

## THE CORRELATION BETWEEN THE ACADEMIC ACHIEVEMENT LEVEL OF PRIMARY-SCHOOL STUDENTS AND THEIR ATTITUDES TOWARD A PHYSICAL EDUCATION LESSON

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### Abstract

The purpose of this study was to determine whether there was a meaningful relationship between students' academic achievements and their attitudes toward a physical education lesson. A total of 873 students from the sixth, seventh and eighth grades participated in the study. While the value attached by 'highly-successful' students to the lesson and their expectations from it were greater than two other groups, they were more dissatisfied with the lesson than the other groups. Although all three groups expressed similar opinions about what they were provided with by the lesson, highly-successful students expressed more negative opinions regarding their affective progress in the lesson than did the 'intermediate' and 'low successful' students. In all three groups, male students were considerably more positive toward the lesson in general than were female students.

**Key Words:** Academic achievement, physical education lesson, attitudes.

### Introduction

Many studies have been conducted in an effort to determine the correlation between students' physical activities or physical skills and their academic achievement levels. This study provides a special focus on such issues as academic performance (achievement), physical condition, eating habits, participation in physical activity programs, knowledge of sports, motor skills and physical fitness.

Some studies show that there is a positive correlation between physical activity, self-confidence, body mass index, school performance and academic performance. For instance, in a study conducted with fifth, seventh and ninth grade students in California, a positive correlation, although low, was discovered to exist between the students' academic scores and their scores in physical fitness tests. The study indicated that at all grade levels, high academic scores were associated with high-level sporting activity (Prosser & Jiang, 2002). Researchers found physical fitness to be more strongly correlated with achievement in mathematics than in English. Studies of 134 students from the third and fifth grades by Eveland-Sayers et al. (2009) supported the existence of a connection between specific components of physical fitness and selected indices of academic achievement (reading and mathematics). Similarly, in their study of 3,990 students from the fourth and eighth grades, Chomitz et al. (2009) pointed out that there was a significant positive correlation between the students' academic achievement in English and mathematics and their physical fitness levels.

Another study (Carlson et al., 2008), whose sample included students from the fifth grade, focused on the correlation between the amount of time allocated for physical education lessons and academic achievement. In a study resulting from a review of literature, Trost (2007) concluded that there was not a positive correlation between participation in physical education and other school-based physical activities

and academic achievement. Evenson, Ballard, Lee & Ammerman (2009) stated that daily 30-minute physical activities yielded positive outcomes in primary and secondary schools. Tara, Yen, Sarah & Marc (2008) conducted a study in order to determine the effects of participation in physical education lesson structured with physical activities on students' academic achievement levels. The authors could not obtain any meaningful data that would suggest a correlation between participation in physical education lessons and academic achievement.

Daley & Ryan (2000) studied the correlation between academic performance and participation in physical activities of male and female students from the eighth grade to the eleventh grade. The study used the students' scores in English, mathematics and science lessons as a basis for determining their academic achievements. A low negative correlation was found between the amount of time (in minutes) allocated for sport and exercise among students who were 13, 14 and 16 years old and their scores in English lessons. A similar situation was observed in the scores of 16-year-old students in science lessons.

In order to determine the effects of physical education and physical activity on the academic achievement levels of sixth-grade students, Coe et al. (2006) studied 214 randomly-selected students over two school terms. The researchers used scores in mathematics, chemistry, English and geography as a basis for measuring academic achievement. An attempt was made to focus on anthropometric structure (weight, body mass index), the training provided throughout a certain time period and the amount of time allocated for physical activities outside the school each week to maintain a metric for physical education and physical activity. No meaningful correlation was found between academic achievement and physical education. High scores were associated with the amount of time allocated for weekly physical activity.

The studies conducted up to now can be categorized in terms of content:

- physical fitness and academic achievement; and
- participation in physical activity and academic achievement.

