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Metaphorical Perceptions of Gifted Students Towards the Phenomenon of Studying Science Lesson

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Abstract

This study aimed to examine the symbolic perceptions of gifted students toward studying science lessons. The study was conducted with 210 gifted students. In this study, the descriptive survey method was preferred since it was aimed to reveal the metaphorical perceptions of gifted students towards studying science lessons. "Metaphor data collection form" was used as a data collection tool in the study. The metaphor data collection form includes the phenomenon of "Studying science lessons". The form includes the following: "The phenomenon name (e.g., studying science) is like ..... Because....." In the study, content analysis was used to analyze student data. Gifted students developed a total of 129 metaphors, including 53 different metaphors for the phenomenon of studying science lessons. The phenomenon of studying science lessons was classified into 12 different categories. The categories with the most metaphors were "entertainment and science", respectively. In the study, the most developed metaphors for "studying science lessons" were "play, life, research, science, knowledge and nature" metaphors. In this study, it was determined that gifted students find studying science lessons very entertaining and have very positive perceptions about studying science lessons. The metaphorical perceptions of gifted students toward studying science are generally positive. The results can be compared, and the reasons can be emphasized by researching normal student groups. This study was conducted with gifted students studying at the primary school level. It can also be conducted on gifted students who continue their high school education. A scale for studying science lessons can be developed. It can be applied to different samples using different measurement tools for studying science lessons. The metaphors of gifted students about studying in different courses can be examined, comparisons can be made between courses, and negative perceptions and thoughts, if any, can be identified.

Keywords: Gifted student, metaphor, studying science lesson.

Introduction

The Ministry of National Education (2005) stated the vision of the Science and Technology curriculum as "All students, regardless of their differences, should be trained to acquire science and technology literacy." In the curriculum of the MNE (2015), science-literate individuals are stated to be the individuals who research, question, make decisions, have sustainable development awareness, solve problems, are confident, communicate effectively, collaborate, and are lifelong learners. Science-literate individuals refer to those who have positive behaviors, skills, understanding, and values related to science, as well as the necessary understanding and psychomotor skills in the parts of science related to the "technology-society-environment." When individuals are distributed according to their intelligence scores, 2% of the general distribution is considered gifted. Individuals who score 130 and above on valid and reliable tests are considered gifted. While numerical skills and reasoning, the ability to analyze, and quick comprehension are signs of superior intelligence, individuals who exhibit superior qualities in areas requiring performance, such as painting, music, and physical activity, are considered gifted (Özsoy et al. 1998). According to Ataman (2000), children who have very superior performance in terms of intelligence in one or more areas of ability

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compared to their peers or who have latent power but show normal level characteristics in other areas are called gifted children.

Gifted children have above-average ability and creative and critical thinking skills. In addition, they are individuals who have developed problem-solving skills, have a sense of responsibility, have stronger reasoning skills than their peers, and can solve problems and make plans (Altıntaş, 2009). Considering the educational needs of gifted students, it is necessary to prepare activities at their own level and cognition level. Instead of thinking of gifted students as "they have high capacity anyway, they will be successful somehow", these students should be educated in the direction of their abilities through programmed education (Gökdere et al. 2003). When measures are not taken for the education of gifted students, some problems arise (Özsoy et al. 1992). Motivational problems are one of the factors that gifted students may experience and may lead to unexpected failure (Reis & McCoach, 2000). Determining the reasons for unexpected failure in gifted students makes it important to research their perceptions of studying. Giftedness in science is defined as a special area of ability with high potential for scientific thinking and -level natural science skills (Heller, 1993). Yager (1989) defined the characteristics of giftedness in science as "a strong interest in objects and the environment, a high interest in researching scientific phenomena, a tendency to make observations and ask questions, an ability to establish relationships between scientific concepts and observed phenomena, an unusual ability to offer creative and topical explanations, and a high interest in collecting, sorting and classifying objects". While it is accepted that individual student work is important in the learning process, students' studying habits and related skills are also gaining importance. It is believed that studying skills acquired during the school period and turned into habits will affect success in the post-school period (Türkcan & Öcal, 2003).

Many students are not successful despite devoting most of their time to studying. Intelligence is necessary but not sufficient to be successful. One of the factors required for success is the knowledge of effective study techniques (Aydıner, 2004). In some cases, the fact that gifted students show success in inverse proportion to their potential is that they do not have the right studying habits. A child who attempts to produce something after wasting most of his/her time cannot naturally use his/her latent power (Davaslıgil, 1999). Some gifted students cannot develop studying habits because they succeed easily in primary and secondary school. When special talent and systematic studying habits are combined, superior success is achieved. The concept of metaphor comes from the Latin word metaphors. Metaphor, in essence, is the meaning and experience of one thing with another thing (Lakoff & Johnson, 1980). Metaphors are expressed as one of the most powerful mental tools that structure, guide, and control our thoughts about the formation and process of concepts, are effective in concretizing concepts, and provide communication (Guerrero & Villamil, 2002; Hogler et al., 2008; Shaw & Mahlios, 2011). Lakoff & Johnson (2010) express the importance of metaphors in our lives with the following words: "Metaphors are creative because they direct our minds beyond existing and obvious similarities, relationships and views to new similarities, relationships, and views of their creation. What kind of perception gifted students have about studying science lessons is a matter of curiosity.

