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INVESTIGATING ATTITUDE AND IMAGES OF SUPERIOR INTELLIGENT AND GIFTED STUDENTS TOWARDS SCIENTISTS

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Abstract:
The objective of this research was to investigate attitude and images of superior intelligent students and gifted students towards scientists. 34 superior intelligent students from 5th, 6th, and 7th grades had participated to the research. In the research, Chambers' (1983) Draw a Scientific Person Test (DAST), Scientific Person Attitude Scale and Personal Information Questionnaire were used. The DAST-c checklist of student drawings with Draw a Scientific Person Test (DAST) included the physical characteristics of the scientist, research symbols, information symbols, technology signs, science gender of the person. In the Scientific Person Attitude Scale, the thoughts of the students' thoughts about the work of the scientist, gender of the scientists, social life and social activities of the scientists, and character, emotions, properties, and work life of the scientists was evaluated. The results of the study indicated that superior intelligent and gifted students perceived scientists as individuals who wore laboratory aprons, used glasses, messy-looking people that used laboratory as the working environment. Majority of gifted female children draw female scientists where majority of gifted male children draw male scientists.

Keywords: superior intelligent students, special gifted student, image of scientist, gender of scientist, physical characteristics of scientist

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1. Introduction

1.1. Problem State

Significant development of science throughout history had accelerated the work regarding the nature of science. In almost all periods of science history, there were scientists who were interested in science and scientific knowledge. As a result of these discussions, although there was no unanimity about the definition of science, the knowledge in the nature of science had significantly increased. Today, science could best be defined as: *"science is the effort to explore the causes of the phenomena in nature, explore their connections, generalize these connection, theorize these connections, and to calculate when and how these events will occur help of this theoretical knowledge"* (Toptemir ve Unat, 2009).

In the 21st century, the constant evolution and change in science and technology required countries to constantly renew and adopt their educational initiatives to keep up with this change. If educators influence the true and positive perceptions of students regarding scientists and increase their participation in scientific careers, further research should focus on the perceptions of students. Thoughts of elementary school students regarding scientists would affect their attitude and behaviour towards science and guide their career (Öcal, 2007). When the history of science education was considered, majority of the objective of science teaching coincided with the concept of scientific literacy. Scientific literacy means acquiring the ability to understand the difference between scientific evidence and opinion by knowing the nature of science, knowing how information is obtained, knowing that knowledge in science depends on known facts, and changing new evidence as it is collected, learning basic concepts, theories and hypotheses in science. Societies with scientific literacy could easily adapt to development and lead innovations (Taşkın, 2008).

One of the general objectives of science education is to raise individuals who sympathise science. Additionally, it is necessary to emphasize that science is not only about facts, laws, and theories but also about scientists, attitudes of these scientists, methods, and the society of the science. Therefore, scientific education should be more than structures of molecules or surface temperature of sun (Taşkın, 2008). Countries that realised this fact had made fundamental changes in their science education program. Changes in science education program around the world had presented science and technology literacy concept. Science and technology literacy is a combination of science-related skills, attitudes, values, insights, and knowledge necessary for individuals to research and inquire, develop critical thinking, problem solving and decision-making skills, become life-long learners, sustain curiosity about the world, and environment. An individual with science and technology literacy would understand the nature of science and scientific knowledge, and use the basic science concepts, principles, laws and theories in appropriate forms (Çepni and Çil, 2009).

In terms of influencing attitudes of students towards learning and becoming interested in science, the model of the scientist is important and can influence whether they can continue their scientific work in future higher education. Scientists are often

symbolised in televisions and science fiction programs, and books with their images and attitudes. This was students develop their perspective for scientist in a constant and resistant to change based on media effect in school and outside school. This perspective could affect the future academic life of the students. Therefore, the idea of scientists in the mind of the students should be determine and shaped in correct form (Öcal, 2007). Science and technology education is applied not only at the level of elementary education but also at every stage of education.

