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INVESTIGATING THE ASSOCIATION BETWEEN TURKISH FRESHMAN'S MULTIPLE INTELLIGENCE PROFILES AND UNIVERSITY ENTRANCE EXAM PERFORMANCE

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Abstract:
Even though curriculum designers in Turkey considered Gardner's multiple intelligence theory as one of the most important theories during the curricula reform in 2005, the university entrance examination system is still on the basis of the two intelligence areas only, mathematical-logical and linguistics intelligence. The aim of this study was to investigate the relation between students' multiple intelligence profiles, gender, and the university entrance exam performance. Results of the study indicated that linguistic and logical-mathematical intelligences were the most dominant intelligence areas of the participants. Also, there was a statistically significant difference in participants' dominant intelligence areas with respect to gender and the university entrance exam scores. Findings from this study suggest reconsiderations in using only one examination to guide students with different abilities and skills through career options and provide insights into considering alternative ways of university entrance exams that may move beyond only measuring linguistic and mathematical intelligences.

Keywords: multiple intelligence; guidance; career choice; university entrance exam; curricula reform

Introduction

Determining skills and interests enables one to find the most appropriate career options. Finding a qualified match between skills and career orientation is an important

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factor on improving productivity in workplaces. As Aydin (2008) stated that students need to be educated at as early an age as possible in order to make favourable and appropriate decisions in regards to their career choices. Furthermore, any educational system needs to take into account students' individual differences with respect to abilities and types of intelligence in guiding students through career orientation (Arslan & Kilic, 2008: Erisen, 2001). However, guiding students through career orientation seems to be problematic with respect to considering their individual unique abilities (Akkok, 2003).

Most people around the world consider getting acceptance to college or university as a good start to a professional career path. In this regard, standardized testing plays an increasingly important role in the university admissions process for some countries. All four-year undergraduate programs in Europe require university entrance exams for admission. However, in this system of placement, there is no effort made to consider student interests, needs, and in general his/her individual differences. A review of the system of university admissions in Turkey reveals that there is a similar trend in Turkey as in other European countries.

Overall, university entrance exams in Turkey measure: 1) students' ability to apply problem solving skills to routine problems in different areas such as mathematics, science, and 2) knowledge of high school curriculum in Turkish literacy history, geography, and philosophy. A closer look at the university entrance system in Turkey will be presented below.

University Entrance System in Turkey

The Student Selection Examination (SSE)[ii] is a standardized exam in Turkey used for determining admission to higher education. The Student Selection and Placement Center (SSPC)[iii] has administered this exam since 1974. Initially in the 1970s, SSPC administered one single exam. The mark received in this examination was averaged out with the student's high school GPA (ÖSYM, 2009). In the subsequent years, the number of stages in the examination system varied between one and two exams from year to year. For instance, while there was only one required exam for university entrance between the years 1999-2009, beginning in 2010, students now need to take two exams and pass the predetermined minimum score to be able to enter university or a college.

Basically, these two exams covers topics from different subject matters taught in

[ii] Student Selection Examination(SSE) is English translation for, Ögrenci Secme Sinavi(ÖSS)

[iii] Student Selection and Placement Center (SSPC) is English translation for Ögrenci Secme ve Yerlestirme Merkezi (ÖSYM)

different levels of high school. For the first stage, students take the Transition to Higher Education Examination (HEE)[iv] every April. In the HEE examination, students are required to answer 160 multiple choice questions from different subjects, including Turkish, math, and social and natural sciences in 160 minutes. Those who obtain a passing mark on the HEE (i.e., 140 points out of 500) proceed to take the Undergraduate Placement Examination (UPE)[v] in June. The UPE has five subsections including foreign language, mathematics, social sciences, literature, and the sciences including biology, chemistry, and physics. Each subsection is evaluated individually and a standard score is calculated for each subject. The minimum total score for five subjects is 180 and the maximum score is 500. A final score is calculated by adding 40% of the HEE, the first stage exam, score and 60% of the UPE, the second stage exam. Students also get extra points depending on their high school grade point average (GPA). Students who score at least 180 in UPE exams are able to rank their decisions for specific undergraduate degree programs (ÖSYM, 2010).

