Asian Journal of Education and Training
Vol. 6, No. 2, 246-255, 2020
ISSN(E) 2519-5387
DOI: 10.20448/journal.522.2020.62.246.255

The Investigation of Multiple Intelligence Modalities of University Students Receiving Sports Education

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Abstract

The aim of this study is to determine the dominant intelligence modality of university students who receive sports education and to examine intelligence modality in terms of various variables. The survey model was chosen for the model of the study. 251 students voluntarily participated in the study. A 6-question Personal Information Form was used by the researchers to determine the demographic characteristics of the participants, and the Multiple Intelligence Scale adapted in Turkish by Babacan and Dilci (2012) was used to determine the multiple intelligence areas. According to the findings, the intelligence modality in which the participants were the most dominant was physical intelligence, and the intelligence modality in which they were the most distant was the verbal intelligence. While multiple intelligence areas differed according to the gender, class, age and sports time of the participants, there was no significant difference in multiple intelligence areas according to department and branch variables. In addition, female participants, 3rd grade students and those who have more time to do sports are more dominant in every intelligence field. As a result, it was concluded that the most dominant intelligence field is physical intelligence and that women are more dominant in multiple intelligence domains than men. It was once again revealed that the duration of sports is an important factor in the development of multiple intelligence areas of individuals.

Keywords: Sport, Multiple intelligence, University students, Physical education, Education.

Citation | Mevlüt Yildiz; Yavuz Öntürk; Engin Efek (2020). The Investigation of Multiple Intelligence Modalities of University Students Receiving Sports Education. Asian Journal of Education and Training, 6(2): 246-255.
History:
Received: 16 January 2020
Revised: 3 March 2020
Accepted: 6 April 2020
Published: 20 April 2020

Publisher: Asian Online Journal Publishing Group

Acknowledgement: Both authors contributed to the conception and design of the study.
Funding: This study received no specific financial support.
Competing Interests: The authors declare that they have no conflict of interests.
Transparency: The authors confirm that the manuscript is an honest, accurate, and transparent account of the study was reported; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained.
Ethical: This study follows all ethical practices during writing.

Contents

Contribution of this paper to the literature
The study contributes to the existing literature by determining the most distant and dominant intelligence field of university students studying sports and also examines intelligence modality in terms of various variables.

1. Introduction

Although the concepts of learning and thinking do not mean the same, they are known as an inseparable whole. Confucius has an opinion on this matter: "Learning without an act of thinking ends with confusion." One of the objectives of learning is to provide the act of thinking. Due to individual differences, there are differences between individuals in thinking and multiple intelligence areas (Babacan & Dilci, 2012; Chongde & Tsingan, 2003). When the focus of learning is considered as an individual, it is important to know the strengths and weaknesses of the student, their past lives, choices, experiences and goals. Instead of allowing students to form indestructible taboos, it should be ensured that their educational decisions are directed towards their needs and expectations in their daily lives (Babacan & Dilci, 2012; Gardner, 1999). In most of the intelligence theories, while people's grades and scores are used as criteria, it is seen as more important how, in which environment and when the individual learns in multiple intelligence theory (Babacan & Dilci, 2012; Gardner, 1999). In this context, it is accepted as a serious mistake that individuals are measured only according to the scores, they get from IQ tests and that they are graded according to these measurement results. On the contrary, intelligence should not be seen as a phenomenon alone, it should be considered as a whole with different abilities (Armstrong, 2003; Babacan & Dilci, 2012). Therefore, intelligence is a reflection of the structure of the brain, which consists of different parts (Babacan & Dilci, 2012; Gardner, 1999). In his book, The Frames of the Mind, published in 1983, Gardner first collected intelligence types in seven areas. These types of intelligence are verbal, logical, musical, physical, visual, interpersonal, physical and internal intelligence. In 1995, an intelligence field was added to the seven intelligence fields advanced by Gardner. These 8 types of intelligence are: 1- Verbal - Linguistic Intelligence, 2- Logic - Mathematical Intelligence, 3- Visual (Figure) – Spatial Intelligence, 4- Musical-Rhythmic and Harmonic Intelligence, 5- Bodily - Kinesthetic Intelligence, 6- Interpersonal - Social Intelligence, 7- Intrapersonal (Inner; Self-directed) Intelligence, 8- Naturalistic Intelligence (İlhan, Mirzeoğlu, Aktaş, & Demir, 2005). Although there are 8 kinds of intelligence types agreed upon, as the 9th intelligence type, Gardner emphasizes that Existentialist Intelligence is also a possible type of intelligence.

Identifying and knowing multiple intelligence areas of individuals is also an educational factor (Babacan & Dilci, 2012). Identifying multiple intelligence trends, meeting the needs of students, preparing a curriculum suitable for learning styles, and knowing and implementing teaching strategies to enrich the learning experience of individuals are useful educational tools for both students and teachers (Armstrong, 2009; Babacan & Dilci, 2012; Temız & Kıraz, 2007). It is important for the person to know his intelligence characteristics well to adapt to his environment and achieve success in this existing environment (Başaran, 2004). For this reason, various education programs should be developed in the schools where the students are trained to experience their mental abilities and students should be actively involved in the educational process through teaching methods.

