

The Characteristics of Gifted Students' Perceptions of Intelligence*

Dilek İlhan Beyaztaşⁱ
Erzincan Binali Yıldırım University

Abstract

This study aims to determine the characteristics of gifted students' perceptions of intelligence and the effective factors in the formation of these perceptions. The research is based on the explanatory sequential mixed-methods design. The research group consists of gifted students studying general ability in the fifth and seventh grades at Erzincan Science and Art Center. According to quantitative data of the study, the arithmetic means of the incremental theory of intelligence were higher than those of the fixed theory of intelligence on the basis of gender and grade level variables. However, qualitative data indicated that 9 (75%) of 12 students perceived intelligence as fixed.

Keywords: Gifted, Growth Mindset, Fixed Mindset, Perception of Intelligence

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ⁱ Dilek İlhan Beyaztaş, Assoc. Prof. Dr., Primary School Education, Erzincan Binali Yıldırım University, ORCID: 0000-0002-7642-9087

Email: dilekilhanbeyaztas@gmail.com

INTRODUCTION

Gifted individuals are generally defined as those having an accurate, rapid and good memory in terms of cognitive qualities (Hoh, 2008). Similarly, Worrell et al. (2018) define giftedness as having superior performance in certain areas compared to peers. Clark (2002), on the other hand, defines it as superiority in the development of various brain functions in the biological context. Albeit common points in the definitions, there is no consensus. Hence, the concept of “giftedness” is discussed in terms of characteristics rather than the definition. In this line, Stenberg (2005) considers gifted individuals to have three characteristics, being creative, analytical and practical. In this regard, Stenberg (2005) defines gifted individuals under three titles, being creative, analytic and practical. Renzuli (1978), on the other hand, emphasizes above-average talent, creativity and high level of task commitment characteristics. Likewise, Clark (2002) describes the characteristics of gifted individuals in terms of cognition, creativity, leadership and art. Olszewski-Kubilius et al. (1988) describe gifted individuals as those with an intrinsic motivation to learn while Kanevsky (1992) defines them as individuals who make more effort in performing a task because they approach it with curiosity and interest. In addition, Porter (1999) states that gifted children organize the problem-solving process with a more systematic approach, while Stenberg (1997) states that they can use skills such as describing the problem, organizing information, using strategies, monitoring and controlling the solution process more effectively.

These explanations describe intelligence, giftedness and its characteristics, yet do not include information about how gifted individuals perceive intelligence, which is the focus point of this process. However, the motivations and actions of people are based on their perceptions of the situation rather than the reality of the present situation (Bandura, 1995, p.2). Therefore, it is important to determine how learners’ perceptions of intelligence affect their behaviors. In this context, one of the theories trying to explain the relationship between perception and talent is Mindset/ Implicit Theory. The focus of this theory, developed by Dweck (2000), is the learners’ perception of intelligence and their reflections on behavior.

According to this theory, the perception of intelligence is classified under two titles, being fixed and incremental intelligence (Dweck, 2000, p. 2-4).

Entity/fixed theory

In the entity/fixed theory, which emphasizes that intelligence is at a certain level in individuals and it is an irrevocable feature, the priority is to get high marks for students. However, as the process is performance-oriented, students can easily give up when they encounter difficulties, they decrease the levels of effort and avoid tasks that might be difficult for them (Dupeyrat and Mariné, 2005, p.44).

Incremental/growth theory

In incremental/growth theory which emphasizes that intelligence is a feature that can be developed through learning, students prioritize learning. For this, students mainly focused on improving their own skills and acquiring new knowledge. To this end, they make more effort and insists to overcome the difficulty in case of possible failure (Dupeyrat and Mariné, 2005, p.44). From this point on, failure is no longer thought as a disappointment or embarrassment, but rather the thought that failure is an opportunity for improvement prevails (Brock & Hundley, 2016).

Dweck (2012) defined both theories in five key areas as challenges, obstacles, effort, criticism and success of others. Figure 1 summarises the information on the responses of individuals in different situations according to their perceptions (Dweck, 2012, p.245, diagram by Nigel Holmes).