#### Purpose

All the previous studies focused on analyses of the correlation between the students' academic achievements and their physical fitness or their participation in physical activities. The purpose of this study is to associate primary and secondary school students' general academic achievement in school with their attitudes towards physical education lessons. Suggestions can then be made to improve physical

education lessons and a different perspective obtained on students' attitudes toward physical education.

#### Method

##### Participants

The study was conducted on a total of 873 students (417 female and 456 male) in the sixth, seventh and eighth grades at the Vali Necati Çetinkaya primary school, which is located in the centre of the city of Konya, Turkey. Table 1 shows the number of students, the distribution by gender and the number of female and male students in each department formed by the process specified above.

Table 1: Classrooms of students participating in the study and their distribution by gender

6th Grade			7th Grade			8th Grade		
Branch	Female	Male	Branch	Female	Male	Branch	Female	Male
6/A	17	21	7/A	20	24	8/A	14	18
6/B	16	21	7/B	28	13	8/B	18	18
6/C	16	20	7/C	20	18	8/C	16	25
6/D	16	19	7/D	25	23	8/D	16	14
6/E	14	19	7/E	24	20	8/E	13	19
6/F	14	22	7/F	24	22	8/F	19	20
6/G	19	19	7/G	12	23	8/G	16	20
6/H	22	18	7/H	18	20	8/H	14	18
Totals	134	159		171	163		126	152

#### The Placement Test (SBS) and Calculation

SBS is carried out on the basis of the classroom scores, which are calculated from Behavior Score and year-end achievement score. SBS is the examination process of the System for Attending Secondary School, which aims to conduct a multi-faced assessment and evaluation of the students.

SBS are central systemic examinations administered at the end of sixth, seventh and eighth grades and cover the curriculum of the compulsory courses other than visual arts, technology and design, music, physical education, counselling and social activities. One can calculate weighted year-end scores by multiplying the scores obtained by the students for each course by the number of hours the course is delivered per week (for example, if a student scores 70 in a course that is delivered for two hours per week, the weighted year-end score will be  $70 \times 2 = 140$ ). When such sums of scores obtained (for example  $140 + 150 + 140 + 160 + \dots = 1,010$ ) are divided by the number of hours such courses are delivered per week ( $2 + 2 + 2 + 2 + \dots = 14$ ), the year-end scores will have been calculated ( $1,010/14=72.14$ ).

The scoring is calculated on a scale of 100 and the highest points at the sixth, seventh and eighth grades are converted to 500, the maximum point. The process of converting the achievement score to 500 is carried out separately for students who study at classrooms/schools or private teaching classrooms/institutions, where reconciling is implemented: such students are evaluated with

reference to their own student groups and not to students from other schools.

The Behavior Score is obtained through an evaluation of performance against such criteria as accommodation to the internal school culture, self-care, self-knowledge, communication and social interaction, compliance with common values, solution-orientation, participation in social activities, teamwork and responsibility, efficient working and environmental awareness, converted into a score on the scale of 100 and then into 500, the maximum point.

The scoring system for the first participants in the SBS, who were seventh grade students in the 2007-2008 school year, calculated the secondary school placement score by focusing on 40 per cent and 60 per cent of the seventh and eighth grades respectively. The classroom score of those who repeat a grade level is calculated from the SBS score, behaviour score and year-end achievement score for the year in which the student repeats the grade level.

The SBS is generally carried out on the first Saturday or Sunday in June, starting at 10.00 am and lasting for up to 120 minutes in one session throughout the nation. Each student's answer sheet is evaluated by two optical readers, via a double control system. The number of correct and wrong answers for each test of the courses included in the SBS is determined. For each test, one-third of the wrong answers are subtracted from the number of correct answers, resulting in raw scores in return for valid scores. These temporary raw scores are turned into the total number of questions in the test and, in this way, evaluation-based raw scores

are determined. Five different raw scores are calculated for each student. The mean score for the test is calculated by adding the scores obtained by all the students and dividing the consequent figure by the number of students taking the test. The standard deviation value of each test is found by using the raw scores, mean scores and the number of students taking the test. The standard deviation value (SD) for each student is obtained via a process of transformation that uses the mean scores and standard deviation values of a particular test, and makes the mean of the raw scores of

all the students 50 and standard deviation values 10. By adding the weighted standard scores of the tests, one can discover the Total Weighted Standard Score (TWSS). For the hearing impaired, who are exempt from the tests on foreign languages, TWSSs are calculated by translating the sum of the weighted standard scores for other tests into the total number of questions included in all the tests. Table 2 presents the distribution of the SBS questions by number and course.