When the literature is analyzed, it can be seen that multiple intelligence theory is an important educational factor. For this reason, we think that the study will make an important contribution to the literature. On the other hand, studies on individuals or athletes who have received sports education are very few compared to other fields. In addition, in the majority of studies available in the literature (Baba, Karakaş, & Gizdem, 2015; Ermiş, Ermiş, & İmamoğlu, 2018; Kul, Bozkuş, Erol, & Elçi, 2014; Metan & Küçük, 2017; Oral, 2001; Tunç, 2008; Yenilmez & Çalışkan, 2011) based on Gardner's previous studies, scales containing 7 or 8 intelligence areas were used. In this research, an up-to-date scale including 9 intelligence areas was used, and it was aimed to provide more up-to-date information to the literature in determining the multiple intelligence areas of its students.

Therefore, this factor expresses another importance of the research. Considering the current literature, in the studies of Bayrak, Celiksoy, and Celiksoy (2005); Hoşgörür and Katrancı (2007) and Kul et al. (2014) the field of intelligence that students of physical education and sports school were the most dominant is bodily / kinesthetic intelligence and verbal intelligence was the area of intelligence they were most distant from.

In the study of Ermiş et al. (2018) it was stated that the lowest intelligence field in adolescents who do sports and do not do sports is verbal intelligence. In addition, it was concluded that students doing sports during adulthood had positive effects on multiple intelligence scores. In the study carried out by Ürgüp (2015) and examining the multiple intelligence of physical education and sports school students studying in different departments, the closest intelligence field of the students was found as internal intelligence. In addition, the existential intelligence of the coaching students is more dominant than the other departments. In the study of Ermiş, İmamoğlu, and Erilli (2012) it was concluded that the sport positively affects the physical and social intelligence score and there is no difference in physical and social intelligence scores among athletes. In the study of Güllü and Tekin (2009) it was reported that there was a significant difference according to the gender and class of the students. In addition, the verbal, logical, visual and internal intelligence of general high school students is better than that of sports high school students; it has been found that only physical intelligence of sports high school students is better than general high school students. In the study of Metan and Küçük (2017) although there is no significant difference in most of the intelligence areas, significant results were found in favor of those who do not exercise regularly in some areas and in others.

In the study of Aslan, Dalkıran, and Ozer (2015) it was revealed that there are differences in the dominant intelligence areas of the athletes who practice the "periodic and aperiodic" sports branches. In the study of Kul et al. (2014) significant differences were observed in the different dimensions of the multiple intelligence areas of the candidates who participated in physical education and sports school examinations and those who could not win. In the study of Baba et al. (2015) while there was no significant differences according to gender, grade, and sport branch in the bodily/kinesthetic intelligence levels of the students in the school of physical education and sports, a significant relationship was observed between bodily/kinesthetic intelligence and academic achievement.

In this context, the aim of this study was to determine the dominant intelligence modality of university students who receive sports education and to examine intelligence modality in terms of various variables (gender, grade, department, age, sport age, and branch). In the study, it was assumed that the participants answered the scale questions sincerely, the research sample represented the population, and the scale used in the research was able to measure the multiple intelligence modalities of the students. In addition, the research was limited to the scale used and to students studying at the Faculty of Sports Sciences at Duzce University in the 2019-2020 academic years.

The hypotheses of the research are listed as follows:

1. While the most dominant intelligence field of students studying in the field of sports sciences is physical / kinesthetic intelligence, the most distant intelligence field is verbal intelligence.
2. There are significant differences in multiple intelligence areas according to the students' gender.
3. There are significant differences in multiple intelligence areas according to students' grade levels.
4. There are significant differences in multiple intelligence areas according to the students' departments.
5. There are significant differences in multiple intelligence areas according to the students' ages.
6. There are significant differences in the areas of multiple intelligence according to the duration of the students' sports.
7. There are significant differences in multiple intelligence areas according to the branches that students make.

2. Method

2.1. Research model

The survey model, which is quantitative, was chosen for the model of the study.

2.2. Study Group

The population of the research was students who were studying at the Faculty of Sports Sciences at Duzce University in the 2019-2020 academic year, and the sample was randomly chosen 251 students who voluntarily participated in the research. Scale application study was carried out by the researchers in the classroom.

2.3. Data Collection Instruments

A 6-question Personal Information Form was used by the researchers to determine the demographic characteristics of the participants. the Multiple Intelligence Scale, developed by McClellan and Conti (2008) adapted to Turkish by Babacan and Dilci (2012) was used to determine the multiple intelligence areas. The scale consists of 3 sections and 27 items in total, 9 items in each section. Participants were asked to make a correct order from the expression they see closest to them to the expression they see as the most distant. The participants place 1 point next to the expression they feel closest to, and 9 points next to the expression they think is the most distant. Which intelligence field the participants are most prone to is determined by specifying the lowest total score they give to the items representing the intelligence field. The rankings of the questions in each intelligence area are summed up and the intelligence area with the lowest score is considered to be the intelligence area where the respondents predominate. The lowest score obtained from the scale is 3, and the highest score is 27. The internal consistency coefficient (Cronbach's alpha coefficient) of the scale was found to be 0.90.

