T. C.
ISTANBUL AYDIN UNIVERSITY
INSTITUTE OF SOCIAL SCIENCES

MULTIPLE INTELLIGENCE THEORY IN MULTIPLE CHILDREN: TWINS AND TRIPLETS

PhD Thesis

Özlem Pakize ŞİNİK

Department of English Language and Literature
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Thesis Advisor:
Prof. Dr. Birsen TÜTÜNİŞ

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18/10/2017

T.C.
İSTANBUL AYDIN ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ MÜDÜRLÜĞÜ
DOKTORA TEZ ONAY BELGESİ

Enstitümüz İngiliz Dili ve Edebiyatı Anabilim Dalı, İngiliz Dili ve Edebiyatı Lisans Sonrası Doktora Programı Y1112.620007 numaralı öğrencisi Özlem Pakize ŞİNİK'in "MULTIPLE INTELLIGENCE THEORY IN MULTIPLE CHILDREN: TWINS AND TRIPLETS" adlı doktora tez çalışması Enstitümüz Yönetim Kurulunun 24/03/2017 tarih ve 2017/06 sayılı kararı ile oluşturulan jüri tarafından ..oybirliği.. ile Doktora tezi olarak ..kabul.. edilmiştir.

	Unvan- Ad-Soyad	İmza
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Sosyal Bilimleri Enstitüsü Yönetim Kurulu'nun ..... tarih ve ..... sayılı kararı ile onaylanmıştır.

Prof. Dr. Özer KANBUROĞLU

Enstitü Müdür Vekili

DECLARATION

I hereby declare that this doctoral thesis entitled “Multiple Intelligence Theory in Multiple Children: Twins and Triplets” has been written by me in accordance with the academic rules and ethical conduct. I also declare that all materials benefited in this thesis consist of the mentioned resources in the reference list. I verify all these with my honor. (…../…../2017)

Özlem Pakize ŞİNİK

Dedicated to My 7/24- hour co-advisor- my spouse and my 12 year-old twin daughters and 6 year-old son, of course my life long supporters: my mom and dad.

FOREWORD

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THANK YOU ALL

October, 2017 **Özlem Pakize ŞİNİK**

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ABBREVIATIONS

MI	**:** Multiple Intelligence
MIT	**:** Multiple Intelligence Theory
MIS	**:** Multiple Intelligence Scale
MIDAS	**:** Multiple Intelligence Development Assessment Scale
TIMI	**:** The Teele Inventory for Multiple Intelligence
IQ	**:** Intelligence Quotient
PDR	**:** Psikolojik Danışmanlık Rehberlik (Psychological Consultant and Guidance)
EQ	**:** Emotional Quotient
MB	**:** Multiple Births
ART	**:** Assisted Reproductive Technology
MC	**:** Multiple Children: Twins and Triplets
MZ	**:** Monozygotic Twins/Identical Twins
DZ	**:** Dizygotic Twins/Fraternal Twins
DNA	**:** Deoxyribo Nucleic Acid
TEOG	**:** Temel Öğretimden Orta Öğretime Geçiş Sınav Sistemi (The Transition Exam from Primary Education to Secondary Education)
YGS	**:** Transition Exam from High School to Vocational High Schools in Turkey
LYS	**:** University Entrance Exam in Turkey
USA	**:** United States of America
FAQ	**:** Frequently Asked Questions
MEB	**:** The Ministry of National Education
GDCN	**:** General Directorate of Civil Registration and Nationality
TUIK	**:** Turkish Statistical Institute
PhD	**:** Doctor of Philosophy
SEN	**:** Special Educational Needs
C-Section	**:** Cesarean Section (A Kind of Delivery Method)
NICU	**:** Neonatal Intensive Care Unit
IVF	**:** In Vitro Fertilization
HIPS	**:** Hacettepe Institute of Population Studies
GDCN	**:** General Directorate of Civil Registration and Nationality
NLP	**:** Neuro-Linguistic Programming
ELT	**:** English Language Teaching
WPPSI	**:** Wechsler Preschool and Primary Scale of Intelligence
WISC	**:** Wechsler Intelligence Scale for Children
WAIS-R	**:** Wechsler Adult Intelligence Scale-Revised
PE	**:** Physical Education

ADHD	**:** Attention Deficit Hyperactivity Disorder
IT	**:** Information Technology
PC	**:** Personal Computer
SPSS	**:** Statistical Package for Social Sciences
PPT	**:** Power Point Presentation
V	**:** Vertex
TAMBA	**:** Twins and Multiple Births Association
CAS	**:** Cognitive Assessment System
YÖK	**:** Council of Higher Education in (COHE)
YTM	**:** Council of Higher Education Thesis Center
M	**:** Mean
N	**:** Number
f	**:** Frequency
SD	**:** Standard Deviation
SS	**:** Sum of Square
MS	**:** Mean Square
df	**:** Degree of Freedom
p	**:** Significance Level
RQ	**:** Research Question
SI	**:** Structure of Intelligence
TUIK	**:** Turkish Statistical Institute
ANOVA	**:** Analysis of Variance
SACs	**:** Science and Art Centers

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ÇOKLU (İKİZ, ÜÇÜZ) ÇOCUKLARDA ÇOKLU ZEKA KURAMI

ÖZET

Bu çalışma, 2014-2015 Eğitim- Öğretim yılı Bahar Dönemi ve 2015-2016 Eğitim-Öğretim yılı Güz Döneminde, İstanbul Esenler İlçesindeki 42 okulda (21 ilkokul, 21 ortaokul) eğitim gören, 679 ikiz ve 33 üçüz teki birinci ve altıncı sınıf (6/7-11/12 yaş) öğrencilerinin çoklu zekâ çeşitlerinin belirlenmesi, ve doğum sırası, cinsiyet, ikiz türü ve sınıf faktörlerin çoklu zekâlarına etkisinin tespit edilmesi üzerinedir.

Araştırma kapsamında, çoklu çocuklarda çoklu zekâ kuramının etkisini ölçmek için "Multiple Intelligences Development Assessment Scales (MIDAS) Assessment" Shearer'dan (2007) esinlenerek Çoklu Zekâ Anketi (ÇZA) 5'li Likert ölçeği kullanılarak araştırmacı tarafından oluşturulmuş ve uygulanmıştır. Ayrıca çoklu çocukların demografik bilgilerini edinebilmek amacıyla oluşturulan "Çoklu Çocuk Aile Tanıma Formu" öğrencilerin aileleri tarafından cevaplandırılmıştır. Araştırma sonucunda, 679 ikiz teki ve 33 üçüz teki (679+33= 712) öğrencinin verileri betimsel istatistik kullanılarak değerlendirilmiştir.

Çalışma kapsamında dört araştırma sorusuna cevap aranmıştır. İlk araştırma sorusu olarak, ikiz ve üçüz çocukların doğum sırası değişkenine bakıldığında, ilk doğan (Çocuk A), ikinci doğan (Çocuk B) ve üçüncü doğan (Çocuk C) çocuklar arasında, çoklu zekâ gelişmişliği açısından istatiksel olarak anlamlı bir fark bulunmadığı gözlemlenmiştir. İkinci araştırma sorusu olarak, ikiz türünün çoklu zekâ çeşitliği üzerindeki etkisine bakılmıştır. Sonuç olarak, çift yumurta ikizlerinin sözel ve müzikal zekâ alanlarında tek yumurta ikizlerine göre istatiksel açıdan daha yüksek puanlar aldıkları görülmüştür. Zigot türü, üçüz çocukların aileleri tarafından bilinmediği için değerlendirilmeye alınmamıştır. Üçüncü araştırma sorusu olarak; cinsiyet faktörünün, ikiz-üçüz çocukların çoklu zekâ çeşitliği üzerindeki etkisine bakılmıştır. Kız ikiz teklerinin sözel, müzikal ve sosyal zekâ alanlarında erkek ikiz teklerine göre istatiksel olarak anlamlı şekilde daha yüksek puanlar aldıkları görülürken, erkek ikiz teklerinin, matematiksel zekâ alanında kız ikiz teklerine göre istatistiksel olarak anlamlı şekilde daha yüksek puanlar aldıkları görülmüştür. Üçüz çocuklarda ise cinsiyet faktörü ve çoklu zekâ arasında istatiksel olarak anlamlı bir fark görülmemiştir. Son araştırma sorusu olarak sınıf faktörünün ikiz-üçüz çocukların çoklu zekâ çeşitliliği üzerindeki etkisine bakılmıştır. İkiz çocuklarda, dört zekâ türünde (matematiksel zekâ, bedensel zekâ, doğa zekâsı ve içsel zekâ) zekâ alanları ile eğitim gördükleri sınıfları arasında istatiksel olarak anlamlı farklılıkların olduğu görülmüştür. Buna göre, matematiksel zekâ alanında, beşinci sınıf öğrencilerinin,

birinci sınıf öğrencilerinden anlamlı şekilde daha yüksek puan aldıkları görülmüştür. Bedensel zekâ alanında ise beşinci sınıf öğrencilerinin birinci ve ikinci sınıf öğrencilerinden istatiksel olarak daha yüksek puanlar aldıkları görülmüştür. İçsel zekâ alanında, dördüncü, beşinci ve altıncı sınıf öğrencilerinin birinci sınıf öğrencilerinden istatiksel olarak daha yüksek puanlar aldıkları gözlenmiştir. Son olarak, doğa zekâ alanında, beşinci, dördüncü ve üçüncü sınıf öğrencilerinin birinci sınıf öğrencilerinden anlamlı bir şekilde daha yüksek puanlar aldıkları görülmüştür. Sınıf faktörünün, üçüz öğrencilerin çoklu zekâ gelişimlerine olan etkisine bakıldığında, üst; altıncı, beşinci ve dördüncü sınıflardaki öğrencilerin görsel zekâ alanında sırasıyla birinci sınıftaki öğrencilerden istatiksel olarak yüksek puanlar aldıkları görülmüştür.

Çalışmanın geneline bakıldığında, ikiz çocuklar aynı anda doğmuş bireyler olmalarına karşın "ikiz türü", "cinsiyet" ve "sınıf" değişkenlerinin ikiz öğrencilerin çoklu zekâlarında istatiksel olarak farklılık göstermesine neden olduğu görülürken, "doğum sırası"nın istatiksel olarak anlamlı bir etkisi görülmemiştir. "Cinsiyet" ve "doğum sırası"nın üçüz çocukların çoklu zekâ çeşitliliğinde istatistiksel olarak bir etkisi gözlenmemiş olmakla birlikte, sınıf faktörünün etkisinin üst sınıflardaki üçüz çocukların uzamsal/görsel zekâlarında istatiksel olarak daha yüksek olduğu görülmüştür.

Anahtar Kelimeler: *İkiz, Üçüz, Çoklu Zekâ*

MULTIPLE INTELLIGENCE THEORY IN MULTIPLE CHILDREN: TWINS AND TRIPLETS

ABSTRACT

The aim of this dissertation is to investigate 6/7- 11/12 year-old 679 co-twins and 33 triplet siblings' multiple intelligence types in Turkish context and to find out how they differ in terms of birth order, zygote type, gender and grade level factors.

The subjects, aged 7- 12 were chosen from the 1st and 6th grade levels, in 42 schools (21 Primary, 21 Middle schools) in Esenler/Istanbul during the Spring Term of 2014-2015 and the Fall Term of 2015-2016 academic years.

The data of the study was gathered through two data collection instruments. The first data collection instrument was an adapted version of Shearer's (2007) "Multiple Intelligences Development Assessment Scales (MIDAS)" and the second one was a "Family Information Form".

The analysis of the data obtained from 679 co-twins and 11 sets of triplets (712 children in total) tried to answer four research questions. The first research question aimed at investigating the relationship between birth order and multiple intelligence, and it was found that there was no statistically significant relation between birth order (Child A, Child B and Child C) and multiple intelligence types in twins and triplets. The second research question focused on analyzing the effect of twin types (zygote types) on multiple intelligence type, and it was found that fraternal/DZ twins had significantly higher scores on verbal/linguistic and musical intelligences than identical/MZ twins. However, zygote type was not considered and analyzed in triplet students since their zygote types were not known. The third research question was on the analysis of gender factor among twins and triplets and it was found that female co-twins had significantly higher scores on verbal, musical and inter-personal intelligences than male co-twins. However, male co-twins had significantly higher scores than female co-twins on mathematical intelligence. As gender factor was analyzed, no significant difference was found in triplet students. Last research question aimed at investigating the relationship between grade level and multiple intelligence in multiple children. It was found that there were significant differences at four intelligences in twins: mathematical/logical intelligence, kinesthetic/bodily intelligence, nature intelligence and intra-personal/individual intelligence. At mathematical/logical intelligence, 5th grade students had significantly higher scores than 1st grade students. At kinesthetic/bodily intelligence, 5th grade students had significantly higher scores than 1st and 2nd grade students. At

intra-personal/individual intelligence, 4th, 5th and 6th grade students had significantly higher scores than 1st grade students. At nature intelligence, 3rd, 4th and 5th grade students had significantly higher scores than 1st grade students. Among triplet siblings, it was observed that 6th, 5th and 4th graders have significantly higher spatial/visual intelligence scores than 1st graders.

As a result, it was seen that even though twins were born together, their multiple intelligence rates and types were different from each other, and were affected by "twin type", "gender" and "grade level" factors but not by "birth order" factor. In triplets, it was found that there was a statistically significant relation between grade level factor and multiple intelligence types but not between gender and birth order factors and multiple intelligence types.

Keywords: *Twins, Triplets, Multiple Intelligences.*

1. INTRODUCTION

Individual differences are very important especially in the field of education. The reason for the Multiple Intelligence Theory (MIT), which is introduced for the first time in 1983 by Howard Gardner, to be accepted by educators since two decades, is the fact that it gives importance and chance to develop individual differences. Gardner (2009) is surprised when educators give much more interests to the theory than psychologists. He states that the reason can be related to psychologists' dealing more with the IQ.

According to Multiple Intelligence Theory, every human being cannot be labeled or restricted by only Intelligence Quotient (IQ) tests. Everybody (including twins and triplets) has different types of intelligence.

> "No two individuals—not even identical twins—have exactly the same intellectual profile. That is because, even when the genetic material is identical, individuals have different experiences; and those who are identical twins are often highly motivated to distinguish themselves from one another (Gardner, 1993)".

Gardner mentions that twins, even though they are identical/MZ twins, they represent different individualities that should be respected they should be encouraged to develop them. At this point, the field of education and educators have vital roles on their individual developments.

The Basic Law of the Turkish Ministry of National Education (MEB) numbered 1789 (MEB, 1973) explains in the first part of Article 2 Number 2 that its general primary educational purpose is to ensure that all Turkish citizens

- have a balanced and healthy character and individuality, physically, mentally, ethically, emotionally,
- have free scientific thinking skills and a wide range of point of view,

- are respectful of human rights and individual enterprises,
- are responsible citizens who are creative, constructive and fruitful.

In Number 3:

- are prepared for life in the Turkish Republic, equipping them with required knowledge, abilities, behaviors and cooperative duties according to their individual interests and abilities,
- have a profession that will make them happy and contribute to the happiness of society.

In the second part of the basic principles of MEB, Article 6 explains that all citizens are educated according to their interests and abilities and then attend the appropriate programs or schools during their educational process. These principles are essential for multiple children, whose numbers have risen in Turkey. 109,138 twins and 2,647 triplet students, who represent Piaget's concrete operational period (between 1st and 6th grade levels), are registered between 2004 and 2009 [1](Şinik, 2016). Even though there is a considerable number of multiple children, there is not enough information about them and their educational process, which causes them to become disadvantaged people (since teachers of multiple children may not know how to educate and behave them) in the field of education. In order to support and develop individual learning differences of twin and triplet students, Multiple Intelligence Theory, which considers intelligence differences, might be fruitful during their educational process.

1.1 Statement of the Problem

A considerable amount of twin and triplet population, especially in Western nations, at a rate of 1:80 (1 set of twins in 80 births) is seen (Hellin, 1895). This rate can change in Eastern nations. In spite of their considerable number, there are limited scientific studies about them. Most of the existing studies are in the field of psychology, health, and genetics rather than the field of education, not only in Turkey but also in the world.

[1] The registration was taken from the General Directorate of Civil Registration and Nationality

Therefore, the lack of information in educational field about twins and triplets might prevent them from revealing their individuality and being more successful during their educational lives.

Most problems are seen when multiple children start school. Multiple children are compared with each other according to their IQ scores, success, and failure and school grades during their educational lives not only by their families but also their teachers and the society. Thus, the most successful multiple sibling goes forward and is praised but the slower one falls backward and is vilified. Howard Gardner (2003) in his Multiple Intelligence Theory (MIT) promotes the idea that intelligence cannot be measured through IQ and each individual has the capacity to possess eight types of intelligence (in the updated version, there are nine types of intelligence including existential intelligence). Hence, MIT might be a fruitful idea for twins, triplets and their families and educators.

For this reason, this dissertation, which is entitled "Multiple Intelligence Theory in Multiple Children: Twins and Triplets" advocates that even though twins and triplets are born together, they might have different multiple intelligences. Investigating multiple children's multiple intelligences will create a more fruitful and equal educational environment for multiple children, especially for the ones who are at primary and middle school. To fulfill this purpose, the present quantitative study will survey multiple children who are at Jean Piaget's concrete operational period (between the 1st and 6th grade levels) and who live in Esenler district in Istanbul, Turkey

1.2 Objective and Significance of the Study

The objective of this study is to investigate multiple children's multiple intelligences in Turkish context, and to find out how they differ in terms of birth order, zygote type, gender and grade level factors and to make suggestions for their educational lives.

The significance of the study might be explained as follows:

- This is the first study in the literature that investigates twins, triplets and their multiple intelligence types (as searched on Council of Higher Education Thesis Center, 2017) in Turkey.

- The study is the first study related to multiple children at primary and middle school, and it might make a significant contribution to the literature in relation to multiple children's (primary and middle) school performances through multiple intelligence theory.
- The outcomes of the study would be beneficial to multiple children, their families and teachers, school administrators, relevant fields of the study, Turkish Government and Turkish Statistical Institute (TUIK), the Ministry of National (Turkish) Education, Istanbul City National Education Directorate, Istanbul and Esenler Municipality, Esenler District Directorate of Civil Registration and Esenler District National Education Directorate and society.

1.3 Statement of the Research Questions

Four research questions (RQ) that are related to multiple intelligences and multiple children (twins and triplets) are investigated in this dissertation:

RQ1: Does birth order make a difference on multiple children's multiple intelligences?
RQ2: Do types of twins have an impact on multiple intelligences in multiple children?
RQ3: Is there a gender factor in multiple intelligences of multiple children?
RQ4: Do multiple intelligences show any differences according to school grades (between the 1^{st} and 6^{th} grade levels) in multiple children?

1.4 Assumptions of the Study

It is assumed that:

- All subjects have similar cognitive, physical and social development, and that the Multiple Intelligence Scale for Multiple Children is answered honestly.
- The birth order of all subjects is answered truly and the questionnaire is given according to their birth order.
- There are no economic differences among multiple children's families.
- The sample of the study represents the population.

1.5 Limitations of the Study

This dissertation is limited in:

- 6/7- 11/12 year-old twin and triplet students who are at the 1st, 2nd, 3rd, 4th, 5th and 6th grade levels that represent Jean Piaget's concrete operational period.
- In total, 40 state schools and 2 private schools in Esenler are included in the study during the Spring term of 2014-2015 and the Fall term of 2015-2016 academic years.
- The questionnaire is only limited to the "Multiple Intelligence Scale in Multiple Children". Subjects respond to 40 requests in total.
- Subjects are also given a "Family Information Form" to be filled by their families.
- Since there are limited triplet subjects, this study might not entirely be representative of the entire population of triplet students who are between the 1st and 6th grade levels.
- Multiple intelligence theory in multiple children should be tested in other districts, cities, and regions.