Since superior intelligent and gifted children are one step ahead of their peers in cognitive terms, and since they are interested in research, it could be said that these children are candidates for becoming a scientist. Science and technology classes that presents basic knowledge about science information is applied effectively from elementary school to other stages of education based on the conditions required by changes in the world. As superior intelligent and gifted children receive necessary gains of public or private school they attend to, children who were diagnosed and educated in Science and Art centre could receive a separate Science and Technology class based on activities. Students who were diagnosed and attended to Science and Art Centre from 1st, 2nd, and 3rd grade would receive education and training to raise the awareness on their abilities and to develop their capacity. After the school readiness of elementary school students were measured, they were accepted to a) Orientation, b) Support Training; 1) Communication Skills, 2) Group Working Techniques, 3) Learning Methods, 4) Problem Solving Techniques, 5) Scientific Research Techniques, 6) Foreign Language, 7) Computer, 8) Social Activities, c) Special Abilities Development, d) Project Production / Management education programs. Education programs in these units are shaped according to talent and need (MEB, 2016). In line with needs of the students, with the education in the field of science, it is expected that the students will develop their thinking skills at a higher level in this area with more comprehensive and detailed studies. The perspectives of students towards science, structure of science, and scientists will have a positive or negative effect on their future career choices, and achievements. For this purpose, it is observed that the scientific attitudes of the students, the thoughts about the structure of the sciences, and the views of the scientists are frequently studied (Demirbaş, 2009).

1. 2. Problem Statement

What are the images of scientists and attitudes towards scientists of secondary school students (5. 6. 7. and 8. Grade) enrolled in Science and Art Centres?

1.3. Objective of the Research

The aim of this research was to determine the attitudes and images of scientists perceived by talented students who continue their education at BİLSEM. Under this framework following questions will be evaluated:

1. What are the attitudes of students towards:

A) physical properties,

B) adopted research symbols,

C) adopted knowledge symbols
D) adopted technology,
E) gender,
D) working environment and alone or group working of scientists?

2. Is there a significant difference between students' opinions regarding work of scientists based on gender and class levels?
3. Is there a significant difference between students' opinions regarding social status and social activities of scientists based on gender and class levels?
4. Is there a significant difference between students' opinions regarding character, emotions, properties, work life, and ideas of scientists based on gender and class levels?
5. Is there a significant difference between students' opinions regarding social status of scientists based on gender and class levels?

1.4. Importance of Study

Individuals need serious work and qualified education systems to keep up with the period, developments, and changes. The importance of science is high as students meet with science and scientists for the first time in education system. When the importance of science on development and economic growth of Turkey as well as the important future roles of superior intelligent and gifted students in BİLSEM for science and technology were considered, "Science Education" should be investigated in detail. Science education is considered as one of the most important parts of mental education. Students with superior intelligence are interested in science and this interest would support research. In particular, laboratory, project and computer-aided science education has been observed to support the willingness and eagerness of gifted students to study science (Keser, 2012). In line with needs of the students, with the education in the field of science, it is expected that the students will develop their thinking skills at a higher level in this area with more comprehensive and detailed studies. Their perspective for superior intelligent scientists will have a positive or negative effect on their future career choices, and achievements. For this reason, it is important to determine scientific attitude of students and their attitude towards scientists. When the thesis studies in Turkey were examined, the finding of the limitations of the work in this area supports our expectation that this study will contribute to science education which will be structured for the gifted and superior intelligent students.

Nowadays, where science and scientist are important, our superior intelligent and gifted students are those who have the potential to work in scientific fields and specialize in these fields. It is important for superior intelligent and gifted people to realize their potentials as scientists and their work and to reflect them on their career choices (Erdoğan, 2013).

2. Method

2.1. Research Model

This study adopted survey model. The survey model consists of studies conducted by collecting data to determine the characteristics of a group (Büyüköztürk, 2009).

2.2 Universe and Sample

The study universe of this research constituted of superior and gifted students in ITO Centre for Science and Arts in Istanbul city centre. The sample of the research consists of 34 students, 15 males and 19 females from the 5th, 6th and 7th grade students who are attending to ITO Science and Art Centre during the first semester of 2016-2017 academic year. Since the research will be applied on superior intelligent and gifted students, only the students who have these qualifications have been studied within ITO Science and Art Centre students. While the number of students participating in the survey was 34, due to the invalid data collection tools, invalid scales were excluded from the research. Therefore, data analysis was conducted on 30 scales.

The gender distribution of the participants was shown in Table 1.

Table 1: Gender Distribution of Superior Intelligent and Gifted Students in the Study

Gender	f	%
Male	14	53.7
Female	16	46.3
Total	30	100

Table 1 indicated that 53.3% of students were male and 46.7% were female.
The class distribution of the participants was shown in Table 2.