Table 2: Distribution of SBS questions by course

Tests	Number of Questions			Test Weight Coefficients		
	6th Grade	7th Grade	8th Grade	6th Grade	7th Grade	8th Grade
Turkish Language	19	21	23	4	4	4
Mathematics	16	18	20	4	4	4
Science and Technology	16	18	20	3	3	3
Social	16	18	20	3	3	3
Foreign Language	13	15	17	1	1	1
Total number of questions	80	90	100	15	15	15

Source: Ministry of National Education, Republic of Turkey, e-Application Guide for SBS 2009

#### *Attitude scale for the physical education lesson*

The study used a Likert-type scale in accordance with the objectives in order to determine the secondary school students' attitudes (affective characteristics) toward the physical education lesson (see Appendix). (Yoncalık 2006).

#### *Data analysis*

The packages SPSS 12.0 (Statistical Package for Social Sciences) and SPSS 10.0 were used to conduct statistical analyses of the data obtained through the study (independent samples T test - inter-group one-way Anova /Scheffe)

#### **Findings**

Table 4 presents the mean achievement displayed by each of the classroom departments formed by the school management in the areas (courses) constituting the sections of SBS.

Since the students from the sixth grade in the school had never taken the SBS, their mean achievement was the data obtained from the practice exams in the format of the SBS conducted in the fifth grade. The most successful in all the areas (courses) of the sixth-grade classrooms were 6/C, 6/H, 6/A and 6/D. The mean achievement scores obtained by the students in these four departments were the same in several areas (courses) and in others are so similar that they could be accepted as being the same. For instance, the mean achievement scores of the departments 6/H and 6/A in Turkish language and mathematics were the same (75). In addition, the mean achievement score of both 6/A and 6/D in social sciences was 70 and the mean score of both 6/D and 6/H in English language was 78 (see Table 3). The least successful were 6/F, 6/E and 6/B. Table 3 indicates that the mean achievement scores of 6/G in all areas had an 'intermediate' character, with 10 to 15 scores different from the most and least successful departments. In

other words, the students in 6/G could be regarded as middle-level successful students in terms of the SBS, compared with the students in other departments.

The most successful seventh-grade departments in all areas were 7/D and 7/E; they were followed by 7/A, 7/F, 7/C and 7/B, and the least successful were 7/H and 7/G. The most successful eighth-grade departments were 8/B, 8/C and 8/H, and the least successful were 8/A, 8/E, 8/D.

The achievement levels were therefore categorised as:

- (1) Highly successful, 6/A, 6/C, 6/D, 6/H, 7/D, 7/E, 8/B, 8/C, 8/H
- (2) Intermediately successful, 6/G, 7/A, 7/B, 7/C, 7/F, 8/F, 8/G
- (3) Low successful, 6/B, 6/E, 6/F, 7/G, 7/H, 8/A, 8/D, 8/E

The first group included 354 students, the second 246 and the third 273.

