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Investigation of the Effect of Cognitive Behavioral and Physical Development Levels on the Multiple Intelligence of University Students

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Abstract

In this study, it was designed to examine the multiple intelligence levels, cognitive, physical and affective levels of the faculty students studying at Hatay Mustafa Kemal University. The population of the study was composed of students studying at Hatay Mustafa Kemal University in 2018 - 2019 academic year. The sample included 1142 students (Male = 603, Female = 539) chosen by random sampling method. In the study, "Cognitive, Behavioral and Physical" scale developed by Schembre *et al.* (2015) adapted to Turkish by Eskiler *et al.* (2016) and "Multiple Intelligence" scale developed by Gardner (1990) adapted to Turkish by Demirtas and Duran (2007) were used as a data collection tool. In order to test the hypotheses of the study, t-test (Mann-Whitney U test) and analysis of variance in multiple comparisons (Kruskal Wallis-H test) were performed in addition to descriptive statistics such as arithmetic mean, standard deviation, frequency/percentage, normal distribution test, (Kolmogorov-Smirnov test). As a result of the study, it was found that there was a significant difference between the participants' cognitive behavioral physical activity and multiple intelligence levels in relation to gender, income status and sporting variables.

Keywords: Multiple intelligence level, Cognitive physical and behavioral level, Physical education and sport, University students.

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Contribution of this paper to the literature

This study aims to assess the concurrent validity of a new, self-report measure of Gardner's multiple intelligences by relating scores on this test to measures of personality, approaches to learning as well as crystallized intelligence and self-estimated scores of those 'intelligences'.

1. Introduction

According to Matlin (2008) the mind-related areas cover philosophy, linguistics, anthropology, artificial intelligence and neuroscience. Accordingly, cognition, that is believed to be the product of an individual's acquisitions with innate endowments, seems to be understood as a fact by sensation, perception, intelligence, memory, emotions, and spirit, biological and cultural contexts. In this regard, Lektorsky (1998) who criticized Piaget's known cognition theory as "generalization of empirical, psychological and history of science data", asks if "could be cognitive theory?" to point out the difficulty in definition of cognition.

Intelligence is a period that continues a person's life and offers people choices in their lives. Within this period; Gardner stated that individuals do not have the same way of thinking, but as a result of taking individual differences seriously with education, differences can be created in all individuals. If individuals can identify different components of intelligence, they may be considered to be more successful in solving problems they will face (Gardner and Hatch, 1990). Gardner carried away his research to a very serious level by observing people with mental differences such as talented, genius, mentally handicapped, brain damaged etc. within the Zero Project at Harvard University. In the extent of the research, he pointed out the wrongness of the traditional approach to intelligence and the need for a renewal in this regard (Armstrong, 2003). Today, many researchers, quite independent of each other, believe that there is a large number of intelligence and their own strengths and limitations; that the mind is not boundless from birth; that the inner strengths of intelligence has natural lines (Smith, 2002).

After 1990s, it was seen that there were serious researches (Hoerr, 1996; Campbell and Campbell, 1999; Armstrong, 2000; Silver *et al.*, 2000; Demirel, 2006; Almeida *et al.*, 2010; Ahmad *et al.*, 2015) done on multiple intelligence theory. It is realized that serious problems have been experienced in revealing the level of intelligence differences of the students as a result of the technological developments which have increased the importance of the studies carried out especially for the young generation of today. While using intelligence levels, students show the level of intelligence in which they are most powerful, while keeping pace with group dynamics.

It has been observed that the practices based on this theory have a positive effect on student achievement and that the active participation and motivation of the students increased in the courses designed according to multiple intelligence theory (Campbell *et al.*, 1992). In the light of the developments in the education system, it is seen that new curricula are prepared based on multiple intelligence theory. Learning-teaching process is formed on the basis of multiple intelligence theory and lesson plans are prepared accordingly (Erdem and Demirel, 2005). In this context, teachers have to organize different teaching activities in the teaching process in order to reach the determined goals.