2.4. Data Analysis

The data were analyzed using the SPSS 17 program. Frequency, percentage, minimum, maximum, average and standard deviation values were used in the analysis of the data. Shapiro Wilk-W test and Skewness-Kurtosis values were evaluated for normal distribution, t-test and ANOVA test were used since the data showed normal distribution, and Tukey test was used for Post-Hoc tests. Significance level was determined as $p < 0.05$.

3. Results

In this part of the research, frequency, percentage, minimum, maximum, average and standard deviation values of the participants forming the research group were displayed. In addition, T-test, ANOVA test and Post-Hoc comparison results were presented in tables to determine whether the scores obtained from the scale differed according to gender, class, department, age, sports age and branch type.

When Table 1 is examined, it is seen that the majority of the participants are male (61.8%). Likewise, it is seen that the majority of them attend fresher (33.5%) and are students of the Department of Coaching education (45%). Most of them are between 19-22 years old (70.5%) and sports age is 6-10 years old (60.2%). In addition, the vast majority of the participants are engaged in team sports (53.8%).

Sub-problem 1: Which intelligence areas are the most distant and dominant students in sports science education?

In Table 2, descriptive statistics on the multiple intelligence areas of students studying in the field of sports science are presented. The participants gave 1 point to the expression they felt closest to, and 9 points to the expression they felt distant to. When the scores are summed, the lowest scores represent the dominant intelligence field, and the highest scores represent the distant intelligence field (Babacan & Dilci, 2012). Accordingly, the intelligence area which students are the most dominant is the physical intelligence area with an average of 8.51. The intelligence area which the students are most distant is the verbal intelligence area with an average of 17.00.

Sub-problem 2: Do students' genders and intelligence areas differ significantly?

When Table 3 is analyzed, there were significant differences between genders regarding interpersonal/social, intrapersonal, logical/mathematical, Musical-Rhythmic/Harmonic, naturalistic, verbal and visual intelligence areas ($p < 0.05$). There were no significant differences between the genders in bodily/kinesthetic and existential intelligence areas ($p > 0.05$). In addition, women were more dominant than men in all modalities.

Sub-problem 3: Do the intelligence areas of the students differ significantly according to their grades?

Table-1. Descriptive statistics of participants' demographic information.

Variable		F	%
Gender	Female	96	38.2
	Male	155	61,8
Grade	Fresher	84	33,5
	Sophomore	26	10,4
	Third year	80	31,8
	Final year	61	24,3
Department	Coaching Education	113	45,0
	Physical Education and Sports Teaching	96	38,2
	Sport Management	42	16,8
Age	18 years and under	32	12,8
	Between 19 and 22 years	177	70,5
	Between 23 and 26 years	34	13,5
	Between 27 and 29 years	1	,4
	30 years and above	7	2,8
Sport Age	5 years and under	52	20,6
	Between 6-10 years	151	60,2
	Between 11-15 years	28	11,2
	16 years and above	20	8,0
Branch	Team	135	53,8
	Individual	116	46,2
Total		251	100%

Note: p<0.05

Table-2. Descriptive statistics for the multiple intelligence areas of the participants.

Modality	n	Minimum	Maximum	Mean	S.D.
Bodily/Kinesthetic	251	3,00	24,00	8,51	5,11
Existential	251	3,00	26,00	9,27	5,01
Interpersonal/Social	251	3,00	27,00	10,32	5,34
Intrapersonal	251	3,00	27,00	8,64	5,08
Logical/Mathematical	251	3,00	27,00	8,96	5,39
Musical-Rhythmic/Harmonic	251	3,00	27,00	13,38	6,13
Naturalistic	251	3,00	25,00	10,92	6,19
Verbal/Linguistic	251	3,00	27,00	17,00	6,25
Visual/Spatial	251	3,00	27,00	13,78	5,78

Note: p<0.05

Table-3. Differences between genders in terms of multiple intelligence.