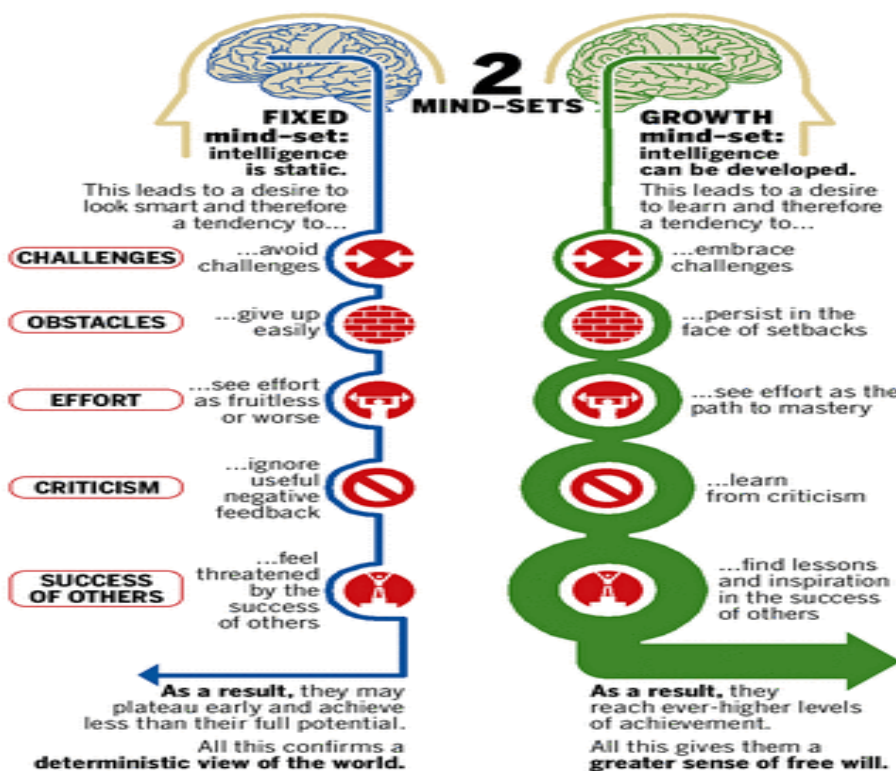


Figure 1: Mindset theory (Dweck, 2012, p.245, diagram by Nigel Holmes)

In the literature review, it is reported that intelligence theory adopted by students affects their success and success tendency (Dweck, 2000; Elliot & Dweck, 1988; Dupeyrat and Marine, 2005; Siegle et al., 2010), motivations (Haimovitz et al., 2011) and efforts (Stipek & Gralinski, 1996, Dupeyrat and Mariné, 2005). Additionally, teachers' perceptions of intelligence also affect their students' achievements (Lynott and Wolfolk, 1994; Lee, 1996). Since the fixed mindset teachers perceive the current situations as unchangeable, they think their impact on students' achievement will be limited (Brock & Hundley, 2016). Therefore, they can negatively affect the development of the idea of being successful in students and eliminate the chance of success (Dweck, 2012). However, growth mindset teachers, who believe that students' capacities can be developed, have a positive effect on motivating their students and helping them succeed (Paunesku et al., 2015). In addition, the language (e.g., praise, criticism) that both teachers and parents use for students' studying or success can also have a positive or negative effect on how students perceive intelligence and success (Dweck, 2012).

Gifted students are likely to contribute to solving existing problems in society in the fields they have chosen in line with their own potential (Esparza, Shumow & Schmid, 2014). Especially in terms of developing countries, it is important to educate gifted students who think that intelligence can be developed in order for countries to reach the desired level of prosperity. However, when the literature is reviewed, it is seen that there are limited studies on how gifted students perceive intelligence. Nevertheless, it is known that especially gifted children are likely to develop fixed mindsets (Dweck, 2012). Accordingly, it is important to determine the characteristics of intelligence perception of students and the factors that affect the formation of this perception in order to develop the perception of intelligence in the desired manner in gifted students. To this end, the following quantitative and qualitative questions were discussed in this study.

Quantitative Research Questions:

1. What are the characteristics of gifted students' perceptions of intelligence?
2. Is there a difference between the characteristics of gifted students' perceptions of intelligence by gender variable?
3. Is there a difference between the characteristics of gifted students' perceptions of intelligence by grade level variable?

Following the analysis of quantitative data, the researcher needed to investigate how gifted students define the concept of intelligence and what factors affect their perception of intelligence (both fixed and incremental intelligence). In this scope, the answers to the following research questions were sought to clarify the issue in depth through quantitative data.