Overall, one of the most prominent criticisms to the university entrance examination in Turkey relates to the system's attempt at measuring only two intelligence domains of students, which are linguistic and mathematical-logical intelligences (Celikoz et al., 2008). As an example, in order to get admission to science related majors, students need to score higher in mathematics and science. Conversely, students need to score higher in social sciences to get into majors related to social sciences. Thus, it is almost impossible for a student to get acceptance from a university without demonstrating a certain level of linguistics and analytical abilities and skills because solving questions in the exam only requires different variations of these two main skills. That is said, students' performance on the examination limits their choices of majors. For instance, according to the results of the study by Sarikaya and Khorshid (2009), 34.4% of newly enrolled undergraduate students indicated that they had enrolled in one of the majors at the university based on their exam scores, and that they would have preferred another major based on their unique abilities if they could have done so. An analysis of the university entrance system demonstrates that university admissions offices hold an assumption on there being a significant correlation between university entrance exam scores of high school graduates and their achievement in university or college. However, this assumption is based on the misguided foundation of the traditional approach to human intelligence, which claims the ability to solve

[iv] Transition to Higher Education Examination (HEE) is English translation for Yuksek Ogretime Gecis Sinavi (YGS)

[v] Undergraduate Placement Examination (UPE) is English translation for Lisans Yerlestirme Sinavi (LYS)

logical and mathematical problems as being the most important factor of intelligence (Topses, 2003; Yavuz, 2004).

This approach to human intelligence expects all students to demonstrate different characteristics of mathematical-logical intelligence and guides students through career choices based on the variations of one typical intelligence. However, 'individuals might have different capacities in different areas and differ from one another in their ability to understand complex ideas, to adapt effectively to the environment, to learn from experience, to engage in various forms of reasoning, to overcome obstacles by taking thought' (Neisser et al., 1996, p. 77).

Theoretical Framework

Howard Gardner, a psychologist of Harvard University, challenged the conventional idea of human intelligence by asserting that human cognitive competence is better described as a 'set of abilities, talents, or mental skills, which are referred to as intelligence' (Gardner, 1993, p. 15). He has proposed the Multiple Intelligences (MI) Theory which introduces the idea that every individual has at least eight types of intelligences (Gardner, 1983). According to the theory, initially there were seven different and independently working intelligence areas (Gardner, 1983), to which he added an eighth intelligence area (Gardner, 1999). These areas are: (1) linguistic, (2) logical-mathematical, (3) musical, (4) spatial, (5) inter-personal, (6) bodily-kinesthetic, (7) intra-personal, and (8) naturalistic intelligence[vi].

As stated by Gardner, each individual was born with having different levels of the previously mentioned eight intelligence areas and these areas can improve throughout life. Every person can have one or more areas of intelligence which are more advanced than another. A person's initial weak skills in an area of intelligence can later become his/her dominant area of intelligence (Gardner, 1993). Shearer (2004) highlights that it is possible, for example, that a person can have extraordinary linguistic intelligence, but low intelligence in music. To that effect, it is the responsibility of educators to prepare students by carrying out activities that cater to students' specific strengths and needs while designing instruction (Tomlinson, 2014). In general, if teachers are careful to design instructions through the use of all types of intelligences to the extent they can, they would be able to support students who are good at certain intelligences but also to help students who need to improve some intelligence areas.

[vi] For a detailed description of the different intelligence areas please see Gardner, 1993.

This Study

The Ministry of National Education (MoNE) in Turkey re-designed the curricula based on the new theoretical developments in the field of education in 2005. Gardner's MI theory was one of the considerations in order to help students develop all eight intelligence areas in schools. However, even though curriculum developers regarded Gardner's theory as one of the most important theoretical bases, as discussed before, the university entrance examination in Turkey still only measures two dimensions of intelligence (i.e., mathematical-logical and linguistic intelligence) in applying Gardner's theory (Pehlivan, 2008). In other words, the Ministry of National Education in Turkey has been encouraging teachers at elementary, secondary, and high school levels to diversify their activities in classrooms based on multiple intelligence theory since 2005.