Teachers also need to have some skills in organizing teaching activities (Green, 2005). Gardner (1997) emphasizes that if the activities that are not compatible with the students' mental fields, the traditional development belong to only language and mathematics will continue or only those who are interested in these fields will benefit from this. However, he argues that the aim of the school is to reach out to more students and that the learning styles of the students need to be known. Within this framework, besides examining the multiple intelligence levels of students completing university education, it is thought that the study of mental, affective and physical development levels of students will increase the importance of the research. It is possible to talk about various studies on psychological, environmental, behavioral and social factors which are affecting the status of participation in physical activities and based on different theoretical foundations about participation of individuals in physical activities (Plotnikoff *et al.*, 2013; Schembre *et al.*, 2015). Schembre *et al.* (2015) stating the measurement tools used in these studies, which are shaped by different theoretical approaches, contain various differences and similarities, argue that a new measurement tool is needed in which the strengths of each theory are evaluated.

Individuals succeed as long as they struggle not only physically but also mentally and emotionally perform positively in their field.

2. Materials and Methods

In the research, a method for descriptive survey and relational survey was used to reveal the current situation. Descriptive survey models are research approaches aiming at defining a past or present situation as it exists. As for relational screening models, these research models aim to determine the presence and / or degree of covariance between two and more variables (Karasar, 2014).

2.1. Population and Sample of Research

The population of the study consists of undergraduate students of Faculty of Education, Faculty of Sport Sciences, Faculty of Arts and Sciences, Faculty of Economics and Administrative Sciences, Faculty of Medicine and Veterinary Faculty of Hatay Mustafa Kemal University in 2018-2019 academic year. The sample of the study involved 1142 students, 539 female and 603 male, using convenient sampling method from different departments of Hatay Mustafa Kemal University.

2.2. Scales Used in Research

2.2.1. Cognitive Behavioral Physical Activity Scale

The scale, which was developed by Schembre *et al.* (2015) and adapted to Turkish by Eskiler *et al.* (2016) consist of 3 sub-dimensions: Outcome Expectation, Self-Regulation, Personal Barriers and a total of 15 items. All expressions in the scale are scored with a 5-point Likert-type rating such as = 1 = Strongly disagree, 5 = Strongly agree". Rate of the total variance explained by the scale is 54.12%. The internal consistency coefficient of the scale

was α = .84, and the scores for the sub-dimensions were Expected Result = .85, Self-Regulation = .79 and Personal Barriers = .64.

2.2.2. Self-Assessment Scale in Multiple Intelligences

This data collection tool was developed by Demirtas and Duran (2007) to measure eight different intelligences using Gardner (1990). The reliability test and factor analysis of this scale were conducted by Demirtas and Duran (2007). For this purpose, the scale was applied to 76 students. The data obtained were analyzed in SPSS package program. As a result of this analysis, Cronbach alpha internal consistency coefficient of the measurement tool was calculated as 0.884. At the same time, factor analysis was applied to the questionnaire, and items with scores less than 0.40 were excluded from the survey. In the Self-Assessment Scale of Multiple Intelligences applied to reveal the dominant intelligence of the students, 5 questions were applied to each of the 8 different intelligence areas and a total of 40 questions were applied to the students. In order to determine the degree of participation of students in each item. They have selected one of 5 options as follow: 5 "Completely A", 4 "Agree", 3 "Partially Agree", 2 "I disagree" and 1 "I strongly disagree".

2.3. Data Analysis

In order to test the hypotheses of the study, t-test (Mann-Whitney U test) and analysis of variance in multiple comparisons (Kruskal Wallis-H test) were performed in addition to descriptive statistics such as arithmetic mean, standard deviation, frequency/percentage, normal distribution test, (Kolmogorov-Smirnov test). After the analysis of variance, the Bonferroni correction method was used to prevent type I and type II errors that might arise from binary comparisons to determine which groups had significant differences (significance level for income level variable (0.05) was divided into the amount of Mann-Whitney U test and significance level was determined as 0.017).