Modality	Gender	n	Mean	S.D.	t	df	p
Bodily/Kinesthetic	Female	96	8,01	5,07	-1,219	249	,224
	Male	155	8,81	5,13			
Existential	Female	96	8,60	4,40	1,760	229,047	,080
	Male	155	9,69	5,32			
Interpersonal/Social	Female	96	8,97	4,97	-3,198	249	,002*
	Male	155	11,16	5,41			
Intrapersonal	Female	96	7,56	3,98	-2,913	243,762	,004*
	Male	155	9,32	5,56			
Logical/Mathematical	Female	96	7,33	4,87	-3,863	249	,000*
	Male	155	9,96	5,46			
Musical-Rhythmic/Harmonic	Female	96	11,37	5,99	-4,224	249	,000*
	Male	155	14,63	5,90			
Naturalistic	Female	96	8,93	5,89	-4,118	249	,000*
	Male	155	12,14	6,06			
Verbal/Linguistic	Female	96	14,88	5,94	-4,371	249	,000*
	Male	155	18,31	6,10			
Visual/Spatial	Female	96	11,96	5,35	-4,113	212,702	,000*
	Male	155	14,91	5,76			

Note: p<0.05

When Table 4 is analyzed, significant differences were found between grades in terms of existential, intrapersonal, logical/mathematical, Musical-Rhythmic/Harmonic, naturalistic, verbal and visual intelligence (p <0.05). It has been determined that bodily/kinesthetic and interpersonal/social intelligence do not change according to grades (p> 0.05). Third-year students reported to be more dominant in every intelligence area. In the areas of visual and existential intelligence, both third year and final year students were more dominant than students in other grades.

Sub-problem 4: Do the intelligence areas of the students differ significantly according to the departments?

When Table 5 is examined, there are no significant differences between departments in terms of multiple intelligence modalities (p>0,05).

Sub-problem 5: Do students have age group differences in multiple intelligence areas?

When Table 6 is examined, visual/spatial intelligence shows age group differences in the favor of the students at 30 years and above. There were no significant age group differences in other intelligence areas.

Sub-problem 6: Do students have sport age group differences in multiple intelligence areas?

Table-4. Differences between grades in terms of multiple intelligence.

Modality	Grade	n	Mean	S.D.	f	p	Post Hoc
Bodily/Kinesthetic	Fresher	84	8,78	5,49	,488	,691	
	Sophomore	26	8,80	4,15			
	Third year	80	7,93	4,76			
	Final year	61	8,75	5,43			
Existential	Fresher	84	10,84	5,46	4,320	,005*	3>1
	Sophomore	26	8,61	5,54			4>1
	Third year	80	8,33	4,07			
	Final year	61	8,63	4,85			
Interpersonal/Social	Fresher	84	11,19	5,45	1,830	,142	
	Sophomore	26	11,26	5,60			
	Third year	80	9,51	5,30			
	Final year	61	9,80	5,03			
Intrapersonal	Fresher	84	10,17	5,44	5,692	,001*	3>1
	Sophomore	26	9,19	5,29			
	Third year	80	7,02	3,52			
	Final year	61	8,44	5,62			
Logical/Mathematical	Fresher	84	10,01	4,91	4,140	,007*	3>1
	Sophomore	26	8,61	5,72			3>4
	Third year	80	7,33	5,10			
	Final year	61	9,78	5,83			
Musical-Rhythmic/Harmonic	Fresher	84	14,82	5,55	7,823	,000*	3>1
	Sophomore	26	14,53	5,47			3>2
	Third year	80	10,76	5,65			3>4
	Final year	61	14,36	6,77			
Naturalistic	Fresher	84	12,78	5,90	5,871	,001*	3>1
	Sophomore	26	11,80	6,49			
	Third year	80	8,92	5,90			
	Final year	61	10,59	6,11			
Verbal/Linguistic	Fresher	84	18,15	6,48	5,935	,001*	3>1
	Sophomore	26	18,19	5,28			3>2
	Third year	80	14,63	5,87			3>4
	Final year	61	18,01	6,08			
Visual/Spatial	Fresher	84	15,71	5,98	5,266	,002*	3>1
	Sophomore	26	13,69	4,53			4>1
	Third year	80	12,41	5,63			
	Final year	61	12,98	5,57			

Note: p<0.05

Table-5. Differences between departments in terms of multiple intelligence.

Modality	Department	N	Mean	S.D.	f	p
Bodily/Kinesthetic	Coaching Education	113	9,17	5,62	2,422	,091
	Physical Education and Sports Teaching	96	8,29	4,75		
	Sport Management	42	7,21	4,19		
Existential	Coaching Education	113	9,62	5,12	,849	,429
	Physical Education and Sports Teaching	96	9,22	5,00		
	Sport Management	42	8,45	4,73		
Interpersonal/Social	Coaching Education	113	10,72	5,73	,764	,467
	Physical Education and Sports Teaching	96	10,18	5,33		
	Sport Management	42	9,57	4,20		
Intrapersonal	Coaching Education	113	8,91	5,57	,279	,757
	Physical Education and Sports Teaching	96	8,46	4,39		
	Sport Management	42	8,35	5,24		
Logical/Mathematical	Coaching Education	113	9,53	5,82	1,188	,306
	Physical Education and Sports Teaching	96	8,48	5,13		
	Sport Management	42	8,47	4,69		
Musical-Rhythmic/Harmonic	Coaching Education	113	13,90	5,74	,776	,461
	Physical Education and Sports Teaching	96	13,07	6,45		
	Sport Management	42	12,71	6,40		
Naturalistic	Coaching Education	113	10,90	5,98	2,808	,062
	Physical Education and Sports Teaching	96	10,11	5,77		
	Sport Management	42	12,80	7,30		
Verbal/Linguistic	Coaching Education	113	17,15	6,04	,258	,773
	Physical Education and Sports Teaching	96	16,65	6,47		
	Sport Management	42	17,38	6,43		
Visual/Spatial	Coaching Education	113	13,66	5,44	,556	,574
	Physical Education and Sports Teaching	96	13,56	5,90		
	Sport Management	42	14,64	6,44		

Note: p<0.05

Table-6. Differences between age groups in terms of multiple intelligence.

