance given to the child was significantly higher in Group 1, while the number of persons living in the house and the number of siblings was higher in Group 2. There was also a significant difference between parents' educational level and occupational distributions (Table 3). Sports injuries, daily training, nutrition and sleep were similar in both groups.

When school information was assessed, 57% of the students in Group 1 were enrolled in a state school and 43% in a private school, while this was 88% and 12% in Group 2, respectively ( $p < 0.05$ ). The number of students enrolled in a class in Group 2 was significantly higher. The time to and from school and the support of the sport by teachers were similar. Approximately 70% of the students in both groups thought that school achievement had not fallen since the start of the sport. Before and after the start of the sport grades for mathematics, science and social studies was significantly higher in Group 1. Language scores were similar in both groups (Table 4). While the students in Group 1 had similar mathematics, science and linguistic scores before and after the start of the sport, it was found that the social studies increased significantly after the start of the sport

(Table 5). In Group 2, all course grades showed a significant increase after the start of the sport (Table 6).

In the analysis of the correlation with personal and familial factors affecting school success, the presence of a separate room at home in Group 1 and Group 2 significantly increased the school success. Monthly income of the family in Group 1 showed a strong correlation with school achievement, but it was not significant in Group 2.

In Group 2, the number of weekly training increases the academic achievement, as well as the fact that if the parents support the athlete to play sports, the school achievement is significantly improved.

Considering the effects of school-related factors, it was found in Group 1 that school success was increased if school was a full day. When the most important factor/factors that increase the school success of the students were evaluated by logistic regression analysis; the most important factor affecting school success in group 1 was monthly income. As monthly income increased, school success increased by 1 fold (confidence interval: 0.9-1). The most important factor in Group 2 was the number of training sessions per week. As the number of weekly training increased, school performance increased 2.3-fold ( $p = 0.006$ ; confidence interval 1.9-59.6). There was statistical significance in this field, although the confidence interval was very wide.

## Discussion

In this study, it was found that academic achievement did not decrease after starting to play sports in 111 junior high school students who are licensed athletes. The achievements in science, language and social studies increased significantly whereas the achievements in mathematics did not change. When the personal, familial, school and sport related factors that may affect school success were evaluated; it was determined that the most important factor that increased school success was



monthly income level of the family. The feeling of physical fatigue had a minimum effect and time devoted to sports positively correlated with school achievement. The monthly income level of the families of group 1 students was significantly higher when compared to Group 2 and in Group 1 the most important factor affecting school success was the monthly income level, while in Group 2, the most important factor was the number of weekly training.

Findings from the evaluations of all licensed athletes combined with the results obtained from the athletes living in different cities with different income levels once again showed the fact that school success is influenced by many factors. Taking all the cases taken into consideration, the most important factor affecting school success was the monthly income level of the family, whereas the monthly income level was found to be the most effective factor only in the Group 1. It can be considered that the higher monthly incomes of the families of the athletes in Group 1, increases the impact factor. The high monthly income of the family can be a factor affecting the success of the school, whereas it can be said that with a lower salary the impact factor decreases or disappears. When we look at the output of many types of research from the 1980s to the present day, it has similarly been reported that academic achievement is boosted in high socioeconomic conditions (9-13). These studies emphasized the economic status of the family and the parallelism of their education and professional career, and emphasized that the academic success was also positively affected by the educational level of the family. Thus, when we look at the school achievements of the students before they were involved in a sport, the success of mathematics, science and social studies was significantly higher in Group 1. This result leads us to consider that the positive contribution to school success especially if their mothers are educated and have a profession. It is pointed out in the literature that educated mothers and fathers have a home environment that will provide academic success for their children and that they are also in academic activities themselves, thus enhancing the school's success (14,15).