3. Results and Interpretation

The results of the analysis belong to the data obtained within the scope of the research are reported in this section. The results of the analysis of the demographic variables are presented in Table 1.

Table-1. Statistical distribution of participants according to demographic characteristics.

Variables	N	%	Variables	N	%
Gender			Income level		
1. Men	603	52.8	1. Low	129	42.5
2. Women	539	47.2	2. Middle	936	30.0
Total	1142	100.0	3. High	77	27.5
Sports status			Total	1142	100.0
1. Participating	669	58.6			
2. Not participating	473	41.4			
Total	1142	100.0			

When examined Table 1, it was seen that 52.8% of the participants were male and 47.2% were female according to the gender variable of the participants. According to the results of the participants' sporting status variable, it was found that 58.6% did sports and 41.4% did not do sports. According to the income level variable, the income level of the participants is in the low-income group with 42.5%, in the middle-income group with 30.0%, and in the high income group with 27.5%.

Table-2. Comparison of participants' cognitive behavioral physical activity and multiple intelligence levels according to gender variable.

Dependent variables	Gender	N	Mean rank	Rank total	U	p
Result expectation	1. Men	603	583.19	351665.50	155457.500	.204
	2. Women	539	558.42	300987.50		
Self-regulation	1. Men	603	614.78	370709.50	136413.500	.003
	2. Women	539	523.09	281943.50		
Personal barriers	1. Men	603	560.03	337699.50	155593.500	.212
	2. Women	539	584.33	314953.50		
Naturalist intelligence	1. Men	603	596.13	359466.00	147657.500	.007
	2. Women	539	543.95	293187.00		
Personal inner intelligence	1. Men	603	558.51	336781.00	154675.000	.157
	2. Women	539	586.03	315872.00		
Visual spatial intelligence	1. Men	603	527.51	318090.00	135984.000	.002
	2. Women	539	620.71	334563.00		
Interpersonal social intelligence	1. Men	603	574.10	346180.50	160942.500	.777
	2. Women	539	568.59	306472.50		
Logical mathematical intelligence	1. Men	603	612.36	369253.00	137870.000	.009
	2. Women	539	525.79	283400.00		
Physical kinesthetic intelligence	1. Men	603	599.68	361609.00	145514.000	.002
	2. Women	539	539.97	291044.00		
Verbal linguistic intelligence	1. Erkek	603	538.82	324906.00	142800.000	.003
	2. Women	539	608.06	327747.00		
Musical rhythmic intelligence	1. Men	603	561.62	338656.50	156550.500	.283
	2. Women	539	582.55	313996.50		

*P<0,05; N (1142).

The results of the t-test to find out the significant difference between gender and dependent variables are presented in Table 2. As a result of the Mann-Whitney U test conducted to test whether there is a significant difference between participants' cognitive behavioral physical activity and multiple intelligence categories according to gender, while among self-regulation (U = 136413.500, p <0.05), naturalistic intelligence (U = 147657.500, p <0.05) visual spatial intelligence (U = 135984.000, p <0.05), logical mathematical intelligence (U = 137870.000, p <0.05)), physical kinesthetic intelligence (U = 145514.000, p <0.05) and verbal linguistic intelligence (U = 142800.000, p <0.05) levels were found to have significant differences, the results expectation (U = 155457.500, p> 0.05), personal barriers (U = 155593.500, p> 0.05), personal inner intelligence (U = 154675.000, p> 0.05), interpersonal social intelligence (U = 160942.500, p> 0.05) and musical rhythmic intelligence (U = 156550.500, p> 0.05) levels were statistically not significant.

Table-3. Comparison of participants' cognitive behavioral physical activity and multiple intelligence levels according to the sporting status variable.