Table 2: Class Distribution of Superior Intelligent and Gifted Students in the Study

Grade	f	%
5. Grade	13	43.3
6. Grade	10	33.3
7. Grade	7	23.3
Total	30	100

As seen from Table 2, 43.3% of students were in 5th grade, 33.3% were in 6th grade, and 23.3% were in 7th grade.

Table 3: Education of Mother Distribution of Superior Intelligent and Gifted Students in the Study

Education of Mother	N	%
Elementary school	1	3.3
Middle school	3	10.0
High school	8	26.7
University	12	40.0
Graduate level	4	13.3
PhD	1	6.7
Total	30	100.0

Table 3 indicated that majority of the mothers of superior intelligent and gifted students were high school (N=8, 26.7%) and university (N=12, 40%) graduates.

Table 4: Education of Father Distribution of Superior Intelligent and Gifted Students in the Study

Education Level of Father	N	%
Elementary school	1	3.3
Middle school	1	3.3
High school:	7	23.3
University	16	53.3
Graduate level	4	13.3
PhD	1	3.3
Total	30	100.0

Table 4 indicated that majority of the father of superior intelligent and gifted students were high school (N=7, 23.3%) and university (N=16, 53.3%) graduates.

The types of schools in which the students continue to attend in addition to Bilsem were shown in Table 5.

Table 5: School Type Distribution of Superior Intelligent and Gifted Students in the Study

School type	N	%
Public school	12	40.0
Private school	18	60.0
Total	30	100.0

N=12 (40%) of students attended to public school while N=18 (60%) attended to private school.

2.3. Data Collection

In the research, Draw A Scientific Person Test, Scientific Person Attitude Scale and Personal Information Questionnaire were used.

2.3.1. Draw A Scientific Person

A DAST (Draw a Scientist) test, developed by Chambers, will be used to identify the opinions of gifted students regarding scientists. The results will be interpreted by changing the control criteria in DAST-c control list according to the answers of students. DAST-c checklist included the physical characteristics of the scientist, research symbols, information symbols, technology signs, science gender of the person. When DAST was applied, the test was changed as draw a scientist to eliminate any gender discrimination. In addition, to improve the reliability of the drawings, students will be asked to write a short paragraph describing what they want to draw.

2.3.2. Scientific Person Attitude Scale

Scientific person attitude scale was constructed from literature data. The test is a 5-item Likert type scale with 38 items and 0.75 Cronbach alpha reliability. In the Scientific Person Attitude Scale, the thoughts of the students' thoughts about the work of the scientist, gender of the scientists, social life and social activities of the scientists, and character, emotions, properties, and work life of the scientists was evaluated.

2.3.3. Personal Information Survey

Personal information survey will be used to determine the demographic characteristics of the students participating in the study. This survey was developed by Ateş (2017) for this study. In the survey, total of 14 questions will be asked to students to determine gender, ages, class levels, mother and father education status, and occupation of parents. The survey also included questions regarding whether there are books about science in their homes, which activities do they participate in about science outside of school, and which professions they will choose in the future.

2.4. Data Analysis

The data of this study is based on qualitative and quantitative data. The data obtained from the scientist image scale is a qualitative data source. Detailed examination of student drawings will be analysed by content analysis method and ANOVA using the new checklist which is formed by grouping the different features which were added to DAST-c checklist.

Scientific Personality Attitude Scale, which determines the attitude of the students towards the scientists, was the quantitative data source of the study. The data obtained from the Likert type survey will be analysed with SPSS 22.0 for Windows package program.

3. Findings

This section includes statistical analyses and the findings obtained as a result of these analyses.

3.1 Findings of Draw A Scientist Test

In this section, scientist pictures of the students were evaluated.

3.1.1 Analysis of the Physical Characteristics of Scientists by Gender and Class Levels

The findings of superior intelligent and gifted students regarding the physical appearance of scientists were given in Table 2. When the data were evaluated without class level and gender distinction, superior intelligent and gifted students draw scientists as individuals who wore laboratory apron (N=24, 80%) > messy (N=21, 70%) >wore glasses (N=13, 43.3%). When class level was considered, 5th grades draw as wore apron (N=12, 92,3%) > messy (N=13, 100%) > wore glasses (N=7, 53,8%), 6th grades draw as wore apron (N=8, 80%) > wore glasses (N=5, 50%) > messy (N=4, 40%), and 7th grades draw as wore apron (N=4, 57,1%) = messy (N=4, 57,1%) > wore glasses (N=1, 14,3%).