There are many studies that emphasize that physical activity and physical fitness increase academic achievement (16-20). These studies were usually conducted in primary and secondary school students. In a recent survey conducted by high school seniors, it was reported that the students with regular physical activity for 3 years had significantly higher university entrance scores (21). In children, there is a positive correlation between aerobic exercise and hippocampal volume and memory, and the hippocampus plays an important role in memory and stress regulation (8). In a review of eight randomized controlled studies on this subject, they concluded that regular aerobic exercises positively affect cognitive functions, academic achievement, behavioral and psychosocial functions (22). It is emphasized that an aerobic exercise program, which are done 2-3 times a week in children under 10 years of age, or participation in school aerobic exercises significantly improves cognitive functions (23-25). A study by Reed JA et al. showed that in the 7-10 year-old group, 155 children who had mid-level exercise for 30 minutes per day showed a significant higher intelligence test and social test score when compared to the control group. In the study, higher scores were obtained in English (linguistic knowledge), mathematics and science courses and there although there was no difference statistically (26). Our study was carried out on athletes with a high level of aerobic exercise, who performed the sport professionally, with a higher average age and has been training for at least a year with a more intense program. Our study group was comprised of swimmers, pentathlons and soccer players that were all involved in aerobic sports. Even though the study had no control group the grades were evaluated in the same group before and after starting sports it was seen that for those students with high grades did not drop and school achievement significantly increased in science, language, and social studies. While the increase in the mathematics was not statistically significant, it was observed that the mathematical success increased at the limit of significance ( $p = 0.054$ ). In addition, there was a positive correlation between school performance and the duration of the daily sports of our licensed athletes. As the daily sports duration increased, the school performance increased 2.5 times (confidence interval = 0.02-0.19,  $p = 0.013$ ). This finding

was one of the surprising findings of our study. It may be thought that if the physical fatigue increases, the teen will study less and the success of the school will be negatively affected. However, the opposite finding was obtained in our study. We believe that this result is due to the fact that athletes are better at time management, have higher self-confidence or are able to study with better concentration. Additionally, the competitiveness of the athletes may also play a role in the increase in academic success. Obviously, it is difficult to measure these predictions and achieve a complete result. The studies on which these findings are measured are also insufficient. A study by Stroth S et al evaluating 33 adolescents between the ages of 12 and 16 found that 20 minutes of aerobic exercise per day was not a significant contributor to attention during the acute phase (27).

In an electrophysiological study conducted in adolescents, they found that acute exercise improves cognitive functions by increasing positive effects on the attention system (7). In our study, we did not use a scale that directly measured attention, but some of our athletes who had an increased school success,

Expressed they were able to focus their attention better because they relax during sports. There is a need for further work on this subject. In a study by Booth JN et al in the United Kingdom medium-intensity exercise in adolescents increased school achievement in mathematics, language, and science in both genders (28). In a study by Fox CK et al. it was found that students who were both physical activity and a member of a sports teams in the study were evaluated by their school achievement and exam grades, a positive effect on school achievement in secondary school students was observed in both groups (29). In a study by Jonker L et al. a survey was conducted on 128 elite athletes in the age group 12-16 and 164 normal students in the same age group. Participants' academic achievement was assessed by university entrance scores and the ability of students to control themselves was elaborated. When we look at the results of the survey, elite athletes have higher pre-university achievement than normal students. In addition, elite athletes' self-monitoring, evaluation, reflection and effort skills were found to have a high score when compared to adolescents that do not

participate in sports. It has been argued that these skills gained by elite athletes have provided significant and positive gains in their high level sports competitions and academic life (30).

In our study, we did not evaluate elite but licensed athletes. Elite athletes participated in national and international competitions with more intensive training programs. So the effort and time they give to the sport are more than the licensed athletes. The positive impact of academic success on elite athletes while engaging in such intense sporting activities has indeed been emphasized in Jonker L et al's study, and it is possible to say that the skills of self-management gained during this training has a positive effect. Competitiveness, struggle, positive thinking ability while preparing for sports competitions affects the academic life of the student positively.

In conclusion, this study suggests that licensed athletes trained at junior high school level have high school achievement and that school achievement has not fallen since the start of the sport, or even that school achievements have improved since the start of the sport. It was determined that the most important factor affecting the school achievement of the students was the socioeconomic status of the family.

## References

- 1- Battle J, Lewis M (2002). The increasing significance of class: The relative effects of race and socioeconomic status on academic achievement. *Journal of Poverty*, 6(2),21-35
- 2- Chambers EA, Schreiber JB (2004). Girls'academic achievement: Varying associations of extra curricular activities. *Gender and education*, 16(3), 327-346
- 3- Crosnoe R, Johnson MK, elder GH (2004). School size and the interpersonal side of education: An examination of race/ethnicity and organizationa lcontext. *Social Science Quarterly*, 85(5),1259-1274
- 4 -McCoy LP (2005) Effect of demographic and personal variables on achievement in eighth grade algebra. *Journal of Educational Research*, 98(3),131-135
- 5- Booth JN, Leary SD, Joinson C, Ness AR, Tomporowski PD, Boyle JM, Reilly JJ (2014). Associations between objectively measured physical activity and academic attainment in adolescents from a UK cohort. *Br J Sports Med*, 48(3), 265-270