1.6 Definitions of Terms

Multiple Children: Twins and triplets who share the same womb and are born at the same time.

Monozygotic/Identical Twins: Monozygotic/MZ twins share the same womb and look very much alike. They are always the same sex (Stone, et al., 2009). They come from the same zygote.

Dizygotic/Fraternal Twins: Dizygotic/DZ twins look like each other like a brother or sister even though they are born together. Two different sperms fertilize two eggs (Stone and et al., 2009). Their sexes might be different.

Triplets: If the egg splits into three, then identical triplets are born. If three eggs are fertilized by three different sperms then fraternal triplets are born (Stone and et al., 2009).

Child A: It shows the delivery order of twins or more. A is the first born child.

Child B: It shows the delivery order of twins or more. B is the second born child.

Child C: It shows the delivery order of triplets. C is the third born child.

Ze: A gender-neutral pronoun. It is used *"Ze"* as a subject, *"Hir"* as an object, *"Hir"* as a possessive adjective, *"Hirs"* as a possessive pronoun, *"Hirself"* as a reflexive pronoun (Anon., n.d.).

Middle Childhood: "Children between the ages of 6 and 12 are in the age period commonly referred to as middle childhood" (Collins, 1984). These children also represent Piaget's 3rd concrete operational period in his cognitive development theory (Piaget, 1964).

Intelligence: According to Howard Gardner (2011), intelligence is a bio-psychological potential that is related to the person's experience, culture, and motivational situations.

Multiple Intelligence: It was defined by Howard Gardner in 1983, opposing IQ tests. Every human being has 7 types of (updated 9) of intelligence: linguistic/ verbal, musical, mathematical/ logical, spatial/visual, kinesthetic/bodily, intra-personal/ individual, inter-personal/social, (natural/environmental and existential/spiritual) intelligence.

Grade Level: "The school system" (Webster, 2017). Each step in the school system.

1.7 Organization of the Study

A brief description of each chapter follows:

Chapter 1: In the first part of the dissertation; statement of the problem, objective and significance of the study, statement of the research questions, assumptions and limitation of the study and definitions of the terms are given.

Chapter 2: The related literature and studies about multiple children, multiple births, and multiple intelligences both in Turkey and in the world are given in this chapter.

Chapter 3: In this chapter, the pilot study, the main study, population and samples of the study, data collection instrument, ethical approval, procedure, data analysis of the study are given.

Chapter 4: Findings and discussion about multiple children and multiple intelligences are presented in this chapter.

Chapter 5: Conclusion and suggestions are given in this chapter.

2. REVIEW OF LITERATURE

2.1 The Features of Twins

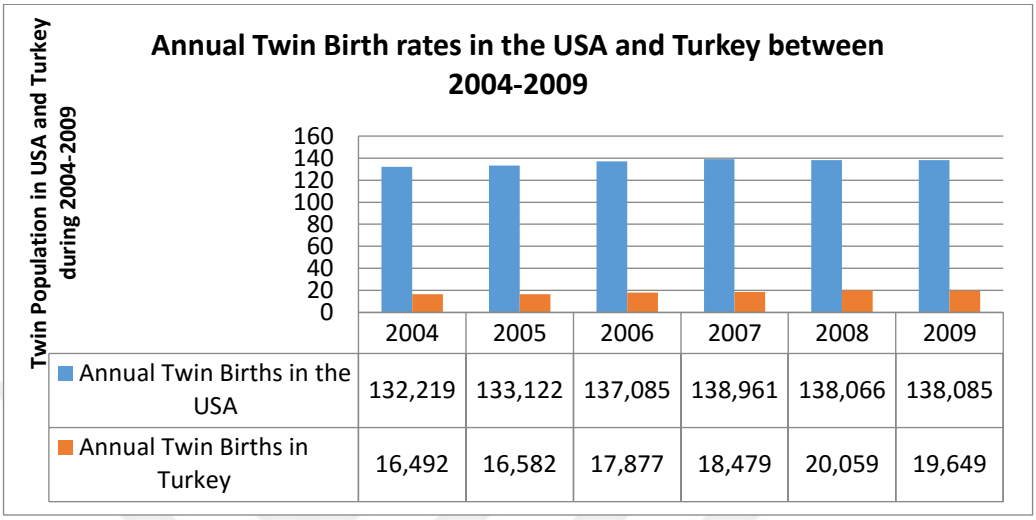
Multiple children are two or more fetuses who share the same womb and are born at the same time. If there are two fetuses, they are called twins. When the number of fetuses increases, multiple children are called triplets (3), quadruplets (4), quintuplets (5), sextuplets (6), septuplets (7), octuplets (8), nonuplets (9), and decuplets (10).

Twins are the most common type of multiple births. According to Hellin's law (Hellin, 1895), twins occur in Western nations at a rate of 1:80, 1 set of twins in 80 births, $1:80^2$, 1 set of triplets in 6,400 births (as cited in Hered, 1945). In Turkey, Onur (1935) explains this number as 1 in 80 births for twins and 1 in 7000 for triplets. For example, Tunakan (1955) gives this number in her first research in Ankara during 1952-1954 that 1 in 75 births produce twins and in her second research during 1945-1956 in Istanbul 1 in 78 births produce twins (Tunakan, 1959). As a result, the rate differences in Western and Eastern contexts can change.

It is said that the twinning rates are increasing both in Turkey and worldwide. According to the USA National Vital Statistics Reports (Hamilton, et al., 2015) as in Table 2.1., both twin and triplet numbers have increased from 2004 to 2009[2]. In 2004, 132,219 twins are registered and there is a substantial increase in their birth rate until 2006. From 2007 through 2009, stability can be seen in twin birth rate in the USA. When the twin birth rate is compared with Turkey (Şinik, 2016), it was seen in Table 2.1. that the twinning birth rate is stable during 2004 and 2005, and then it increases until 2008 and decreases in 2009.

[2] 2004-2009 represent 6-11 year-old multiple children (young learners) who are between the 1st and 6th grade levels in 2015. School starting age varies.

Table 2.1. The Incidence of Twin Births in the USA and Turkey between 2004 and 2009



	2004	2005	2006	2007	2008	2009
Annual Twin Births in the USA	132,219	133,122	137,085	138,961	138,066	138,085
Annual Twin Births in Turkey	16,492	16,582	17,877	18,479	20,059	19,649

Sources: USA National Vital Statistics Reports (2015) and Turkish Ministry of the Interior General Directorate of Civil Registration and Nationality (Şinik, 2015).

Note: Figures show live births

2.2 Types of Twins

It is general knowledge that there are two types of twins: Monozygotic/MZ twins and Dizygotic/DZ twins. While monozygotic twins are called identical, dizygotic/DZ twins are also called fraternal twins. To determine the twin type scientifically, blood type or DNA (DeoxyriboNucleic Acid) analysis can work. However, determining the blood type is not always the correct method. Sometimes the same blood type can be seen between fraternal/DZ twins (Segal, 1999).

2.2.1 Identical/MZ Twins

Identical/MZ twins occur in 1/3 of all twins. The gestation starts with a single egg, but it is divided into two parts (Erol, 2006). Segal (2012) explains in one of her interviews that

> "natural twinning rate is nearly 1 in 80 births in Western countries and MZ twins are only a 3rd of those".

Hall (2003) mentions that identical/MZ twins are rarer than fraternal/DZ twins all around the world. Their genders are the same: boy-boy or girl-girl. (However, same sex can be seen in fraternal/DZ twins, too). Like their genders, identical/MZ twins' blood

types are also the same. They are genetically identical, after all. However, all twin types have different fingerprints (Fierro, 2015). When they get older, the differences between them begin to be seen (Miller, 2012).

2.2.2 Fraternal/DZ Twins

Fraternal/DZ twins occur in nearly two-thirds of all cases. In fraternal/DZ twins, two eggs are fertilized by two different sperms (Erol, 2006). They look like each other like an older or younger sibling. Their genders, blood types, ideas can be different from each other. Their genders can be same sex (boy-boy, girl-girl), or opposite sex (a boy and a girl).

2.3 The Reasons for having Identical/MZ or Fraternal/DZ Twins

There might be some reasons to have identical/MZ or fraternal/DZ twins. For instance, having identical/MZ twins can be because of having identical/MZ twin genes in your family. Stone et al. (2009) state that if the woman gets fertility drugs, she can produce an egg which can then split into two fetuses as identical/MZ twins. While identical/MZ twins occur naturally and their rates are mentioned above, fraternal/DZ twins generally occur as a result of Assisted Reproductive Technology (ART). Thus, the fraternal/DZ twin rate is increasing day by day. Finally, whether they are identical/MZ twins or fraternal/DZ twins, both of them are always the focus of interest by both society and science as nature or nurture matter.

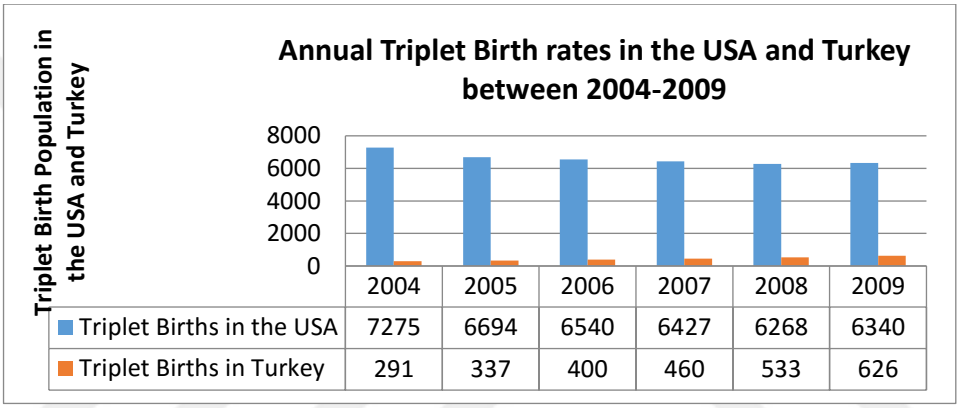
Twinning rate may differ from Western to Eastern countries. However, MZ twins are rarer than DZ twins in both countries. In Turkey, it is known how many twins there are, but it is not known how many identical/MZ twins and fraternal/DZ twins there are. Şinik (2016) investigated 88 identical/MZ twins and 295 fraternal/DZ twins in one of her small online survey and the results were similar as in literature: identical/MZ twins are rarer than fraternal/DZ twins.

2.4 The Features of Triplets

Triplets (3) occur like twins but often in trizygotic circumstances: “three different eggs are fertilized by three different sperms”. Akerman (1999) says that without hormone or

other fertilization treatments, triplets are very rare: one in 7,000 births. Triplets can be same sex (3 boys and 3 girls) or of different sexes: 2 boys + a girl or 2 girls + a boy. Triplets can be trizygotic/all fraternal or all identical/monozygotic. As it is seen in Table 2.2., triplet birth rates in the USA decreased from 2004 to 2009. When it is compared with Turkey, it is seen that the number of triplets increases every year.

Table 2.2. The Incidence of Triplet Births in the USA and Turkey between 2004 and 2009



	2004	2005	2006	2007	2008	2009
Triplet Births in the USA	7275	6694	6540	6427	6268	6340
Triplet Births in Turkey	291	337	400	460	533	626

Sources: USA National Vital Statistics Reports (2015) and The Ministry of the Interior General Directorate of Civil Registration and Nationality (Şinik,2015).

Note: Figures show live births.

2.5 Individual Differences in Twins and Triplets

Although twins (even if identical) and triplets are born together, share same genes, same womb and same birthday, they have individual differences. These differences show us that they might have different capabilities, abilities, paces, performances and multiple intelligences. In addition, gender, birth order, twin type and grade level may affect these differences. Many more similarities can be seen among identical/MZ twins than fraternal/DZ twins.

Dr. Alfred Adler, who is the founder of the school of individual psychology indicates the importance of individuality when the world's first quintuplets (all of them are in same-sex: girls) are born, he writes,

> "The quintuplets live like inmates of a model orphanage, and a certain emotional starvation is inseparable from institutional life. There is danger ahead" (Berton, 1978).

As Adler states, individual strengths and talents not only in twins, triplets but also in each person cannot be neglected. If it is neglected, the individualism starvation might occur. It is one of the human needs. At this point, society and educational institutes should give the necessary importance to the development of individuality of each individual. However, as Segal (2012) mentions individual values can change from culture to culture.

> "I think in our Western culture, we value individual strengths and talent".

There are major differences in twins and triplets, even if they are born together and the differences can be ordered:

- birth order in twins and triplets: Child A, Child B, Child C,
- gender differences,
- birth weight,
- neonatal intensive care unit (NICU) stay,
- breastfeeding,
- fingerprint minutia in twins and more,
- left or right handedness,
- IQ differences in twins and more,
- Adolescence differences in twins and more.

2.5.1 Birth Order Child A, Child B, Child C

Birth order is used in a different way in literature. According to individual theorist Adler (1929), the birth order shows the place of siblings in the family. Children take one of the roles according to their birth order: firstborn, middle-born and lastborn children may have different personality according to their place in the family. Being only child also might affect this role. There might be advantages and disadvantages of birth order and it can change from culture to culture and from family to family.

Birth order in twins and more is related to the numerical birth order that shows who the firstborn or the second is born during delivery time. Because there are two or more babies in the womb, fetuses are called Child A, Child B, Child C, or more:

- Child A shows the firstborn child at delivery,
- Child B shows the second born child at delivery,
- Child C shows the third born child at delivery,

The birth takes place in an order according to the mode of delivery: vaginal or C-section. In a vaginal birth, birth order is determined according to who is the first or second in the womb. Child A is born first and Child B is born later passing through the birth channel. For the C-section birth, birth order is determined according to the closest to the incision (Fierro, 2005). Child A is the closest one and taken first then Child B is taken later.

The first born child can be called the bigger one as an elder sister or brother to the second one. Twins are generally aware of who is bigger or first born as it is gained from the research. The first born twin might represent freedom or responsibility; likewise, the second born might represent the opposite. As a result, birth order is a big problem for twins and their parents and might create arguments between twins and triplets to get a family role. Some families do not tell the truth to their twins so as not to have an argument with them about who is older or younger.

Some scientists state that birth order is very important for twins and more because it affects their intelligence. Because the first born baby gets oxygen earlier than the second one, Child A can be more intelligent than the second one (Segal, 1999). As a result, the birth order is one of the individual differences in twins and more and it is taken into consideration as one of the research questions in the present study.

2.5.2 Gender Differences

Identical/MZ twins are generally of the same gender: boy-boy or girl-girl. However, fraternal/DZ twins can be of the same or opposite gender. Triplets also can be in the same gender: three girls or three boys or opposite gender: two boys- a girl or two girls- a boy. Taşdemir et al (1997) note that when the human fetus number increases, boy fetus numbers also increase. He also says that in the USA, boy fetus numbers are cited at % 49.54 in singletons. However, Yayla and et al. (2004) mention that when the number of

fetuses increases especially in triplets and more, girl fetuses are seen much more than boy fetuses.

Gender differences may affect children's learning styles, interests and lifestyles and influence individual differences among children. Sexual identity is defined as:

> "Sex-role behaviors, activities, and interests culturally associated with femininity and masculinity" (Green & Elizabeth, 1984).

Queller (1997) states the gender difference effect on learning styles that females generally focus on inter-personal relations (emotions) however males focus on the task. As a result, while cooperative learning style can be a good alternative for females, task-based learning can be for males.

Schäfer (2010) also remarks the gender differences in a different way:

> "Clearly twins and triplets are more comparable than serial born offspring, and children of the same gender are more comparable than a boy and a girl.

As a result of her article, same-gender co-twins might have similar sex role behaviors. These similarities can be seen especially in MZ twins. If we consider Schäfer, it seems likely that same-gender twins and triplets are compared with each other rather than opposite gender multiple children.

Boy-girl twins do not have similar behaviors (Green&Elizabeth, 1984). This might be an advantage for the different sex twins and triplets that can lead to a fruitful educational environment both at home and at school. Boys learn about girls' lives from birth and improve their skills and ideas. It is also true for the girls.

2.5.3 Birth Weight

As can be seen in Table 2.3., twins and multiples are generally born earlier (premature) than singletons. Because they are born early, their birth weight is generally lower than singletons. At birth, twins are about 0.9 gr. lighter and 3.5 cm shorter than singletons (Buckler, 1999).

Table 2.3. Average Birth Week and Weight for Twins and Triplets

Types of Pregnancy	Average Gestational Age at Time of Delivery	Average Birth Weight
Singleton	38,6 weeks	7.3 lb. (3,300 gr.)
Twin	35 weeks	5.1 lb. (2,300 gr.)
Triplet	32 weeks	3.7 lb. (1,660 gr.)

Source: www.reproductivefacts.org

According to Dommelen et al. (2008), boy fetuses are heavier than girl fetuses. Fraternal/DZ twins are heavier and longer than identical/MZ twins who are born at 36 weeks. Also, opposite gender twins are heavier than same-gender twins as cited in Dutch twin registry.

Lower weight can cause problems such as respiratory, cardiovascular, neurological, gastrointestinal problems (Fierro, 2005). According to Science Daily report (2011),

> "First Irish study shows that weight difference in twins at birth is the key predictor of health complications".

Twin birth weight is related to fetal or neonatal death risk. Bowel complications, breathing difficulties, infection and admission to the neonatal intensive care unit can be seen in twins and more related to their birth weight. Bentley (2011) also explains that twins who have weight difference are called discordant twins. Scientists also mention that there is a positive correlation between birth weight and cognitive development.

2.5.4 Neonatal Intensive Care Unit (NICU) Stay

Since twins and multiples are born early, some of them can stay in the Neonatal Intensive Care Unit (NICU) and complete their growth there (Fierro, 2005). In some cases, children or one/two of them (in triplets) stay in the NICU.

Some families take one of the children home; however, one/two of them (in triplets) can stay in NICU. The children taken home can get much more breastfeeding and mother and baby physical contact. This might lead to individual differences between multiple children siblings and family members.

2.5.5 Breastfeeding

Multiple birth deliveries often result in C-section delivery and breastfeeding problems can be seen much more in mothers of twins and more who have C-section births (Şinik, 2011).

As it is mentioned above, multiple children are generally born prematurely and their sucking reflex cannot be developed. As a result, the child who has a sucking problem cannot get as much breastfeeding as the other child/ren. One baby can have breastfeeding and the other/s can get formula. However, breast milk is easy to digest especially for multiple children's immune system (Flais, 2010) and it may affect their mental and psychical development that causes individual differences among multiple children.

2.5.6 Fingerprint Minutia in Twins and Triplets

Fingerprints are used to determine guilt in criminal cases since each person has different fingerprints. Even if they are MZ twins, their fingerprints are different from each other. They are identical but not their fingerprints (Jaina et al., 2002).

2.5.7 Left-Handedness or Right-Handedness

Generally, people use their right hand but there are left-handed people too. Differing in handedness can be seen in twins and triplets. Co-twins can be left-left handed, right-right handed or right-left handed. It can be same for triplets.

According to Segal (as cited in Jacobs, 1987), left-handedness can be because of birth trauma. She also notes that second-born children can be left-handed as a result of pathological problems.

Left-handed rates are higher in twins than singletons. Saltzman et al. (1976) state that 40 % of males and same-gender twins are left-handed in their study. According to Saltzman et al. (ibid.), right-handed people generally use the left hemisphere of the brain for linguistic purposes. Left-handed people can use both hemispheres (Milner et al., 1964).