Qualitative Research Questions:

1. According to the quantitative data, how do the gifted students, who perceive intelligence as fixed and incremental, define intelligence according to the quantitative data?
2. According to the quantitative data, what are the views of the gifted students who perceive intelligence as fixed and incremental about their perception of intelligence and the factors affecting this perception?

METHODOLOGY

The explanatory sequential mixed-methods design was used in this study. It involves “ a two-phase project in which the researcher collects quantitative data in the first phase, analyzes the results, and then uses the results to plan the second”, qualitative phase to better explain the quantitative data (Creswell, 2014).

In the first stage of the research, quantitative data were collected and analyzed. In the second stage, qualitative data were collected and analyzed to support the data previously obtained during the quantitative research process. Findings obtained from both quantitative and qualitative analyses were interpreted in association with each other.

Study Group

The study population consists of 24 students studying general ability at the fifth, sixth and seventh grade levels at Erzincan Science and Art Center in the second semester of the 2018-2019 academic year. Science and Art Centers educational institutions opened to provide support education in order to ensure that gifted students, as determined by the exam at the primary school level, use their capacities at the highest level by developing their abilities while also studying at formal education institutions.

The sample of quantitative data was selected via the purposive sampling method, which is one of the non-random sampling methods, and consisted of 21 volunteer students in the fifth, sixth and seventh grades at Erzincan Science and Art Center.

The sample of qualitative data consists of 12 voluntary students who were determined by the criterion sampling method among purposive sampling methods. Although the sampling was based on voluntary participation, the scores received from the “Implicit Theory of Intelligence Scale” were taken into consideration as the main criterion. Accordingly, 6 students (2 females and 1 male from the 5th grade, 1 boy from the 6th grade and 2 boys from the 7th grade) who got the highest score from the subscale “Fixed Theory of Intelligence” and 6 students (2 females from the 5th grade, 1 female and 1

male from the 6th grade and 2 males from the 7th grade) who got the highest score from the subscale “Incremental Theory of Intelligence” of the scale were included in the study group. Information about the sample of the research is presented in Table 1.

Table 1. Demographic characteristics of the qualitative and quantitative sampling

	Gender	Grade Level					
		5th Grade		6th Grade		7th Grade	
		F	%	f	%	F	%
Qualitative	Female	4	33	1	8	-	-
	Male	1	8	2	16	4	33
Quantitative	Female	1	5	5	24	1	5
	Male	4	19	4	19	6	29

Data Collection Tools

For quantitative data, the “Implicit Theory of Intelligence Scale” adapted to Turkish by İlhan-Beyaztaş and Hymer (2016) was used. “Implicit Theory of Intelligence Scale” is a 6-item measurement tool developed by Dweck (2000) to determine learners' perception of intelligence. The 6-point Likert-type scale can be scored from “strongly agree” to “strongly disagree”. The scale consists of two dimensions called “Fixed Theory of Intelligence” (you have a certain level of intelligence and there is not much you can really do to change it) and “Incremental Theory of Intelligence” (you can change your basic intelligence level significantly). Cronbach's alpha reliability coefficient of the Turkish version of the scale was found 0.81 and 0.70 for the dimensions “fixed theory of intelligence” and “incremental theory of intelligence”, respectively.

A semi-structured interview form consisting of 12 questions was used for the qualitative data. The following steps were followed in the preparation and implementation of the interview form:

1. The literature review was conducted to determine the implicit theory of intelligence, factors affecting the perception of intelligence, basic characteristics and the scope of these factors.
2. Based on the criteria obtained from the literature, a 14-question draft form was created and applied to 2 students studying at the Erzincan Science and Art Center. The basic criteria were determined based on the information obtained from the literature and student interviews. The interview questions were then written according to the determined criteria.
3. In order to determine the content validity of the draft form, two experts, being one Turkish language expert and one measurement expert were consulted. Required regulations and changes were made in line with the opinions received.
4. Two students studying at Erzincan Science and Art Center were interviewed in order to determine the convenience of the draft form in terms of serving the purpose and its comprehensibility. In line with the suggestions of the students, the necessary corrections were made on the interview questions. In order to finalize the draft form, the interview form consisting of 12 questions was re-discussed with 2 field experts who got Ph.D. in the field of education programs and teaching as well as publications on the Implicit Theory of Intelligence.