**Table 3: Ranking of the achievement levels of the 6th, 7th and 8th grades in terms of the SBS**

Turkish language			Mathematics			Science and Technology			Social			Foreign language (English)		
Row	Branch	Average puan	Row	Branch	Average puan	Row	Branch	Average puan	Row	Branch	Average puan	Row	Branch	Average puan
1	6/C	77	1	6/C	77	1	6/H	81	1	6/H	73	1		
2	6/H	75	2	6/H	75	2	6/C	79	2	6/C	72	2	6/C	81
3	6/A	75	3	6/A	75	3	6/D	76	3	6/A	70	3	6/A	79
4	6/D	74	4	6/D	74	4	6/A	75	4	6/D	70	4	6/D	78
5	6/G	60	5	6/G	60	5	6/G	61	5	6/G	53	5	6/H	78
6	6/B	50	6	6/B	50	6	6/B	43	6	6/E	43	6	6/G	63
7	6/F	48	7	6/F	48	7	6/E	43	7	6/F	38	7	6/E	54
8	6/E	48	8	6/E	48	8	6/F	40	8	6/B	36	8	6/B	53
1	7/E	94	1	7/E	79	1	7/D	75	1	7/E	90	1	6/F	52
2	7/D	92	2	7/D	74	2	7/E	71	2	7/D	88	2	7/D	94
3	7/A	86	3	7/A	63	3	7/A	64	3	7/A	80	3	7/E	92
4	7/B	83	4	7/F	54	4	7/F	52	4	7/F	73	4	7/A	87
5	7/C	80	5	7/C	48	5	7/C	46	5	7/B	67	5	7/B	82
6	7/F	79	6	7/B	41	6	7/B	46	6	7/C	62	6	7/C	77
7	7/H	54	7	7/H	21	7	7/G	24	7	7/H	33	7	7/F	74
8	7/G	50	8	7/G	20	8	7/H	22	8	7/G	26	8	7/H	52
1	8/B	86	1	8/B	77	1	8/B	69	1	8/B	90	1	7/G	45
2	8/C	85	2	8/C	66	2	8/C	61	2	8/C	81	2	8/B	87
3	8/H	83	3	8/H	57	3	8/H	59	3	8/H	78	3	8/C	85
4	8/G	74	4	8/F	42	4	8/F	45	4	8/F	60	4	8/H	83
5	8/D	73	5	8/D	38	5	8/A	41	5	8/D	57	5	8/G	65
6	8/E	70	6	8/G	37	6	8/G	41	6	8/G	55	6	8/E	59
7	8/F	70	7	8/A	31	7	8/D	39	7	8/A	46	7	8/F	57
8	8/A	55	8	8/E	28	8	8/E	37	8	8/E	44	8	8/D	54
												8/A	50	

Table 4: Results of inter-group one-way Anova (Scheffe)

Dependent variable	Group	Mean	F	Sig.	Group Multiple Comparisons	Std error	Significance	
Interest	1 (High)	4.02	5.771	.003	1	2	.07761	.060
	2 (Mid.)	3.82				3	.07531	.006
	3 (Low)	3.73				2	.08219	.786
Motivation	1	3.41	9.841	.000	1	2	.06702	.790
	2	3.45				3	.06504	.000
	3	3.69				2	.07098	.005
Acquisition	1	3.33	3.507	.030	1	2	.08594	.659
	2	3.41				3	.08340	.031
	3	3.45				2	.09102	.299
General Attitude	1	3.58	1.404	.246	1	2	.06455	.953
	2	3.56				3	.06264	.396
	3	3.67				2	.06836	.306

The highest mean (4.02) in terms of the dimension of 'Interest' of the attitude scale was obtained from the student group that had the highest scores in the SBS and the student group that had the lowest score in the SBS ranked last (3.73). In the dimensions of 'Motivation' and 'Acquisition', the highest mean scores (3.69 and 3.45 respectively) were achieved by the student group with low scores in the SBS. In terms of 'Interest' and 'Motivation' for physical education lesson, it can be concluded that the student group with high scores in the SBS was more interested in a statistically-meaningful way ( $p=.006$ ,  $p=.000$ ) than the group with low scores in the SBS, but the motivation levels during physical education lesson were less when compared with other student groups. There was a statistically-meaningful difference in terms of the dimension of 'Motivation' between mean of the group with intermediate scores in the SBS and that of the group with low scores in the SBS ( $p=.005$ ). There was no statistically-meaningful difference between the groups in terms of the dimension of 'Acquisition' ( $p=.030$ ).