2.5.8 IQ Differences in Twins and Triplets

Segal (2012) investigates in one of her investigations that lighter co-twins might have lower IQ score than weightier ones. She also remarks that the average IQ in twins is lower than non-twins. This IQ difference can be as much as 6 % in MZ twins and 10 % in DZ twins (Segal, 1999). Bouchard & McGue's (1981) study also supports Segal's statement: the median correlations of identical twins that reared together were 0.85 while fraternal twins' was 0.58 (as cited in Aiken, 1996). The birth order might affect IQ because of getting oxygen earlier rather than later. As a result, IQ score can differ from Child A to Child B also to Child C.

2.5.9 Puberty in Twins and Triplets

Puberty can be seen at the age of 10-11 years in girls and 9-13 years in boys (Büyükgebiz, 2008). As it is seen, the puberty varies across age groups. At this point, opposite-sex twins or triplet can reach puberty at different ages. As Reed (2016) mentions

> "Even same-sex twins can go through puberty at different times maybe a year apart".

Together with puberty, some changes begin to seen in twins and triplets. The hormone level might affect their behaviors. An adolescent might ignore hir family and friends become important (Dodson, 1999).

Adolescence is a transition stage: passing from primary to middle school. School or class choice can affect puberty and educational life. In the adolescence period, twins or triplets might have adequate skills like their peers, but boy-boy twins can have more problems during adolescence than other twin types (Hay, 1999). Some twins or triplets can have academic achievement problems but it cannot be generalized for all twin and triplet types. The hormonal changes can cause this problem but family support will be helpful.

2.6 Theories of Cognitive Development

Cognitive learning theories examine the cognitive processes that humankind uses to understand the world (Tüyel, 2011).

2.6.1 Jean Piaget's Cognitive Theory

French psychologist Jean Piaget explains the development of knowledge via an operation. The operation is a kind of inner action which defines the aim of knowledge. It consists of classifying, ordering, counting and measuring. These actions occur in periods together with development (Piaget, 1964). According to Jean Piaget, children have 4 cognitive development periods; sensory-motor period, preoperational period, concrete operational period and formal operational period.

1st: The sensory-motor period: it starts with the pre-verbal stage and goes until the child is about 18 months old. Piaget explains this period in these words: "there is a series of structures which are indispensable for the structures of later representational thought" (Piaget, 1964)

2nd: Pre-operational period: it is the beginning of language, symbolic function, thought and representation. Children at these ages are likely to attend kindergarten and preschool.

3rd: Concrete operational period: Piaget states that this period corresponds with starting primary school (Piaget, 2004). As a result, there might be some variation, such as in Turkey, before 2012, the starting primary school age was 7. After changes (Article 15, RG-21/7/2012-28360) 60-66 month-old children can start 1st grade at primary schools (E-okul, n.d.). Because the children from 1st grade to 6th-grade level are at the concrete operational period, the subjects were chosen between 1st and 6th grade levels that represent Piaget's 3rd period. At this period, children understand only concrete things and subjects. They are social and they can attend group activities, try new things (Piaget, 2004). They do not have abstract thoughts like adults (Berk, 2013). For the fact that abstract thoughts are beyond children's comprehensibility; existential intelligence, Gardner's last intelligence type abstract thoughts are embedded highly within, is not examined in the present study.

4th: The formal operational period: At this period, the child reaches the formal or hypothetic deductive operational stage. Logical operations can be constructed at this level. Piaget mentions that four factors can affect the level of cognitive development:

- maturation,
- experience,
- social transmission,
- equilibration (Piaget, 1964).

Maturation can be changed from one culture to another. Experience cannot explain everything but it is the fundamental factor of cognitive development and there are two types of experiences: physical and logical. The third factor: social transmission can be linguistic or educational. The last factor: equilibration is a kind of self-regulation and it is an active process. Of course, these levels occur in a sequence (Piaget, 1964).

2.6.2 Lev Vygotsky's Social Cognitive Theory

Vygotsky rejects three theoretical positions:

- child development is independent from learning,
- learning is a development,
- the relation between learning and development. There is no coincidence with learning and development. Learning and development are in common.

Vygotsky (1978) believes that social environment has an important role in children's cognitive development (Tüyel, 2011) and he defines The Zone of Proximal Development (ZPD)[3].

> "the distance between the actual developmental level as determined by independent problem-solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers".

According to Vygotsky (1978), ZPD is very important for a learner. ZPD shows the potential level of the learner. (Stephen Krashen's +1 input theory[4] can be a good

[3] Zone of Proximal Development (ZPD): The distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance, or in collaboration with more capable peers (Vygotsky, 1978).

example of this point). However, Krashen (1998) is against learning rather than acquiring (in second language learning), +1 input can be considered similar to ZPD: it is the potential level of learners. When students are at the ZPD, someone should provide a helping hand to assist them. This can be called scaffolding. This scaffolding can be provided by an adult or peers. Scaffolding helps the learners to reach their potential level. At this point, twins can be each other's scaffolders. But the most important task as a scaffolder is to cooperate with the learner rather than compete.

2.6.3 Jerome Bruner's Constructive Learning Theory

Like Piaget, Bruner believes that cognitive development has levels. His cognitive development consists of 3 levels:

- enactive: 0-3 years,
- iconic: 3-8 years,
- symbolic: from 8.

Learning comes through actions at the first level. At the second level, images and models help to learn. At the last level, abstract terms lead to learning.

2.7 Cognitive Development of Twins and Triplets in Middle Childhood

Twins are born at the same time and share the same genes and environment. As a result of these concepts, they are always the focus of researchers. Their development is like a singleton in the mother's womb but they are generally born earlier with a lower weight than singletons. Birth week and birth weight can affect not only singletons but also multiple births' cognitive development. In some of the research, it is said that twins have lower cognitive abilities than singletons. Christensen et al. (2006) state in one of their study that twins are disadvantaged when they are compared with singletons in the 1950s (Ronalds et al., 2005). However, according to their Danish adolescent twin study, twins have similar academic performance if they are compared to singletons at 9^{th}-grade level

[4] Input Theory: According to this hypothesis, the learner improves and progresses along the 'natural order' when he/she receives second language 'input' that is one step beyond his/her current stage of linguistic competence. For example, if a learner is at a stage 'i', then acquisition takes place when he/she is exposed to 'Comprehensible Input' that belongs to level 'i + 1' (Krashen, 1985).

from during 1986 and 1988. This shows that twins catch up with singleton peers when they are an adult and the effect of cognitive development.

According to Webbink et al. (2008), twins who are at 2nd-grade level have lower language and arithmetic scores and at 4th-grade levels twins have lower in verbal tests. At 6th and 8th grade levels, twins' scores are nearly equal or better than singletons. Kaleli (2012) also compares twins with only children and children with their siblings and finds that there is a significant developmental difference between the theory of mind at the age of 3, 4 and 5 years-old twins and the other two groups. There might be a positive correlation between cognitive development and multiple children's school grade levels and ages.

Tüyel (2011) investigates age, zygote type, gender and birth order factors in twins and finds that at the age of 5 and 6, twins have a much higher attention rating score than those aged 7 and older. However, no significant cognitive development difference is seen between identical/MZ twins and fraternal/DZ twins. As a gender factor, girl twins have a higher attention rate than boy twins and Child A- the first born co-twin have a higher Cognitive Assessment System (CAS) score than Child B- the second born co-twin.

According to Tsou et al. (2008), referencing a study from the Netherlands, little intelligence difference is observed between 260 adult twins and their 98 singleton siblings. In their another study that is conducted in Scotland using participants' attendance and test scores in the college joint entrance examination and investigate that 7 to 9-year-old twins had lower IQ scores than their singleton siblings. They also observe in their study that adult twins have lower scores in Chinese, mathematics and natural science but not in English and social sciences. As a final word, Tsou et al. (ibid.) indicate that adult twins have lower cognitive abilities than singletons.

2.8 Social Development of Twins and Triplets in Middle Childhood

Twins and triplets share the same womb and after birth, they share the same environment. Sharing the same environment might shape their social development positively or negatively. The environmental effect can be seen as Vandel et al. (ibid.)

state in their study that there is a positive interaction between twins with each other rather than with unfamiliar peers. The increase in this correlation is seen especially during the second year. Vandal et al. also mention that securely attached twins are more social than insecurely attached twins. Secure attachment with the mother is also another aspect; if twins have a secure attachment with their mothers, they get on well with each other. If they do not, some problems can be seen between twins. Secure attachment in twins might play an important role in developing their individual/intra-personal or social/inter-personal intelligence.

Competition between twins and secure family attachment can affect twins' or triplets' social development. According to DiLalla (2006), identical/MZ twins are more cooperative with each other rather than fraternal/DZ twins (as cited in Segal and Herschberger, 1999). As a result, identical/MZ twins might be less social than fraternal/DZ twins since they share same genes and same environment that might help them to feel more comfortable being together rather than others.

According to Vandel et al. (1988) cited from Zazzo (1982), adolescent and adult twins have rich interactions with each other rather than younger twins. However, in DiLalla's (ibid.) study, she investigates 10 to15-year-old twins and compares them with 5-year-old twins. The results show that 5-years-old twins are more dependent on each other and they reach their peers' level at 10 years old. As a result of their environment, adolescent twins do not rely on each other like 5-year-old twins.

According to DiLalla (2006), the cooperation between identical/MZ twins begins to decrease between 8 and 12 years old (as cited in Segal at al. (1996). This cooperation can be seen as a close social relationship (Segal, 2012). Since this corresponds to Piaget's concrete operational period, the impact of puberty might have an important effect on cooperation with each other in identical/MZ twins.

DiLalla (2006) also indicates that having a co-twin can have positive social effects. As a result, twins learn how to behave earlier compared to other peers. Also, she mentions that day care helps children to be more social. In her study, she investigates that twins are less social than singletons and the boys are more aggressive and less social than girl twins at the age of 5 years old.

Having or sharing the same or different friend(s) might affect twins and triplets' social development. According to Preedy's (1999) survey, 44 % of multiples have the same friends, 28 % of multiples have both separate and common friends, 8 % have mostly their own friends and 20 % mainly stick together and have few friends. Having different friends will enhance the multiple's social developments.

It is known that twins or triplets often develop twin language and produce new vocabulary that only they know and understand. Twin language or language delay might lead multiples to be unsocial. One of the twins can be talkative but not the other one. If the more talkative one is supported more, the passive one cannot develop socially (Şinik, 2011).

Akarmen (1999) explains that triplets who are born lighter than twins have lower cognitive development and social development. She also explains that identical triplets were much more dependent on each other than trizygotic triplets. All these findings suggest that twins or triplets should be in the same class or different classes according to their cognitive and social development.

2.9 Educational Needs of Twins and Triplets in Middle Childhood

Middle childhood twins and triplets students are at primary and secondary schools. Their educational needs can be different from singleton students since they share same family and school environment. These needs can be given respectively: learning and learner meanings, school and class choice for multiple children, the cognitive, physical, social developments of multiple children at primary and secondary schools.

2.9.1 Learning

The dictionary meaning of learning is given as; "measurable and relatively permanent change in behavior through experience, instruction or study. Learning itself cannot be measured but its results can be" (Anon., n.d.).

Theorists explain the meaning of "learning" in different ways: Piaget (1964) defines learning: "It is based on the stimulus-response schema". According to Vygotsky (1997), learning begins with birth and shapes at starting primary school age. While Bruner

explains learning as an active process, Bandura (1971) defines it as a social activity: imitation and observation.

As seen in Figure 2.1., there are six levels in Bloom (1956)'s taxonomy of educational objectives about learning: remember, understand, apply, analyze, evaluate and create.

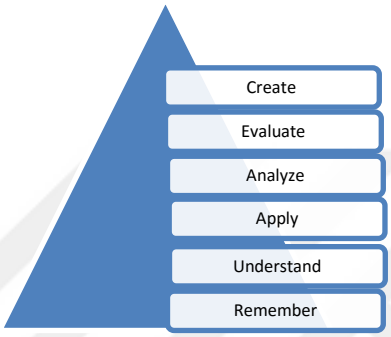


Figure 2.1. Bloom's Taxonomy

Teachers can use these six steps in their classes. Remembering activates students' schemata and recalls the items in their minds. Understanding helps them to explain related items in their minds. Applying is using the information in new situations. Analyzing helps them to distinguish and compare the related information. Evaluation is a kind of making decision and creating is a kind of construction.

According to Adger Dale (1969) who develops the cone of the learning experience (seen in Figure 2.2.), learners acquire knowledge in different ways especially by doing rather than hearing, reading or observing. He states that while the least effective ways of learning or teaching are at the top starting from 50 %, respectively: exhibits, motion and still pictures, recordings, radio recordings, visual and verbal symbols and, the most effective learning ways are at the bottom starting from 50 % respectively: field trips, dramatic participations, contrived experiences, direct and purposeful experiences.

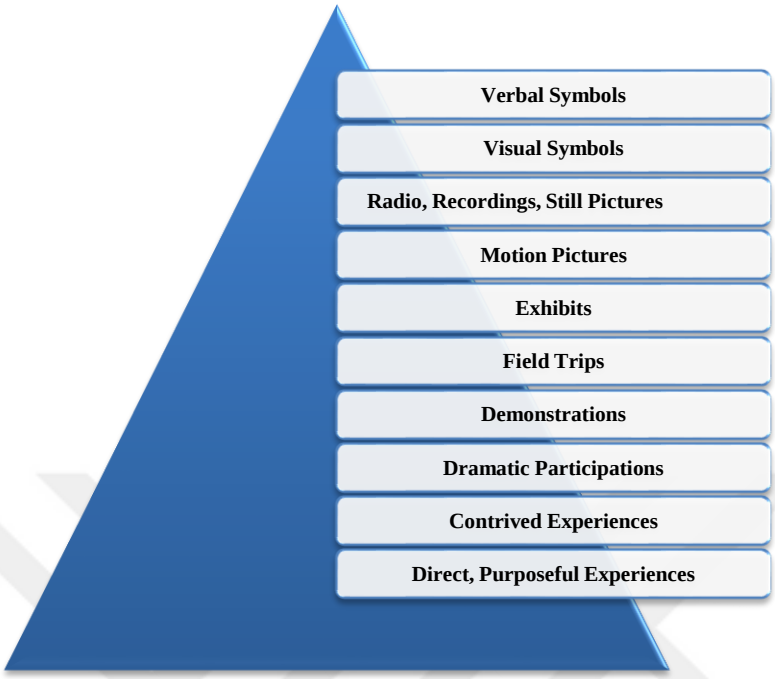


Figure 2.2 Dale's Cone of Learning Experience

Source: Adapted from E. Dale, Audiovisual Methods in Teaching, 1969, NY: Dryden Press.

2.9.2 Learning Differences and Individual Learning Styles in Twins and Triplets

Individual differences might affect learning and learning types. There are two types of variation which support individual differences: Neuro-Linguistic Programming (NLP) and Multiple Intelligences (MI).

People learn using the first one (NLP) that is developed by John Grindler and Richard Bandler (as cited in Richards and Rodgers, 2001) as an alternative therapy. It is a kind of communication technique and related to receptive skills: listening and reading. It helps people towards self-discovery. The second one MI is introduced by Howard Gardner. Gardner refuses one type of intelligence and presents 9 types of intelligence: verbal/linguistic, musical, mathematical/logical, spatial/visual, kinesthetic/bodily, intra-personal/individual, inter-personal/social, naturalist/environmental and existential (as cited in Harmer, 2007).

Gardner claims that MI concludes that:

- All individuals possess the full range of intelligences—the intelligences are what define human beings, cognitively speaking;
- No two individuals, not even identical twins, exhibit precisely the same profile of intellectual strengths and weaknesses. These constitute the principal scientific claims of the theory; educational or other practical implications go beyond the scope of the theory (Davis, et al., 2013).

Even if multiples are born together, they can have different types of learning: VAK, Visual, Auditory, and Kinesthetic also they might learn under the learning theories: behaviorism, cognitivist and constructivist and they might have different learning skills.

As the last word, Preedy (1999) explains that

> "Life cannot provide exactly the same for each child. Multiples have differing needs at different times and it is therefore unfair to try and always treat them in the same way. Even when the children are in the same class, they will frequently end up reading different pages from a book, with different parts in a play, with one winning a prize and the other not, and so on".

2.9.3 Who is a Learner and Who are Young Learners?

After giving the definition of learning, the definition of "who" a learner can be given. A learner can be defined as a person who is engaged in the learning process. Learners can be slow learners, fast learners or have learning difficulties. If these differences are known and understood, not only multiple children but also all individual can be more successful in their academic process.

While Piaget explains that children as active learners, Vygotsky explains children as social learners and Bruner explains them as learning by repetition (Cameron, 2001).

Linse (2005) defines young learners as being between 5 and 12 years old. Young learners learn differently from older children (Harmer, 2007). These children can be slow learners or fast learners. In addition, according to Gardner (2011), they can be visual, audial, verbal, mathematical, intra-personal, inter-personal, kinesthetic, natural or existential learners. Linse (2005) says that teachers (it could be same for families) should be aware of the developmental stages of the individual child.

Piaget's cognitive developmental stages can be useful for teachers and families to know more about the child/ren's cognitive stages. If they are cognitively ready, they can learn easily. Learning materials can be given to them according to their cognitive stages. After Piaget, learning can be supported by Vygotsky's social environment. Bandura's imitation and observation techniques should also be given to learners. In addition, as Bruner suggests, previous knowledge helps us to learn new knowledge; so as a result, our schemata have a vital role while we are learning (McLeod, 2008).

Besides these, new trend that gives opportunities to individual differences is neomillennial learning styles for Net generation might be fruitful not only for multiple children but also for all students. Dede (2005) explains this

> "Net Generation learning styles stem primarily from the world-to-the-desktop interface; however, the growing prevalence of interfaces to virtual environments and augmented realities is beginning to foster so-called neomillennial learning styles in users of all ages".

2.9.4 Twins and Triplets as Learners

As for everyone, twins' and triplets' learning processes start from birth. They share both genes and environment. Their learning processes go together until they are separated. This separation can be seen at primary or secondary school.

As a primary and secondary school learners, twins and triplets are young learners and they can be a slow learner or a fast learner. Slow learners are those who learn a little bit later than other learners. Fast learners can learn easily than others. The pace differences can be seen between twins and triplets. One of the twin or triplets can be slow or fast learner or vice versa.

As learners, twins and triplets can be competitive or cooperative with each other. Competitive learners love rivalry. One of the twins or triplets can be competitive and learn better than others. As Sandbank (1999) says that

> "identical twins generally like to pace themselves on each other rather than compete)".

Cooperative learners love learning from others. As a result, co-operative learning can be a good alternative for multiple children to teach and support each other. Also as it is mentioned above, Gardner presents nine types of intelligence which means nine types of

learners: visual learner, numerical learner, musical learner, kinesthetic learner, individual learner, social learner, natural learner and existential learner. Multiple intelligences can vary among multiple children.

One of the multiple children can be dominant and the speaker for other(s). Sometimes, they can be dependent on each other too much. In some situations, one of the multiples can be jealous and turn the twinship into a race.

Sex differences might affect learning. According to Preedy (1999), boy twins have more concentration problem than others, so routines, clear rules, and self-organization can help these children to concentrate on learning. In addition to this, it is suggested that girls are more hardworking than boys. In boy-girl twins, the girl can be academically more successful than the boy, sometimes vice versa. One of the twins can get a scholarship but not the other. This kind of situation can lead to competitive behaviors between twin siblings. The family balance will be helpful for twins to solve the competition problem for the sake of both twin siblings.