Dependent variables	Sports status	N	Mean rank	Rank total	U	p
Result expectation	1. Participating	669	639.41	427768.00	112784.000	.001
	2. Not participating	473	475.44	224885.00		
Self-regulation	1. Participating	669	676.50	452581.50	87970.500	.001
	2. Not participating	473	422.98	200071.50		
Personal barriers	1. Participating	669	518.28	346726.50	122611.000	.007
	2. Not participating	473	648.78	305927.50		
Naturalist intelligence	1. Participating	669	594.12	397467.50	143084.500	.006
	2. Not participating	473	539.50	255185.50		
Personal inner intelligence	1. Participating	669	564.22	377461.00	153346.000	.373
	2. Not participating	473	581.80	275192.00		
Visual spatial intelligence	1. Participating	669	564.31	377523.50	153408.500	.379
	2. Not participating	473	581.67	275129.50		
Interpersonal social intelligence	1. Participating	669	580.15	388123.50	152428.500	.289
	2. Not participating	473	559.26	264529.50		
Logical mathematical intelligence	1. Participating	669	583.72	390510.50	150041.500	.135
	2. Not participating	473	554.21	262142.50		
Physical kinesthetic intelligence	1. Participating	669	647.07	432893.00	107659.000	.002
	2. Not participating	473	464.61	219760.00		
Verbal linguistic intelligence	1. Participating	669	583.63	390450.50	150101.500	.138
	2. Not participating	473	554.34	262202.50		
Musical rhythmic intelligence	1. Participating	669	600.36	401641.00	138911.000	.004
	2. Not participating	473	530.68	251012.00		

*P<0,05; N (1142).

The t-test results for determining the significant difference between the sporting state variable and dependent variables are presented in Table 3.

According to the Mann-Whitney U test conducted to test whether there is a significant difference between participants' cognitive behavioral physical activity and multiple intelligence categories according to the status of doing sports, between the participants who do sports and those who do not do sports, results expectation (U = 112784.000, p <0.05), self-regulation (u = 87970.500, p <0.05), personal barriers (U = 122611.000, p <0.05), naturalistic intelligence (U = 143084.500, p <0.05), physical kinesthetic intelligence (U = 107659.000, p <0.05) and musical rhythmic intelligence (U = 138911.000, p <0.05) levels were found to have statistically significant difference, however, personal inner intelligence (U = 153346.000, p> 0.05), visual spatial intelligence (U = 153408.500, p> 0.05), interpersonal social intelligence (U = 152428.500, p> 0.05), logical mathematical intelligence (U = 150041.500, p> 0.05) and verbal linguistic intelligence (150101.500, p> 0.05) levels did not show any statistically significant difference.

The results of the analysis of variance to determine the significant difference between the income level variable and dependent variables are presented in Table 4. As a result of Kruskal Wallis H test, which was conducted to test whether there was a significant difference between participants' cognitive behavioral physical activity and multiple intelligence categories according to income level variable, while result expectation $\chi 2$ (sd = 2, n = 1142) = 0.95, p> 0.05), personal barriers $\chi 2$ (sd = 2, n = 1142) = 2.325, p> 0.05), interpersonal social intelligence $\chi 2$ (sd = 2, n = 1142) = 0.912, p> 0.05) and musical rhythmic intelligence $\chi 2$ (sd = 2, n = 1142) = 0.532, p> 0.05) variables did not show any statistically significant difference, self-regulation $\chi 2$ (sd = 2, n = 1142) = 26.669, p <0.05), naturalist intelligence $\chi 2$ (sd = 2, n = 1142) = 11.920, p <0.05), personal inner intelligence $\chi 2$ (sd) = 2, n = 1142) = 33.647, p <0.05), visual spatial intelligence $\chi 2$ (sd = 2, n = 1142) = 21.371, p <0.05), logical mathematical intelligence $\chi 2$ (sd = 2, n = 1142) = 21.598, p <0.05), physical kinesthetic intelligence $\chi 2$ (sd = 2, n = 1142) = 17.703, p <0.05) and verbal linguistic intelligence $\chi 2$ (sd = 2, n = 1142) = 9.197, p <0.05) variables showed statistically significant difference.