Thus, students can have educational opportunities to develop all eight areas of intelligences. However, when it is time to assess students' different abilities and skills to determine their career path, students are assessed based on only two types of intelligence. That is said, students are guided based on only two dimensions of multiple intelligences at the end of high school. Therefore, first, a valid MI scale was used to determine first year undergraduate students' intelligence profiles in this study. Then, the relation between students' intelligence profiles and their exam scores from the university entrance examination, which is a main factor in determining their career path, was examined to explore entrance exam's capability to place students in an undergraduate degree according to their different multiple intelligence areas.

Finally, researchers of this study also examined the difference between female and male students' multiple intelligence profiles to explore possible differences in terms abilities and skills as MI theory strongly advices to organize educational settings based on individual differences derived from gender, differing ability and skills.

This study addressed the following research questions:

1. How do undergraduate students' multiple intelligence profiles vary?
2. Is there a statistically significant difference between first year female and male undergraduate students' mean level of intelligence in each area?
3. Is there a statistically significant difference between first-year undergraduate students' MI profiles and their scores from university entrance examination system?

Methodology

A non-experimental correlational research design was used to describe the statistical association between first-year undergraduate students' MI profiles, gender and scores from the university entrance examination system in Turkey.

Participants

The participants of this study were 245 first-year undergraduate students from a public university in Turkey. Participants were randomly selected from eight different faculties of the university including the Faculty of Communication Studies, Faculty of Art, Faculty of Science, Faculty of Religious Studies, Faculty of Engineering, Faculty of Agricultural Studies, Faculty of Language and Literature Studies, and Faculty of Health Sciences.

Data Collection Tool and Procedure

An ordinal 'Multiple Intelligence Profile Scale' (i.e., the MI scale) was used to determine students' MI profiles as conceptualized by Gardner. According to developers of the scale, Celikoz et al. (2008), the MI scale was completed by a wide-ranging sample of 228 faculty members from different fields of universities and over 965 students in order to establish reliability and content validity of the scale. The MI scale consists of 11 sub-dimensions which involve different daily life situations as follows; (1) spare time activities, (2) courses, (3) learning methods, (4) different abilities or skills (5) devices and materials mostly used in daily life, (6) games, (7) occupations, (8) most disturbing social problems, (9) places to visit, (10) daily activities, and (11) likes/dislikes. Further, each sub-dimension involves 8 items each of which represent one of the eight intelligence areas from the MI theory. For example, items for the spare time activities sub-dimension involve reading, listening to music, drawing or painting, solitariness, watching movies, playing with computers, doing sports, and spending time with pets. In the spare time activities sub-dimension, *reading* represents linguistics intelligence, *listening to music* represents musical intelligence, *drawing/painting* represents spatial intelligence, *playing with computer* represents logical-mathematical intelligence, *solitariness* represents intra-personal intelligence, *chatting* represents inter-personal intelligence, and *exercise* represents bodily-kinesthetic intelligence.

The MI scale starts with a brief instruction on its first page followed by a sample rating task and then asks participants to complete the scale accordingly. The instruction and sample task are as follows:

Dear students,

This scale is intended to determine your skills. Please choose each situation that describes you best. Otherwise, there will be problems in identifying your skills. Therefore, do not leave any question blank, read each question carefully and choose the appropriate answer. Rank each question according to how the situation suits you (1 being the most appropnate, 8 being the least appropriate).

Mary is a 6th grade student. She enjoys spending her spare time with animals. She does not like to be alone. She also enjoys going to the movies, playing on the computer, and listening to music. She does not enjoy reading books and sports much.

Mary ranked her likes as follows:

(6) Reading
(5) Listening to music
(4) Drawıng/painting
(8) Solitariness
(2) Movies
(3) Computers
(7) Sports
(1) Pets

Like Mary did, *please answer the questions below ranking them from 1 to 8 (1 being the most liked, 8 being the least liked.)'*

Following the instructions, students were then asked to rate their preferences of given 8 items in each sub-dimension, ranking them from 1 to 8 based on the amount of time they spend doing or how much they like/dislike each particular item. A detailed description of how students multiple intelligence was determined based on the rankings will be presented below in the data analysis section of this paper.