Data Analysis

For qualitative data; the interviews conducted with the semi-structured interview forms lasted an average of 20-30 minutes. During the interviews, the parental consent of the participants was obtained and the interviews were recorded with a voice recorder. The voice records of the interviews

were transcribed by the researchers. The content analysis technique was used in the evaluation of the obtained data. Content analysis is “a scientific approach that investigates social reality by objectively and systematically classifying, digitizing and making inferences from the message of oral, verbal and other materials in terms of meaning and/or grammar” (Tavşancıl and Aslan, n.d., p. 22). In the process of content analysis, the steps defined by Elo and Kynagäs (2008, p. 110) were followed. In this scope, all data were read twice by two researchers independently to generate codes. Themes were created based on the associated codes. MAXQDA software was used to create codes and themes. The data was re-read and re-arranged according to these codes and themes.

In addition, to ensure internal validity, the data was continuously discussed and examined with an expert. The obtained codes and themes were re-examined by three experts and were re-arranged and finalized according to their feedbacks. To determine the reliability of the qualitative data, the formula suggested by Miles and Huberman (1994, p. 64) was used and the consistency between the researchers (coders) was determined to be 0.78. According to Miles and Huberman (1994), the reliability rate close to 80 is regarded as sufficient.

For quantitative data; descriptive statistics such as arithmetic mean and standard deviation were used to determine the characteristics of learners' perception of intelligence in line with the purpose of the study. The Mann Whitney U test was used for the gender and grade levels of the students' perception of intelligence.

FINDINGS

The data obtained are given under headings in line with the sub-purposes of the research.

Quantitative Finding

1. What are the characteristics of gifted students' perceptions of intelligence?

The first sub-problem of the study is to answer the question “What are the characteristics of gifted students' perceptions of intelligence?” and the related descriptive scores are presented in Table 2.

Table 2. Arithmetic Mean and Standard Deviations of Gifted Students' Perceptions of Intelligence

	FTI		ITI	
	\bar{X}	SD	\bar{X}	SD
General	11.85	5.27	15.14	3.03

As presented in Table 2, the mean value of the students on the incremental theory of intelligence was higher than the one on the fixed theory of intelligence. Wilcoxon signed-rank test was used to determine whether there was a significant difference between the mean scores of the students and it was found that there was a significant difference in favor of the incremental theory of intelligence ($z = 2.298$, $p < 0.05$).

2. Is there a difference between the characteristics of gifted students' perceptions of intelligence by gender variable?

The second sub-problem of the study is to answer the question “Is there a difference between the characteristics of gifted students' perceptions of intelligence by gender variable?” and the related descriptive scores are given in Table 3.

Table 3. Arithmetic Mean and Standard Deviation Scores of Gifted Students' Perceptions of Intelligence by Gender Variable

Gender	FTI		ITI	
	\bar{X}	SD	\bar{X}	SD
Girl (n: 7)	10.14	4.91	14.85	2.47
Male (n: 14)	12.71	5.41	15.28	3.36

As presented in Table 3, the mean value of both female and male students on the incremental theory of intelligence was higher than the one on the fixed theory of intelligence.

Mann-Whitney U test, among non-parametric tests, was used to determine whether there was a difference between the groups by the gender factor and the results showed no significant difference for either FTI or ITI dimension ($U = 31, p > 0.05$).

In addition, the Wilcoxon signed-rank test, a non-parametric test, was used to determine whether there was a significant difference between the FTI and ITI scores for each gender. Accordingly, there was no significant difference between the FTI and ITI scores of male students ($z = -1.146, p > 0.05$) while the ITI scores of female students were significantly different from the FTI scores ($z = -1.992, p < 0.05$).

3. Is there a difference between the characteristics of gifted students' perceptions of intelligence by the grade level variable?

The third sub-problem of the study is to answer the question "Is there a difference between the characteristics of gifted students' perceptions of intelligence by the grade level variable?" and the related descriptive scores are presented in Table 4.