Mann Whitney U tests were applied to determine which income level cause the significant difference between the dependent variables. As a result of the tests, it was found that the statistically significant difference in the self-regulation variable was between high income participants and low (U = 3753.000, p <0.017) and medium (U = 23795.500, p <0.017) income level participants. Similarly, there were significant differences between; high income level participants and low income level (U = 2567.500, p <0.017) and middle income (U = 29577.000, p <0.017) level participants in the naturalistic intelligence variable; high spatial intelligence variable and low (U = 3104.000, p <0.017) and medium (U = 25133.500, p <0.017) income participants in the visual spatial intelligence variable; high-income level participants and low (U = 3022.000, p <0.017) and medium (U = 26139.000, p <0.017) income participants in the logical mathematical intelligence variable; high income level participants and low (U = 3446.500, p <0.017) and moderate (U = 25847.500, p <0.017) income participants in the physical kinesthetic

intelligence variable; high income level participants and those with low (U = 3830.500, p <0.017) and moderate (U = 28744.500, p <0.017) income participants in the verbal linguistic variable.

Table-4. Variance analysis results of participants' cognitive behavioral physical activity and multiple intelligence levels according to income level variable.

Dependent variables	Income	N	Mean rank	sd	χ2	p	(I-J)
Result expectation	1. Low	129	563.70	2	0.95	.953	
	2. Middle	936	572.15				
	3. High	77	576.68				
Self-regulation	1. Low	129	608.78	2	26.669	.002	1-3, 2-3
	2. Middle	936	551.99				
	3. High	77	746.53				
Personal barriers	1. Low	129	610.93	2	2.325	.313	
	2. Middle	936	565.05				
	3. High	77	583.90				
Naturalist intelligence	1. Low	129	510.27	2	11.920	.003	1-3, 2-3
	2. Middle	936	571.54				
	3. High	77	673.55				
Personal inner intelligence	1. Low	129	437.74	2	33.647	.004	1-2, 1-3, 2-3
	2. Middle	936	579.40				
	3. High	77	699.55				
Visual spatial intelligence	1. Low	129	536.67	2	21.371	.001	1-3, 2-3
	2. Middle	936	562.66				
	3. High	77	737.28				
Interpersonal social intelligence	1. Low	129	562.06	2	0.912	.634	
	2. Middle	936	570.07				
	3. High	77	604.79				
Logical mathematical intelligence	1. Low	129	509.27	2	21.598	.002	1-3, 2-3
	2. Middle	936	567.43				
	3. High	77	725.29				
Physical kinesthetic intelligence	1. Low	129	556.96	2	17.703	.001	1-3, 2-3
	2. Middle	936	561.00				
	3. High	77	723.56				
Verbal linguistic intelligence	1. Low	129	557.85	2	9.197	.010	1-3, 2-3
	2. Middle	936	569.36				
	3. High	77	597.81				
Musical rhythmic intelligence	1. Low	129	571.36	2	0.532	.766	
	2. Middle	936	569.36				
	3. High	77	597.81				

*P<0,05; ** P<0,017, N (1142).

A statistically significant difference was found between the participants with high income level and the participants with low (U = 2723.000, p <0.017) and moderate (U = 28419.500, p <0.017) income level in the personal inner intelligence variable as well as between the participants with low income and those with moderate (U = 45360.500, p <0.017) income level.

Table-5. Correlation test results between participants' cognitive behavioral physical activity and multiple intelligence levels.