An examination of the literature on metaphor reveals that there are metaphor studies on various concepts. Existing studies were generally conducted with pre-service teachers, teachers, or secondary school students (Saban, 2008; Soysal & Afacan, 2012; Kaya et al., 2013; Aktamış & Dönmez, 2016; Ekici, 2016). When the literature abroad is examined, it is seen that there are various studies on the image of science and scientists (Schibeci & Sorensen, 1983; Chambers, 1983; Newton & Newton, 1992; Huber & Barton, 1995; Barman, 1996; McDuffie, 2001; Garbett, 2003; Schibeci, 2006).

In the literature review, it was seen that studies were conducted to reveal the metaphorical perceptions of pre-service teachers and students in different branches towards the concept of science or various concepts related to science. In these studies, participants' metaphorical perceptions of concepts such as "science", "science and technology course", "science and technology teacher", "physics", "chemistry", and "science laboratory" were determined. When we analyzed these studies, it was seen that pre-service science teachers were the main group whose metaphorical perceptions of science or related concepts were investigated. In these studies, pre-service science teachers' metaphorical perceptions of the concept of "science" (Afacan, 2011; Evren Yapıcıoğlu & Korkmaz, 2019), the concept of "science and technology course" (Toplu, 2015), the concept of "science and technology teacher" (Afacan, 2011), the concept of "chemistry" (Anılan, 2017), the concept of "science laboratory" (Arık & Benli Özdemir, 2016; Ural et al. 2018) and the concept of "physics" (Demir & Demir, 2019) were tried to be determined. Other sample groups in which metaphorical perceptions of science and related concepts were investigated are secondary school students (Aktamış & Dönmez, 2016; Toplu, 2015), elementary school students (Soysal & Afacan, 2012), pre-service preschool teachers (Taş et al. 2020), pre-service mathematics teachers (Evren Yapıcıoğlu & Korkmaz, 2019) and pre-service classroom teachers (Demirci Güler, 2012).

There are not many studies conducted on primary school students in this field. One of the studies tried to determine the status of metaphors of primary school students concerning the concepts of "science and technology course" and "science and technology teacher" (Soysal & Afacan, 2012). In another study, Saban (2008) tried to determine the images that teachers and students at the first level of primary education have about the concept of knowledge through metaphors. Şenel and Aslan (2014) investigated the metaphorical perceptions of pre-service preschool teachers about the concepts of science and scientists. In another study, Saban (2008) tried to determine the images that teachers and students at the first level of primary education have about the concept of knowledge through metaphors. Şenel and Aslan (2014) investigated the metaphorical perceptions of pre-service preschool teachers about the concepts of science and scientist. Bıyıklı, et al. (2015) determined the metaphors produced by middle and high school students about the concept of science. When the literature is examined, it is seen that metaphor studies have been conducted with gifted students to determine the gifted students' perceptions of "social studies lesson" (Mertol et al., 2013; Ünal & Er, 2015), "values" (Kurnaz et al. 2013; Topçu, 2015), "future" (Yam et al. 2018), "bilsem-science and art center and school" (Aslan & Doğan, 2016; Kunt & Tortop, 2013; Su et al.2017), "school and teacher" (Ogurlu et al. 2015), "biology" (Özarslan, 2019), "mathematics" (Arıkan & Ünal, 2015), "leadership" (Demirçelik et al. 2017) and "project" concepts (Nacaroğlu & Mutlu, 2020). No study was found in which the perceptions of gifted students towards "science and studying" were revealed.

There are not many studies conducted on primary school students in this field. One of the studies tried to determine the status of metaphors of primary school students concerning the concepts of "science and technology course" and "science and technology teacher" (Soysal & Afacan, 2012). In another study, Saban (2008) tried to determine the images that teachers and students at the first level of primary education have about the concept of knowledge through metaphors. Şenel and Aslan (2014) investigated the metaphorical perceptions of pre-service preschool teachers about the concepts of science and scientist. In another study, Saban (2008) tried to determine the images that teachers and students at the first level of primary education have about the concept of knowledge through metaphors. Şenel and Aslan (2014) investigated the metaphorical perceptions of pre-service preschool teachers about the concepts of science and scientist. Bıyıklı et al. (2015) determined the metaphors produced by middle and high school students about the concept of science. With this study, it is important to reveal gifted students' positive or negative perspectives towards studying science lessons. The study's results are expected to contribute to taking necessary measures if there are negative perceptions towards studying science lesson. From this point of view, the problem sentence of this study can be stated as "What are the metaphorical perceptions of gifted students towards studying science lesson?"