Table 6: Frequency and Percentage of Images of Physical Characteristics of Scientists

									Class Level			
Criteria	**Female**		**Male**		**Total**		**5**		**6**		**7**	
(N=30)	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Laboratory Apron	14	87.5	10	71.4	24	80.0	12	92.3	8	80	4	57.1
Glasses	10	62.5	3	21.4	13	43.3	7	53.8	5	50	1	14.3
Messy	14	87.5	7	50.0	21	70.0	13	100.0	4	40	4	57.1

When gender was considered, superior intelligent and gifted female students defined as wore apron (N=14, 87,5%) = messy (N=14, 87,5%) > wore glasses (N=10, 62,5%) and superior intelligent and gifted male students defined as wore apron (N=10, 71,4%) > messy (N=7, 50%) > wore glasses (N=3, 21,4%).

3.1.2 Investigation of Image (s) of Scientist for Research (Materials), Science and Technology Symbols according to Gender and Class Levels

The findings of superior intelligent and gifted students regarding the research, science, and technology symbols scientists were given in Table 4. When gender and class levels were disregarded, most of the students have drawn scientists as chemical researchers with experimental tubes, and beakers (N = 20, 66.7%). Nevertheless, they perceive scientists as individuals who use technology less (N = 3, 10%). Similarly, in the pictures

of scientists, a small proportion of the students had drawn knowledge sources (N = 7, 23.3%). When examined at the class level, the research instruments used by the scientist were classified into 5th grade (N = 9, 69.2%), 6th grade (N = 7, 70%) and 7th grade (N = 4, 57.1% It has been found that the use of information symbols is much higher in female students than in male students, with little use of information symbols in the drawings of superior intelligent and gifted female students (N = 5, 31.3%) and male students (N = 2, 14.3%). Although technology symbols were slightly used, the data was found as females (N = 1, 6.3%), males (N = 2, 14.3%) and 5th grade (N = 3, 23.1%) , 6th grade (N = 0, 0%) and 7th grade (N = 0, 0%).

Table 7: Frequency and Percentage of Images for Research, Information and Technology Symbols

							Class Level					
Criteria	**Female**		**Male**		**Total**		**5**		**6**		**7**	
(N=30)	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Research Tool	11	68.8	9	64.3	20	66.7	9	69.2	7	70.0	4	57.1
Information	5	31.3	2	14.3	7	23.3	3	23.1	1	10.0	3	42.9
Technology	1	6.3	2	14.3	3	10.0	3	23.1	0	0	0	0

3.1.3 Analysis of the Gender Symbols of Scientists by Gender and Class Levels

Findings of the gender of the scientist from the drawings of superior intelligent and gifted students were given in Table 4. Regardless of gender, 46.7% (N = 14) of superior intelligent and gifted students draw female scientists and 53.7% (N = 16) draw male scientists.

Table 8: Frequency and Percentage of Images of Gender of Scientists

							Class Level					
Criteria	**Female**		**Male**		**Total**		**5**		**6**		**7**	
(N=30)	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Female	12	75.0	2	14.3	14	46.7	5	38.5	5	50.0	4	57.1
Male	4	25.0	12	85.7	16	53.7	8	61.5	5	50.0	3	42.9

When the gender distribution was considered, most of the gifted male students (N = 12, 85.7%) draw male scientists and the most of the female students (N = 12, 75%) draw female scientists.

3.1.4 Analysis of the Work Place Symbols of Scientists by Gender and Class Levels

Findings of the work place of the scientist from the drawings of superior intelligent and gifted students were given in Table 6. Regardless of gender and class level, 56.7% (N=17) of superior intelligent students draw scientists in laboratory, and 43.3% (N=13) draw in another environment.

Table 9: Frequency and Percentage of Images of Work Place of Scientists

									Class Level			
Criteria	**Female**		**Male**		**Total**		**5**		**6**		**7**	
(N=30)	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**	**f**	**%**
Laboratory	9	56.3	8	57.1	17	56.7	11	84.6	3	30.0	3	42.9
Other	7	43.8	6	42.9	13	43.3	2	15.4	7	70.0	4	57.1
Alone	15	93.7	13	92.8	28	93.3	12	92.3	10	100	6	85.7
With Group	1	6.5	1	7.2	2	6.6	1	7.7	0	0	1	14.3

It has been observed that most superior intelligent and gifted students where female (N = 15, 93.7%) and male (N = 13, 92.8%) draw scientists alone. All superior intelligent and gifted students in 6th grade draw scientists alone (N=10, 100%).