In order to examine the reliability of the MI scale, Cronbach alpha (α) scores were calculated for each sub-dimension in the scale using test-retest techniques. Cronbach's alphas for the 8 sub-dimensions were as follows: linguistic intelligence (α=.92), logical-mathematical (α=.95), musical (α=.98), spatial (α=.95), inter-personal (α=.90), bodily-kinesthetic (α=.92), intra-personal (α=.90), and naturalistic (α=.91). Further, in order to establish construct validity of the scale, the researchers consulted expert opinions from different fields including psychology and educational measurement and assessment. Overall, experts went through the items and situations included in the MI scale and indicated that each situation and eight items under each situation covered in the scale were valid indicators of the each type of multiple

intelligences (Celikoz et al., 2008).Results from the study indicated that the MI scale is a highly reliable and valid measure of undergraduate students' multiple intelligence profiles.

Data Analysis

Descriptive statistics for all the variables were computed as well as checks for underlying assumptions of the subsequent analyses, such as normality and homogeneity of variances. In order to examine participants' most dominant intelligence areas with respect to their individual differences such as gender, declared major, and scores obtained from the university entrance exam, frequencies (*f*), percentages (%), means ($\bar{x}$), and standard deviations (*sd*) were calculated.

As indicated earlier, raw ratings were collected from students for the 88 items under 11 sub-dimensions. Different scores were created based on these raw rankings in order to obtain a total score for each participant's intelligence area, as described below. These raw rankings were recoded into different scores from 1 to 8 because raw ratings by participants do not reflect the true priority of participants' choices. For example, if a participant ranks *music* as 8 for the most enjoyed courses, that mean the participant favours other courses over music, thus s/he gives an 8 to music among the most enjoyed courses. Conversely, if a participant ranks library as 1 for the most desirable visiting places, that indicates that this person likes libraries the most among other possible visiting places. Therefore, each rating for the 88 items was assigned a different score both to reflect true order of choices and to obtain total scores for each intelligence area. With this regard, ranking 8 was coded as 1, ranking 7 was coded as 2, ranking 6 was coded as 3, ranking 5 was coded as 4, ranking 4 was coded as 5, ranking 3 was coded as 6, ranking 2 was coded as 7, ranking 1 was coded as 8. Possible scores for each participant in each intelligence area ranged from 11 to 88 with a midpoint 49.5. Higher scores of intelligence areas indicate higher levels of dominance. The area with the highest score was identified as the person's preferred Multiple Intelligences area. Thus, a participant's most dominant intelligence can be determined.

To illustrate, suppose that a participant's ranking for the items represents musical intelligence under eleven sub-dimensions as follows; s/he ranks *listening to music* as 5 among the eight spare time activities, ranks *music* as 4 for the most enjoyed courses, ranks *melody/rhythm* as 6 for the mostly used learning methods, ranks *singing, playing a musical instrument* as 6 for the most talented area, ranks *musical instrument* as 7 for the most frequently used items, ranks *dancing* as 8 for the mostly like games, ranks *singer* as 5 for the most interesting occupations, *ranks bad music* as 8 for the most concerned social and global issues, ranks *concert* as 1 for the most desirable visiting

place, ranks *song writing* as 2 for the easiest activities, and ranks *noises/melodies* as 7 for the least likes. As described earlier, these ratings were converted into different scores, in order, 4, 5, 3, 2, 1, 8, 7, 2. Then, this participant's musical intelligence score would be the sum of these converted ratings as being 32.

T-test and One Way Analysis of Variance (ANOVA) tests were conducted on the participants' total score for each intelligence domain in order to determine if there is a significant difference between students' dominant intelligence areas with respect to gender, declared major, and university exam scores. Moreover, the Scheffe test was conducted as a follow up test to describe any further significant difference in terms of dominant intelligence area.

Result and Discussion

1. How do undergraduate students' multiple intelligence profiles vary?

Descriptive statistics were calculated in order to determine first year undergraduate students' multiple intelligence levels. While Table 1 presents the total number of participants (*N*), mean scores ($\bar{x}$) for each intelligence area, standard deviation (*sd*) of these scores, minimum (*min*.) and maximum scores (*max*.) obtained by participants in each intelligence area. As seen in Table 1, linguistic intelligence has highest mean among other intelligences (M=56.66, SD=12.82) followed by logical-mathematical intelligence (M= 52.55, SD=12.52) while naturalistic intelligence has the lowest mean (M=40.67, SD=10.22) among the participants of this study.