- 6 -Bass RW, Brown DD, Laurson KR, Coleman MM (2013). Physical fitness and academic performance in middle school students. *ActaPaediatr*, 102(8),832-837
- 7 - Hogan M, Keifer M, Kubesch S, Kilmartin L, Brosnan M (2013). The interactive effects of physical fitness and acute aerobic exercise on electrophysiological coherence and cognitive performance in adolescents. *Exp Brain Res*, 229 (1), 85-96
- 8 -Chaddock-Heyman L, Hillman CH, Cohen NJ, Kramer AF (2014). The importance of physical activity and aerobic fitness for cognitive control and memory in children. *Monogr Soc Reschild Dev*, 79(4), 25-50
- 9- Farooq MS, Chaudhry AH, Shafiq M, Berhanu G (2011). Factors affecting students' quality of academic performance: A case of secondary school level. *Journal of Quality and Technology Management*, 7(2), 1-14
- 10- Jeynes WH (2002). Examining the effects of parental absence on the academic achievement of adolescents: The challenge of controlling for family income. *Journal of Family and Economic Issues*. 23(2), 56-65
- 11- Caldas SJ, Banston CL (1997). The effect of school population socioeconomic status on individual student academic achievement. *Journal of Educational Research*, 90, 269-277
- 12- Mitchell SO (1998). Restructuring US higher education: Analyzing models for academic program review and discontinuation. *The review of Higher Education*, 21(4), 377-404
- 13- Ma X, Klinger DA (2000). Hierarchical linear modeling of student and school effects on academic achievement. *Canadian Journal of Education*, 25(1), 41-55
- 14- Barnard WM (2004). Parent involvement in elementary school and educational attainment. *Children and Youth Services Review*, 26,39-62
- 15- Shumox L, Lomax R (2001). Parental efficacy: Predictor of parenting behavior and adolescent outcomes. *Parenting*, 2(2), 127-150
- 16- Welk GJ, Jackson AW, Morrow JR, Haskell WH, Meredith MD, Cooper KH (2010). The association of health-related fitness with indicators of academic performance in Texas Schools. *Research Quarterly for Exercise and Sport*, 81:sup3,16-23
- 17- Carlson SA, Fulton JE, Lee SM (2008). Physical education and academic achievement in elementary school: data from the early childhood longitudinal study. *Am J Public Health*, 98,1-7

- 18- London RA, Castrechini S (2011). A longitudinal examination of the link between youth physical fitness and academic achievement. *J Sch Health*, 81,400-408
- 19- Dwyer T, Sallis JF, Blizzard L (2001). Relation of academic performance to physical activity and fitness in children. *Pediatr Exerc Sci*, 13,225-237
- 20- Nelson MC, Gordon-Larson P (2006). Physical activity and sedentary behavior patterns are associated with selected adolescent health risk behaviors. *Pediatrics*, 117,1281-1290
- 21- Liao PA, Chang HH, Wang JH, Wu MC (2013). Physical fitness and academic performance: empirical evidence from the National administrative Senior High School Student Data in Taiwan. *Health Education Research*, 28, 512-522
- 22- Lees C, Hopkins J (2013). Effect of aerobic exercise on cognition, academic achievement and psychosocial function in children: a systematic review of randomized control trials. *Prev Chronic Dis*, 10, 1-8
- 23- Donnelly JE, Greene JL, Gibson CA, Smith BK, Washburn RA, Sullivan DK (2009). Physical activity across the curriculum (PAAC): a randomized controlled trial to promote physical activity and diminish overweight and obesity in elementary school children. *Prev Med*, 49(4), 336-341
- 24- Fisher A, Boyle JM, Paton JY, Tomporowski P, Watson C, McColl JH (2011). Effects of a physical education intervention on cognitive function in young children: randomized controlled pilot study. *BMC Pediatr*, 11, 97-107
- 25- Hill LJ, Williams JH, Aucott L, Thomson J, Mon- Williams M (2011). How does exercise benefit performance on cognitive tests in primary-school pupils? *Dev Med Child Neurol*, 53(7), 630-635
- 26- Reed JA, Einstein G, Hahn E, Hooker SP, Gross VP, Kravtiz J (2010). Examining the impact of integrating physical activity on fluid intelligence and academic performance in an elementary school setting: a preliminary investigation. *J Phys Act Health*, 7(3), 343-351
- 27- Stroth S, Kubesch S, Dieterie K, Ruchow M, Heim K, Kiefer M (2009). Physical fitness, but not acute exercise modulates event-related potential indices for executive control in healthy adolescents. *Brain Res*, 1269,114-124
- 28- Booth JN, Leary SD, Joinson C, Ness AR, Tomporowski PD, Boyle JM, Reilly JJ (2014). Associations between objectively measured physical activity and academic attainment in adolescents from a UK cohort. *Br J Sports Med*, 48, 265-270