Table 4 presents an evaluation of the total scores obtained by the students without dividing the answers provided to the attitude scale into dimensions. There was no meaningful difference among the attitudes of the students on the basis of their scores in the SBS. However the highest mean value (3.67) belonged to the student group with low scores in the SBS. The number of male students with high scores in the SBS was 156, with intermediate scores 116 and with low scores 184.

Table 5 indicates that in all the three dimensions of the attitude scale, male students with high scores in the SBS had higher mean scores than those with intermediate and low scores in the SBS ('Interest' 3.76, 'Motivation' 3.68 and 'Acquisition' 3.78). On the other hand, the lowest mean scores belonged to the group with low scores in the SBS ('Interest' 3.52, 'Motivation' 3.48 and 'Acquisition' 3.73).

Table 5: Results of inter-group one-way Anova by gender (Scheffe)

Males								
Dependent variable	Group	Mean	F	Sig.	Group Multiple Comparisons	Std error	Sig.	
Interest	1(High)	3.76	4.441	.012	1	2	.09372	.128
	2(Mid.)	3.57				3	.08320	.016
	3(Low)	3.52				2	.09063	.859
Motivation	1	3.68	1.762	.173	1	2	.12123	.733
	2	3.59				3	.10761	.174
	3	3.48				2	.11723	.665
Acquisition	1	3.78	.229	.795	1	2	.08532	.981
	2	3.76				3	.07574	.803
	3	3.73				2	.08251	.920
Females								

Dependent variable	Group	Mean	F	Sig.	Group Multiple Comparisons	Std error	Sig.	
Interest	1(High)	3.60	3.093	.046	1	2	.12690	.927
	2(Mid.)	3.56				3	.11962	.192
	3(Low)	3.82				2	.11603	.072
Motivation	1	3.58	4.563	.011	1	2	.10708	.094
	2	3.35				3	.09790	.807
	3	3.28				2	.09790	.807
Acquisition	1	3.38	1.318	.269	1	2	.13553	.654
	2	3.25				3	.12775	.269
	3	3.17				2	.12391	.802

In terms of interest in, motivation during and acquisition from physical education lesson, the male student group with low scores in the SBS had more positive opinions than other groups, although this did not lead to any statistically-meaningful difference. The number of female students with high scores in the SBS was 117, intermediate scores 130 and low scores 170. Unlike the male students, the greatest interest among female students ( $M=3.82$ ) was displayed by the student group with low scores in the SBS. Even so, it can be seen that the students with low scores in the SBS are at the bottom of the list in terms of motivation during and

acquisition from the lesson. The difference for female students with high scores in the SBS was not at a significant level ( $p<.005$ ).

This is also reflected in the results of inter-group independent t test, which means that there were statistically-meaningful differences between the means of the answers provided by female and male students ( $p<.005$ ). Notwithstanding their achievement scores in the SBS, male students in all three groups had more statistically-meaningful positive attitudes than female students.

**Table 6: Results of the independent samples T test on the basis of the genders of the students in each group categorized by their achievement scores in the SBS**

#### High SBS score

Dependent variable	Gender	N	Mean	Std deviation	Sig.
Interest	Female	117	3.60	.96246	.006
	Male	156	3.89	.72564	
Motivation	Female	117	3.58	.82496	.062
	Male	156	3.76	.74853	
Acquisition	Female	117	3.38	.98829	.010
	Male	156	3.68	.93023	
General Attitude	Female	117	3.52	.77731	.003
	Male	156	3.78	.63883	

#### Intermediate SBS score

Dependent variable	Gender	N	Mean	Std deviation	Sig.
Interest	Female	130	3.56	.97845	.000
	Male	116	4.13	.80662	
Motivation	Female	130	3.35	.86618	.033
	Male	116	3.57	.74814	
Acquisition	Female	130	3.25	1.06034	.011
	Male	116	3.59	.96098	
General Attitude	Female	130	3.39	.85507	.000
	Male	116	3.76	.66049	