Table 1: Participants' level of multiple intelligence profiles

Intelligence Areas	N	$\bar{x}$	sd	Min.*	Max.*
Linguistic Intelligence	245	56.66	12.82	20.00	82.00
Musical Intelligence	245	49.68	15.87	20.00	88.00
Spatial Intelligence	245	48.68	12.53	16.00	80.00
Intra-personal Intelligence	245	50.54	11.54	18.00	80.00
Inter-personal Intelligence	245	50.20	9.8	16.00	78.00
Logical-mathematical Intelligence	245	52.55	12.52	22.00	80.00
Bodily-kinesthetic Intelligence	245	47.16	14.30	12.00	84.00
Naturalistic Intelligence	245	40.67	10.22	15.00	65.00

Table 2 also shows the percentage of participants who declared each intelligence area as the most dominant area. In order to help us understand the declared level of each intelligence area better, five categories including very low, low, medium, high, and very

high, were created by equally dividing the interval between possible lowest score (i.e., 11.00) and possible highest score into five. As seen in Table 2, the percentages of participants who declared each intelligence as being high as follows: linguistic intelligence (47.3%), logical-mathematical (37.6%), intra-personal (29%), musical (25.7%), bodily-kinesthetic (24.1%), spatial (23.7%), inter-personal (20.8%), and naturalistic (6.1%). Moreover, 60% of participants declared their inter-personal intelligence area as being medium, while 58.8% of participants believed that their naturalistic intelligence is at low level.

Table 2: Percentages of participants with each intelligence area as most dominant

Multiple Intelligences	N	high	medium	low
Linguistic Intelligence	245	47.3	37.6	15.1
Musical Intelligence	245	25.7	36.7	37.6
Spatial Intelligence	245	23.7	42.4	33.9
Intra-personal Intelligence	245	29.0	50.2	20.9
Inter-personal Intelligence	245	20.8	60.0	19.2
Logical-mathematical Intelligence	245	37.6	37.5	24.9
Bodily-kinesthetic Intelligence	245	24.1	34.7	41.2
Naturalistic Intelligence	245	6.1	35.1	58.8

Very Low	11.00 - 26.40
Low	26.41 - 41.80
Medium	41.81 - 57.20
High	57.21 - 72.60
Very High	72.61 - 88.00

Considering participants' intelligence profiles revealed in Table 1 and 2, the dominance of linguistic and logical-mathematical intelligence areas among freshman might be due to the fact that these two intelligence areas are the most valued domains in the Turkish educational system. Particularly, questions are formed only based on these two intelligence areas in the university entrance exam in Turkey which sets a barrier between students and career path. High school students need to demonstrate their knowledge and skills related to linguistics and logical-mathematical intelligence areas upon graduation of high school in order to enter a university or college regardless of their choice of major. The possibility of entering a university or college increases if students develop their skills related to linguistics and logical-mathematical intelligence. Moreover, the dominance level of all intelligence areas among participants ranged around 'medium' level with mean scores differing between 41.81 and 57.20 except for the naturalistic intelligence being at 'low' level. However, this area is also close to

'medium' level. Furthermore, the bodily-kinesthetic intelligence area has the lowest minimum scores and the logical-mathematical intelligence area has the highest minimum scores. These findings are consisted with Armstrong's (2000) conclusion that every individual possesses all intelligence areas at various levels, however some individuals have high intellect in particular areas. Additional support for this line of inquiry can also be found in the work of Celikoz (2009) and Hamurcu et al. (2011). While examining university students' multiple intelligence profiles with respect to different variables, Celikoz (2009) and Hamurcu et al. (2011) also found that university students' multiple intelligence levels are at medium level for all intelligence areas.

2. Is there a statistically significant difference between first year female and male undergraduate students' mean level of intelligence in each area?

A *t-test* was conducted to answer the second research question, is there a statistically significant difference between first year female and male undergraduate students' mean level of intelligence in each area? Table 3 below presents the t-test results related to participants' dominant intelligence areas by gender.