Table 4. Arithmetic Mean and Standard Deviations of Gifted Students' Perceptions of Intelligence by the Grade Level Variable

Grade Level	FTI		ITI	
	\bar{X}	SD	\bar{X}	SD
5th grade (n:5)	14.4	2.3	15.0	2.0
6th grade (n: 9)	7.44	3.64	14.22	4.14
7th grade (n:7)	15.71	4.42	16.42	1.39

As presented in Table 4, the mean value of the students on the incremental theory of intelligence was higher than the scores on the fixed theory of intelligence at all grade levels.

Mann-Whitney U test was used to determine whether there was a significant difference between the groups by the grade level factor and it was found that there was a significant difference in the scores on the fixed theory of intelligence. Accordingly, 5th-grade students significantly differed from the 6th-grade students ($U = 2, p < 0.05$) and 7th-grade students significantly differed from 6th-grade students ($U = 5,5, p < 0.05$).

In addition, the Wilcoxon signed-rank test was used to determine whether there was a significant difference between the FTI and ITI scores at each grade level. Accordingly, there was no significant difference between the FTI and ITI scores of 5th grade ($z = -.412, p > 0.05$) and 7th-grade students ($z = -.368, p > 0.05$) while the ITI scores of 6th-grade students significantly differed from the FTI scores ($z = 2.437, p < 0.05$).

Qualitative Finding

The content analysis of gifted students' views on intelligence, perception of intelligence and the factors affecting this perception was determined under the themes of “Intelligence Indicator”, “Fixed and Incremental Theories of Intelligence ”and “Factors Affecting the Perception of Intelligence”.

4. According to the quantitative data, how do the gifted students, who perceive intelligence as fixed and incremental, define intelligence according to the quantitative data?

4.1. Intelligence indicator

The codes obtained from the views of the gifted students about the definition of intelligence as well as the frequency of occurrence of these codes are presented in Table 5.

Table 5. Views and Frequency of Gifted Students on Definition of Intelligence

Themes	Codes	5 th Grade Student (5)		6 th Grade Student (3)		7 th Grade Student (4)	
		f	%	f	%	f	%
		Intelligence Indicator	Being knowledgeable	-	-	-	-
Capable of problem-solving	-		-	-	-	1	8
Understanding quickly and performing easily	2		16	1	8	4	33
High marks	3		25	2	16	2	16
Being reasonable	-		-	1	8	1	8
Thinking differently and finding new things	-		-	1	8	-	-

As presented in Table 5, high scores were reported as an intelligence indicator by 7 (58.3%) of 12 students, understanding easily and performing quickly by 7 (58,3%) and being reasonable by 2 (16%). Considering the findings in association with the quantitative data, it was found that 2 students with a perception of incremental intelligence among 5 participants at the 5th grade level and 2 students with a perception of incremental intelligence among 4 participants at the 7th grade defined intelligence according to the fixed intelligence perception. In addition, it was observed that only one of the 2 students who had a perception of incremental intelligence among 3 participants at the 6th grade defined intelligence according to the perception of fixed intelligence. Direct quotations on the theme “Intelligence Indicator” are presented below.

4.2. Student Expressions on the Theme ”Intelligence Indicator”

7th Grade-Male Student

“..... I don't believe that intelligence can be measured by things like paper, pencils, exams. I think the intelligent person is the one who can solve problems easily when in trouble, can answer the questions correctly and overcome them comfortably”

5th Grade-Female Student

“..... For example, if a person gets a high mark in terms of lessons, I would call him intelligent. If not, I would not call him intelligent...”

5. According to the quantitative data, what are the views of the gifted students who perceive intelligence as fixed and incremental about their perception of intelligence and the factors affecting this perception?

5.1. Fixed and Incremental Theories of Intelligence

The codes obtained from the views of the gifted students on the perception of intelligence and the frequency of these codes are presented in Table 6.

Table 6. Views and Frequency of Gifted Students on the Perception of Intelligence

Themes	Codes	Grade Student (5)		Grade Student (3)		7th grade Student (4)	
		f	%	F	%	f	%
Fixed Theory of Intelligence	Being born intelligent	3	-	2	16	4	32
	Not studying	3	32	2	16	3	24
	High mark-oriented studying	1	8	1	8	4	33
	Doubting intelligence in case of failure	3	25	-	-	1	8
Incremental Theory of Intelligence	The belief that intelligence can be improved	2	16	1	8	-	-
	Studying	2	16	1	8	-	-
	Learning-oriented studying	1	16	1	8	-	-
	Persistence in making effort	1	8	1	8	-	-

According to Table 6, 9 (75%) of 12 students reported that intelligence is perceived as fixed, while 3 (25%) stated that they perceive it as incremental. Considering the findings in association with the quantitative data, on the other hand, it was found that the quantitative and qualitative data were compatible with each other for the 5th and 6th grade students, while 2 students with the perception of incremental intelligence among 4 participants at the 7th grade made explanations according to the fixed intelligence perception.