Hay (1999) mentions that

> "any problems in twin girls generally diminish by adolescence while those in twin boys stay the same or even get worse. At the age of 10, both girl and boy twins were behind their singleton peers. By age 13 to 14, the twin girls essentially caught up. Over 70 percent of these girls and of the male and female singletons had adequate mastery of literacy and numeracy. For the twin boys it was a very different matter, with only 42 percent having adequate skills)".

2.9.5 Class and School Choice for Twins and Triplets

Multiple children are in fact a small group. Since most multiple children are always together at home, this togetherness can cause some problems, such as cooperation, competition, jealousy, getting the attention of friends, families, and teachers. As a result, multiple children are generally compared with each other physically and mentally. At this point, Gardner (1998) advises teacher and families that

> "No two individuals, not even identical twins or clones, have exactly the same amalgam of profiles, with the same strength and weakness. Even in the case of identical genetic heritage, individuals undergo different experiences and seek to distinguish their profiles from one another".

When multiple children: twins and triplets begin school, their families also begin to worry about their educational life. The most important question is whether they should

attend the same or different classes and schools (Şinik, 2011). Scientists have two ideas about this question: they can attend the same class if they are cooperative but if they are competitive, they can attend different classes (Reed, 2016). Kaleli says that if twins are in the same class, they might have less communication and relations with each other (Kaleli, 2012). Adler (1936)'s statement also supports Kaleli's idea:

> "The Dionne quintuplets would develop into more useful, normal members of human society, if they were separated, put into ordinary homes and schools"

At this point: about separation, Preedy (1999) gives an idea: "Pre-school offers a vital opportunity for individual and separate experiences". Razon (1987) points out the importance of separating twins and triplets as early as possible, because "we" language is more developed among twins rather than "I" language. To develop individual strengths, their language, and social skills, this separation can be a good opportunity for multiple children.

Some twins and triplets do not want to be at the same school because they have different capabilities and skills (Şarman et al., 2013). Thus, they can prefer different schools such as same-sex schools, vocational schools. Competitive twins or triplets can be separated or sent to the same school. As a result choosing the same or different classes depends on twins' and triplets' and their families' attitudes.

According to the Twins and Multiple Births Association (TAMBA) booklet (Reed, 2016), identical/MZ twin girls can be more cooperative with each other than fraternal/DZ twin girls. It might be said that identical/MZ twin girls can attend the same class. This is a situation that changes from twin to twin. Some twins are really addicted to each other, and this can cause some problems. To develop their individuality, being in different classes can be a good idea (Şinik, 2011).

Boy and girl twins can show different maturity as a result of puberty (Reed, 2106). Most families see their daughter as a big sister in a girl and a boy twin. This idea can cause the boy as a co-twin to stay like a little brother. At this point, being in different classes/schools is likely to be a good idea for this kind of twins (Şinik, 2011).

Segal (2006) mentions that the negative effects of separation are seen in 7-year-old identical/MZ twins rather than fraternal/DZ twins in Oklahoma and she explains that

according to Texas State Legislation, parents of multiples can have an opportunity to choose the same or different classrooms for their children. It is not compulsory and she (2012) gives the last word on this discussion in one of her interviews:

> "Many educators have a misguided notion that if twins aren't placed in separate classrooms, they won't develop a sense of self. But you have to handle this situation on a case-base basis. Separation may work well for some twins, but not so well for others".

The choice for triplets of being in the same class or different classes should be taken together with families, schools, and multiple children. As a first alternative: if one of the triplets is a kind of spokesman for multiple children, being in a different class can be positive for multiples to improve their individualities (Akerman, 1999). During the research, in one of the schools at 1st-grade level, boy triplets are taken for the questionnaire and it is seen that one of the triplets is taken the role of spokesman for the group (triplet brothers). He answers the (birth order, birth date, age, sex, and grade) questions not only for himself but also for his brothers. While the others are drawn themselves back and behave shy as an introvert people, the spokesman is developing not only his language ability but also his social relation. In addition to this evidence, it is observed that in some schools, multiple children are placed into different classes as school legislation.

As a second alternative: if being in the same class will motivate multiple children, this can be beneficial for them. Of course, the teacher of multiple children should have an interaction with multiple children's families for the sake of multiple children's academic performances.

Being in a same or different class can be an advantage or disadvantage according to multiple children's gender, birth order or twin types: being identical/MZ or fraternal/DZ twin. In addition, sharing same class or not might affect multiple children's multiple intelligences in a positive or negative way.

2.9.6 Twins and Triplets at Primary and Middle Schools

The education system in Turkey, which is run by The Ministry of National Education (MEB), consists of 4+4+4 compulsory education. The first 4 describes the four years of primary school between the 1st and 4th grade levels (between the ages of 6 and 9/10). In

the first term of the 1st grade, children prepare for reading and writing skills. In the second term, they can read and write. In the 2nd, 3rd and 4th-grade levels, children complete the general curriculum and as it is seen in Table 2.4., the school subjects show that multiple intelligences are used in schools (MEB, 2017). However, subjects' hours are not equal and it is given too much importance on mostly linguistic and mathematical subjects. Especially, visual arts and music subjects are neglected. This is unfair in terms of equality of opportunities in education.

Table 2.4. Turkish Primary and Middle School Education Weekly Schedule

Subjects	**Grade Levels and Hours**							
	Primary School Grade Levels				**Middle School Grade Levels**			
	1st grade	***2nd grade***	***3rd grade***	***4th grade***	***5th grade***	***6th grade***	***7th grade***	***8th grade***
Turkish Language	10	10	8	8	6	6	5	5
Mathematics	5	5	5	5	5	5	5	5
Science of Life	4	4	3					
Science			3	3	4	4	4	4
Social Sciences				3	3	3	3	
Foreign Language (English)		2	2	2	4	4	4	4
Religion Culture and Ethic Values				2	2	2	2	2
Visual Arts	1	1	1	1	1	1	1	1
Music	1	1	1	1	1	1	1	1
Playing and Psychical Activities	5	5	5	2				
Physical Education and Sport					2	2	2	2
Traffic Education				1				
Human Rights, Civics and Democracy				2				
Information Technologies					2	2		
Turkish Revolution History and Kemalism								2
Technology and Design							2	2
Psychological Counseling and Career Guidance								1

Source: *Republic of Turkey Ministry of National Education*

After the first 4 years, children attend the second 4 years: 5th, 6th, 7th and 8th-grade levels (between the ages of 10 and 13). 6/7-11/12-year-old children (young learners), who are between 1st and 6th grade levels, are at the concrete operational period according to Jean Piaget. During these years, children begin to develop physically, emotionally and socially. They understand and can learn of concrete objects easily, developing their own thoughts, and acceptance by the social world takes place during these years.

At 5th grade, children are generally still children, but by 6th-grade, children begin to grow and enter puberty. After sixth grade, students are at the formal operational period (Piaget, 2014) that they can understand and learn abstract things easily. At this period, abstract school subjects begin to seen as in Table 2.4., and children prepare for the TEOG (Temel Öğretimden Orta Öğretime Geçiş) exam in Turkey[5]. (It is a kind of a transition exam from primary education to secondary education that students have at 8th grade level). Exam preparation might prevent students from developing their multiple intelligences or make them give importance to only two intelligences: verbal/linguistic and mathematical/logical intelligences. It is known that students prepare for the exam solving multiple choice tests in PE, art and music classes in Turkey. It can be said that multiple intelligences are neglected during 7th and 8th-grades for TEOG exam. As a result, the grade levels were not taken into consideration in the present study.

The last 4 describes the four years of high school education between the 9th and 12th-grade levels (between the ages of 14 and 17). The ages can change according to the starting age of a child for the primary school.

There can be some problems among twins and triplets during their educational life, including

- dislike or denial of being a twin/triplet,
- the situation where one twin is positive about their twinship and the other negative,
- expressing hir individuality by doing the same as hir twins (Hay, 1999).

[5] The exam has been applied since 2013-2014 academic year in Turkey.

Razon (1987) emphasizes that teachers and families should consider these elements for twins' educational lives:

- Twins should be given a chance to develop their individuality,
- They shouldn't be doing copy-paste visually and mentally,
- One of the twins shouldn't abuse the other,
- They should be together but independently,
- Competition and jealousy should be discouraged,
- Instead of imitating and competing with each other, they should be encouraged to cooperate and associate with each other.

2.10 Intelligence

Yavuz (2010) says that the definition of "intelligence" was used for the first time by Cicero as "intelligentsia" (as cited in Göğebakan, 2003). The definition of intelligence has been discussed by educators, psychologists, and scientists who have put forward many explanations for this mental quality. However, firstly the dictionary meaning of intelligence can be given;

> "(1) the ability to learn or understand or to deal with new or trying situations: reason; also: the skilled use of reason (2): the ability to apply knowledge to manipulate one's environment or to think abstractly as measured by objective criteria (as tests)" (Webster, 2016).

It is clearly understood that acquisition has a very important portion of intelligence. If you acquire (not learn) and apply the knowledge and skill at a significant level, it can be said that you are an intelligent person or you know how to use your intelligence in terms of learning, recognizing and solving problems.

Spearman (1904) explains intelligence this way:

> "Intelligence", the guiding principle has been not to make any a priori assumptions as to what kind of mental activity may be thus termed with greatest propriety. Provisionally, at any rate, the aim was empirically to examine all the various abilities having any prima facie claims to such title, ascertaining their relations to one another and to other functions".

Thurstone's (1924) intelligence definition is: "Intelligence, considered as a mental trait, is the capacity to make impulses focal at their early, unfinished stage of formation. Intelligence is, therefore, the capacity for abstraction, which is an inhibitory process".

While Gardner (1998) defines the intelligence: "There is an interaction between intelligence and culture. If it has the opportunity, intelligence can develop. For instance, Mozart had musical genes, but the culture allowed him to be a great composer. This performance can be seen in different fields: language, mathematics". He also says that intelligence is a kind of genetic factor (Gardner, 2006), Sternberg (2004) defines intelligence as follows:

> "I define [intelligence] as your skill in achieving whatever it is you want to attain in your life within your sociocultural context by capitalizing on your strengths and compensating for, or correcting, your weaknesses".

Legg and Hutter (2006) explain Alfred Binet's intelligence definition as below:

> "It seems to us that in intelligence there is a fundamental faculty, the alteration or the lack of which, is of the utmost importance for practical life. This faculty is judgment, otherwise called good sense, practical sense, initiative, the faculty of adapting one's self to circumstances. To judge well, to comprehend well, to reason well, these are the essential activities of intelligence … Indeed the rest of the intellectual faculties seem of little importance in comparison with judgment".

While Armstrong (1993) defines intelligence as; "Intelligence depends on the context, the tasks, and the demands that life presents to us and not on an IQ score, a college degree, or a prestigious reputation", Clark (2015) defines it in a different way; "it can be seen not only stable and comes from genes but also it can be changed and developed according to the person's individual performances and experiences".

2.10.1 The History of Intelligence

The first intelligence idea comes from Francis Galton (1892); he proclaims that if humankind has a bigger head size, he/she is intelligent. However, later on, it is understood that there is no relation between the head skeleton and intelligence (Gardner, 2004).

Piaget (1955) believes that intelligence develops when the individual takes an active role in learning and he focuses on the cognitive development of intelligence in his studies. He also divides the learning period into four levels according to age as follow:

- Sensorimotor period: from birth
- Preoperational period: from 2 to 6/7
- Concrete operational period: from 6/7 to 11/12
- Formal operational period: from 11/12 and +

Vygotsky anticipates the social and cultural side of intelligence in his studies. According to him (as cited in Berk, 2013), intelligence cannot be considered only as a genetic factor. There are social and cultural factors that affect the development of intelligent. Family members, teachers, caregivers or older/younger siblings of a child are social tools for the intelligence development of a child at the Zone of Proximal Development (ZPD). Moreover, he adds that this social development can change from culture to culture.

According to Benjamin Bloom, people develop their IQ from birth to four years old about 50 %. From four to six years old, they develop 30 % of their IQ. After that, until 18 years old, IQ development goes on systematically. Between 18 and 45, IQ can go up or down related to individual development (Clark, 2015).

An American psychologist Howard Gardner (1983) argues that there is no stable or single intelligence to label a person as intelligent. He introduces a multiple intelligences theory. According to him, there are seven intelligence at the beginning of the theory, yet then the numbers of intelligence go up to nine (Gardner, 2011). The nine intelligence Gardner identifies and describes in his studies are linguistic/verbal, musical, mathematical/logical, spatial/visual, kinesthetic/bodily, intra-personal/individual, interpersonal/social, natural/environmental, and existential/spiritual.

2.10.2 Intelligence Tests

The Intelligence Quotient (IQ) concept is first used by German psychologist Whilelm Stern in 1912 to define intelligence score on intelligence tests (Clark, 2015). Thus, the IQ abbreviation comes from German: “Intelligenz-Quotient” (Stephen, 2015).

At the beginning of the 20th century, a French psychologist, Alfred Binet creates a scale to develop a curriculum and measure intelligence of disabled children (Gardner, 2004). He observes 3-13-year-old children and determines the standard for them (Karakurt, 2012). The Binet test is introduced and updated to a new intelligence test: the Standford-Binet Intelligence Scale by Lewis Tarman at Stanford University in the USA. According to him, this test gives an idea about the intelligence level of humankind depending on hir age, family background, birth order, culture and sex (Berk, 2013). Stern (the German psychologist) develops intelligence age and birth age calculations to use to determine IQ and Tarman approves it. From that time on, IQ testing has been widely used (Karakurt, 2012).

IQ is calculated as:

$$\text{IQ} = 100\frac{\text{Mental Age}}{\text{Chronical Age}}$$

IQ classification is used to predict the level of educational achievement. Person who gets 145+, are called as genius, 120-144 scores are called as exceptional, 110-119 scores are called as high, 90-109 scores are called as average, 80-89 are called as dull, 70-79 are called as mild disability, 50-69 are called as moderate disability, 20-49 are called as severe disability and -20 are called as profound disability. As Karakurt (2012) quoted from Özden (2005), people having 80-90 IQ scores can finish primary school, 90-110 can finish high school, 110 generally graduate university and with 130 and high IQ are generally gifted students.

Stanford-Binet IQ test can be applied to the people who are over 2 years old and it measures five factors together with IQ: general knowledge, numerical, visual, working storage and analysis of knowledge. Numerical and verbal areas are related to culture but visual, working storage and analysis of knowledge are irrelevant (Berk, 2013).

After the Standford-Binet tests, David Wechsler (an American psychologist) develops the Wechsler Intelligence Scales in 1949.

Wechsler Intelligence Scale:

1- WPPSI: Wechsler Preschool and Primary Scale of Intelligence. This test is for 3-7-year-old children.

2- WISC: Wechsler Intelligence Scale for Children. This test is for 6-16-year-old children.
3- WAIS-R: Wechsler Adult Intelligence Scale-Revised. It is used for people who are 16 and over (Tüyel, 2011).

These tests are very popular among educators because they are standardized for all cultures. They measure four intelligence factors: verbal comprehension, working storage, perceptual reasoning and speed (Berk, 2013). Reliability, validity, and standardization are very important criteria for these IQ tests.

Sancar (2016), a Turkish scientist who wins the Nobel Prize in 2015 explains that "I don't believe in IQ test that determines everything. In this kind of tests, I get average scores. In my opinion, for the success, the only the keyword is to be hardworking". Japanese beliefs support Sancar's statement:

> "effort makes a difference everywhere in intellectual achievement even (when one lacks ability)" (Sato, et al., 2004).

IQ tests can be helpful in education and for clinical psychology departments to determine the individual's strong and weak fields (Tüyel, 2011). Gardner (1998) pinpoints that people are looking for a new way or ways to label you as intelligent. He reminds that IQ tests measure only linguistic, mathematical and spatial intelligences. However, other intelligences seem to be ignored. IQ tests do not give us any information about our creativity, moral or ethical values (Checkley, 1997). To explore over these questions, psychologists have conducted a considerable amount of research on the nature, influences, and effects of intelligence.

2.10.3 Individual Differences in IQ Scores and Intelligence Differences in Twins and Triplets

Research states the different aspects of IQ scores which are

- Genetic,
- Environment,
- Race,
- Socio-Economic Level,
- Sex

Many scientists focus on nature and nurture dimensions of intelligence. Nature is related to genetics, and nurture deals with the environment. Some experts argue that intelligence is genetic and comes from parents. On the other hand, others believe that environmental influences help to improve or weaken the intelligence.

Ataman (2016) indicates in one of her talks that genius people generally come from the same family (as cited in Galton, 1892). Turner (1996) supports this idea:

> "The male's frontal cortex should interpose reminding him that his sons' intelligence if that is important to him is solely dependent on his partner, and that is mirrored in both her parents. The female has more freedom of choice; she may be driven to mate by her partner's physique but the brightness of her children lies mainly within her. His daughters are helped by the paternal contribution but it is her potential mother-in-law, not her father-in-law, who needs checking out".

Scientists explain the genetic factor on intelligence by twin studies. Francis Galton recognizes that twins have the potential to help understand whether characteristic features are inherited or not (as cited in Gillham, 2012). He analyzes 94 sets of twins then 35 sets of identical/MZ twins. He measures behavioral genetics of twins and finds remarkable similarities among identical/MZ twins. Unfortunately, he did not develop an IQ test. Reared apart identical/MZ twins are also examined to understand genetic influences on intelligence. Results reveal that even if identical/MZ twins are reared apart, their IQs are still similar (Gardner and et al., 1996). Segal (1997) states in one of her IQ studies that the IQ correlation does not show similarity among twins who shared the same environment. The environment effect becomes less when they get older (because of interacting with different people and situations).

Reared apart twins can be a good example to explain the environmental effect on intelligence. The first twin and adaptation study in 1920 supports the genetic factor. The findings of the research also premediate previous heritability studies (as cited in Jacobs, et al., 2007). Even in the case of MZ twins, if they are reared apart, IQ score differences can be seen.

Gardner (1999) explains the genetic and environmental factors in this way:

> "Studies of identical twins reared apart provide surprisingly strong support for the "heritability" psychometric intelligence (the intelligence tapped in standard measures like an IQ test). That is, if one wants to predict someone's score on an intelligence test, it is on the average more relevant to know the identity of the

> biological parents (even if the individuals have had no contact with them) than the identity of the adoptive parents".

Researchers say that environmental factors such as family income, family education, and birth order and family-children relationships might affect IQ development (Kaleli, 2012). She also indicates that having a co-twin is an advantageous situation for cognitive development. Berk (2013) mentions that a good family environment can increase children's IQ scores and African-American children have lower IQ score than white American children (as cited in Rosenblum and Kumpf, 1998).

Culture also can occupy an important place in IQ scores. A portion of cultures gives importance to music and musicians, such as Mozart. Had Mozart not lived in Austria, would he be the Mozart? The answer is not exactly known but one thing is certain: culture affects intelligence types (Gardner, 1998).

Gardner (2003) gives the importance of individual values and differences saying that:

> "A dimension on which human beings differ (No two people—not even identical twins— possess exactly the same profile of intelligences)".

2.10.4 Theories of Intelligence

There have been many theories about intelligence as it is summarized in Table 2.5.