29- Fox CK, Barr-Anderson D, Neumark-Sztainer D, Wall M (2010). Physical activity and sports team participations: associations with academic outcomes in middle school and highschool students. *J Sch Health*, 80(1), 31-37

30- Jonker L, Elferink-Gemser MT, Toering TT, Lyons J, Visscher C (2010). Academic performance and self-regulatory skills in elite youth soccer players. *Journal of Sports Sciences*, 28(14), 1605-1614

**Table 1. Personal and Familial Characteristics of Licensed Athletes**

Characteristics	Mean	Median	SDS	Min.	Max.
Age (year)	14.1	14	2.3	10	23
Siblings	1.5	1	0.7	1	3
Number of people living in the house	4.1	4	0.8	2	6
Monthly income of the family (TL)	4728	4500	3358	1000	20000
Allowance (TL)	171.5	100	242.3	0	2000
Mother's education (%)	University:49.5 High School:24.3 Middle school:9 Primary School:17.2				
Father's education (%)	University:61.3 High School:27.9 Middle school:5.4 Primary School:5.4				
Mother's occupation (%)	No occupation:45.9 Government official:20 Teacher:13 other:21.1				
Father's occupation (%)	Self employed:30.6 Government official:32.4 Teacher: 9.9 architect/engineer:13.5 other: 14.6				

TL: Turkish Lira



**Table 2. Grades of the Licensed Athletes Before and After the Start of the Sport**

<b>Grades</b>	<b>Before the start of the sport</b>	<b>After the start of the sport</b>	<b>P</b>
<b>Mathematics</b>	80.4±10.6	81.6±10.9	0.054
<b>Science</b>	80.5±12.5	82.4±11.9	0.008
<b>Language</b>	82.7±9.7	84.3±9.4	0.009
<b>Social science</b>	83.6±9.5	85.5±8.5	0.004

**Table 3. The personal, family and sports life features of Athletes in Group 1 and 2**

<b>Characteristics</b>	<b>Group 1</b>	<b>Group 2</b>	<b>P</b>
<b>Age(yr)</b>	14.9±2.5	13.5±1.8	0.03
<b>Sex(M/F)</b>	24/27	31/29	0.08
<b>No. of siblings</b>	1.0±0.2	1.8±0.7	0.01
<b>No. of people living in that house</b>	3.7±0.5	4.4±0.9	0.02
<b>Monthly family income(TL)</b>	6697.9±3835.3	3153.3±1750.6	0.001
<b>Allowance (TL)</b>	263.1±331.5	97.8±80.1	0.001
<b>Weekly training (day)</b>	5.5±1.1	3.6±1.2	0.01
<b>Hourly training (hour)</b>	2.7±0.8	2.8±1.2	0.09
<b>Amount of sleep (hour)</b>	8.0±0.9	8.6±1.6	0.08
<b>How many years since being an athlete</b>	6.9±2.7	2.0±0.9	0.001

**Table 4. Grades of the Licensed Athletes in Group 1 and Group 2**

Grades	Before the start of the sport			After the start of the sport		
	Group 1	Group 2	P	Group 1	Group 2	P
<b>Mathematics</b>	84.1±7.8	78.3±11.5	0.01	84.4±8.2	79.9±11.9	0.03
<b>Science</b>	84.7±9.1	78.0±13.4	0.01	85.7±8.4	80.5±13.2	0.01
<b>Language</b>	84.7±8.3	81.5±10.3	0.1	85.3±9.6	83.7±9.3	0.4
<b>Social science</b>	86.5±6.9	81.9±10.3	0.02	88.1±6.5	83.9±9.2	0.02

**Table 5. Grades of the Licensed Athletes in Group 1**

Grades	Before the start of the sport	After the start of the sport	P
<b>Mathematics</b>	84.1±7.8	84.4±8.2	0.7
<b>Science</b>	84.7±9.1	85.7±8.4	0.3
<b>Language</b>	84.7±8.3	85.3±9.6	0.6
<b>Social science</b>	86.5±6.9	88.1±6.5	0.04

**Table 6. Grades of the Licensed Athletes in Group 2**

<b>Grades</b>	<b>Before the start of the sport</b>	<b>After the start of the sport</b>	<b>P</b>
<b>Mathematics</b>	78.3±11.5	79.9±11.9	0.04
<b>Science</b>	78.0±13.4	80.5±13.2	0.01
<b>Language</b>	81.5±10.3	83.7±9.3	0.004
<b>Social science</b>	81.9±10.3	83.9±9.2	0.02