Under the theme fixed theory of intelligence, 8 students (66.7%) reported that they do not study and 6 students (50%) reported that they study only for high marks also. Under the theme incremental theory of intelligence, 3 students (25%) reported that they study and 2 students (16%) reported that they study with the purpose of learning. Direct quotations on the theme “fixed and incremental theories of intelligence” are presented below.

5.1.1 Student Statements on the Theme “Fixed and Incremental Theories of Intelligence”

7th Grade-Male Student (FTI)

Student: *I think intelligence is an innate talent, not something that can be achieved by studying. I know there are different areas of intelligence; visual intelligence, mathematical intelligence and so on. For example, if a person is playing an instrument like a violin, saz etc., or if he can draw well or if he quickly completes mathematics transactions, I think he is an intelligent person.*

Teacher: *So you think you're born intelligent?*

Student: *Yes.*

Teacher: *For example, do you think that a person, no matter what, can't be intelligent by working hard?*

Student: *I don't think that he can be.*

Teacher: *For example, you say you're born intelligent. Do you think you can improve your intelligence by studying a little more?*

Student: *Most probably.*

Teacher: *So if you can improve it and why not the others?*

Student: *Because an intelligent-born person has potential. But, it is not possible to take a passerby and turn him into an intelligent one...”*

6th Grade- Female Student (FTI)

Teacher: *Is a person who got a higher mark than you higher than you more intelligent than you are?*

Student: *Because he works harder.*

Teacher: *Is he more intelligent?*

Student: *I don't think so because he's not here (BİLSEM). Of course, there's no such thing as every intelligent person comes here, but I don't think so.*

Teacher: *So how can he get higher marks than you when he's not more intelligent than you are?*

Student: *Because he studies.*

Teacher: *So why do you study less than him?*

Student: *Because I am a contended person. Even if I get the lowest mark (from the exam), it makes no difference to me. My goal is to finish school with a high success certificate."*

5th Grade- Female Student (ITI)

Student: *I think people can be intelligent by studying.*

Teacher: *So, are you born intelligent or became intelligent by studying?*

Student: *I still do not understand but in the end, I am at this institution. Being here requires working hard but still, I have the advantage of high IQ. But I think I become intelligent by working.*

Teacher: *So, does your studying below or above your friends'?*

Student: *Definitely above their studying level. Because I solve test problems regularly, I read books and try to learn. I even study during breaks from time to time. Since I love reading, our Turkish teacher calls me a bookworm."*

5.2. Factors Affecting the Perception of Intelligence

The codes obtained from the views of the gifted students about the factors affecting the perception of intelligence as well as the frequency of occurrence of these codes are presented in Table 7.

Table 7. Views and Frequency of Gifted Students on Factors Affecting the Perception of Intelligence

Themes	Codes	5 th Grade Student (5)		6 th Grade Student (3)		7 th grade Student (4)	
		f	%	f	%	f	%
Teacher's Behaviors	Praising Intelligence	2	-	-	-	2	16
	Emphasizing hard-work	3	25	3	25	2	16
Family's Behavior	Praising Intelligence	1	8	-	-	1	8
	Emphasizing hard-work	4	33	3	25	3	25

As presented in Table 7, 4 (33%) of 12 students reported that teachers praise intelligence while 2 students (16%) reported that families praise intelligence. In addition, 8 students (67%) reported that teachers emphasize hard-work while 10 students (83%) reported that families emphasize hard-work. Direct quotations on the theme "Factors Affecting the Perception of Intelligence" are presented below.

5.2.1. Student Expressions on the Theme "Factors Affecting the Perception of Intelligence"

5th Grade-Female Student

"... My family always says that I need to study. If I study, they say, I will be successful. They say intelligence is not enough without studying. So, I study..."