Dependent variables	RE	SR	PB	NI	PII	VSI	ISI	LMI	PKI	VLI
SR	.388**									
PB	-.089**	-.172**								
NI	.183**	.149**	-.004							
PII	.135**	.098**	.058	.312**						
VSI	.151**	.022	.068*	.291**	.223**					
ISI	.151**	.027	.016	.137**	.093**	.233**				
LMI	.153**	.029	.034	.284**	.244**	.148**	.221**			
PKI	.242**	.255**	-.115**	.293**	.176**	.274**	.291**	.271**		
VLI	.074*	.205**	.018	.083**	.178**	.185**	.049	.006	.071*	
MRZ	.202**	.092**	.072*	.218**	.181**	.320**	.267**	.129**	.269**	.205**

*P<0,05; **P<0,01; N (1142).

Table 5 shows the correlation test results for the determination of the relationship between the cognitive behavioral physical activity and multiple intelligence levels of the participants.

As a result of the spearman correlation test which was used to test whether there was a significant relationship between the dependent variables, there were moderately positive correlation between the participants' result expectation variable and self-regulation variable (r = .388; p <0.01) and a significant positive correlation between the result expectation variable and natural intelligence (r = .183; p <0.01), personal inner intelligence (r = .135; p <0.01), visual spatial intelligence (r = .151; p <0.01), interpersonal social intelligence (r = .151; p <0.01), logical mathematical intelligence (r = .153; p <0.01), physical kinesthetic intelligence (r = .242; p <0.01), verbal linguistic intelligence (r = .074; p <0.05) and musical rhythmic intelligence (r = .202 ; p <0.01), a negative correlation between the expectation variable and personal barriers (r = -.089; p <0.01).

There was low level negative correlation between self-regulation variable and personal barriers (r = -.172; p <0.01) variables and a low level positive correlation between the self-regulation variable with natural intelligence (r = .149; p <0.01), personal inner intelligence (r = .098; p <0.01), physical kinesthetic intelligence (r = .255; p

<0.01), verbal linguistic intelligence (r = .205; p <0.01) and musical rhythmic intelligence (r = .092; p <0.01) variables of participants.

Moreover, a low level positive correlation were found between the variables of personal barriers and visual spatial intelligence (r = .068; p <0.05) and musical rhythmic intelligence (r = .072; p <0.01) of the participants, a low level significant negative correlation between personal barriers variable and physical kinesthetic intelligence (r = -.115; p <0.01) variable, moderately positive correlation between naturalistic intelligence variable and personal inner intelligence (r = .312; p <0.01), a low-level positive significant correlation between naturalistic intelligence variable and visual spatial intelligence (r = .291; p <0.01), interpersonal social intelligence (r =. 137; p <0.01), logical mathematical intelligence (r = .284; p <0.01), physical kinesthetic intelligence (r = .293; p <0.01), verbal linguistic intelligence (r = .083; p <0.01) and musical rhythmic intelligence (r = .218; p <0.01) variables.

In addition, a low-level significant positive correlation was found between visual spatial intelligence (r = .223; p <0.01), interpersonal social intelligence (r = .093; p <0.01), logical mathematical intelligence (r = .244; p <0.01), physical kinesthetic intelligence (r = .176; p <0.01), verbal linguistic intelligence (r = .178; p <0.01) and musical rhythmic intelligence (r = .181; p <0.01) variables with personal inner intelligence variables of participants. A low-level significant positive correlation was found between visual spatial intelligence and interpersonal social intelligence (r = .233; p <0.01), logical mathematical intelligence (r = .148; p <0.01), physical kinesthetic intelligence (r = .274; p <0.01) and verbal linguistic intelligence (r = .185; p <0.01) variables, and a moderate positive correlation between visual spatial intelligence and musical rhythmic intelligence (r = .320; p <0.01) variables of participants.