Modality	Age Group	n	Mean	S.D.	f	p
Bodily/Kinesthetic	18 years and under	32	7,68	4,83	1,733	,143
	Between 19 and 22 years	177	8,23	4,90		
	Between 23 and 26 years	34	10,29	5,76		
	Between 27 and 29 years	1	13,00	-		
	30 years and above	7	10,00	7,14		
Existential	18 years and under	32	11,53	5,24	1,965	,100
	Between 19 and 22 years	177	8,92	4,91		
	Between 23 and 26 years	34	9,23	4,75		
	Between 27 and 29 years	1	7,00	-		
	30 years and above	7	8,42	6,37		
Interpersonal/Social	18 years and under	32	11,25	5,59	,404	,806
	Between 19 and 22 years	177	10,20	5,15		
	Between 23 and 26 years	34	10,02	5,97		
	Between 27 and 29 years	1	14,00	-		
	30 years and above	7	10,14	6,86		
Intrapersonal	18 years and under	32	11,00	5,47	2,086	,083
	Between 19 and 22 years	177	8,25	4,73		
	Between 23 and 26 years	34	8,41	5,12		
	Between 27 and 29 years	1	7,00	-		
	30 years and above	7	9,28	9,14		
Logical/Mathematical	18 years and under	32	10,65	5,12	1,414	,230
	Between 19 and 22 years	177	8,48	5,20		
	Between 23 and 26 years	34	9,82	5,81		
	Between 27 and 29 years	1	7,00	-		
	30 years and above	7	9,42	8,24		
Musical-Rhythmic/Harmonic	18 years and under	32	15,65	5,28	1,935	,105
	Between 19 and 22 years	177	12,76	6,21		
	Between 23 and 26 years	34	14,52	6,05		
	Between 27 and 29 years	1	16,00	-		
	30 years and above	7	12,85	6,44		
Naturalistic	18 years and under	32	12,62	6,13	1,028	,394
	Between 19 and 22 years	177	10,55	6,14		
	Between 23 and 26 years	34	11,58	6,54		
	Between 27 and 29 years	1	7,00	-		
	30 years and above	7	9,71	5,93		
Verbal/Linguistic	18 years and under	32	18,37	6,45	1,304	,269
	Between 19 and 22 years	177	16,53	6,24		
	Between 23 and 26 years	34	18,55	5,43		
	Between 27 and 29 years	1	15,00	-		
	30 years and above	7	15,42	8,71		
Visual/Spatial	18 years and under	32	17,06	5,97	3,583	**,007**
	Between 19 and 22 years	177	13,29	5,64		
	Between 23 and 26 years	34	13,97	4,92		
	Between 27 and 29 years	1	11,00	-		
	30 years and above	7	10,71	8,05		

Note: p<0.05, Groups with only one case are ignored in computing the test of homogeneity of variance for.

Table-7. Differences between sport age groups in terms of multiple intelligence.

Modality	Sport Year	n	Mean	S.D.	f	p	Post Hoc
Bodily/Kinesthetic	5 years and under	52	8,30	5,23	1,614	,187	
	Between 6-10 years	151	8,52	5,21			
	Between 11-15 years	28	10,03	5,22			
	16 years and above	20	6,80	3,22			
Existential	5 years and under	52	10,26	5,31	3,375	,019*	16>5
	Between 6-10 years	151	9,33	5,03			16>6-10
	Between 11-15 years	28	9,39	4,71			
	16 years and above	20	6,15	3,21			
Interpersonal/Social	5 years and under	52	10,84	4,93	6,054	,001*	16>5
	Between 6-10 years	151	10,64	5,35			16>6-10
	Between 11-15 years	28	11,03	5,52			16>11-15
	16 years and above	20	5,60	3,92			
Intrapersonal	5 years and under	52	9,00	6,06	4,238	,006*	16>5
	Between 6-10 years	151	8,82	4,85			16>6-10
	Between 11-15 years	28	9,71	4,57			16>11-15
	16 years and above	20	4,95	2,96			
Logical/Mathematical	5 years and under	52	9,50	6,25	4,395	,005*	16>5
	Between 6-10 years	151	9,16	5,08			16>6-10
	Between 11-15 years	28	9,75	5,16			16>11-15
	16 years and above	20	4,90	4,02			
Musical-Rhythmic/Harmonic	5 years and under	52	12,94	6,38	3,252	,022*	16>6-10
	Between 6-10 years	151	13,74	5,93			16>11-15
	Between 11-15 years	28	14,89	6,10			
	16 years and above	20	9,75	5,94			
Naturalistic	5 years and under	52	11,53	6,40	3,331	,020*	16>5
	Between 6-10 years	151	10,87	6,40			16>11-15
	Between 11-15 years	28	12,64	5,16			
	16 years and above	20	7,25	3,62			
Verbal/Linguistic	5 years and under	52	15,51	7,57	4,877	,003*	11-15>5
	Between 6-10 years	151	17,07	5,96			11-15>6-10
	Between 11-15 years	28	20,64	4,58			16>11-15
	16 years and above	20	15,25	4,73			
Visual/Spatial	5 years and under	52	12,90	6,39	2,250	,083	
	Between 6-10 years	151	14,06	5,67			
	Between 11-15 years	28	15,46	5,19			
	16 years and above	20	11,65	5,13			