Method

In this study, the descriptive survey method was preferred since it was aimed to reveal the metaphorical perceptions of gifted students towards studying science lesson. In education, a descriptive survey model is adopted to learn people's attitudes, opinions, and beliefs (Salaria, 2012).

Study Group

Convenience sampling was used in this study. Researchers may prefer individuals that they can reach more easily to make their studies easier and faster (Yıldırım & Şimşek, 2011). The study was carried out with a total of 210 gifted students, whose characteristics are given in Table 1, studying in the 3rd, 4th, 5th, 6th, 7th, and 8th grades of Alanya Science and Art Center affiliated with the Alanya District Directorate of National Education in Antalya in 2 weeks in the spring semester of the 2020-2021 academic year.

Table 1. Number of students in the study group

Group	Grade	Girl	Boy	Total
Support education	3rd Grade	21	25	46
	4th Grade	9	20	29
Recognizing individual talents	5th Grade	41	39	80
	6th Grade	22	15	37
Developing special skills	7th Grade	5	6	11
	8th Grade	2	5	7
Total				**210**

Application Process

The researcher provided the necessary information about the purpose of the application and how it would be conducted in all classes. The students were informed about the research by reading the metaphor information section in the metaphor data collection form.

Data Collection Tools

While developing the data collection tool used in the study, the data collection tools used in the studies conducted to reveal metaphorical perceptions in the literature were examined (Uygur & Yolçun, 2019; Epçaçan et al. 2020; Nacaroğlu & Mutlu, 2020), and it was seen to be "Concept or Phenomenon (for example, studying) is like ..... Because....." Since this study is about revealing metaphorical perceptions, a metaphor data collection form containing "studying science lesson.....Because....." was prepared.

Analysis of Data

Content analysis, one of the qualitative data analysis methods, was used to analyze the metaphors developed by gifted students for the phenomenon of studying science lesson. In content analysis, connections that can express the data can be reached. In content analysis, similar codes are combined, organized, and interpreted in common categories and themes (Yıldırım & Şimşek, 2011). In analyzing the metaphors developed by gifted students, a five-stage process was followed: "coding and sorting, sample metaphor image compilation, category development, ensuring validity and reliability, and quantitative data analysis" (Saban, 2009). *Coding and Sorting Phase:* Each student's data collection form was coded and numbered S-1, S-2, ... All of the metaphors produced by the students were coded in an Excel file, and an alphabetical list was created. *Sample Metaphor Image Compilation Phase:* After the sorting process, the metaphors were again arranged in alphabetical order , the raw data were reviewed a second time, and one sample metaphor statement was selected from the student sentences representing each metaphor. *Category Development Phase:* The metaphors developed by the students were combined in the same categories by bringing together similar answers. *Ensuring Validity and Reliability:* Since the phases of analyzing the data obtained in the study were explained in detail, study validity was ensured (Yıldırım & Şimşek, 2011). The reliability of the data analysis was calculated by using the formula [Agreement / (Agreement + Disagreement) x 100] proposed by Miles & Huberman (1994). In the metaphors in this study, the approximate reliability values between the researcher and the expert for each concept were determined in the range of 90 %. *Quantitative Data Analysis Phase:* For the phenomenon examined in this study, a frequency table was made for all data representing the metaphors and categories produced.

Findings

In this section, the metaphors created by gifted students about the phenomenon of "studying science lesson" and the categories that these metaphors are combined according to their similarities are shown as a frequency table.

Science and Art Center Students' Metaphors Related to the Phenomenon of "Studying Science Lesson"

Science and Art Center students participating in this study expressed the phenomenon of "studying science lesson" with a total of 129 metaphors, including 53 different metaphors. The data related to these metaphors are shown in Table 2.