Table 2.5. Theories of Intelligence

Theory	**Summary**
1904, 1927 Charles Spearman's *"G" and "S" factor Theory"*	Two-factor Intelligence
1921, Thorndike's *"Multi-factory Intelligence Theory"*	Four-factor Intelligence
1938, Louis L. Thurstone's *"Primary Mental Abilities Theory"*	Seven- factor Intelligence
Vernon's "Hierarchical Theory"	Hierarchy in Intelligence in 4 Levels
1965, Guilford's *"Three-dimensional Intelligence Theory"*	Structure of Intelligence (SI)
1963, Raymond B. Cattell and John Horn's *"Fluid and Crystallized Theory"*	Two-part Intelligence
1983 +1 in 1990, Howard Gardner's *"Multiple Intelligence Theory"*	Eight-factor Intelligence
1985, Robert Stenberg's *"Triarchic Theory of Intelligence"*	Three-factor intelligence
1995, Daniel Goleman's *"Emotional Intelligence*"	Emotional ability

The history of intelligence starts with "g" factor. Spearman (1904) proposed "G Intelligence" and he argued that the "g" factor affects our abilities in different areas. Beside "g" factor, he mentions the effect of "s" in 1927. "S" factor is related to the environment (Jacobs, et al., 2007). In other words: intelligence can have nature (g) or nurture (s) dominance on it. Additionally, he accepts the possibility of measuring intelligence.

Thorndike (1921) believes that there are such factors as level, range, area and speed that affect intelligence and these factors can change from person to person. After Thorndike, Thurstone (1938) develops a theory of intelligence and according to Thurstone's "Primary Mental Abilities"; intelligence is not a single concept. There are seven factors:

- Verbal comprehension

- Reasoning
- Perceptual speed
- Numerical ability
- Word fluency
- Associative memory
- Spatial visualization

These are the primary mental abilities of human beings. Even though the first multiple intelligence expression is given by Thurstone, it is not developed by him.

For Vernon (1950), human abilities occur in the hierarchy. In four levels: the highest level (g factor), next level: ved (verbal and educational abilities), the next level: minor groups and the bottom level: s factor.

Guilford (1966) proposes the structure of intelligence (SI) in five categories: cognition, memory, divergent production, convergent production, and evaluation. He adds four content categories: figural, symbolic, semantic and behavioral. He, after some time, develops it as six categories: units, classes, relations, systems, transformation, and implications.

Psychologist Cattel (1963) proposes fluid and crystallized intelligence but later develops it with John Horn (1966).

- Fluid Intelligence: It is the ability of abstract thinking, logical problem solving and visual reasoning. This intelligence decreases during life.
- Crystallized intelligence: It is the ability of verbal and mathematical skills which increases during life (Postletwaite, 2011).

The Cattell-Horn theory suggests that "intelligence is composed of different abilities that interact and work together to produce overall individual intelligence". (Cherry, 2016).
Gardner (1983) asserts that IQ tests are not enough to label people as intelligent. He believes that there are seven types of intelligence affecting our intelligence;

- Linguistic/Verbal Intelligence
- Mathematical/Logical Intelligence
- Musical Intelligence

- Spatial/Visual Intelligence
- Kinesthetic/Bodily Intelligence
- Intra-personal/Individual Intelligence
- Inter-personal/Social Intelligence

In 1990, he adds one more intelligence; natural/environmental intelligence and afterward existential/spiritual intelligence is also added. As an updated version, there are nine types of intelligence (Gardner, 2011).

Stenberg's (1985) "Triarchic Theory of Intelligence" mentions that our intelligence is affected by three factors:

- Analytical intelligence: Analytical abilities enable the individual to evaluate, analyze, compare and contrast information.
- Creative intelligence: Creative abilities generate invention, discovery, and other creative endeavors.
- Practical intelligence: Practical abilities tie everything together by allowing individuals to apply what they have learned in the appropriate setting (Plucker, 2014)".

In 1995, Daniel Goleman introduces Emotional Quotient (EQ). Goleman explains emotional intelligence as: "The capacity for recognizing our own feelings and those of others, for motivating ourselves, and for managing emotions well in ourselves and in our relationships (Howell, 2014)".

Emotional intelligence has five components:

- Self-awareness
- Self-regulation
- Motivation
- Empathy
- Social Skills (Goleman, 2003).

Gardner explains: "Your EQ is the level of your ability to understand other people, what motivates them and how to work cooperatively with them" (as cited in Akers and Porter, 2003). It can be said that one's EQ level shows their inter-personal intelligent level as well.

2.11 Multiple Intelligence Theory (MIT)

Multiple is the keyword in the dissertation: multiple children and multiple intelligences. As it is seen in the preceding literature, intelligence is a multi-dimensional concept: As offered, there is not just one intelligence, but there are multiple intelligences.

Multiple Intelligence Theory is proposed by Howard Gardner and he says that for the first time, multiple intelligence as a concept is discussed by Guilford (1967) and he finds 120 types of intelligences. Also, Tristan (1930) asserts that there are seven intelligence operators (Gardner, 2009) and then in the year of 1983, Gardner who is working on neuropsychology and child development and questioning traditional intelligence definitions deepens his studies under the concept, Multiple Intelligence Theory (MIT). According to him, people cannot be tagged with labels showing their IQ scores. To explain intelligence, only one aspect cannot be enough due to the fact that people have different types of intelligence in different ways: genes, parents, nutrition, society, school, and culture (Gardner, 2009). MI is pluralistic, and Gardner (2003) believes that:

> "Human brains and human minds are highly differentiated entities. It is fundamentally misleading to think about a single mind, a single intelligence, a single problem-solving capacity. And so, along with many others, I tried to make the argument that the mind/brain consists of many modules/organs/intelligences, each of which operates according to its own rules in relative autonomy from the others".

Firstly, in MI theory, not only is intelligence active but also several intelligences are active. Secondly, IQ scores cannot show our intelligence, ideas, products, and performances. Thirdly, culture has an important role in determining intelligence (Gardner, 2004).

In 1983, he introduces seven types of intelligences:

- Verbal/Linguistic
- Musical
- Mathematical/Logical
- Spatial/Visual
- Kinesthetic/Bodily
- Intra-personal/Individual

- Inter-personal/Social

The last two of them are related to individuality: inter-personal/social and intra-personal/individual intelligence. In 1990, he adds natural/environmental intelligence and as a result, Multiple Intelligence Theory (MIT) consists of eight intelligences. After 20 years, he adds existential/spiritual intelligence which is related to the spiritual world. He also mentions emotional, sexual, moral, attention, observation, artistic, cooking, moral, and humor intelligences but these remain as candidate intelligence assortments. Nevertheless, the studies on those intelligence types are not completed, and the criteria for these potential alternative intelligences are not established yet (Davis, et al., 2013).

Gardner (2011) also states that MI can change from culture to culture. Some cultures give too much importance to a specific intelligence, such as music (e.g. Mozart, where the effect of culture can clearly be seen). For instance, in Turkey, there are seven regions and they are different from each other from a cultural point of view. For instance, in the Black Sea, kinesthetic intelligence is very active. People from the Black Sea love moving and they have special dances: Kolbastı and Horon. Also, musical intelligence is developed in this region. They love singing folk music related to their dances.

Gardner (2009) also underlines the importance of intelligences interacting with one another but sometimes (due, perhaps, to mental illnesses) they are not involved in an interaction. During life, people develop our intelligences and they work in a harmony. In certain occasions, people can advance especially one intelligence over the others leaving the others undeveloped.

In his attempt to identify those eight intelligences, he puts forth several criteria;

- Potential isolation by brain damage (neurological evidence)
- Evolutionary history and evolutionary plausibility
- Identifiable set of core operations
- Susceptibility to encoding in a symbol system
- Recognizable end state and distinctive developmental trajectory
- Existence of savants, prodigies, and other individuals distinguished by the presence or absence of specific abilities
- Support from experimental psychological tasks

- Support from psychometric findings (Baum, et al., 2007).

According to Gardner (2003), MIT encompasses individual differences:

- A property of all human beings (All of us possess these 8 or 9 intelligences)
- A dimension on which human beings differ (No two people—not even identical twins— possess exactly the same profile of intelligences).

As a result, MI has found a great number of educators as educators for it acknowledges and prioritizes each student's individuality that might help to achieve their educational goals (Gardner, 2003). Kornhaber (2016) mentions that

> "MI provides a more 'real world' perspective on human problem solving".

The important ambition for the educator is to discover and polish each student's sharpened intelligences because there is no student who genuinely fails but whose skills undiscovered. Student-centered approach that is defended by Piaget (1964) also supports MIT giving a chance each individual to improve their interests, abilities, and experiences.

There have been arguments for and against MIT (Armstrong, 2009). However, it can be said that teachers have a tendency to use it in their classes (Gardner, 2009). MIT also would be useful for multiple children's educational lives supporting their individualities. Even if they are born together, they are really different from each other. As Gardner (2003) said, MIT is

> "A dimension on which human beings differ (No two people—not even identical twins— possess exactly the same profile of intelligences".

As Albert Einstein is reputed to have said:

> "Everyone is a genius. But if you judge a fish on its ability to climb a tree, it will live its whole life believing that it is stupid".

Einstein summarizes the importance of MIT, in fact. Parents and educationalists are expected to help multiple children advance the right ability or abilities. Also, William G. Spady in one of his quotes touches on the significance of MIT in education.

> "All students can learn and succeed, but not all on the same day in the same way".

Firstly, MIT gives every individual the ability to achieve their intelligence and put it into practice and secondly, Gardner's "not even identical twins have exactly the same intelligence" explanation can be a good educational alternative for one of the hypotheses.

According to Gardner (2004), there is no superiority among intelligences and MIT can be explained in four ways:

- Key abilities
- Sub-abilities
- Roles or domains
- Strategies or products (Baum, et al., 2007).

Key abilities are the abilities showing the dominant intelligence's features. Sub-abilities are related to the main abilities that support it. Roles or domains are the professions that are related to the dominant intelligence and dominant intelligence as used in daily life. Strategies or products are what you can do with the dominant intelligence.

In Turkey, as it is mentioned in Table 2.4, Ministry of National Education gives priority to verbal and mathematical subjects and the growing support families give to those two intelligences, namely mathematical and verbal, they on the side to support school legislation in a similar manner. As a result, children in Turkey get exposed too much to verbal and mathematical intelligence rather than other intelligences.

2.11.1 Verbal/Linguistic Intelligence

> *"The child begins to perceive the world not only through his eyes but also through his speech".*
>
> Lev Vygotsky (1930)

In one of his interviews, Chomsky explains to Lawton (2012), linguistic/verbal intelligence as a genetic factor.

> "It's perfectly obvious that there is some genetic factor that distinguishes humans from other animals that it is language-specific".

Linguistic/Verbal intelligence is a kind of language ability that can be divided into four language skills:

- Listening,
- Reading,
- Speaking,
- Writing.

The first two of them are receptive skills (input) and the last two of them are productive skills (output). In terms of these factors, linguistic intelligence is very important in learning, acquisition and educational environment. According to Gardner (2006)

> "The gift of language is universal, and its rapid and unproblematic development in most children is strikingly constant across cultures. Even in deaf populations where a manual sign language is not explicitly taught, children will often invent their own manual language and use it surreptitiously. We thus see how intelligence may operate independently of a specific input modality or output channel".

Linguistic intelligence requires knowledge of semantics, phonology, and syntax. Please note that linguistic competence and linguistic intelligence are two different field-based and commonly-used concepts. Linguistic intelligence allows you to use the language in an efficient way. Noam Chomsky (1983) says

> "Language is a process of free creation; its laws and principles are fixed, but the manner in which the principles of generation are used is free and infinitely varied. Even the interpretation and use of words involve a process of free creation".

As Chomsky mentions (1983), language is a kind of creation that consists of finite grammar rules and infinite words. In our daily lives, people use their linguistic intelligence in order to communicate with people, read a newspaper, go online, write a paper, and listen to the news.

The strong linguistic ability allows a person to be adept at writing, reading, listening, talking, arguing, and using vocabulary in a native or foreign language. Linguistically intelligent people can choose professions, such as poet, writer, author, politician, lawyer, language teacher, journalist, editor, teacher, and comedian.

2.11.2 Musical Intelligence

"Music is the mediator between the spiritual and the sensual life".

Ludwig van Beethoven (1770-1827)

Musical intelligence is the ability to use and perform musical patterns and it is located in the right hemisphere of the brain. It can be divided into two categories;

- Singing, and
- Composing.

It is the capacity to recognize and compose musical pitches, tones, and rhythms. Brualdi (1996) emphasizes that auditory functions can be enough to develop these abilities rather than musical knowledge. These kinds of people, who have sensitive auditory functions, have sensitivity to sounds and voices (Pradhan, n.d.). They can easily make music and have rhythm. Music is the expression of them by using music, composing, singing, tapping, humming, whistling or dancing. Bodily/kinesthetic intelligence can be involved with dancing because musical intelligence is mostly about hearing and singing and maybe composing. However, dancing, playing a musical instrument or performing are mostly related to kinesthetic (bodily) intelligence.

Musical intelligence is generally linked with mathematical/logical intelligence. There is a positive correlation between mathematics and music. Like linguistic and mathematical intelligences, musical intelligence has its symbols: notes. Like words and numbers, notes are the symbols for expressing our emotions. As cited in Snyder (1997), music is the most direct way of thinking because it does not require words and symbols. In many societies, unfortunately, linguistics and mathematical intelligences are overemphasized rather than musical, visual or kinesthetic intelligence that require special abilities.

Gardner (2011) states that musical intelligence emerges earlier than other intelligences. For instance, babies can easily recognize their mother's voice among many voices. Snyder (1997) states that early musical exposure is good for cognitive process and intelligence. Hoekstra (n.d.) mentions that children who have strong musical intelligence gain self-esteem and inner strength. Gardner (1998) adds that that musical intelligence comes from genes, such as Bach, Mozart or Haydn, in their backgrounds, in the family trees, parents with a considerably high level of musical intelligent can be witnessed.

A strong musical ability allows a person to be good at listening, writing a song, and singing, performing, dancing, composing, and playing a musical instrument. Musically intelligent people can choose professions such as singer, composer, musician, and DJ.

2.11.3 Mathematical/Logical Intelligence

"Mathematics knows no races or geographic boundaries; for mathematics, the cultural world is one country".

David Hilbert (1862-1943)

Mathematical/Logical intelligence is the ability to use numbers efficiently and handle science and logical issues. This ability is universal. Thus, mathematical/logical intelligence can be divided into two categories;

- Mathematical issues
- Logical issues

It can be said that mathematics is the world's scientific communication language. It is for sure that it does not consist of only numbers,

> "It consists of the ability to detect patterns, reason deductively and think logically" (Gardner, 2004).

Mathematic intelligence also comes from early years. As Piaget mentions

> "The roots of logical, the highest regions of logical, mathematical, and scientific thought can be found in the simple actions of young children upon the physical objects in their worlds" (Gardner, 2011).

For instance, children know how to group and classify objects; afterwards, they begin to calculate. According to Gardner (2011), numerical relations and concepts are located in the right hemisphere. Numbers are the symbols of mathematical intelligence. With numbers, people understand the world in a different way but it gives stable data. Mathematical intelligence is also part of our daily life. While buying and selling, traveling, looking at a watch, calculating time, and mathematical intelligence is used.

Gardner (2016) says that

> "it's great to have language and logical intelligence because most tests really focus on that. And if you do well in those tests as long as you stay in school, you think you're smart. But if you ever walk out into Broadway or the highway or into the woods or into a farm, you then find out that other intelligences are at least this important".

Decision making and finding solutions are important consequences of the mathematical/ logical mind (Hoekstra, n.d.). Hierarchies, memorization, algebra, geometry, trigonometry, statistics, probability, discrete mathematics, fractions, percentages, decimals are the mathematical subjects that children are familiar with.

The strong mathematical or logical ability allows a person to be good at dealing with numbers, solving abstract and mathematical problems, critical thinking, scientific experiments and projects, and computer programming. A mathematically intelligent person can choose to become a mathematician, science teacher, scientist, astronaut, laboratory assistant, computer programmer, engineer, accountant, lawyer, and architect.

2.11.4 Spatial/Visual Intelligence

> *"Animation offers a medium of storytelling and visual entertainment which can bring pleasure and information to people of all ages everywhere in the world".*
>
> Walt Disney

Spatial/Visual intelligence is the ability to perceive a form or an object and to work in space (Gardner, 2016). Visual codes take place in the right hemisphere of the brain and the importance of this ability is seen especially during the preschool period that children do not know how to read and write. Their linguistic and mathematical intelligences are not sufficient to express themselves since they are in Piaget's concrete operational period. However, visual/spatial intelligence helps students to describe the world that they observe or touch. Pens, pencils, crayons, paints, Lego, blocks are the tools which represent their world. Unfortunately, although these skills are developed during the preschool period, they can be neglected after preschool by the pressure of strict curricula.

Visual people have visual memories and learn easily by visual materials. They remember their night dreams easily and they find addresses easily. They get a screenshot of a visual in their minds. When they see something, it is easy for them to remember, memorize and do it by themselves. They are also skillful at using colors. There is a harmony in their colors. This harmony can be seen not only in their pictures or art but also when they are wearing clothes or decorating their homes. Visual people are also

able to design different objects or things. Their creations can be easily recognized by others.

The strong visual ability allows a person to be competent in drawing, painting, sculpting, watching, doing, decorating, mental organization, using graphics and diagrams, navigating.

> "Free play is very important. Play in the real world, with logical freedoms and limits, actually influences the thinking of the future manager, designer, and athlete of the year!" (Hoekstra, n.d.) .

Spatially/visually intelligent people can choose these professions: artist, architect, graphic designer, designer, webmaster, engineer, pilot, surgeon, taxi driver or sea captain.

2.11.5 Kinesthetic/Bodily Intelligence

"I hear and I forget. I see and I remember. I do and I understand".
Confucius 551-479 BC)

Some people learn by doing. Especially, young learners can be taught totally kinesthetically at home or at school because they love being active and moving. Bodily intelligence can be divided into two categories:

- The first one involves using the whole body to move or do something, like athletes.
- The second one involves using hands and fingers, like surgeons (Gardner, 2016).

Kinesthetic intelligence controls our movements (Gharaibeh, 2012). Kinesthetic people love being active, running, touching. They learn best by using their body wholly or partly. They use their body as a learning tool. Therefore, they know their body very well. Kinesthetic intelligent people have good balance, coordination, flexibility, strength, endurance, and reflex. Their hand-eye coordination, tactile sensitivity, and dexterity are well-developed (Armstrong, 2014).

Kinesthetic intelligent people are adept at sports such as running, jumping, walking, jogging and dancing. They love hands-on tasks and constructing models such as building up by the use of Lego blocks. As a result, their small-motor abilities are recognizable. Some kinesthetic/bodily children can be labeled hyperactive or having Attention Deficit Hyperactivity Disorder (ADHD). Before labeling a child as hyperactive or ADHD, parents should take advice from an expert. Therefore, parents who have a kinesthetically intelligent child(ren) should help them to achieve their goals using their bodies. Professions such as farmer, athlete, sports person, dancer, craft person, mechanic, designer, Physical Education (PE) teacher, surgeon, builder, and carpenter are appropriate for kinesthetic people.

2.11.6 Intra-personal/Individual Intelligence

"When you accept yourself, the whole world accepts you".

Lao Tzu (604-531 BC)

Intra-personal or individual intelligence means loving and being ourselves. To love people, firstly people should love themselves. The new generation is expected to have developed their intra-personal intelligence since they constantly spend time with themselves using social media such as Facebook, Twitter, Instagram or Snapshot. Technological equipment such as PCs, laptops, I pads, and iPhones give a lot of opportunities for people to be themselves. As a result, intra-personal people can be considered anti-social. These kinds of people should balance their intra-personal and interpersonal intelligences.

Ross (n.d.) mentions that children between 0-3 years old develop their intra-personal/individual intelligence, focusing on themselves. This focus helps them build their self-development and prepares them to develop their inter-personal intelligence after 3 years old.

Intra-personal intelligent people know their own goals, their strong and weak sides, and listen to their inner voices. They can easily motivate themselves internally, which the most effective motivation type is leading to success. They plan their futures. Their short-term and long-term goals are clearly established and progressed in their minds. They

also learn how to learn by themselves through the educational materials that they choose. Thus, distance learning can be a good alternative for them.