Note: p<0.05

In Table 7, significant differences were found between sport age groups in terms of existential, interpersonal/social, intrapersonal, logical/mathematical, Musical-Rhythmic/Harmonic, naturalistic, and verbal intelligence (p<0,05). No significant differences were found in terms of bodily/kinesthetic intelligence and visual/spatial intelligence (p>0,05). The students doing sport for 16 years and more reported to have higher scores in each modality. In verbal intelligence area, the students doing sport between 11-15 years and for 16 years and above had higher scores than those doing sport lesser time.

Sub-problem 7: Do students have sport branch differences in multiple intelligence areas?

Table-8. Differences between students according to their branches in terms of multiple intelligence.

Modality	Branch	n	Mean	S.D.	t	df	p
Bodily/Kinesthetic	Team	135	8,78	5,09	,919	249	,359
	Individual	116	8,18	5,14			
Existential	Team	135	9,65	5,08			
	Individual	116	8,84	4,91	1,273	249	,204
Interpersonal/Social	Team	135	10,25	4,91			
	Individual	116	10,41	5,83	-,236	225,793	,814
Intrapersonal	Team	135	7,56	5,24			
	Individual	116	9,32	4,91	,058	249	,954
Logical/Mathematical	Team	135	7,33	5,32			
	Individual	116	9,96	5,48	-,554	249	,580
Musical-Rhythmic/Harmonic	Team	135	11,37	6,26			
	Individual	116	14,63	5,99	,532	249	,595
Naturalistic	Team	135	11,25	6,39			
	Individual	116	10,53	5,95	,915	249	,361
Verbal/Linguistic	Team	135	17,31	6,53			
	Individual	116	16,63	5,92	,858	249	,391
Visual/Spatial	Team	135	13,97	6,16			
	Individual	116	13,57	5,32	,536	249	,593

Note: p<0.05

Table 8 presents the differences between sport branches in terms of multiple intelligence. No significant differences were found between sport branches.

4. Discussion and Conclusion

The aim of this study was to determine the dominant intelligence modality of university students who receive sports education and to examine intelligence modality in terms of various variables (gender, grade, department, age, sport age, and branch). In this section, the results obtained from the research findings and the relationship of these results with the relevant literature were discussed and suggestions were made for other studies to be conducted.

The first hypothesis was "While the most dominant intelligence field of students studying in the field of sports sciences is physical / kinesthetic intelligence, the most distant intelligence field is verbal intelligence." The intelligence area which students are the most dominant is the physical intelligence area with an average of 8.51. The intelligence area which the students are most distant is the verbal intelligence area with an average of 17.00. This hypothesis was accepted. In the studies of Bayrak et al. (2005); Hoşgörür and Katrancı (2007) and Kul et al. (2014) the field of intelligence in which physical education and sports school students are dominant was physical / kinesthetic intelligence and verbal intelligence was the area of intelligence they are most distant from. Some studies supported our results (Baba. & Güçlü, 2015; Kiremitçi & Canpolat, 2014; Kul et al., 2014; Oral, 2001).

In the study of Ermiş et al. (2018) it was stated that the lowest intelligence field is verbal intelligence in adolescents who do sports and do not do sports. According to a different study on the intelligence type of Turkish language teaching students (Eyyam, Meneviş, & Doğruer, 2010) there was a significant difference between students' verbal multiple intelligence and their academic achievements. In addition, individuals who successfully achieve their physical goals and control their movements are in this intelligence sphere. Skills such as strength, balance, speed, flexibility, coordination and dexterity are seen in this intelligence field. Actors, artisans, dancers, athletes and sculptors can be given as master examples of physical intelligence. The person's ability to use his body while expressing his ideas or feelings expresses this field of intelligence (Armstrong, 2003, 2009; Babacan & Dilci, 2012; Gardner, 1999; Moran, Kornhaber, & Gardner, 2006; Nolen, 2003). Likewise, because of the more intensive lessons to develop bodily / kinesthetic intelligence in institutions providing education about physical education, students studying in these schools are expected to have higher bodily / kinesthetic intelligence (Baba. & Güçlü, 2015).