Table 3: Participants' multiple intelligence levels by gender

Intelligence Area	*Gender*	*N*	$\bar{x}$	*sd*	*t*	*P*
Linguistic	Male	109	54.28	13.06	2.629	**0.009***
	Female	136	58.57	12.35		
Musical	Male	109	48.35	16.38	1.178	0.240
	Female	136	50.75	15.43		
Spatial	Male	109	46.42	11.79	2.556	**0.011***
	Female	136	50.49	12.85		
Intra-personal	Male	109	49.98	10.94	0.676	0.500
	Female	136	50.99	12.02		
Inter-personal	Male	109	49.46	10.30	1.060	0.290
	Female	136	50.79	9.38		
Logical-mathematical	Male	109	54.65	12.24	2.377	**0.018***
	Female	136	50.86	12.53		
Bodily-kinesthetic	Male	109	51.70	14.48	4.629	**0.001***
	Female	136	43.52	13.11		
Naturalistic	Male	109	41.17	10.31	0.673	0.502
	Female	136	40.28	10.18		

P<0.05 (*) Asterisk indicates significant difference at 0.05 alpha level

As depicted in Table 3, there is a significant difference between female and male participants' distributions of intelligence levels in the linguistics, spatial, logical-mathematical, and bodily-kinesthetic areas. Specifically, there was a statistically significant difference in the mean scores of the linguistics intelligence for male (M=54.28, SD=13.06) and female participants (M=58.57, SD=12.35); t=2.629, p=0.009; and mean scores of the spatial intelligence for male (M=46.42, SD=11.79) and female participants (M=50.49, SD=12.85); t=2.556, p=0.011; mean scores of the logical-mathematical intelligence for male (M=54.65, SD=12.24) and female participants (M=50.86, SD=12.53); t=2.377, p=0.018; and mean scores of the bodily-kinesthetic intelligence for male (M=51.70, SD=14.48) and female participants (M=43.52, SD=13.11); t=4.629, p=0.001. While female participants' mean scores for the linguistics and spatial intelligences are higher than male participants, male participants' mean scores for the logical-mathematical and bodily-kinesthetic intelligences are higher than female participants.

These results are consistent with the gender expectations and gender roles prospected for individuals in the Turkish society. One would expect male participants to have higher bodily-kinesthetic intelligence scores than female participants in the Turkish society due to an assumption that male individuals are more likely to engage in occupations that require use of physical power and muscles. It is also believed in the Turkish society for male individuals to take responsibility over accounting duties of the family, such as calculating monthly total income and expenses of the family. These kinds of responsibilities of male participants would provide them with more opportunities to improve their mathematical-logical intelligence than female participants. Thus, the results of this study indicating higher mathematical-logical intelligence scores for male participants compared to the female counterparts are consistent with expectations and responsibilities accepted by the Turkish society. Furthermore, female participants' higher linguistic and spatial intelligence scores are also consistent with the general assumptions related to female individuals' roles and responsibilities in the Turkish society. First, it is believed in the society that women have a better ability than men to express ideas and feelings. Second, there is a common assumption that interior design and organization of the home life become important parts of the female individual's daily life. Due to these two assumptions related gender roles and responsibilities; one would expect female participants of this study to have higher linguistics and spatial intelligence scores than male students. Moreover, studies of the societal views on gender roles in Turkey have also supported these findings. For example, a recent report published by UNESCO in 2010 highlighted that Turkey needs to do much more to overcome inequalities based on gender. As indicated in the report

7% of girls between ages 8 and 12, never enroll to school while the percentage is only 2% for boys of the same age group in Turkey. By age 15, female attainment is about 20% below than male enrolment (UNESCO, 2010). According to Caner et al. (2015) the cultural bias against the education of girls is a crucial element in explaining low educational attainment of girls. The researchers also reported that parents' traditional view on roles and responsibilities of girls was the main reason for not educating girls while having a parent with a traditional view does not have an impact on the educational attainment of boys. In another study by Adana et al. (2011), 54.3% of undergraduate male students believe that women in Turkish society is responsible only for the organization of home life, giving birth to children, looking after the elderly members of the house.

Studying secondary school students' multiple intelligence profiles in different cultures, the findings reported by Shahzada, Khan, and Ghazi (2015) also indicated that female students had higher linguistic intelligence scores than their male counterparts, while male students had higher naturalistic bodily/kinesthetic and naturalistic intelligences than their female counterparts. Similarly, Furnham and Budhani (2002) reported that male participants scored higher on visual/spatial and logical/mathematical intelligences, while female respondents scored higher on intrapersonal and musical intelligences.