3.2 Scientific Person Attitude Scale Findings

3.2.1 Attitudes of Superior Intelligence and Gifted Towards Work of Scientists

Table 10: Findings of 1st Sub-Scale of Scientific Person Attitude Scale

1. Findings for sub-scale	**Mean**	**Standard Deviation**
1. The work of the scientist is not affected by the personal views and feelings they have.	2.60	1.35
2. Scientists are influenced by their religious beliefs.	2.60	1.91
3. The results scientists are 100% correct and never change.	1.53	0.93
4. Scientists try to develop scientific knowledge.	**4.46**	**0.93**
5. Scientists work for the benefit of humanity.	**4.20**	**0.96**
6. All researches of scientist are complete and perfect.	1.80	0.80
7. Scientist had sacred duty to make the world a beautiful place.	3.60	1.06
8. Scientists around the world should agree on the same result.	3.16	1.17
9. The results of research are influenced by the prior knowledge and experience of the scientist.	3.83	0.87

When 1-1,80=Completely disagree, 1,81-2,60=Disagree, 2,61-3,40= Hesitant, 3,41-4,20=Agree, 4,21-5,0=Completely agree, table indicated that students only agreed with item 4 and 5.

Table 11: T Test Result Distribution of Attitudes towards Scientists Work Based on Gender

Gender	Mean	Standard Deviation	t	p
Female (N=16)	26.56	0.56	0.765	0.44
Male (N=14)	25.78	0.83	0.782	

There was no significant difference between attitude towards scientists work and gender variable (p>.05). It could be said that gender has no effect on attitudes towards scientists' work.

Table 12: T Test Result Distribution of Attitudes towards Scientists Work Based on School Type

School type	Mean	Standard Deviation	t	p
Public (N=12)	26.91	2.35	1.19	0.241
Private (N=18)	25.71	2.86	1.47	

There was no significant difference between attitude towards scientists work and school type variable (p>.05). It could be said that school type have no effect on attitudes towards scientists work.

Table 13: ANOVA Test Result Distribution of Attitudes towards Scientists Work Based on Class Level

	Sum of squares	df	Squared average	F	p
Between groups	21.679	2	10.840	1.548	.231
Intragroup	189.121	27	7.004		
Total	210.800	29			

There was no significant difference between attitude towards scientists work and class level variable (p>.05). It could be said that class level have no effect on attitudes towards scientists work.

3.2.2 Attitudes of the Superior Intelligent and Gifted Students towards Daily Social Positions and Social Activities of the Scientist

Table 14: Findings of 2st Sub-Scale of Scientific Person Attitude Scale

2. Findings for sub-scale	Mean	Standard Deviation
10. Being a scientist means being alone and unhappy.	1.50	0.93
11. I don't want to be a scientist since becoming a scientist needs a lot of education.	1.43	0.62
12. Scientists are not interested in art activities like painting and music like other people.	1.83	0.82
13. Scientists like to participate sportive activities like other people.	**4.03**	**0.99**
14. Low number of scientists has happy marriages.	2.16	1.08
15. Scientists do not have enough time for their family.	2.70	1.23
16. Scientists like to go to laboratory even they have holiday.	3.53	1.00

When 1-1,80=Completely disagree, 1,81-2,60=Disagree, 2,61-3,40= Hesitant, 3,41-4,20=Agree, 4,21-5,0=Completely agree, table indicated that students only agreed with item 13.

Table 15: T Test Results of Distribution of Attitudes towards Daily Social Positions and Social Activities of Scientist Based on Gender

Gender	Mean	Standard Deviation	t	p
Female (N=16)	17.25	3.15	0.96	0.924
Male (N=14)	17.14	2.93	0.96	

There was no significant difference between attitude towards scientists' social status and social activities and gender variable (p>.05). It could be said that gender has no effect on attitudes towards scientists' social status and social activities.

Table 16: T Test Results of Distribution of Attitudes towards Daily Social Positions and Social Activities of Scientist Based on School Type

School type	Mean	Standard Deviation	t	p
Public (N=12)	17.75	3.74	0.815	0.422
Private (N=18)	16.83	2.43	0.749	

There was no significant difference between attitude towards scientists' social status and social activities and school type variable (p>.05). It could be said that school type have no effect on attitudes towards scientists social status and social activities.