Table 2. Student metaphors for the phenomenon of "studying science lesson"

Metaphor	Frequency	Metaphor	Frequency
Play	23	Dream	1
Life	13	Family	1
Research	6	Human	1
Science	6	Road	1
Information	5	Step	1
Nature	5	Patience	1
Reading a book	4	Travel	1

Amusement Park	4	Traveling	1
Party	3	Growing up	1
Beautiful	3	Labyrinth	1
Space	3	Ice cream	1
School	3	Orange	1
Scientist	3	Core	1
Chocolate	3	Diver	1
Playground	2	Recognizing the world	1
Being a professor	2	Knowing everything	1
Boring	2	Being aware	1
Teacher	2	Bee	1
Traveler	2	Plant	1
Reading a book	2	Bird Bird	1
Swimming	1	Wearing a mask	1
Phone	1	Going to Heaven	1
Television	1	Shining light into the darkness	1
Sense organs	1	Planet	1
Sound	1	Sun	1
Searching on the internet	1	Understanding how substance is	1
Distinctive properties of substances	1	Total	53

Categories of Metaphors Related to the Phenomenon of Studying Science Lesson

In the study, the metaphors produced by Science and Art Center students for the phenomenon of "studying science lesson" were combined into twelve different categories as " Entertainment ", "Science", "Emotion", "Place", "Human", " Achieving the goal", "Food", "Curiosity", "Living Creature", "Boring", "Hope" and "Sky" according to their common characteristics. The frequencies of the categories are shown in Table 3.

Table 3. Categories of metaphors related to the phenomenon of studying science lesson

Categories	**Frequency**
Entertainment	35
Science	28
Emotion	19
Place	11
Human	7
Achieving the goal	7
Food	6
Curiosity	6
Living Creature	3
Boring	3
Hope	2
Sky	2
Total	129

When Table 3 is examined, it is seen that the category with the highest number of metaphors in the category distribution of metaphors related to the phenomenon of "studying science lesson" is "Entertainment" (f=35). In the "Entertainment" category, there are a total of 35 metaphors with seven different categories shown in Table 4: "game (23), amusement park (4), party (3), playground (2), swimming (1), telephone (1) and television (1)".

Table 4. Student metaphors related to the category of "Entertainment."

Categories	**Metaphors and their numbers**	**Frequency (f)**
	Game	23

Entertainment	Amusement Park	4
	Party	3
	Playground	2
	Swimming	1
	Phone	1
	Television	1
	Total (7)	***35***

The metaphors developed by some students in the entertainment category and their justifications are given below. *S46: "Studying science lessons is like playing a game. Because we can learn by having fun.", S106 ""Studying science lessons is like an amusement park. Because learning new information is like riding a new amusement park ride. Because learning new information is like riding a bike in a new amusement park. S106: ". Because studying science lesson is like going to a party.", S156: "Studying science lesson is like a playground. Because playgrounds are very entertaining, I think science is also very entertaining.", S95: "Studying science lesson is like swimming. Because you swim in a lot of information.", S207: "Studying science lesson is like a telephone. Because I have fun both on the phone and in science class.", S17: "Studying science lesson is like watching television. Because it is enjoyable."* When Table 3 is examined, it is seen that the second category in the category distribution of metaphors belonging to the phenomenon of "studying science lesson" is "Science" (f=28). In the science category, there are a total of 28 metaphors with 10 different categories shown in Table 5: "research (6), science (6), information (5), reading a book (4), being a professor (2), sense organs (1), sound (1), knowing everything (1), distinctive properties of substances (1) and understanding how substance is (1)".

Table 5. Student metaphors related to "science" category

Categories	Metaphors and their numbers	Frequency (f)
Science	Research	6
	Science	6
	Information	5
	Reading a book	4
	Being a professor	2
	Sense organs	1
	Sound	1
	Knowing everything	1
	Distinctive properties of substances	1
	Understanding how substance is	1
	Total (10)	***28***

The metaphors developed by some students in the science category and their justifications are given below. *S38: "Studying science lesson is like research. Because science lesson is to leave your work to the results of research, not to chance.", S48: "Studying science lesson is like research. Because we research while studying science lesson.", S43: "Studying science lesson is like science. Because without science, there would be no science lesson.", S133: "Studying science lesson is like information. Because we get a lot of new information.", S136: "Studying science lesson is like reading a book. Because books teach us something.", S174: "Studying science lesson is like being a professor. Because it is very important to think while studying science lesson.", S122: "Studying science lesson is like sensory organs. Because science explains these things.", S122: "Studying science lesson is like sound. Because we always study sound channels in science lessons.", S49: "Studying science lesson is like knowing everything. Because it tells you everything." S190: "Studying science lesson is like the distinctive properties of substances. Because it is the subject of science." S189: "Studying science lesson is like understanding how the substance is. Because in science we examine what everything is."* When Table 3 was examined, it was seen that the third category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "emotion" (f=19). In the emotion category, there are a total of 19 metaphors with 4 different categories shown in Table 6: "life (13), beautiful (3), boring (2), and dream (1)".