#### Low SBS score

Dependent Variable	Gender	N	Mean	Std deviation	Sig.
Interest	Female	170	3.82	1.03090	.001
	Male	184	4.18	.92580	
Motivation	Female	170	3.28	.83054	.006

Acquisition	Male	184	3.52	.78758	.007
	Female	170	3.17	1.11448	
General Attitude	Male	184	3.48	1.05212	.000
	Female	170	3.43	.84684	
	Male	184	3.73	.76103	

### Discussion

The study was conducted with the aim of examining some ideas about the correlation between academic achievement and attitudes toward a physical education lesson. It focused on students from one school. The reason for this is that attitudes toward a physical education lesson may be affected by various factors, including teachers with different equipment, knowledge, experience and personal characteristics; the socio cultural, socioeconomic and physical environment surrounding the school; the physical facilities of the school (sports hall, sports arena, school garden, sports tools, equipment and materials) and the characteristics of the students enrolled in the school.

These factors can also apply to other courses (mathematics, science, English language and so on) that have been used as bases for determining academic achievement. The study indicated that even though a physical education lesson does not interest 'low successful' students as much as it interests highly-successful ones, the former take more pleasure (get more motivated) than 'intermediately' or 'highly' successful students. On the basis of the findings, it can be argued that while highly-successful students attach more value and expect more from a physical education lesson than the other groups, they are more dissatisfied with the lesson than the other two groups. Although the three groups have expressed similar ideas as to the contributions of the lesson, highly-successful students are least likely to think that they have experienced affective development or progress during the lesson.

The most positive attitude toward the lesson was displayed by the student group with low scores in the SBS, although not a level that would result in a statistically-meaningful difference (see Table 4). The highly-successful male group expressed more positive opinions than the other male groups regarding interest, motivation and acquisition, but this did not result in a statistically-meaningful difference. Unlike the male students, the greatest interest was displayed by the 'low successful' female group. A study of 300 female students in Zagreb focused on the correlation between the general achievement levels of the students and their interest in physical education. It concluded that there was not a meaningful correlation between an interest in sports activities and general achievement levels (Students' interests, 2005). Male students in all three groups had more positive attitudes, in a statistically-meaningful manner, than female students.

### Implications

Physical education lessons could be carried out with a group formed through the participation of students from different departments with similar interests in, expectations from and motivations during the lessons. The students' academic achievement in other courses could also be taken into consideration during the process of grouping. In this way, physical

education lessons might prove to be more useful for all students in a school. Another way of grouping might be to measure the physical fitness levels of the students in the same classroom and to enable the students with similar physical characteristics to receive physical education lessons together. When students with similar anthropometric and physiological characteristics participate in physical education together, the lessons will be more uninterrupted, faster and more competitive, leading in turn to higher-level affective, cognitive and behavioral acquisitions.

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#### **Appendix: Attitude Scale**

##### ***Interest items***

1. If it were allowed, I would not attend the physical education classes.
2. I do not have any expectations from the physical education course.
3. I cannot think of any schools in which the physical education course is absent from their curriculum.
4. I am waiting for the days on which we have physical education classes with full enthusiasm.
5. In my opinion, physical education course hours should be increased in the curriculum.
6. I feel sad on the days we have physical education classes at school.

##### ***Motivation items***

1. I learn something new in each of the physical education classes.
2. It makes me bored to repeat the movements during the classes.
3. In my opinion, most of the things we do during the classes are to waste time.
4. In physical education classes, I feel as if time never passed.
5. A physical education course is a lesson enabling me to show my capabilities and abilities.
6. I like the way course subjects are taught to us in the classes.
7. I do not learn the course subjects well.
8. I forget what we are taught in physical education classes in a short time.

##### ***Acquisition items***

1. The physical education course teaches me to respect my friends.
2. I understand the importance of working by helping each other in the physical education course.
3. The physical education course helps me understand what I can achieve on my own.
4. Through the physical education course, I trust myself more.
5. I understand the importance of obeying rules in the physical education course.
6. The physical education course makes me love sports.
7. In physical education classes, I am in better harmony with my friends.