In the case of twins and triplets, one or two of them can have intra-personal intelligence while other(s) has/have inter-personal intelligence. Sometimes, one of the twins has inter-personal intelligence while the other one has intra-personal intelligence.

Strong intra-personally intelligent people analyze everything in a detailed way, do research patiently, love studying or working alone. They are prone to be a poet, professor, researcher, scientist, inventor, writer, actor, filmmaker, coach, and trainer and choose as a profession.

2.11.7 Inter-personal/Social Intelligence

"Empathy and social skills are social intelligence, the interpersonal part of emotional intelligence. That's why they look alike".

Daniel Goleman (1995)

As it is mentioned above, social awareness begins after three years old. After that age, children begin to develop social skills in their environment. To be able to live in a social world with minimum problems, every individual needs to develop their interpersonal and communication skills: how to listen to and respond, respect others, positive interaction, how to gain empathy, how to get in the queue. Ross (2014) mentions the features of interpersonally intelligent people: they control both sides of their brain according to the situation they face with.

Inter-personal intelligence allows people to get on well with each other. Group or team activities encourage these people to learn to work with others in harmony and to greet and thank people for a polite stance. They are talkative, open to conversations and taking time with others. Their considerable ability to show empathy towards others allows them to easily put themselves in others' shoes. It is their very nature to get to understand other people, negotiate over issues and offer suggestions with ease in a principle of reciprocity. Organizing social events, leading a group of people or be a member of a team is several of their general characteristics. Professions such as a teacher, coach, psychologist, psychiatrist, salesperson, sociologist, therapist, waiter/waitress, activist, reporter, politician, speaker, mediator, suit a lot to interpersonally intelligent people.

2.11.8 Nature/Environmental Intelligence

"The earth has music for those who listen."

Shakespeare (1564-1616)

Nature provides wonderful learning materials and realia for human beings. However, children would rather stay indoor places than outdoor places. Louv (2005) unfolds that the reason as quoted below:

> "I like to play indoors better 'cause that's where all the electrical outlets are," reports a fourth-grader. Never before in history have children been so plugged in—and so out of touch with the natural world."

The new generation called "net-generation" generally spends their time on the internet. Eventually, to plug in, they have to stay in or prefer indoor places. Outdoor activities are less likely to be performed not only for children but also for parents or teachers for the fact that children might get dirty or injured or for the security purposes. However, according to Outdoor Industry Foundation booklet (2005) (as cited in Environmental Protection Agency), the pollution in indoor places is worse than outdoor places. In fact, families need not fear from the environment considering their children; environmental factors are less threatening and more secure when compared to the home environment. In addition to security or injury problems, it can be claimed that anti-social problems can be witnessed as a result of separation from the environment as Louv (2010) calls attention to:

> "The growing separation of children from nature, unless reversed, will drive future families deeper into their cocoons, removing them not only from natural experiences but from many social contacts."

Nature intelligence is added into Multiple Intelligence Theory in 2001 by Howard Gardner. Nature intelligent people are sensitive to the environment as plants, insects, mountains, lakes and natural events call their attention. Zoology, botany, ecology, geography, astronomy, meteorology, biology are considerably significant subjects for environmentally intelligent people. These subjects might motivate students to acquire through topic-based learning.

As Ross (n.d.) clarifies, natural intelligence takes place on both the right and left hemispheres of the brain. Naturalist characteristics related to the right side of the brain:

- Feels at hir best in the outdoors,
- Strives for balance with nature and mind and body,
- Demonstrates an empathy with nature and its creatures,
- Has a strong sense of responsibility towards the environment,
- Possesses a sensitivity to animal abuse and environmental destruction,
- Enjoys exploration, adventure, open-ended experiences,
- Feels an affinity toward animals in general, pets in particular,

Natural characteristics related to the left side of the brain:

- Analyses information,
- Has an eye for detail,
- Sees patterns,
- Identifies categories,
- Reasons in hierarchy (can rank items by significance and relationship),
- Memorizes schematically,
- Looks for structure,
- Understands statistics,
- Prefers charts and timelines,
- Has a strong interest in ecology, biology, and chemistry.

Environmentally intelligent people may prefer professions such as gardener, farmer, veterinarian, zoologist, teacher, meteorologist, botanist, fishing, geologist, anthropologist, and sailor.

2.11.9 Existential/Spiritual Intelligence

"In order to understand the world one has to turn away from it on occasion".

Albert Camus (1913-1960)

Gardner proposes existential intelligence as a ninth intelligence in 1999. It is the ability to observe human beings and the world, questioning them or the world asking questions such as why we are created, how we are created, why the earth exists.

Armstrong (2014) puts the existential intelligence under the three headings:

- Getting philosophical,
- Learning about religion and spirituality,
- Getting cosmic with the universe.

Existentially intelligent people prefer to be therapists, yoga instructors, poets, imams, pastors, priests, philosophers, herbalists, acupuncturists, or theologians as professions for their future career. The last intelligence has not been accepted by educators yet (Lunenburg and Lunenburg, 2014). It is mostly about abstract things, it is difficult for 6/7- 11/12-year-old children who are at the concrete operational period to understand. For that reason, existential intelligence was not mentioned in the questionnaire of the present study as a data collection instrument.

2.12 The Features and Critics of Multiple Intelligence Theory

Howard Gardner states that

- All human beings possess all intelligences in varying amounts.
- Each person has a different intellectual composition,
- We can improve education by addressing the multiple intelligences of our students,
- These intelligences are located in different areas of the brain and can either work independently or together,
- These intelligences may define the human species,
- Multiple intelligences can be nurtured and strengthened, or ignored and weakened,
- Each individual has nine intelligences (and maybe more to be discovered).

To sum up these points, every individual is born with MI and it is up to the person to discover them and to make them stronger or get weaker. The strength and weakness portions can change from time to time. The interconnectedness between intelligences seems obvious. As a result, every individual uses hir intellectual capacity in a different way. From an educational point of view, MIT can be used as an approach while educators are teaching in different fields to different ages.

There are questionable areas for MIT: Is MI really intelligence, ability or a gift? Gardner (2003) answers whether MI is ability or a gift. MI cannot be perceived as or confused with learning style or a social domain. When he explores these faculties in his investigation, he calls them intelligences rather than abilities or gifts, because he constitutes his theory on different disciplines such as biology, genetics, and anthropology (Gardner, 2009).

As Armstrong (2009) points out, the critics generally refer to the lack of empirical support; no solid research support for MI exists in the classroom. MI theory dumbs down the curriculum to make all students mistakenly believe they are smart. Klein (1997) also criticizes MI theory as it does not offer a level of analysis either empirically plausible or pedagogically useful. Another critic comes from Çalık and Birgili (2012), one of the critics is related to the intelligence and skill definitions are not clear yet (as cited in White and Breen, 1998).

2.13 Educational Implications of Multiple Intelligence Theory

"All students can learn and succeed, but not all on the same day in the same way".

William G. Spady

When Howard Gardner proposes MI, he is surprised that teachers have given too much importance to MIT. However, it is not accepted by academic psychology (Gardner, 2013). Teachers know their students very well and their observations lead them to apply MIT in their classrooms. MIT also enables educational equalization among students and gives them a chance to learn in their own ways, and according to their own interest, needs and talents due to and in line with their personal and specific learning strategies. MIT supports the educational process (Saban, 2005). In addition, MIT can help educators to feel more efficient: should their method work; they feel the pleasure of witnessing the development in their students.

Gardner (1993) advises that using MIT in the classroom has benefits but teachers should not label their students with their strongest or weakest intelligences since these two intelligences might change during life and intelligences can be improved. Gardner

(1996) also adds that teachers should use all intelligences equally during the lesson. When they are on the threshold of deciding on and choosing their materials, they should take MIT into consideration seriously. Armstrong (2009) supports Gardner,

> "Strong intelligent students are metaphorically saying through their misbehaviors: This is how I learn, teacher, and if you don't teach me in the way that I most naturally learn, guess what? I'm going to do it anyway (Armstrong, Multiple Intelligences in the Classroom)".

According to Gardner, MIT provides two opportunities for the education system:

- to prepare a curriculum for the students to reach their goals,
- to educate the students not only in verbal or mathematical disciplines but also in different disciplines (Talu, 1999).

➢ <u>The MI Curriculum</u>

There are MI schools in which the MI curriculum has been applied successfully worldwide, as storified in "Six Success Stories from Six Schools" (Campbell and Campbell, 1999). In Kentucky, the MI curriculum has been applied in Russell Elementary School. Lesson plans include all different intelligences and they give special importance to art. There is a flexible program where students move freely. There are MI learning centers and students go to these centers and have a lesson there from mentors. They decorate the center under famous names whose strongest intelligence is famous:

- Whitney Houston for musical intelligence
- Helen Keller for intra-personal intelligence
- Malcolm X for inter-personal intelligence
- Dr. Seuss for linguistic intelligence
- George Washington Carver for logical-mathematical intelligence
- Shaquille O'Neal for kinesthetic intelligence
- Donatello for visual-spatial intelligence

A Cycle of Success in Figure 2.3. can be shown as in Russell Elementary School; Teachers use MI to improve observation and instruction of students. Lazear (1992) proposes four stages to design a multiple intelligences syllabus:

- Stage 1: Awaken the Intelligence

- Stage 2: Amplify the Intelligence.
- Stage 3: Teach with/for the Intelligence.
- Stage 4: Transfer of the Intelligence

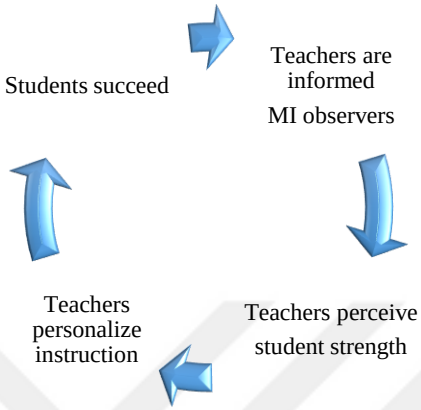


Figure 2.3. A Cycle of Success: Campbell & Campbell

Teachers can design their own syllabus using these stages. Awaken the intelligence is a kind of warm-up activity that awakens students strongest intelligence. It is supported by related materials and activities. It becomes an educational tool and lessons are taught through this intelligence. It is used, practiced in front of the class. Thus, the MIT cycle is completed.

Nicholson- Nelson (1998) used Bloom's taxonomy to teach MI:

Knowledge: Rote memory skills (facts, terms, procedures, classification systems).

Comprehension: The ability to translate, paraphrase, interpret, or extrapolate material.

Application: The capacity to transfer knowledge from one setting to another.

Analysis: The ability to discover and differentiate the component parts of a larger hole.

Synthesis: The ability to weave component parts into a coherent whole.

Evaluation: The ability to judge the value or use of information using a set of standards.

These five stages can be applied to nine intelligences and used in the classrooms. For instance, to teach Verbal/Linguistic Intelligence, the teacher can follow these stages:

Knowledge: define, memorize, record and list.

Comprehension: clarify, discuss, restate, describe, explain and review.

Application: interview, dramatize, express, show and publish.

Analysis: interpret, compare, inquire, investigate, organize, survey, question and test.

Synthesis: compose, create, imagine, predict and invent.

Evaluation: evaluate, revise, deduce, infer, predict, correct and edit.

- Using Different Disciplines

Siegel and Shaughnessy (as cited in Gardner, 1994) state that

> "The biggest mistake of the past centuries in teaching has been to treat all children as if they were variants of the same individual and thus to feel justified in teaching them the same subjects in the same way."

As a result, MI teachers are not like traditional teachers. Teachers are a kind of guide. They show many alternatives to teach, using different kinds of materials and methods, such as interviewing, critical thinking, designing, debating, problem-solving, picturing. Children pick up the material or alternative way(s) to reach their goals. For that reason, MI is much more student-centred rather than teacher-centred. As a result, students learn in an efficient way and get motivated intrinsically. Their self-esteem increases and eventually education finalizes with success.

Teachers can take the children to MI centers to strengthen their weakest and strongest intelligences.

- Libraries can be good places for linguistic/verbal intelligence,
- Information Technology (IT) and science laboratories are for mathematical/logical intelligence,
- Music rooms are for musical intelligence,
- Art centers and rooms are for visual/spatial intelligence,
- PE rooms and sports centers are for kinesthetic/bodily intelligence,
- Computer centers, libraries, art & craft centers are for intra-personal/individual intelligence,
- Stages and social areas for inter-personal/social intelligence,

- Gardens and zoos are for natural intelligences,
- Mosques, churches, and observatories can be nice places for existential intelligence.

Teachers can also get feedback about the MIT curriculum by asking themselves these questions: (Nicholson-Nelson, 1998)

- Have you provided the learners with opportunities to speak, listen, read and write?
- Have you included numbers, calculations and/or activities requiring critical thinking?
- Have you included pictures, graphs and/or art?
- Have you included activities involving movement?
- Have you included music and/or rhythms?
- Have you included set work and/or group work?
- Have you provided the learners with private learning time and/or time for reflection?
- Have you included categorization tasks and/or arranging exercises?
- Have you helped the learners consider the topic/theme/grammar point(s) of today's lesson in relation to a larger context?

2.13.1 Identifying Multiple Intelligences

Identifying multiple intelligences is different from identifying a general intelligence. IQ defines only linguistic/verbal, mathematical/logical and spatial/visual intelligences. These skills can be determined by pen and paper tests, whereas multiple intelligences can be determined by multiple assessment versions (Armstrong, 1993).

- Observation: Gardner, (as cited in Lazear (1992), is against testing MI using pen and paper tests and he suggests the best way to identify multiple intelligence is

  > "10 hours of careful observation of students involved in various activities and learning tasks, we can get a fairly accurate intelligence profile of them".

- Check-List: During observation, teachers take notes by keeping a diary, journal, and notebook. It can be very difficult for teachers who have crowded classes. Thus multiple intelligence checklists can be a good alternative for the teacher who has less time but many students (Armstrong, 2009).
- Documentation: visual, hard or soft documents reflect students' MI.
- School records: School scores and documents give ideas about MI.
- Talking to teachers: School consultation gives clues about MI.
- Talking to parents: Feedback from families is very important to determine MI.
- Ask students: Students, themselves determine their MI.
- Multi-dimensional activities: Activities should be balanced with eight types of intelligences. Sometimes, students pay much more attention one of the activities. At that time you can get an idea about your students' MI.

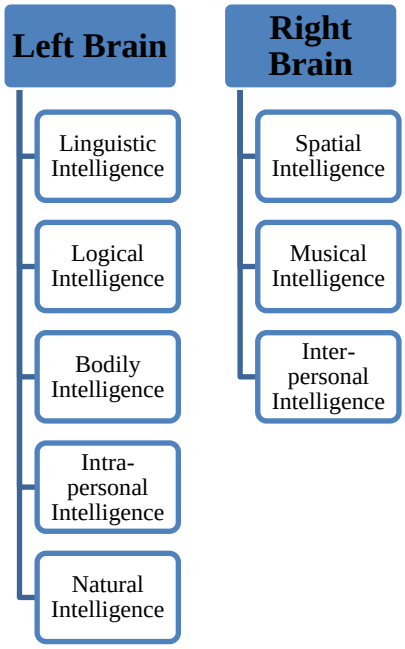


Figure 2.4. The Location of the Multiple Intelligences in the Brain

Teachers can get clues about their students' multiple intelligences using one of these methods. To discover students' multiple intelligences is, in fact, to see which part of the

brain of the students' is active. Armstrong (2003) mentions that these eight intelligences as a result of neurological events take place in the different parts of the brain. As in Figure 2.4., linguistic/verbal intelligence, mathematical/logical intelligence, kinesthetic/bodily intelligence (mostly finger motor skills are seen on the left side of the brain, some bodily movement can be seen on the right side of the brain), intra-personal/individual intelligence and nature intelligence take place on the left side of the brain. However, spatial/visual intelligence, musical intelligence, and inter-personal/social intelligence take place on the right side of the brain.

2.13.2 Assessment of Multiple Intelligence Theory

Assessment is an essential part of education. Correct assessment helps students to be successful in their careers. At schools, generally, assessments are done via pen and paper tests or exams. These sorts of tests measure linguistic, mathematical and visual abilities of students. In Turkey, school exams are generally done in this way. Students take multiple-choice exam tests TEOG, YGS and LYS[6]. However, there are different types of assessment methods as well as different types of students. Some students can be successful at these three intelligences (verbal, mathematical and visual). However, there are six more intelligences to be measured. For a better education system, every child should be educated and get training according to hir strong intelligence and they should take their places in society. As well as lawyers, doctors or engineers, each society is also rich with athletes, carpenters, barbers, mechanics gardeners, or biologists. Beyond the scope of necessity, it is the sign indicating that each person is unique and naturally represents specific features from their own points of views and lifestyles.

MI gives teachers and students the opportunity not to make evaluations through the filter of a short-answer test (Checkley, 1997). For that reason, teachers should prepare "intelligence profiles" to evaluate their students. This evaluation might be beneficial to test and categorize the students according to the eight types of intelligences and to get feedback about teachers' education methods (Brualdi, 1996). Portfolios, projects, journals, creative tasks can be called as alternative assessment methods for MIT.

[6] YGS and LYS exams have been applied since 2009-2010 academic year.

To apply these assessment methods to multiple intelligences can help students to discover their strong and weak intelligences, to motivate themselves easily, and to learn the subjects related to their cultures through different types of educational materials. As Armstrong (2009) proposes, the weak and strong intelligences can change from time to time due to numerous internal or external factors.

Internal factors:

- Biological endowment: genetic factors, injuries and mental problems with the brain,
- Personal life story: family, educational background of the people,
- Cultural and historical background: the place where you are born, lifestyle and culture your experience, affect using, develop or neglect multiple intelligences.

External factors that affect intelligence rates or weakness:

- Access to resources or mentors,
- Historical-cultural factors,
- Geographic factors,
- Familial factors,
- Situational factors,

If educators assess their students according to these factors or prepare their curriculum based on MIT, their students can have equal educational opportunities. Moreover, to understand how students learn, there are some MI scales, tests, and inventories. The Teele Inventory for Multiple Intelligence (TIMI) is one of them which is developed as a spatial inventory by Sue Teele (1992). It is used with three-year-old children and older adults. Another scale is developed by Shearer (1987) who is also recommended by Gardner (n.d.) in his website, in the FAQ part. It is used both for kids and adults to pinpoint their learning types.

2.14 Multiple Intelligence Theory in Multiple Children: Twins and Triplets

It might be known how multiple intelligences work in siblings, however, if twins and triplets are accepted as a small group, it might be useful to have knowledge about how multiple intelligence might help them.

2.14.1 Linguistic/Verbal Intelligence in Multiple Children

Language development generally occurs among all children at similar ages and developmental stages. However, premature children such as twins and triplets can have some linguistic problems related to low birth weight and biological factors. As Yılmaz and et al. (2013) state that there is a two-year language delay among twins (as cited in Davis (1937).

Twin language is a language that twins develop between themselves. Others do not understand some of the words, sentences or expressions which they speak to each other. It is also interesting that if one or two of multiple children are mute, this can also cause twin language to occur. As a result, one of the twins or triplets can be more talkative than other(s). In this situation, the talkative one is like the spokesperson of the peer or the group. The other(s) can be like listeners, passive talkative participant. As a result, the talkative one improves hir verbal intelligence and the other improves intra-personal intelligence

In twins and triplets, females have more linguistic intelligence than her male siblings. One of the twins or triplets can have a high level of competency in the skills of reading and writing and encompass a large vocabulary but the other(s) does/do not. Pronunciation problems can be seen in all twins or triplets or individually, and memorization can be a strength of one or all of them.