Table 6. Student metaphors related to the "emotion" category

Categories	Metaphors and their numbers	Frequency (f)
Emotion	Life	13
	Beautiful	3

	Boring	2
	Dream	1
	Total (4)	***19***

The metaphors developed by some students in the emotion category and their justifications are given below. *S32: "Studying science lesson is like life. Because we learn information about our life and living.", S19: "Studying science lesson is like life. Because we discover the substances and beings in life with science lessons.", S37: "Studying science lesson is like beauty. Because we understand why the things we call beautiful are beautiful.", S120: "Studying science lesson is like beauty. Because science lesson is very beautiful. ", S169: "Studying science lesson is boring. Because people do not like to study a lot.", S87: "Studying science lesson is boring. Because I don't like science lessons at school, I like Bilsem because it is full of activities.", S77: "Studying science lesson is like a dream. Because it is my favorite lesson."* When Table 3 was examined, it was seen that the fourth category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "Place" (f=11). In the place category, there are a total of 11 metaphors with 3 different categories shown in Table 7: "nature (5), space (3) and school (3)".

Table 7. Student metaphors related to the "place" category

Categories	Metaphors and their numbers	Frequency (f)
Place	Nature	5
	Space	3
	School	3
	Total (3)	***11***

The metaphors developed by some students in the place category and their justifications are given below. *S31: "Studying science lesson is like nature. Because we understand and discover nature as we get to know it.", S51: "Studying science lesson is like nature. Because in this lesson, we learn about human beings and their environment.", S191: "Studying science lesson is like space. Because we learn about space in science lesson.", S198: "Studying science lesson is like school. Because we work in science class and we work in school."* When Table 3 was examined, it was seen that the fifth category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "Human" (f=7). In the place category, there are a total of 7 metaphors with 4 different categories shown in Table 8: "scientist (3), teacher (2), family (1) and human (1)".

Table 8. Student metaphors related to the "human" category

Categories	Metaphors and their numbers	Frequency (f)
Human	Scientist	3
	Teacher	2
	Family	1
	Human	1
	Total (4)	***7***

The metaphors developed by some students in the human category and their justifications are given below. *S71: "Studying science lesson is like a scientist. Because we do research and experiment in science class, in short, we feel like a scientist.", S14: "Studying science lesson is like a teacher. Because it tells us the things in our lives.", S3: "Studying science lesson is like a family. Because science class helps us develop and so does the family.", S56: "Studying science lesson is like human. Because human beings are made up of science.* When Table 3 was examined, it was seen that the sixth category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "Achieving the goal" (f=7). In the place category, there are a total of 7 metaphors with 7 different categories shown in Table 9: "life (1), step (1), patience (1), travel (1), traveling (1), growing up (1) and labyrinth (1)".

Table 9. Student metaphors related to the "Achieving the goal" category

Categories	Metaphors and their numbers	Frequency (f)
Achieving the goal	Road	1
	Step	1
	Patience	1
	Travel	1
	Traveling	1

	Growing up	1
	Labyrinth	1
	Total (7)	***7***

The metaphors developed by some students in the achieving the goal category and their justifications are given below. *S24: "Studying science lesson is like life. Because science lesson is life itself.", S52: "Studying science lesson is like a step. Because when we study science lesson, we take a step towards success.", S154: "Studying science lesson is like patience. Because some experiments require patience.", S69: "Studying science lesson is like travel. Because we learn as we travel, see, hear and live.", S129: "Studying science lesson is like traveling. Because when we study science lesson, we learn new things and we want to do more research.", S164: "Studying science lesson is like growing up. Because you constantly learn new things.", S82 "Studying science lesson is like a labyrinth. Because if there is a mistake somewhere, you cannot reach the result, but if you do not give up and change your path, you will eventually succeed."* When Table 3 was examined, it was seen that the seventh category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "Food" (f=6). In the food category, there are a total of 10 metaphors with 4 different categories shown in Table 10: "chocolate (3), ice cream (1), orange (1) and seeds (1)."

Table 10. Student metaphors related to the "Food" category

Categories	**Metaphors and their numbers**	**Frequency (f)**
Food	Chocolate	3
	Ice Cream	1
	Orange	1
	Seeds	1
	Total (4)	***6***

The metaphors developed by some students in the food category and their justifications are given below. *S71: "Studying science lesson is like chocolate. Because it gives people happiness.", S178: "Studying science lesson is like an orange. Because I like both doing science lessons and eating oranges.", S73: "Studying science lesson is like eating seeds. Because I like studying science lesson, I feel like doing it more and more."* When Table 3 was examined, it was seen that the eighth category in the category distribution of metaphors related to "studying science lesson" was "curiosity ". In the curiosity category, there are a total of 6 metaphors with 5 different categories shown in Table 11: "traveler (2), diver (1), getting to know the world (1), searching on the internet (1), and being aware.