Participants' interpersonal social intelligence variable and logical mathematical intelligence (r = .221; p <0.01), physical kinesthetic intelligence (r = .291; p <0.01) and musical rhythmic intelligence (r = .267; p <0.01) variables showed a low-level positive significant correlation. Also, a low-level significant positive correlation was found between the participants' logical mathematical intelligence variables and physical kinesthetic intelligence (r = .271; p <0.01) and musical rhythmic intelligence (r = .129; p <0.01) variables. Similarly, low positive correlation was detected between the participants 'physical kinesthetic intelligence and verbal linguistic intelligence (r = .071; p <0.05) and musical rhythmic intelligence (r = .269; p <0.01) variables, and the participants' verbal linguistic intelligence variable and musical rhythmic intelligence (r = .205; p <0.01).

4. Discussion and Conclusion

When the mean rank values of the gender variable are analyzed, it was seen that male participants 'self-regulation naturalistic, logical mathematical intelligence and physical kinesthetic intelligence mean rank values were higher than the mean rank of female participants' self-regulation, naturalistic intelligence, logical mathematical intelligence and physical kinesthetic intelligence. On the other hand, it was found that the mean rank of visual spatial and verbal linguistic intelligence rankings of female participants were higher than the mean rank of visual spatial and verbal linguistic intelligence of male participants. According to the research conducted by Kuzgun and Deryakulu (2004) it was concluded that gender is not important in terms of physical intelligence score and social intelligence score (Kuzgun and Deryakulu, 2004). In the study conducted by Cinkılıç and Soyer (2013) on the multiple intelligence levels of physical education teacher candidates, they concluded that gender does not constitute significance.

These results create an opposite situation with our study. Furnham *et al.* (2002) conducted a study with British, American and Japanese participants aimed at identifying intelligence types. As a result of this study, no significant difference was found between men and women in the field of verbal linguistic intelligence. It was parallel with the study done by David (2003). In this study, there was no significant difference between the fields of naturalistic intelligence according to gender. However, in a study conducted by Dogan and Alkis (2007) the results of the university students' use of multiple intelligence fields in the classes are parallel with our study. Loori (2005) found out that the participants were examined separately as men and women in the logical-mathematical intelligence type, and it was found out that the difference was in favor of men according to the averages in the field of logical-mathematical intelligence.

When the mean rank values of the sporting status variable are examined, the mean rank of the result expectation, self-regulation, natural intelligence, physical kinesthetic intelligence and musical rhythmic intelligence of the participants doing sports were higher than means rank of the result expectation, self-regulation natural intelligence, physical kinesthetic intelligence and musical rhythmic intelligence of the participants who do not do sports. On the other hand, the personal barriers mean rank of the participants who do not do sports was higher than the personal barriers mean rank of the participants doing sports. Tekin (2009) compared the levels of male and female athletes in different types of intelligence in individual and team sports, and as a result of the study, it was found that male students had higher logical-mathematical intelligence and physical kinesthetic intelligence areas than female students. In this study, it was found that the athletes engaged in individual sports had higher social and inner intelligence areas than the athletes engaged in team sports. According to the class variable; in the 9th grade students who do sports, verbal linguistic intelligence, logical-mathematical intelligence, inner intelligence, musical rhythmic intelligence and visual spatial intelligence were higher than 11th grade students. Erturan *et al.* (2005) showed that the physical intelligence fields of the students who do sports and those who do not do sports are different from each other. In the studies done by Katz *et al.* (2002); Bayrak *et al.* (2005) and Tekin (2008) based on multiple intelligence theory, it was revealed that social intelligence creates significance in terms of sportive activity. Besides, it was revealed that the musical intelligence fields of the students who do sports and those who do not do sports are very close to each other (Bümen, 2004). In the studies conducted by Hoşgörür and Katrancı (2007). Tekin (2008) and Cengiz (2008) it was found that the naturalistic intelligence levels of individuals engaged in sports were high.