2.14.2 Musical Intelligence in Multiple Children

One of the twins or triplets may have an ability to sing or play an instrument but the other(s) may not. One of the twins or triplets can compose music while the other/s can just sing or play it. They can get a music group together. Families and teachers should support them in accordance with their individual characteristics.

2.14.3 Mathematical/Logical Intelligence in Multiple Children

Regarding the reality of new generation technology is an attractive norm. Both twins and all of them may have mathematical intelligence. One of them may be able to count by heart; one of them may be good at playing chess or mind/strategy games, again, one of them may be able to reset an electronic machine to see how it works which all in all distinguishes each of them among others.

2.14.4 Spatial/Visual Intelligence in Multiple Children

One of the twins or triplets may have a visual mind; if so, the visually intelligent twin or triplet can be watchful and hypercritical because ze recognizes each and every detail. One of them may be very much intrigued by drawing when compared to the other(s); the better one is generally good at visual art lessons and sometimes helps the co-twin if ze is not good at it. One of them may have a visual mind and never forgets where ze has been to; thus, ze can help to find the way when they need to go back to the starting point or destination. Lego blocks, building constructions might be of interest to one of the twins or triplets. And one of them can learn by watching and seeing but not the other(s); TV, internet, CDs, DVDs, pictures can be used as educational tools.

The hairstyle or clothing can also be very important for one of them. As a result, arguments and fighting for clothes can occur especially among girl twins. Choosing and preferring clothes and accessories, fashion or dressing style can be important for visually intelligent co-twins or triplet siblings. Wearing the same or different colors and clothes is a debatable subject. Scientists tend to suggest that families should encourage multiple children to choose different colors and clothes that might be helpful for them to improve their sense of individuality and self-esteem.

2.14.5 Kinesthetic/Bodily Intelligence in Multiple Children

Twins or triplets are often very active, sometimes hyperactive. As the same with the other intelligences, multiple children do not always show or have the same specialties. One of the twins or triplets may love moving; ze is always in action, running, moving, jumping, dancing, and doing sports. One of the twins or triplets has the ability to imitate

and can use mime, gestures and body language. One of the twins or triplets can be good at PE lessons. Hand-skills may be seen in one of the twins or triplets but not the other(s).

2.14.6 Intra-personal and Inter-personal Intelligence in Multiple Children

Because multiple children spend much time together, they do not feel the need for further friends. It is easy for them to play together and isolate themselves from the environment. Sometimes, one of the twins or triplets can be dominant and abuse the other(s). As a result, one child can be inter-personal and the other one(s) can be intra-personal. One of the children may love being by hirself, however, the other(s) do/es not; as a result, the inter-personal one/s can disturb the other(s) causing fighting or argument. One of the children cannot wish to take time with others and may isolate hirself from hirself sibling(s).

One of the twins can make friends easily and the other(s) cannot. The social one can have fun with hir friends and the other one loves being alone or sometimes envy hir co-twin or triplet siblings from others. Making and sharing friends can cause problems among twins and triplets. While one of the children might love group activities, the other one might enjoy individual activities.

Because of empathy development, inter-personal twins or triplets might be a volunteer to do housework and help parents. Intra-personal twins or triplets know good and bad sides of themselves that lead them success. Intra-personal child(ren) should be encouraged to express their inner thoughts via writing, painting, drawing, singing or composing.

2.14.7 Natural/Environmental Intelligence in Multiple Children

Metropolitan children are generally far away from nature. They do not know plants, trees, animals, and insects. One of the multiple children may love being with nature however the other does not. One of them may like being with animals or adopt a pet, but the other one(s) is/are afraid of or dislike them. One of the children may prefer going to outdoor places (garden, zoo, mountains, and parks). One of the children may want to grow a plant and take responsibility for it but the other(s) do/es not. Recycling may be very important for one of the twins but the other one does not care about it. And one of

the children may have an allergy for any kind of flower, plant or animal but not the other(s).

2.14.8 Existential/Spiritual Intelligence in Multiple Children

Finally, multiple children do not always have the same spiritual intelligence. One of the children can think a lot about life and questions it, but this might be of no interest to the other/s. Worship, yoga, meditation can be very important for one of the children, but not all. And religion, spirituality, philosophical questions about truth, right, wrong, and justice are important for one of the children who read books related to these topics while the sibling/s show(s) no interest in such ideas.

3. METHODOLOGY

This descriptive study endeavors to pinpoint the dimensions of multiple intelligence in multiple children by depicting the similarities and differences between them. In this section, the pilot and the main study, the samples of the study, the data collection instrument, ethical approval, procedure and data analysis of the study are presented.

3.1 The Pilot Study

Before the main study, it is useful to apply a pilot study to get some reliable and valid results. The pilot study helps us to see how the subjects perceive the items and terms in the questionnaire. As a result, after having administered the pilot study, the scale is reformulated and the data are analyzed.

3.1.1 The Demographic Information about the Subjects of the Pilot Study

The pilot study is carried out in 2015 with 24 sets of twins aged between 6-12 years, who are from among grades 1 through 6. Sıra Dışı Annelik Foundation's[7] Facebook page is highly helpful to find the subjects via social media. Of the subjects whose families do not know anything about multiple intelligence theory, 14 are from Istanbul, 2 from Ankara and Bursa, 1 from Samsun, Balıkesir, Hatay, Tekirdağ, Adana, and Niğde.

Table 3.1. Twin Types of the Subjects in the Pilot Study

Types of Twins	**n**	**%**
Identical/MZ Twins	6	25
Fraternal/DZ Twins	18	75
Total	**24**	**100**

[7] Sıra Dışı Annelik Foundation: The First Multiple Births Association of Turkey which was found in 2012 by the researcher.

As it is illustrated in Table 3.1., 24 subjects consist of identical/MZ n= 6, (25 %) twins and fraternal/DZ n= 18, (75 %) twins. The results turn out to be in line with the literature: identical/MZ twins rarer than fraternal/DZ twins. (All identical/MZ twins are in girl-girl gender pairs).

Table 3.2. Gender Pairs of Twins in the Pilot Study

Gender Pairs of Twins	**n**	**%**
Girl- Girl	14	58.3
Boy- Boy	6	25
Girl-Boy	4	16.7
Total	**24**	**100**

As we can see in Table 3.2., the subjects of the study are 14 sets of girl-girl twins (58.3 %), six sets of boy- boy twins (25 %) and four sets of girl-boy twins (16.7 %).

Table 3.3. Gender Types of Child A and Child B in the Pilot Study

Gender of Child A	**n**	**%**	**Gender of Child B**	**n**	**%**
Female	18	75	Female	14	58.3
Male	6	25	Male	10	41.7
Total	**24**	**100**		**24**	**100**

As it is seen in Table 3.3., Child A is the first born and Child B is the second one. 18 (75 %) female co-twins and six (25 %) male co-twins are cited as the first born child. For the second born, female co-twins are again more than male co-twins. 14 female co-twins (58.3 %) and 10 male co-twins (41.7 %) are cited as Child B.

Given what depicted here under in Table 3.4. below, in the pilot study, students are from grade 2 and 6. Subjects are mostly at 2nd grade level, n= 8, (33.3 %). Respectively, at 4th grade, n= 7, (29.2 %), at 6th grade, n= 4, (16.7 %), at 3rd grade, n= 3, (12.5 %), and at 5th grade, n= 2, (8.3 %) sets of twins are cited.

Table 3.4. The Grade Levels of the Subjects in the Pilot Study

The Grade Levels of the Subjects	**n**	**%**
2nd grade	8	33.3
3rd grade	3	12.5
4th grade	7	29.2
5th grade	2	8.3
6th grade	4	16.7
Total	**24**	**100**

As shown in Table 3.5., the subjects are mostly born in 2007, n= 8, (33.3 %) sets of twins. N= 7, (29.2 %) sets of twins are born in 2005. In 2003, n= 4, (16.7 %) sets of twins are born. N= 3, (12.3 %) sets of twins are born in 2006, and in 2004, n= 2, (8.3 %) sets of twins are born.

Table 3.5. The Birth Dates of the Subjects in the Pilot Study

The Birth Date of the Subjects	**n**	**%**
2003	4	16.7
2004	2	8.3
2005	7	29.2
2006	3	12.5
2007	8	33.3
Total	**24**	**100**

3.1.2 The Instrument

The instrument is inspired from Shearer (2007) who is recommended by Howard Gardner and mentioned in his web site in FAQ part (n.d.). It is modified by the researcher using the staments in the article. They are constructed as a 5-point Likert scale version.

Multiple intelligence theory, as and upgraded, has nine intelligences. Since the last intelligence has abstract items (it is out of Piaget's concrete operational period), it is not included in the questionnaire. As a result, the questions are constructed for eight

dimensions of intelligence: verbal/linguistic, musical, mathematical/logical, spatial/visual, kinesthetic/bodily, intra-personal/individual, inter-personal/social and nature. In total, there are 40 statements, five items for each intelligence. The answers are formed using the 5-point Likert Scale as 0= "Never", 1= "Rarely", 2= "Sometimes", 3= "Usually", 4= "Always". The total scores in each intelligence are calculated and rated on 20-point scores and interpretations are 0-3 Points: "Poor", 4-7 Points: "Fair", 8-11 Points: "Average", 12-15 Points: "Good" and 16-20 Points: "Excellent" on subjects' views. The scale is performed in mother tongue: Turkish.

In addition to the multiple intelligence scale, to get much more information about multiple children, a Google Form is designed and send to the families, which it is filled out online and sent back.

3.1.3 The Procedure

The subjects are found via social media: Facebook. The procedure is carried out via cell telephone interview. The families do not know anything about multiple intelligences. Thus, they are informed about MI and told what to do during the procedure. So as not to affect the objectivity of the study, they are asked to separate each child while answering the questions on the phone.

In order to warm the children up for the interview, they are informed about MIT and told that this study is not a study that shows their IQ. Thus, it would be beneficial for them to determine their MI types or learning styles, and the similarities and differences between them.

There are 40 questions to be answered. Each statement is read for the subjects on the phone and required an answer from 0 to 4 indicating frequency. Children give their rating and the researcher circles it on the paper. The procedure takes approximately 20 minutes with each child. In total, 40 minutes is spent on the phone. Some of the children get bored and lose their attention when they are answering the questions. After questionnaire is applied to 24 sets of twins (totally 48 children) on the telephone and the results are shared with the mothers. It is seen that there are similarities between the results and mothers' comments.

3.1.4 Findings and Discussion

The results of the pilot study, support our hypothesis; "every child has different dimensions of multiple intelligences even if they are identical/MZ twins" as in Table 3.6. below. Much more multiple intelligence similarities among identical/MZ twins are seen than those among fraternal/DZ twins as in the literature.

Table 3.6. Multiple Intelligence Scores for each Dimension of Twins in the Pilot Study

Multiple Intelligences	**Excellent**		**Good**		**Average**		**Fair**		**Poor**	
	Child A	**Child B**	**Child A**	**Child B**	**Child A**	**Child B**	**Child A**	**Child B**	**Child A**	**Child B**
Verbal Intelligence	13	13	9	9	2	2	-	-	-	-
Musical Intelligence	11	6	6	12	2	3	4	3	1	-
Mathematical Intelligence	14	15	2	7	5	2	3	-	-	-
Spatial Intelligence	10	9	11	8	2	5	1	2	-	-
Kinesthetic Intelligence	14	15	7	6	2	3	1	-	-	-
Intra-personal Intelligence	9	16	10	6	4	2	1	-	-	-
Inter-personal Intelligence	15	14	6	6	3	4	-	-	-	-
Natural intelligence	15	15	6	5	3	3	-	1	-	-

The numbers of fraternal/DZ twins are higher than identical/MZ twins. This is not a statistical data since the analysis of multiple intelligence scores of multiple children are not analyzed statistically. Considering this information, if the results are analyzed roughly, it seems to be that Child Bs have higher scores than Child As in all intelligences in terms of twin type factor (identical/MZ twin or fraternal/DZ twin).

When multiple intelligence is examined as shown in Table 3.6., it is seen that at the same number of Child As and Child Bs n= 13, (54.2 %) have "excellent" score, n= 9, (37.5 %) have "good" score, n=2, (8.3 %) have "average" score for linguistic/verbal competence. There is no child who has fair or poor scores for linguistic/verbal intelligence.

When musical intelligence is compared between Child As and Child Bs, the differences are clearly seen. While Child As n=11, (47.8 %) have “excellent” musical intelligence, Child Bs n=6, (25 %) have “excellent” musical intelligence. At “good” level, there are more children from Child Bs n= 12, (50 %) than Child As n= 6, (21.7 %). At average level, Child As n= 2, (8.3 %) and n=3, (12.5 %) Child Bs get “average” musical intelligence. At “fair” degree, n=4, (17.4 %) Child As and n=3, (12.5 %) Child Bs have “fair” degree musical intelligence. While “poor” musical intelligence is seen in one of Child As n=1, (4.3 %); Child Bs do not have any “poor” musical intelligence.

Like linguistic/verbal intelligence, mathematical/logical intelligence is also given much importance by both educators and families. n=14, (58.3 %) Child As and n=15, (62.5 %) Child Bs have “excellent” mathematical/logical intelligence. “Good” degree mathematical/logical intelligence is seen among n=2, (8.3 %) Child As and n=7, (29.2 %) Child Bs. “Average” mathematical/logical intelligence is seen among n=5, (20.8 %) Child As and n=2, (8.3 %) Child Bs. While n=3, (12.5 %) Child As have “fair “mathematical/logical intelligence, there are no Child Bs at this level. Neither Child A’s nor Child B’s score in the “poor” mathematical/logical intelligence range.

In spatial/visual intelligence as shown in Table 3.6., n=10, (41.7 %) Child As and n=9, (37.5 %) Child Bs have “excellent” spatial/visual intelligence. “Good” spatial/visual intelligence is seen in as n=11, (45.8 %) Child As and n=8, (33.3 %) Child Bs. At an “average” level, there are n=2, (8.3 %) Child As and n=5, (20.8 %) Child Bs. At “fair” spatial/visual intelligence, n=1, (4.2 %) of Child As and n=2, (8.3 %) of Child Bs are seen. There is no one with “poor” spatial/visual intelligence.

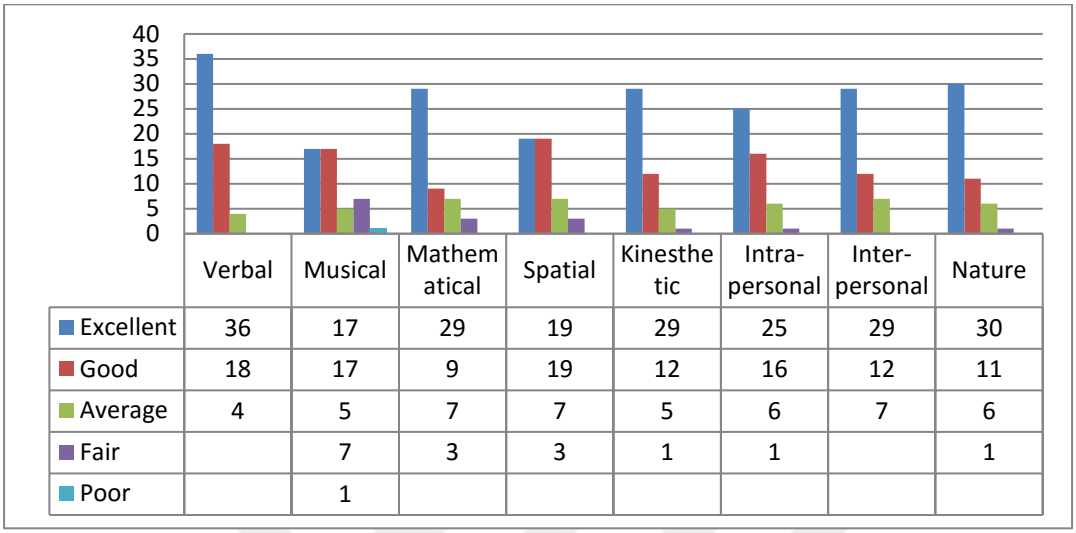
In Table 3.7., the similarities can be seen in kinesthetic/bodily intelligence among Child As and Child Bs in twins. Since children love being active at these ages, it is very natural to see kinesthetic/bodily intelligence similarities between twins. n=14, (58.3 %) Child As and n=15, (65.2 %) Child Bs have “excellent” kinesthetic/bodily intelligence. n=7, (29.2 %) Child As and n=6, (21.7 %) Child Bs have “good” /bodily intelligence. n=2, (8.3 %) Child As and n=3, (13 %) Child Bs have “average” kinesthetic/bodily intelligence. n=1, (4, 2 %) Child A has just “fair” kinesthetic/bodily intelligence. However no one show “poor” kinesthetic/bodily intelligence.

As in Table 3.6., interestingly, there are visible differences between Child As' and Child Bs' intra-personal/individual intelligence. N= 9, (37.5 %) Child As and n=16, (66.7 %) Child Bs have intra-personal/individual intelligence to an "excellent" degree., N=10, (41.7 %) Child As and n=6, (25 %) Child Bs have "good" intra-personal/individual intelligence. At "average" level, n=4, (16.7 %) Child As and n=2, (8.3 %) Child Bs have intra-personal/individual intelligence. n=1, (4.2 %) of the Child As has intra-personal/individual intelligence to a "fair" degree. No one is poor at intra-personal/individual intelligence.

In the pilot study, as seen in Table 3.6., n=15, (62.5 %) of Child As and n=14, (58.3 %) of Child Bs (58.3 %) have an "excellent" degree of inter-personal/social intelligence. The same number of Child As n=6, (25 %) and Child Bs develop their inter-personal/social intelligence to a "good" degree. n=3, (12.5 %) Child As and n=4, (16.7 %) Child Bs have "average" inter-personal/social intelligence. There is no one at "fair" and "poor" degrees of inter-personal/social intelligence.

The last intelligence is nature intelligence. In the pilot study as seen in Table 3.6., the same number n=15, (62.5 %) Child As and Child Bs have "excellent" nature intelligence. "Good" nature intelligence is also evident in n= 6, (25 %) Child As and n=5, (20.8 %) Child Bs. "Average" nature intelligence is seen at the same amount of number both in n=3, (12.5 %) Child As and Child Bs. "Fair" nature intelligence is seen only one of the Child Bs (4.1 %). As with the other intelligences, there is no one who has a "poor" level of nature intelligence among the twins.

Table 3.7. The Frequency of Multiple Intelligence Rates of the Subjects in the Pilot Study



	Verbal	Musical	Mathematical	Spatial	Kinesthetic	Intra-personal	Inter-personal	Nature
Excellent	36	17	29	19	29	25	29	30
Good	18	17	9	19	12	16	12	11
Average	4	5	7	7	5	6	7	6
Fair		7	3	3	1	1		1
Poor		1						

As it is seen in Table 3.7., the most developed intelligences seem to be the verbal/ linguistic intelligence and relatively, nature intelligence, mathematical/logical intelligence, kinesthetic/bodily intelligence, intra-personal/individual intelligence, inter-personal/social intelligence, spatial/visual intelligence and musical intelligence in the pilot study. Since their mean scores and standard deviations are not known, these results do not represent as statistical data.

3.1.5 Concluding Remarks

The results gained from the pilot study seem to coincide with literature. For example, fraternal/DZ twins are more common than identical/MZ twins. As a result, in the study, n=18, (75%) sets of fraternal/DZ twins are seen higher than n=6, (25%) sets of identical/MZ twins. In addition, (n=32) female co-twins are seen higher than (n=16) male co-twins.