The second hypothesis was "There are significant differences in multiple intelligence areas according to the students' gender." There were significant differences between genders regarding interpersonal/social, intrapersonal, logical/mathematical, Musical-Rhythmic/Harmonic, naturalistic, verbal and visual intelligence areas (p <0.05). This hypothesis was accepted. Females were more dominant than males in terms of each modality. Some studies in literature supported our findings reporting significant differences (Azar, 2006; Baba et al., 2015; Cinkılıç & Soyer, 2013; Furnham & Chamorro-Premuzic, 2005) and insignificance between genders in terms of some multiple intelligence modalities (Kahraman & Bavlı, 2014; Kahraman. & Bulut, 2014; Loori, 2005; Metan & Küçük, 2017; Nevılle, 2000; Yenice & Aktamış, 2010). In addition, in the study of Altınok (2008) and Ermiş et al. (2018) the bodily / kinesthetic intelligence of women was higher than that of men, in line with the findings of our research. Senel and Yıldız (2016) reported no significant gender differences in terms of bodily/kinesthetic intelligence. Similar to our findings, in the study conducted by Tunç (2008) there were significant differences between the genders in terms of verbal, visual, musical, interpersonal and intrapersonal intelligence modalities. In Yenilmez and Çalışkan (2011) study, there were significant differences in the areas of verbal, visual and musical intelligence

according to the gender variable. In the studies of Tekin (2007); Tekin (2008) and Yıldız (2010) the average of bodily / kinesthetic intelligence of men was higher than that of women. In addition, in the study of Tekin (2008) bodily / kinesthetic intelligence differs significantly according to the gender variable. Unlike these studies, no significant difference was found in the areas of gender and multiple intelligence in the study of Izci, Kara, and Dalaman (2007). The higher interpersonal intelligence of women is due to two reasons, according to Ciarrochi, Chan, and Caputi (2000). First, women are more social and can read other people's feelings better. Second, they are biologically better equipped for such a situation. In addition to this situation, Mayer, Caruso, and Salovey (1999) stated that women should read emotions better because they have less power in society. According to the opinions of Mayer et al. (1999) the fact that women are more dominant in terms of intrapersonal and logical intelligence can be based on this reason. In addition, women become socialized by taking an emotional attitude towards some of their difficulties (Zakowski et al., 2003). Women can share the difficult situations they face in life more easily than men. In addition, this may be associated with gender roles (Kimura, 2002). Therefore, it can be considered normal for women to have multiple intelligence levels more dominant than men.

The third hypothesis was "There are significant differences in multiple intelligence areas according to students' grade levels." Significant differences were found between grades in terms of existential, intrapersonal, logical/mathematical, Musical-Rhythmic/Harmonic, naturalistic, verbal and visual intelligence ($p < 0.05$). It has been determined that bodily/kinesthetic and interpersonal/social intelligence do not change according to grades ($p > 0.05$). Third-year students reported to be more dominant in every intelligence area. In the areas of visual and existential intelligence, both third year and final year students were more dominant than students in other grades. This hypothesis was accepted. Some studies supported our findings reporting no significant grade differences in terms of bodily/kinesthetic intelligence (Altınok, 2008; Baba et al., 2015; Nulhakım, Wıbawa, & Erwın, 2019; Tekin, 2007; Yenice & Aktamış, 2010). In the study of Baba et al. (2015) the average of bodily / kinesthetic intelligence score of 3rd grade students was found higher than other grades. In the study of Güllü and Tekin (2009) significant differences were found in the areas of verbal, logical, interpersonal and intrapersonal intelligence according to grade. The reason for these differences can be shown as the differentiation of interests, wishes and expectations of students, which can change according to their grade levels (Güllü & Tekin, 2009).

The fourth hypothesis was "There are significant differences in multiple intelligence areas according to the students' departments." there were no significant differences between departments in terms of multiple intelligence modalities ($p>0,05$). This hypothesis was rejected. According to the study of Güllü and Tekin (2009) the intelligence areas of sports high school students and general high school students differed from each other. In the studies of Oztürkmen (2006) and Camurcu (2007) and Erman (2003) the intelligence areas in which students studying in different departments had different dominant intelligence modalities. Ermiş et al. (2012) compared the students of the Police Vocational School and the School of Physical Education and Sports in terms of intelligence and did not find a significant difference. The reason for insignificance between the departments in intelligence areas is that they take sports lessons at the same time, there is a special talent exam at the entrance to both departments and they like sports lessons (Ermiş et al., 2012). Also, Armstrong mentioned two factors that had a significant impact on intelligence development. These are accelerator and blinding factors. Accelerator factors have positive effects for intelligence development and blinding factors have negative effects (Kuru, 2001). In this context, it is a natural result that different intelligence fields develop as a result of different courses taken by students in different schools and departments.