3. Is there a statistically significant difference between first-year undergraduate students' MI profiles and their scores from university entrance examination system?

In Turkey, high school graduates receive three different scores in the university entrance exam depending on their performance on different stages of the exam. The three types of scores obtained from the exam are linguistics, mathematical and combined scores. The linguistics score is assigned based on students' performances in the linguistics related questions that measure language abilities and the mathematical score is given based on students' performances in the mathematical related questions to measure analytical ability of students. Moreover, a combined score is given as a combination of linguistics and mathematical scores. Then, students are placed in an undergraduate degree based on one of the three scores of their choice depending on the ranking of their preferences, as different faculties/majors require a different score from the university entrance exam. Considering the participants of this study, for example, while getting admission from the Faculty of Language and Literature Studies and Faculty of Art require higher linguistic scores, getting admission from the Faculty of Science, Faculty of Health Sciences, and Faculty of Agricultural Studies requires higher

mathematical scores. Similarly, getting acceptance from majors in the Faculty of Communication Studies require higher combined scores.

As seen in Table 4 below, 138 participants of this study were placed in an undergraduate major based on their linguistics scores while 85 of them were placed based on their mathematical scores and 22 of them were majoring based on their combined scores. Hypothetically speaking, if the university entrance exam is really good at placing high school graduates in majors according to students' diverse intelligence areas, one would expect from the results of this specific analysis that participants who were placed in an undergraduate program based on their linguistic scores would have the mean level of linguistic intelligence highest among eight types of intelligence. Likewise participants majoring in one of the undergraduate program based on their mathematical scores would have the mean level of their mathematical intelligences highest among other types of intelligences. Similarly, same logic would apply to the expected intelligence areas of the other faculties.

One-way analysis of variance (ANOVA) was run for each intelligence area to determine whether there is a statistically significant difference between participants' mean scores on each declared intelligence area with respect to scores in the university entrance exam as a main determinant of participants' majors in the university. For each ANOVA, three different types of exam scores served as independent variable while the mean scores for each intelligence was the dependent variable. The table below shows eight different one-way ANOVA tests results.

Table 4: One-way ANOVA results showing the comparison of participants' dominant intelligence areas with the university entrance exam scores

Intelligence Area	***Score***	***N***	$\bar{x}$	***sd***	***F***	***p***
Linguistic	Linguistics	138	58.70	12.64	4.009	**0.018***
	Mathematical	85	54.16	12.11		
	Combined	22	53.55	14.78		
Musical	Linguistics	138	47.12	12.46	4.508	**0.012***
	Mathematical	85	52.40	19.03		
	Combined	22	55.23	19.00		
Spatial	Linguistics	138	49.90	11.79	10.215	**0.001***
	Mathematical	85	44.65	12.22		
	Combined	22	56.64	13.32		
Intra-personal	Linguistics	138	52.58	10.24	6.060	**0.003***
	Mathematical	85	48.66	12.33		
	Combined	22	45.00	13.47		

Inter-personal	Linguistics	138	50.34	8.66	0.618	0.540
	Mathematical	85	50.54	10.94		
	Combined	22	48.00	11.93		
Logical-mathematical	Linguistics	138	49.27	11.63	15.824	**0.001***
	Mathematical	85	58.35	11.43		
	Combined	22	50.68	14.39		
Bodily-kinesthetic	Linguistics	138	47.33	15.20	0.076	0.927
	Mathematical	85	47.18	13.38		
	Combined	22	46.05	12.32		
Naturalistic	Linguistics	138	40.96	9.35	0.161	0.852
	Mathematical	85	40.16	11.34		
	Combined	22	40.86	11.31		

P<0.05 (*) Asterisk indicates significant difference at 0.05 alpha level

As presented in Table 4, there were statistically significant differences in the mean scores of participants some intelligence areas with respect to the different exam scores used to place students in undergraduate programs. Post hoc comparisons using the Tukey HSD test indicated that the mean score for the linguistics intelligence ($F=4.099$; $p<0.05$) was significantly different with respect to linguistics scores, musical intelligence ($F=4.588$; $p<0.05$) was significantly different with respect to combined scores, spatial intelligence ($F=10.215$; $p<0.05$) was significantly different with respect to combined scores, intra-personal intelligence ($F=6.060$; $p<0.05$) was significantly different with respect to linguistics scores, and mathematical-logical intelligence ($F=15.824$; $p<0.05$) was significantly different with respect to participants' mathematical scores from the university entrance exam.