Table 11. Student metaphors related to the "Curiosity" category

Categories	**Metaphors and their numbers**	**Frequency (f)**
Curiosity	Traveler	2
	Diver	1
	Getting to know the world	1
	Searching on the internet	1
	Being aware	1
	Total (5)	***6***

The metaphors developed by some students in the curiosity category and their justifications are given below. *S137: "Studying science lesson is like a traveler. Because you discover new things.", S58: "Studying science lesson is like a diver. Because each time you dive deeper and get new information.", S4: "Studying science lesson is like getting to know the world. Because we learn everything about the world in the lesson.", S93: "Studying science lesson is like searching on the internet. Because you always learn new things.", S86: "Studying science lesson is like being aware. Because even if you know what is going on in the environment, you learn the details of it, and if you don't know, you want to take a closer look and feel curious."* When Table 3 was examined, it was seen that the ninth category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "living creature". In the living creature category, there are a total of 3 metaphors with three different categories shown in Table 12: "bee (1), plant (1) and bird (1)".

Table 12. Student metaphors related to the "Living Creature" category

Categories	**Metaphors and their numbers**	**Frequency (f)**
Living creature	Bee	1
	Plant	1

	Bird	1
	Total (3)	***3***

The metaphors developed by some students in the living creature category and their justifications are given below. *S26: "Studying science lesson is like a bee. Because bees work with flowers to obtain honey and pollen to make them better.", S2: "Studying science lesson is like a plant. Because it is good for people and ourselves.", S193: "Studying science lesson is like a bird. Because each species has a different feature and beauty."* When Table 3 was examined, it was seen that the tenth category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "boring"(f=3). In the boring category, there are a total of 2 metaphors with two different categories shown in Table 12: "reading a book (2) and wearing a mask (1)".

Table 12. Student metaphors related to the "Boring" category

Categories	Metaphors and their numbers	Frequency (f)
	Reading a book	2
Boring	Wearing a mask	1
	Total (2)	***3***

The metaphors developed by some students in the boring category and their justifications are given below. *S34: "Studying science lessons is like reading a book. Because studying science lessons can sometimes be boring and sometimes entertaining, like reading a book.", S208: "Studying science lessons is like wearing a mask. Because wearing a mask is boring, like studying."* When Table 3 was examined, it was seen that the eleventh category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "Hope"(f=2). In the hope category, there are a total of 2 metaphors with 2 different categories shown in Table 13: “shining light into the darkness (1) and going to heaven (1)”.

Table 13. Student metaphors related to the "Hope" category

Categories	Metaphors and their numbers	Frequency (f)
	Going to heaven	1
Hope	Shining light into the darkness	1
	Total (2)	***2***

The metaphors developed by some students in the hope category and their justifications are given below. *S50: "Studying science lessons is like shining light into the darkness because it allows us to research and learn the unknown." S91: "Studying science lessons is like going to heaven. Because I love science lesson."* In Table 3, it was seen that the twelfth category in the category distribution of metaphors related to the phenomenon of "studying science lesson" was "Sky"(f=2). In the sky category, there are a total of 2 metaphors with 2 different categories shown in Table 14: "planet (1) and sun (1)".

Table 14. Student metaphors related to "Sky" category

Categories	Metaphors and their numbers	Frequency (f)
Sky	Planet	1
	Sun	1
	Total (2)	***2***

The metaphors developed by some students in the sky category and their justifications are given below. *S116: "Studying science lesson is like a planet. Because we learn about the planets.", S94: "Studying science lesson is like the sun. Because they both enlighten us.*

Discussions and Conclusions

Gifted students developed 129 metaphors with 53 different metaphors about the phenomenon of studying science lesson. There are scientific studies on "science lesson" and "studying" in the literature. In this context, the results of the studies examining the metaphorical perceptions of students towards the phenomena of "science lesson" and "studying" in the literature were examined. In this study, the most frequently developed metaphors for "studying science lesson" were "play, life, research, science, information and nature" metaphors.

The results of this study are similar to some studies conducted in the literature to reveal metaphorical perceptions. In the study of Kalaycı (2018), 3rd and 4th-grade elementary school students used metaphors