In the studies conducted by Hoşgörür and Katrancı (2007) and Tekin (2008) it was revealed that the level of inner intelligence was positive in favor of the ones doing sports. It was also found that the logical intelligence fields of the students who do sports and those who do not do sports are very close to each other. Individuals with a field of logical intelligence are very sensitive and susceptive to logic rules, cause-and-effect relationships, making and

questioning assumptions and similar abstract processes (Campbell, 1990; Saban, 2005). Tekin and Taşğın (2008) examined the relationship between creativity and multiple intelligence areas of secondary school students, who are doing sports and not doing sports. According to the results of the study, male students engaged in sports in secondary education had higher logical-mathematical intelligence and physical-kinesthetic intelligence areas than female students.

When the mean rank values of the income level variable are analyzed, it was seen that the mean rank values of self-regulation, natural intelligence, personal inner intelligence, visual spatial intelligence, logical mathematical intelligence physical kinesthetic intelligence and verbal linguistic intelligence of participants with high income level were higher than the mean rank values of self-regulation natural intelligence, personal intrinsic intelligence, visual spatial intelligence, logical mathematical intelligence, physical kinesthetic intelligence and verbal linguistic intelligence of low income level participants. Similarly, when the mean rank values of the income level variable were examined, it was observed that the mean rank values of self-regulated, naturalistic intelligence, personal inner intelligence, visual spatial intelligence, logical mathematical intelligence, physical kinesthetic intelligence and verbal linguistic intelligence of participants with high income levels were higher than mean rank values of the natural intelligence, personal inner intelligence, visual spatial intelligence, logical mathematical intelligence, physical kinesthetic intelligence and verbal linguistic intelligence of participants with middle income level. When the mean rank values of personal inner intelligence of the low- and middle-income participants was examined, it was seen that the mean rank values of middle income participants were higher than the mean rank of the low income participants. In a study conducted by Altınok (2008) the kinesthetic intelligence of those with low income was found to be high. In the study of Karademir *et al.* (2010) they found no relationship between family income and intelligence levels in the study conducted on the candidates who took the physical education and sport exam. Abaci and Baran (2007) reported that there was no significant difference in the intelligence scores according to the income level variable of university students. In terms of musical intelligence, there was a significant difference in the field of musical intelligence, and candidates with poor economic status had higher scores than those with good and moderate economic intelligence. There is no other type of intelligence other than musical intelligence that was found to be significant (Cinkılıç and Soyer, 2013). According to the economic situation, the highest results were obtained in the field of social and physical intelligence. Although there was no statistical difference in these two sub-dimensions, the averages indicated highly developed intelligence level. This showed that those who are economically poor have good social and physical intelligence. In other words, it would not be wrong to say that economic insufficiency has no negative effect on social and physical intelligence. In a study, a significant difference was found in physical-kinesthetic intelligence and nature intelligence of multiple intelligence types in terms of economic status variable (Altınok, 2008). Again, Altınok (2008) did not find statistically any significant difference in the comparison of the scores related to logical-mathematical intelligence, verbal intelligence and musical-rhythmic intelligence of the sub-dimensions of multiple intelligence theory in terms of economic status. A statistically significant difference was found in the comparison of scores of physical-kinesthetic intelligence and natural intelligence in terms of economic status variable. Although this study shows some similar results with our study, a significant difference was found only in naturalistic intelligence in our study (Altınok, 2008). According to Gardner (2004) multiple intelligence theory, it was seen that individuals studying in physical education and sports departments had one or more intelligence areas and had differences between individuals according to gender, class, department, type of sports, income status and place of residence. It is thought that these areas of intelligence are affected by social, environmental, economic, etc. situations.

5. Suggestions

It can be thought that multiple intelligence tests may be better for younger individuals in terms of age category and revealing individual differences.

When talent selection is to be done, before the selection process of individuals, intelligence tests can be considered to help in the selection of branches and categories of athletes.

Experimental studies to reveal the physical, cognitive and affective processes will contribute to the literature.

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