Participants who were enrolled in an undergraduate program solely based on their linguistic scores had linguistics intelligence as their most dominant intelligence while those who were placed in an undergraduate program solely based on their mathematical scores had mathematical logical intelligence as their most dominant intelligence. Based on these results, we can conclude that students whose most dominant intelligence area is either linguistic or logical-mathematical intelligence were guided to a related undergraduate program. In other words, the students who are strong in those areas ended up having their multiple intelligence profiles match their scores. However, participants' intelligence profiles such as inter-personal, bodily-kinesthetic, and naturalistic intelligences did not significantly differ with respect to their three different types of exam scores obtained from the university entrance exam. It is because the examination system itself is not designed to measure these intelligence areas. That is said, the university entrance exam is not able to consider students'

different abilities and skills derived from their higher mean levels of inter-personal, bodily-kinesthetic, naturalistic, and musical intelligence areas while determining their majors. For example, majors such as Visual Arts, Physical Education, Communication Studies and Music Education require higher linguistics and combined scores. Therefore, for instance, one would expect from students with highest mean level of inter-personal intelligence to be placed into the Communication Studies based on their combined scores since people with high inter-personal intelligence would have abilities and skills required for different types of communication as indicated in the MI theory. However, as seen above, students' inter-personal intelligence did not differ with respect to their combined scores. Likewise, we would expect students with highest mean level of bodily-kinesthetic intelligence to be placed in the majors related to physical education based on their combined scores. Similarly, Azar (2006) and Yalmanci's (2011) also did not report a significant difference between undergraduate students' linguistic, musical, bodily-kinesthetic, naturalistic and intrapersonal intelligence profiles with respect to their majors while studying undergraduate students multiple intelligences difference by majors.

It is also worth to note that students who want to get acceptance from majors such as physical education or visual arts need to take extra exams organized by higher education institutions in Turkey. These exams measure students' abilities and skills in these domains to determine their eligibility to enter these particular majors. Even though it seems that the examination system attempts to measure different abilities and skills, these types of exams only accounts for 30% of the total score. As seen, students' scores from the entrance exam still remains as the main determinant and accounts for the 70% of the total scores. Overall, the university entrance examination in Turkey tends to place students whose linguistics and logical-mathematical intelligence domains are strong. It is almost impossible for a student to enroll in a high-ranking university without demonstrating strong ability in one of these intelligence areas.

Conclusion

Howard Gardner first presented MI theory over 25 years ago, which provides a theoretical foundation for understanding individuals different abilities and capacities. Further, the theory highlights that students may have an expertise in a diversity of areas other than just having in linguistic and mathematical areas (McClellan & Conti, 2008). The aim of this study was to establish that the university entrance examination system for admissions into higher education in Turkey still continues to dismiss recommendations proposed by recent developments in the field of education. Further,

the MI scale used in this study helped researchers determine that there are statistically significant differences between participants' mean levels of multiple intelligence areas by gender. Female and male participants had different types of intelligences as their highest mean level of intelligences while students' majors as determined by their university entrance exam scores were only consistent with their linguistics and mathematical intelligence areas.

Statistics related to the university entrance examination system in Turkey portray a serious problem in the examination system such as not being inclusive enough to involve different types of assessment which can determine participants' different abilities and capacities. For instance, in an attempt to investigate students' success in the university entrance exam in Turkey across the years, Berberoglu and Kalender (2005) noted that students' achievement level is very low in this examination system and there is no sign of improvement across the years as is evidenced by the success rate of below 50% at some public high schools in Turkey. Therefore, alternative ways of placement into higher education institutions would benefit students who fails in this examination system. Thus, students would have at least a chance to be assessed in terms of their different abilities rather than being assessed based on only mathematical and linguistic areas.

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