The fifth hypothesis was "There are significant differences in multiple intelligence areas according to the students' ages." visual/spatial intelligence shows age group differences in the favor of the students at 30 years and above. There were no significant age group differences in other intelligence areas. This hypothesis was partially accepted. There are some studies in the literature that are similar to the findings of our research (Inan, Aydin, & Bilgin, 2000; Metan & Küçük, 2017). According to these studies, a decrease in reasoning skills was found with the increase in the age level. The reason for this decline has been shown that students are in a compulsory period for studying (Metan & Küçük, 2017). In our study, it was seen that students in the exam preparation periods received lower averages. Elderly participants were found to have higher averages from their intelligence fields. There are different opinions supporting these findings. According to these views, as the age of the individual progresses, they gain different experiences and therefore their ability to use information increases with age (Alpar, 2000; Uysal, 2006). It is known that intelligence is influenced not only by heredity but also by the environmental factor with which the family and the individual interact. According to the multiple intelligence theory, the development of intelligence areas depends on providing opportunities and environment suitable for the individual rather than the existing natural capacity (Uysal, 2006).

The sixth hypothesis was "There are significant differences in the areas of multiple intelligence according to the duration of the students' sports." Significant differences were found between sport age groups in terms of existential, interpersonal/social, intrapersonal, logical/mathematical, Musical-Rhythmic/Harmonic, naturalistic, and verbal intelligence ($p<0,05$). No significant differences were found in terms of bodily/kinesthetic intelligence and visual/spatial intelligence ($p>0,05$). The students doing sport for 16 years and more reported to have higher scores in each modality. In verbal intelligence area, the students doing sport between 11-15 years and for 16 years and above had higher scores than those doing sport lesser time. This hypothesis partially accepted. When the literature is examined, there are different research findings that are similar to the findings of our study (Cengiz & Pulur, 2008; Demirsöz & Kocabaş, 2006; Ermiş et al., 2012; Guastello & Guastello, 2003; İlhan et al., 2005; Katz, Mirenda, & Auerbach, 2002; Teele, 1997; Tekin, 2008; Tekin, Filiz, Tasgin, & Özmutlu, 2008). In these studies, it was found that students who do sports are more dominant than students who do not do sports in some intelligence fields. In a study on the socialization levels of university students studying in different departments (Erdemir, Sert, & Okmen, 2006) the levels of socialization of students of Physical Education and Sports were higher than those of the Music and Painting departments. According to the study of Canlı, Toksöz, and Ozmutlu (2017) there is a significant and positive relationship between basketball-specific skill level and musical intelligence. It has been reported that sports have many positive effects on human development. Movement behavior and hence sport is an essential condition in individuals' development processes. Physical activity and sports in which the individual

participates is very important in the cognitive, spiritual and emotional development of the individual (Gohla, 2010; Orhan, 2019). In addition, cognitive development starts at a very early age and is supported by physical activities, among other things. The development of thought structure and perception is closely related to motor abilities that require motion and sensory experience (Orhan, 2019; Zimmer, 2014).

The seventh hypothesis was "There are significant differences in multiple intelligence areas according to the branches that students make." No significant differences were found between sport branches in terms of multiple intelligence modalities. This hypothesis was rejected. There are different studies in the literature that support our research (Baba et al., 2015). According to these studies, no significant difference was found between the branch type and multiple intelligence areas in parallel with our research. Senel and Yıldız (2016) reported no significant differences between team and individual athletes in terms of bodily/kinesthetic intelligence. In the works of Altınok (2008) and Tekin (2007) bodily/kinesthetic intelligence of athletes engaged in individual sports was found higher than athletes doing team sports. In the study of Aslan et al. (2015) similar to our finding, the intrapersonal intelligence areas of athletes interested in team sports were more dominant. In Altınok (2008) study, a significant difference was found between the branch types in bodily/kinesthetic intelligence field.

Physical activity and sports that the individual participates contributes to cognitive, spiritual and emotional development (Gohla, 2010; Orhan, 2019). Since physical activity and sports make positive contributions to individuals 'multiple intelligence domains, participants' intelligence domains are close to each other. The fact that the branch type does not differ significantly in terms of multiple intelligence may be due to this reason.

Based on the findings of the research, the following suggestions can be made for future studies:

1) It will be appropriate to use a scale including 9 intelligence fields in future studies.

2) By doing longitudinal studies, developments in intelligence areas of the same individuals through sports can be brought to the literature in the light of current information.

3) Based on the results of the studies, applications can be developed to improve the intelligence areas where students are distant through sports and education, and the intelligence areas they are distant from.

4) Since it is known that multiple intelligence areas of individuals are affected by both personal and environmental factors, attention should be paid to creating the most appropriate educational environments.

5) The positive effects of sports on the development of multiple intelligence have been repeated with this study and therefore it is important that individuals are directed to sports for their intelligence development.

6) It has been determined in the literature that the verbal intelligence areas of the students receiving physical education and sports are low. Accordingly, it would be beneficial to make additional applications to improve the verbal intelligence field.

7) Wider sampling groups and different independent variables can also be proposed as an additional suggestion for future studies.

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