5th Grade-Male Student

“..My family says that I am both intelligent and chatterer. I like it when they say I am intelligent. But, they have the expectation of high marks which I do not much like. They set 85 as the limit for me, I am not allowed to get any mark below this. Therefore, I feel pressure in hard exams. They get very angry when I get a low mark. For this reason, I study only to get a high mark, not more than that.”

CONCLUSION AND RECOMMENDATIONS

This study aims to determine the characteristics of gifted students' perceptions of intelligence and the effective factors in the formation of these perceptions. To this end, the explanatory sequential mixed-methods design was used to first collect quantitative data and then qualitative data to get a more in-depth perspective. In this framework, mean scores of gifted students on the “Implicit Theory of Intelligence Scale” are analyzed under the categories; general total, gender and grade level variables. Accordingly, arithmetic means of ITI were found higher than those of FTI. In this scope, general total scores of the students indicate that the ITI scores of female students and 6th-grade students significantly differed from the FTI scores. However, no significant difference was found between the FTI and ITI scores of 5th and 7th-grade levels and male students. This finding is particularly noteworthy. Albeit the significant difference in general score means in favor of ITI, the discontinuity of this difference in specific is to be taken into consideration. The literature shows that male students especially face the risk of being unsuccessful academically (Autor & Wasserman, 2013). Accordingly, it is stated that if teachers include low-level growth mindset practices in the classroom, they may cause, especially male students, to develop the feeling of inadequacy towards their own potential and belief in success (Mesler, Corbin & Martin, 2021). In a study conducted by Van Bommel (2014), gifted and non-gifted two groups at secondary school level were compared and it was found that the FTI scores of gifted students were found higher also. In the study by Mofield and Peters (2018), among gifted, advanced, and typical students in Grades 6 to 8 (N = 416) no statistically significant difference in growth or fixed mindset beliefs about intelligence among groups. This findings does not overlap with the finding of the present study. In addition, Dweck (2012) reports that gifted students tend to adopt the fixed theory of intelligence in time due to high concerns regarding their intelligence. This statement is partially supported by the qualitative findings of the present study. Within the scope of qualitative data, 9 (75%) of 12 students stated that they perceive intelligence as fixed. There can be many different reasons why students perceive intelligence as fixed. One of these is the statements used by teachers and families while praising children. It was found the fact that families and teachers praise only intelligence and do not attach importance to effort leads students to adopt the perception that intelligence is innate and fixed. In this scope, 4 (33%) of 12 students reported that teachers praise intelligence while 2 students (16%) reported that families praise intelligence. In addition, 8 students (67%) reported that teachers emphasize hard-work while 10 students (83%) reported that families emphasize hard-work. According to the literature, this finding is supported by high ITI scores found in quantitative data while it is not supported by the high number of students who adopt FTI in qualitative data. In this direction, it was determined that parents and teachers praise intelligence and do not value effort, causing the perception that intelligence is fixed and innate in students (Mueller ve Dweck, 1998). In addition, in the study conducted by Laine, Kuusisto, & Tirri (2016) on Finnish teachers, it was determined that teachers shape the teaching and learning process at school according to the fixed, growth or mixed mindset they have adopted for their gifted students. Accordingly, a positive and significant relationship was found between teachers who have a growth mindset perception and developing a growth mindset perception in students (Mesler, Corbin & Martin, 2021). In the study conducted by Rattan, Good & Dweck (2012), it was determined that teachers' comfort-oriented feedback (e.g., "It is OK not to be good at math") resulted in a fixed mindset among students in terms of both students' perception of their teachers and their expectations about their own potential. However, teachers play a key role in the education of gifted students. It is necessary to emphasize the importance of teacher education in the change of approaches applied in the education of gifted students (Kirsi, 2017). In this context, it may be beneficial to apply additional and new practices in teacher education programs in order to improve the teachers' perception of intelligence and

prospective teachers in a desirable way because the growth mindset education given in the learning process is one of the most important pedagogical approaches in order to develop creativity in students.

The limitation of the study is the small research group. To overcome this, it can be recommended collecting qualitative and quantitative data on a larger research group. In addition, it can be recommended for further studies to be experimental research to detect the factors leading gifted students to perceive intelligence as fixed and to create intervention programs to this end. Such research is deemed important bearing in mind the prevailing Industrial Revolution 4.0 in the 21st century in which the needed skills can only be translated into reality by training gifted students who believe in working and effort.

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