belonging to the categories of "informative", "descriptive" and "entertaining" regarding the phenomena of "science" and "science lesson". While 3rd grade students mostly compared the science lesson to "science", "information," and "life" metaphors, 4th-grade students compared it to "science", "information" and "life" metaphors. Some of the metaphors reached by Kalaycı (2018) and the "science, information, entertainment and life" metaphors produced by gifted students in this study are compatible. In this study, it was observed that the metaphors such as "information, play, amusement park, playground, scientist and book" produced by the students for the phenomenon of studying science lesson matched with the metaphors such as "information, play, riddle, amusement park, scientist and book" produced by primary school students for the phenomena of "science and technology lesson" and "science and technology teacher" in Soysal & Afacan's (2012) study. When the explanations of the metaphors produced by the gifted students in the study were examined, they stated that studying science lesson was entertaining and that it was in life. In Bartoszeck & Bartoszeck's (2017) study, it was also found that primary and secondary school students found science lessons entertaining and made statements expressing that the concept of science has an important place in people's lives. In this study, it was seen that the "life" metaphor produced by the gifted students was supported by the "life" metaphor produced by the pre-service teachers in the study of Palic Sadoğlu & Durukan (2018) regarding the phenomena of science lesson, science laboratory, science teacher and science student. In this study, it was seen that metaphors such as "life and science" produced by gifted students were supported by metaphors such as "life and doing science" produced by pre-service teachers in Önal & Kızılay's (2017) study in which mental perceptions about science and technology lesson were determined through metaphors. Similarly, in the study of Aktamış & Dönmez (2016), it was seen that middle school students mostly produced metaphors such as "science, experiment, and life" for the phenomenon of "science lesson".

In Gökbulak, Uzun & Şenler's (2020) study, the category of "entertainment environment" among the metaphors produced by pre-service primary school teachers about the phenomenon of "science laboratory" and the category of "entertainment" in this study are similar. In the study of Ural & Başaran Uğur (2018), the "playground" metaphor among the metaphors created by prospective classroom and science teachers about the phenomenon of "science laboratory" and the "amusement park and playground" metaphors produced by gifted students in the study are similar. In the study of Arık & Benli Özdemir (2015), the metaphor of "playground" among the metaphors produced by pre-service science and technology teachers about "science laboratory" and the metaphor of "playground" produced by gifted students in this study are similar. In the study of Akarçay, Demirezen & Akhan's (2013), the "bee" metaphor produced by the students in the findings of the research question "Which metaphors have primary school students developed about regular studying?" is the same as the "bee" metaphor produced by gifted students in this study. In the study, it was seen that the metaphors of "nature, human, research and science" produced by gifted students were in line with the objectives of "exploring nature, understanding the relationship between human-environment and scientific research approach", which are among the main objectives of the Science Curriculum of the MNE (2018), which aims to raise individuals as science literate. The metaphors such as, "information, scientist, being a professor and knowing everything" produced by gifted students match with the objectives of "helping to understand how scientific knowledge is created by scientists, the processes that this knowledge goes through and how it is used in new researches", which are among the main objectives of the Science Curriculum. Metaphors such as "traveler, diver, getting to know the world, searching on the internet and being aware" produced by gifted students in the category of curiosity support the objectives of "arousing interest and curiosity about the events occurring in nature and its immediate surroundings and developing attitudes", which are among the main objectives of the Science Curriculum. In addition, the goal of "gaining basic knowledge about astronomy", which is among the main objectives of the Science Curriculum, is compatible with the "space, planet, and sun" metaphors produced by gifted students.

Consequently, analyzing the metaphors produced by gifted students for the phenomenon of studying science and the categories they were related to, it was determined that there was no negative perception towards studying science except for the students who stated that studying science was boring in 3 metaphors out of 129 metaphors produced in total. Gifted students produced different metaphors about the phenomenon of studying science lesson. Gifted students produced different metaphors about the phenomenon of studying science lesson. Revealing various dimensions of a phenomenon can only be possible by producing a large number of metaphors about it (Yob, 2003). This study revealed the phenomenon of gifted students studying science lesson by gifted students with different dimensions and characteristics. Each metaphor produced by the study participants indicates that they have different understandings (Cerit, 2008).

The research results indicated that gifted students generally associate studying science with researching, exploring, learning the functioning of the world, learning by doing and experiencing, using scientific process steps, and being science literate. In the study, gifted students expressed the phenomenon of studying science

with the dimension of learning science rather than studying. The possible reason for this situation may be that gifted students do not have difficulty studying science. In the study, one of the students (*S157) stated, " Studying science lessons is like ice cream. This is because it ends immediately."* In his book, Berger (1991) stated that gifted students do not need to learn time management and effective study methods because school is very easy for them until the 7th grade (and maybe higher). In previous studies, it was detected that there was no relationship between gifted students' study habits and their achievement in science lessons (Bayır, 2015; Çetin, 2023). The fact that gifted students have study habits since they like science lessons was shown as the reason for this result (Bayır, 2015). Çalıkoğlu (2009) stated that gifted students can successfully perform the learning or tasks required of them with little effort due to their high sense of self and self-confidence, and attributed this to the fact that they are aware of their abilities from an early age and have no experience of failure. In the research results, gifted students associated studying science with "doing research". *S48 said, "Studying science is like doing research because we research while studying science."* and likened studying science to doing scientific research. Student *S129 said, "Studying science lessons is like traveling because when we study science lessons, we learn new things and we want to do more research."* and *S50: "Studying science is like shining a light in the darkness because it allows us to research and learn the unknown."* They emphasized that researching while studying science teaches them new things. Russell and Martin (2023) stated that the main goal of science lessons is to raise individuals who research, not memorize, science concepts.