Table 17: ANOVA Test Results of Distribution of Attitudes towards Daily Social Positions and Social Activities of Scientist Based on Class Level

	Sum of squares	df	Squared average	F	p
Between groups	32.409	2	16.204	1.916	.167
Intragroup	228.391	27	8.459		
Total	260.800	29			

There was no significant difference between attitude towards scientists social status and social activities and class level variable (p>.05). It could be said that class level have no effect on attitudes towards scientists' social status and social activities.

3.2.3 Attitudes of the Superior Intelligent and Gifted Students towards Character, Emotions, Properties, Work Life, and Ideas of the Scientist

Table 18: Findings of 3rd Sub-Scale of Scientific Person Attitude Scale

2. Findings for sub-scale	Mean	Standard Deviation
17. Scientists are willing to change their ideas.	3.43	0.93
18. Scientists are extremely smart.	3.10	1.26
19. Scientists never let a question go without finding answers.	**4.30**	**0.91**

20. Scientists must work extremely.	2.83	1.34
21. Scientists never change their ideas.	1.83	0.98
22. Scientists work on the area they know where they can get financial support or reward.	1.80	0.99
23. Scientists believe that nothing is certain.	3.13	1.13
24. Science is for men rather than women.	1.56	1.25
25. One of the most important properties of scientist is to be humble.	3.83	0.87
26. Scientists are racing each other.	2.50	1.16

When 1-1,80=Completely disagree, 1,81-2,60=Disagree, 2,61-3,40= Hesitant, 3,41-4,20=Agree, 4,21-5,0=Completely agree, table indicated that students only agreed with item 19.

Table 19: T-test results showing the distribution of the attitudes of scientists towards character, emotions, characteristics, work life and ideas based on gender

Gender	Mean	Standard Deviation	t	p
Female (N=16)	28.06	4.46	0.581	0.556
Male (N=14)	27.21	3.35	0.592	

There was no significant difference between attitude towards scientists' character, emotions, characteristics, work life and ideas and gender variable (p>.05). It could be said that gender has no effect on attitudes towards scientists' character, emotions, characteristics, work life and ideas.

Table 20: T-test results showing the distribution of the attitudes of scientists towards character, emotions, characteristics, work life and ideas based on school type

School type	Mean	Standard Deviation	t	p
Public (N=12)	29.16	3.95	1.76	0.089
Private (N=18)	26.66	3.71	1.74	

There was no significant difference between attitude towards scientists' character, emotions, characteristics, work life and ideas and school type variable (p>.05). It could be said that school type has no effect on attitudes towards scientists' character, emotions, characteristics, work life and ideas.

Table 21: ANOVA test results showing the distribution of the attitudes of scientists towards character, emotions, characteristics, work life and ideas based on class level

	Sum of squares	df	Squared average	F	p	Significant difference
Between groups	130.407	2	65.204	5.497	.010	5Th grade - 6th grade 5
Intragroup	320.259	27	11.861			
Total	450.667	29				

There was significant difference between attitude towards scientists' character, emotions, characteristics, work life and ideas and class level variable (p‹0,05). This

difference is based on the point differences between 5th and 6th grades based on t test results. According to results, it could be said that class level has an effect on attitudes towards scientists' character, emotions, characteristics, work life and ideas.

3.2.4 Attitudes of Superior Intelligence and Gifted towards Social Status of Scientists

Table 22: Findings of 3rd Sub-Scale of Scientific Person Attitude Scale

3. Findings for sub-scale	Mean	Standard Deviation
27. Everything produced by scientist are beneficial for society.	2.60	1.91
28. Scientists may not answer the questions of people.	**3.66**	1.09
29. Scientist are as healthy and well as other people.	**3.83**	0.84
30. When you meet a scientist, the scientist will probably be same as any other person.	3.36	1.32

When 1-1,80=Completely disagree, 1,81-2,60=Disagree, 2,61-3,40= Hesitant, 3,41-4,20=Agree, 4,21-5,0=Completely agree, table indicated that students only agreed with item 28 and 29.

Table 23: T Test Result Distribution of Attitudes towards Scientists Social Status Based on Gender

Gender	Mean	Standard Deviation	t	p
Female (N=16)	13.87	2.47	1.14	0.261
Male (N=14)	13.00	1.51	1.18	

There was no significant difference between attitude towards scientists' social status and gender variable (p>.05). It could be said that gender has no effect on attitudes towards scientists' social status.