In the research findings, gifted students associated studying science with "learning everything". Explaining this situation, one of the students (*S49) said, "Studying science is like knowing everything, because it tells you everything."* and emphasized the relationship between studying science and "scientific literacy". Science literacy is the ability of every citizen in society to understand and explain some scientific concepts and phenomena at the most basic level (Kaya & Bacanak, 2013). One of the students *(S4) said, "Studying science is like getting to know the world, because we learn everything about the world in the lesson."* He drew attention to the fact that studying science lessons allows us to get to know the world we live in. In the literature, science is defined as a science that explains the world and enables students to examine, learn and understand the natural world (Irez, 2006). In the research results, gifted students associated studying science with "scientific process skills". One of the students (*S38) said, "Studying science is like doing research because studying science lesson is not leaving the work to chance, but to the results of research." He emphasized "concluding"* in causal processes, which is one of the dimensions of scientific process skills. One of the students (*S154) said, "Studying science is like patience because some experiments require patience."* and emphasized "experimenting" in experimental processes, which is one of the dimensions of scientific process skills. One of the students (*S82) stated, "Studying science lessons is like a maze because if there is a mistake somewhere, you cannot reach the result, but if you do not give up and change your path, you will eventually find success."* He explained the study of science lesson very effectively by emphasizing "changing and controlling variables", which is one of the dimensions of scientific process skills.

In the research findings, gifted students associated studying science with "scientist". One of the students (*S71) said, "Studying science lessons is like being a scientist because we do research and experiment in science class, in short, we feel like scientists."* and *(S174), "Studying science class is like being a professor because it is very important to think while studying science"* and (S174) stated that studying science enabled them to think like a scientist. A scientist is a person who tries to obtain information systematically by using scientific methods of obtaining data about phenomena and variables related to the universe. In the research findings, gifted students associated studying science with "science". One of the students *(S43) said, "Studying science is like scholarship because without science, there would be no science lesson."* He pointed out that science is a part of science, but not all science is science. In the research findings, gifted students associated studying science with "learning by doing and experiencing". One of the students *(S69) said, "Studying science is like traveling because we learn as we travel, see, hear, and live."* He stated that studying science lessons involves learning by doing and experiencing. Since education is a lifelong activity, learning emerges through doing and experiencing (Bender, 2005).

In the research results, gifted students associated studying science with "curiosity". One of the students (*S86) said, "Studying science is like realizing because even if you know what is happening in the environment, you learn the details, and if you don't know, you want to take a closer look and feel curiosity."* Thus, he emphasized that studying science lessons activates a sense of curiosity in them. In Mecek's (2017) study with gifted students, one of the students shared his thoughts with the statement, *"I cannot understand why we look at the blackboard when my teacher talks about ferns in science class. I am curious about ferns because I don't know them, and I am asking you. I would like to touch this fern and inhale its smell if I could"*. In the research results, gifted students associated studying science with "being successful".One of the students (*S3) said, "Studying science is like a family, because science class helps us develop, and so does the family."* So, he emphasized that studying science would bring them success. Families play an important role in

preparing the appropriate environment for study, providing the necessary materials, and supporting the student morally (Eren, 2011). It is stated that there is a positive relationship between family and teacher support variables and academic achievement (Türkoğlu et al. 2011). One of the students (*S52) emphasized that studying science would lead to success by saying, "Studying science lessons is like a step because when we study science, we take a step towards success."*

In the research results, some gifted students associated studying science lessons with " boring". One of the students *(S87) emphasized that studying science lessons is more fun when there are activities by saying, "Studying science lessons is like being boring, I don't like science lessons at school, but I like BİLSEM. It is full of activities."* Yılmaz and Çaylak (2009), in their study on BİLSEM students, stated that the majority of the parents of the students stated that BİLSEM contributed positively to the science achievement of the students (*there are activities in BİLSEM)*.

Recommendations

The metaphorical perceptions of gifted students toward studying science are generally positive. The results can be compared, and the reasons can be emphasized by researching normal student groups. This study was conducted with gifted students studying at the primary school level. It can also be conducted on gifted students who continue their high school education. A scale for studying science lessons can be developed. It can be applied to different samples using different measurement tools for studying science lessons. The metaphors of gifted students about studying in different courses can be examined, comparisons can be made between courses, and negative perceptions and thoughts, if any, can be identified.

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