Table 24: T Test Result Distribution of Attitudes towards Scientists Social Status Based on School Type

School type	Mean	Standard Deviation	t	p
Public (N=12)	12.91	1.83	-1.18	0.247
Private (N=18)	13.83	2.22	-1.230	

There was no significant difference between attitude towards scientists' social status (p>.05). It could be said that school type has no effect on attitudes towards scientists' social status.

Table 25: ANOVA Test Result Distribution of Attitudes towards Scientists Social Status Based on Class Level

	Sum of squares	df	Squared average	F	p
Between groups	1.433	2	.716	.153	.858
Intragroup	126.034	27	4.668		

	Sum of squares	df	Squared average	F	p
Between groups	1.433	2	.716	.153	.858
Intragroup	126.034	27	4.668		
Total	127.467	29			

There was no significant difference between attitude towards scientists' social status and class level (p>.05). It could be said that class level has no effect on attitudes towards scientists' social status.

4. Discussion and Comments

When images of scientist were evaluated based on Draw A Scientists Test results, stereotypical comments were observed. Students' perception of the scientists were translated as individuals who wore laboratory aprons, wore glasses, look messy, uses laboratory as work environment, and makes experiments. The results of this study are in line with the literature (Öcal, 2007; Kavak, 2008; Gümüş, 2009; Erdoğan, 2013; Kara, 2013; Bağ; 2013; Turgut et al.., 2017). In addition to these similarities, superior intelligent and gifted female and male students draw scientists as individual who used technology less frequently and who are far from knowledge sources.

When the drawings were examined, majority of superior intelligent and gifted female students draw female scientists and superior intelligent and gifted male students draw male scientists. It is believed that these results were obtained because female students thought themselves as scientists. It could be said that male students were affected by written-visual media, and the scientist concept frequently found in social memory (Erdoğan, 2013; Kara, 2013).

In the drawings, the students draw the scientists as the experimenters who experimented in the laboratory environment. It has been determined that scientists are perceived as individuals who are producing something, and pursuing exploration. It can be said that the scientist figure used in the textbooks is effective on students and image of science formed accordingly. It can also be said that the image of the scientist created in films, cartoons, media and children's books could also influence ideas of students. It would be useful to include scientists working in nature, social sciences and other fields to create a positive image of a scientist that scientists are not working only in experimental and laboratory environments.

When the research results were examined, it has been determined that superior intelligent and gifted students believed that scientists are people who work for the benefit of mankind and to improve knowledge. It could be stated that superior students see scientists as the basis for the development of knowledge and humanity.

Students have the idea that scientists are willing to find answers to the questions that come to their minds in a deliberate way. Students who think of scientists as researchers working in the laboratory perceive them as individual who pursue their goals.

It has been observed that superior intelligent and gifted students believed that scientists cannot always answer certain questions. This perception could be described as consistent with the nature of science. Scientist may not always find a solution for the hypothesis. Scientists who handle questions separately may prove the correctness or may revise the hypothesis (Medawar, 2005).

It has been determined that students perceived scientists as individuals who like to participate in sporting activities and are health and fit as other people could be linked.

5. Results and Recommendations

According to the obtained results, scientists were regarded as people working in the laboratory. Students perceive scientists as individuals who work in the field of science with their tools. Biographies of scientists from different areas could be included in education program for students to learn about these scientists. Organising meetings, seminars etc between scientists in different majors and students could contribute for the image of scientists. These activities could enable superior intelligent and gifted children to know scientists as role models.

Education programs could be redesigned to eliminate the scientist stereotype on the minds of superior intelligent and gifted students. New programs should emphasise that scientist could have different physical properties.

By collaborating with university and science centres, superior intelligent and gifted children who want to do scientific research could be supported.

To create positive scientist image on the minds of students, properties of scientists should be included in books, films, and magazines suitable for the development of these children. Bookshelves could be places to accessible areas and scientific publications could be added. Thus, students will be able to know scientists, follow scientific developments, and learn about their interests by observing publications that teachers or parents follow.

In addition to school and BİLSEM projects, other projects, studies, and activities could be promoted and the idea of scientists can work in every environment should be emphasised for superior intelligent and gifted children. During these activities, products could be emphasised, and students could be encouraged to feel like scientists.

Collaborating with universities for positive scientist image of BİLSEM teachers and creating common scientific projects would contribute to teachers who will affect the positive scientist image on the mind of students.

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