The results of the pilot study give clues in the course of main the study. At the beginning of the pilot study, there are ten questions for each dimension of intelligence, in total: 80 questions to be answered. The questionnaire is applied to two or three sets of twins, it is seen that ten questions for each dimension of intelligence are too many for the children who are at Piaget's concrete operational period. As a result, they get bored and lose their attention.

Considering the fact that children might get bored and give incorrect answer or they might answer without listening to the questions, the numbers of the questions are reduced. In the updated scale, there are five items for each intelligence: 40 questions to be answered. There are also some abstract words that are difficult for children to understand. As a result, questions are redesigned by using more simplified and clearer words.

The pilot study results do not represent the general idea about multiple intelligence in multiple children since the results are not analyzed statistically.

3.2. The Main Study

The subjects of the dissertation consists of n= 679 co-twins and n= 33 triplet siblings who are between 6 and 12 years old and inhabit of Esenler/Istanbul. The main study is conducted during the Spring term of 2014-2015 and 2015-2016 Fall term of academic years. The demographic information related to the subjects; their total numbers, their numbers in primary, and secondary schools, genders, twin types, grades, birth dates, class sharings, data collection instruments of the main study; its validity and reliability results, the ethical approval of the instruments, and the procedure and data analysis methods of the main study are given below.

3.2.1 The Subjects of the Main Study

The subjects of the main study are chosen from 6-12-year-old twin and triplet students who are between the 1st and 6th grade levels (represent Jean Piaget's concrete operation period) in the state and the private schools in Esenler/Istanbul. Esenler is chosen as a district because the researcher is an inhabitant of Esenler. Thus, it is a convenient area.

The study is carried out in the Spring term of 2014-2015 academic year. Because of time constraints, all the schools are not visited in this term. As a result, the research is continued in the Fall term of 2015-2016 academic year. According to Istanbul Provincial Directorate for National Directorate, n= 42 schools; n= 21 primary and secondary schools and n= 40 of them are state schools and n= 2 of them are private schools, are cited during these two academic terms.

3.2.1.1 The Subjects of the Study during the Spring Term of 2014-2015 Academic Year

During the Spring term of 2014-2015 academic year, primary n=14, (54%) and secondary n=12, (46 %) schools are visited. Out of 26 schools, n= 4 (15%) of them are private and n= 22, (85 %) are state schools. There are n= 28, 365[8] students and out of this number, n= 209, (95 %) sets of twins and n= 9, (5 %) sets of triplets. In total, the questionnaire is answered by n= 445 students in this term.

Primary schools consist of 1st, 2nd, 3rd and 4th grade levels. During the Spring term of the 2014-2015 academic year, n= 12 state and n= 2 private primary schools are visited in Esenler and n= 171 multiple children (162 sets of twins and 8 triplets) are identified and participated in the primary schools. No twin or triplet students are not registered in private schools.

Secondary schools consist of 5th, 6th, 7th and 8th grade levels. In the study, only 5th and 6th grade levels students are included. As a result, n= 47 sets of twins and n= 1 set of triplets, in total: 97 students are identified in 12 secondary schools in Esenler during the Spring term of the 2014-2015 academic year.

3.2.1.2 The Subjects of the Study during the Fall Term of 2015-2016 Academic Year

During this term, n= 7, (44 %) primary and n= 9, (56 %) secondary schools are visited and none of them are private schools. At the end of the research, n= 139, (99 %) sets of twins and n= 2 (1 %) sets of triplets are identified and in total, the questionnaire is answered by n= 284 students. Out of n= 18,503 primary and secondary students, n= 140 sets of twins and n= 2 sets of triplets, in total n= 286 students, are identified during the Fall term of the 2015-2016 academic year.

[8] The general numbers of students were taken from the Esenler District National Education Directorate. Twin and triplet numbers were gained from the research.

3.2.1.3 The Total Number of the Subjects

In total, n= 348 (97 %) sets of twins and n= 11 (3 %) sets of triplets are identified and participated in the Spring term of the 2014- 2015 academic year and the Fall term of the 2015-2016 academic year. In total, 696+33= n= 729 children answer the Multiple Intelligence Scale. Table 3.8 and Table 3.9 show triplet and twin students' numbers in schools in Esenler.

Table 3.8. The Numbers and Percentages of Triplet Students in Schools in Esenler

Triplet Students	**N**	**%**
50. Yıl Tuna Primary School	1	8,3
Dr. Ilhami Faydagör Primary School	1	8,3
Kazım Karabekir Primary School	3	25,0
Kazım Karabekir Imam Hatip Secondary School	1	8,3
Mehmet Akif Ersoy Primary School	3	25,0
Menderes Secondary School	1	8,3
Yunus Emre Primary School	1	16,7
Total	**11**	**100**

Table 3.9. The Numbers and Percentages of Twin Students in Schools in Esenler

Twins at Schools	**N**	**%**
125. Yıl Secondary School	5	1,7
50. Yıl Tuna Primary School	6	1,7
Aksoy Secondary School	7	2,0
Atatürk Primary School	4	1,1
Atışalanı Ismet Paşa Primary School	13	3,7
Atışalanı Secondary School	7	2,0
Ayvalıdere Primary School	10	2,9
Ayvalıdere Secondary School	6	1,7
Birlik Secondary School	4	1,1
Cumhuriyet Primary School	17	4,9
Dr. Ilhami Faydagör Primary School	14	4,0
Dr. Ilhami Faydagör Secondary School	4	1,1
Engin Can Güre Primary School	23	6,6
Engin Can Güre Secondary School	8	2,3
Fatih Imam Hatip Secondary School	4	1,1
Fidan Demircioğlu Secondary School	5	1,4
Hasip Dinçsoy Primary School	22	6,3
Kazım Karabekir Primary School	10	2,9

Kazım Karabekir Imam Hatip Secondary School	1	0,3
Kemer Primary School	12	3,4
Mareşal Fevzi Çakmak Primary School	17	4,9
Mehmet Akif Ersoy Primary School	21	6,0
Menderes Secondary School	9	2,6
Neyyir Turhan Primary School	10	2,9
Neyyir Turhan Secondary School	5	1,4
Nine Hatun Imam Hatip Secondary School	2	0,6
Oruç Reis Primary School	11	3,2
Oruç Reis Secondary School	6	1,7
Orfi Çetinkaya Primary School	9	2,6
Orfi Çetinkaya Secondary School	2	0,6
Oz-De-Bir Secondary School	9	2,6
Ressam Şevket Dağ Primary School	13	3,7
Tacirler Eğitim Vakfı Primary School	12	3,4
Tacirler Eğitim Vakfı Imam Hatip Secondary School	8	2,3
Türk - Isveç Kardeşlik Primary School	11	3,2
Türk - Isveç Kardeşlik Secondary School	2	0,6
Yunus Emre Primary School	16	4,6
Yunus Emre Secondary School	3	0,9
TOTAL	**348**	**100**

3.2.2 Demographic Information of the Subjects in the Main Study

348 sets of twins and 11 sets of triplets: in total (n=729) subjects take place in the study. Since filling the form incorrectly, lack of or missing information in twin data, 17 out of co-twins are cited as missing or as unengaged, during the demographic SPSS analysis of the twin subjects.

In total, (n=679) co-twin's and (n= 33) triplet sibling's demographic information are examined and given as below.

3.2.2.1 The Gender and Birth Order of the Subjects: Twins and Triplets

The birth order is one of the essential issues in multiple children studies. Child A represents the first-born and Child B is the second born child in twin births and Child C is the last born child in triplet births.

Before starting the questionnaire, the birth order of children is asked. If the child (ren) does not know who the Child A, Child B, and Child C is, their families are called and

learned. According to their response, birth order section is filled with the correct response in the questionnaire.

As can be seen in Table 3.11., out of 336 Child As, n= 190, (57 %) are cited as female and n= 146, (43 %) are cited as male co-twins. However, out of 343 Child Bs, n= 195, (57 %) are cited as female and n= 146, (43 %) are cited as male co-twins. It is seen that both in Child A and Child B, the number of female co-twins are higher than male co-twins.

In the study, the gender factor is analyzed as female and male co-twins. In twins, while n= 190, (49 %) Child A and n= 195, (51 %) Child B, in total, n= 385 female co-twin are registered in the study, n= 146, (50 %) Child A and n= 148, (50 %) Child B, in total, n= 294 male co-twin are registered in the study as in Table 3.11.

Table 3.10. The Numbers of Female and Male Co-twins in the Main Study

Gender	Child A	Child B	Total
Female	190	195	385
Male	146	148	294

It is seen that the numbers of female n= 385, (57 %) co-twins are higher than male co-twins n= 294, (43 %) in the main study and the results are similar with those of the pilot study (n=32 female, n=16 male co-twins).

Table 3.11. The Numbers of Female and Male Triplet Siblings in the Main Study

Gender	Child A	Child B	Child C	Total
Female	5	3	3	11
Male	6	8	8	22

The study is carried out with n= 33 triplet siblings (11 sets of triplets), n= 11 female and n= 22 male triplet siblings are cited, in total as seen in Table 3.12. The gender results are different from twin results'. There are higher amount of female siblings (n= 385> 294) in twins however, there are male siblings (n= 22> 11) in triplets.

Out of 11 female siblings, five of them are cited as Child A, three of them are Child B and Child C. In 22 male siblings, six of them are cited as Child A, eight of them are Child B and Child C.

3.2.2.2 Twin Types of the Subjects: Identical/MZ or Fraternal/DZ Twins

There are two types of twins: identical/monozygotic or fraternal/dizygotic. In the study, the twin type determination is done by asking children. (It is seen that students generally know their twin types). If they do not know, their families are called and asked. The twin type is circled on the questionnaire. However, the twin type is not considered in triplets.

Table 3.12. Twin Types of the Subjects in the Main Study

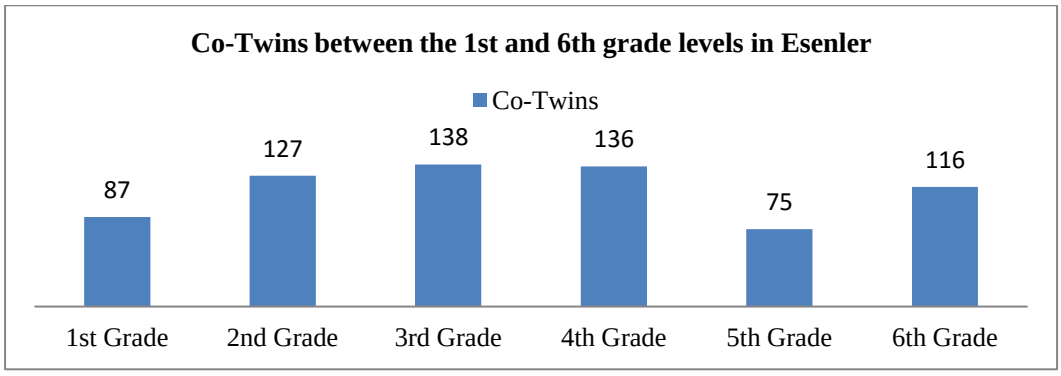
Twin Types of Twins	Child A	Child B	Total	%
Identical/Monozygotic (MZ)	69	68	137	20,3
Fraternal/Dizygotic (DZ)	267	275	542	79,7
Total			**679**	**100**

As it is stated before, fraternal/DZ twins are more common than identical/MZ twins and the study coincided with not only the pilot study but also with previous studies (as in Chapter 2). In the pilot study, n= 18, (75 %) sets of fraternal/DZ twins are seen rather than n= 6, (25 %) sets of identical/MZ twins. As seen in Table 3.12., the study includes n= 542, (79, 7 %) fraternal/DZ co-twins and n= 137, (20, 3 %) identical/MZ co-twins.

3.2.2.3 Grade Levels of the Subjects (1-6 Grades)

The study is carried out with 679 co-twin students from the 1st grade to 4th grade (in primary schools) and 5th and 6th grades (in middle/intermediate schools) in Esenler.

Table 3.13. Twin Students' Grade Levels during the Spring Term of 2014-2015 and Fall Term of 2015-2016 Academic Years

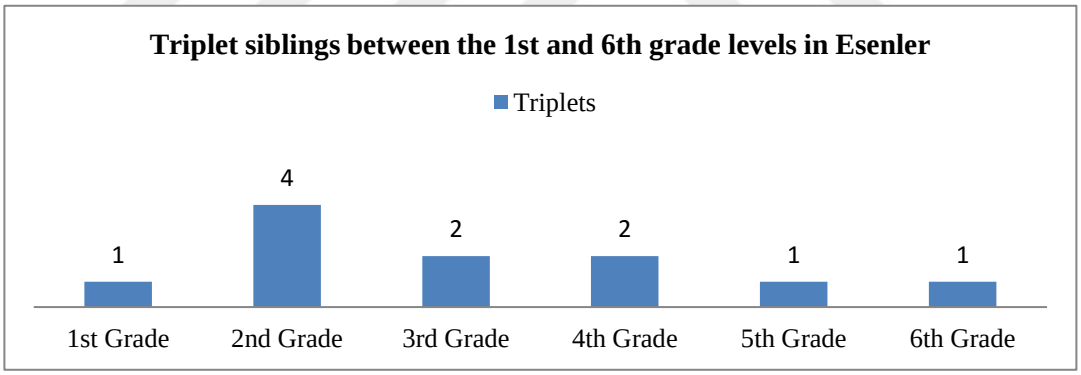


Note: The numbers represent the co-twins.

The Table 3.13. above displays the twin students during the Spring Term of 2014-2015 and Fall Term of 2015-2016 academic years. The grade categories represent those starting from the 1st grade through 6th grade levels. These grade categories are chosen to represent the Piaget's 3rd period (Concrete Operational Period) at cognitive stages of development (Piaget, 1964). The largest co-twin population is seen respectively at 3rd, 4th, 2nd, 6th, 5th and 1st grade levels.

- 1st Grade: n=87, (42 Child A, 45 Child B), 13,8 %
- 2nd Grade: n=127, (62 Child A, 65 Child B), 18,3 %
- 3rd Grade: n=138, (70 Child A, 68 Child B), 20,3 %
- 4th Grade: n=136, (67 Child A, 69 Child B), 19,5 %
- 5th Grade: n=75, (37 Child A, 38 Child B), 11,5 %
- 6th Grade: n=116, (58 Child A and Child B), 16,6 %

Table 3.14. Triplet Students' Grade Levels during the Spring Term of 2014-2015 and Fall Term of 2015-2016 Academic Years



Note: The numbers represent the set of triplets

N= 11 sets of triplets are cited during the study and Table 3.15. displays the number of triplet students from the 1st grade level through 6th grade level. The largest triplet set population is seen respectively at 2nd grade level n=4, (41,7 %). At 3rd and 4th grade levels, the numbers are equal: n= 2, (16,7 %), at 1st, 5th and 6th grade levels, the numbers are also equal: n= 1, (8,3 %).

3.2.2.4 The Birth Dates of the Subjects

Table 3.15. Birth Order and Birth Dates of Co-twins in the Main Study

Birth Dates of Twins	Child A	Child B	Total	%

2002	2	2	4	0,5
2003	32	32	64	9
2004	43	43	86	13
2005	57	58	115	17
2006	62	63	125	18
2007	63	65	128	19
2008	57	60	117	17
2009	19	19	38	6
2010	1	1	2	0,5
Total	**336**	**343**	**679**	**100**

The subjects: twins and triplets are born between 2002 and 2009. Some of the students can start school earlier or later and as a result, they might stay behind or move forward grade levels. Their starting school age in each grade level is not taken into consideration. The birth dates of the subjects are given in Table 3.15. respectively:

- 2002: n=4, (1 %),
- 2003: n=64, (9 %),
- 2004: n=86, (12 %),
- 2005: n=115, (17 %),
- 2006: n=125, (18 %),
- 2007: n=128, (18 %),
- 2008: n=117, (17 %),
- 2009: n=38, (6 %), and
- 2010: n=2, (0,5 %) co-twins were born.

Triplets' birth date range is between 2003 and 2008. There are many more, n= 4, (33, 3 %) sets of triplets who are born in 2007 than in other years. While in 2003, 2004, 2005 and 2006, n=1, (8, 3 %) set of triplets are born, n= 3 (25, 0 %) sets of triplets are born in 2008 as in Table 3.16.

Table 3.16. Birth Dates of Triplet Siblings in the Main Study

Birth Dates of Triplets	**N**	**%**
2003	1	8,3
2004	1	8,3
2005	1	8,3
2006	1	8,3

2007	4	33,3
2008	3	25,0
Total	**11**	**100**

3.2.2.5 Class Sharing in Subjects: Same or Different Class

Being in the same or different classes is a big issue for both families and educators of multiple children. Families, whether consciously or unconsciously, want to choose the right class for their children.

Table 3.17. Class Sharing in Co-twins in the Main Study

Class Sharing in Twins	Child A	Child B	Total	%
Same Class	295	300	595	84
Different Class	41	43	84	16
Total			**679**	**100**

As seen in Table 3.17., n= 595, (84, 0 %) co-twins are in the same classes. However, n= 84, (16, 0 %) co-twins are in different classes. The same situation is true for triplets (in Table 3.18.), n= 9, (83, 3 %) sets of triplets are in the same classes. However, n= 2, (16, 7 %) sets of triplets are in different classes.

Table 3.18. Class Sharing in Triplet Siblings in the Main Study

Class Sharing	Child A	Child B	Child C	Total
Same class	9	9	9	27
Different class	2	2	2	6

3.2.3 Data Collection Instruments

According to Linse (2005) there are many ways to discover a child's interest and development, such as observation, survey, talking, examining hir tasks and writing. In the study, a survey is chosen to discover twins' and triplets' interests and multiple intelligences.

"Multiple Intelligence Scale for Twins and Triplets" questionnaire and "Personal Information Form for Multiple Children's Family" are used as data collection instruments (See the Appendix 7-8).

3.2.3.1 The Validity and Reliability of the Multiple Intelligence Scale for Multiple Children

The instrument is inspired from who is recommended by Howard Gardner's web site in FAQ part (n.d.). It is modified using the statements in the article by the researcher for multiple children in a 5-point Likert scale version.

Multiple intelligence theory, as an upgraded, has nine intelligences. Since the last intelligence has abstract items (it is out of Piaget's concrete operational period), it is not included in the questionnaire. As a result, the questions are constructed for eight dimensions of multiple intelligence: verbal/linguistic, musical, mathematical/logical, spatial/visual, kinesthetic/bodily, intra-personal/individual, inter-personal/social and nature. In total, there are 40 items, five for each dimension of intelligence. Scoring is conducted using the 5-point Likert Scale as showing how frequently they love, like or prefer the statements. The responses are formed by ranging from 0= "Never", 1= "Rarely", 2= "Sometimes", 3= "Usually", 4= "Always" of the 40 items[9]. The total scores in each intelligence are calculated and rated on 20-point scores an interpretations are 0-3 Points: "Poor", 4-7 Points: "Fair", 8-11 Points: "Average", 12-15 Points: "Good" and 16-20 Points: "Excellent" on participants' views. The scale is performed in mother tongue: Turkish.

The multiple children's[10] multiple intelligence evaluation part is created by the researcher. In order to understand and get feedback about their families, the family questionnaire[11] is modified by the researcher of the study (See the Appendix 7-8).

The validity and reliability of the multiple intelligence scale

As One (2017) states the validity of a test can be affected by too difficult or unclear vocabularies, ambiguity, inadequate time limit, too short test and improper arrangement of items (as cited in Kim & Feldt, 2010). MIS is inspired from Shearer (2007) and

[9] Due to technical reasons, the responses are encoded as 1,2,3,4,5 instead of 0,1,2,3,4. This slight change in the data encoding process does not have any effect on the analysis of the data.

[10] Multiple Intelligences in Multiple Children Scale was modified from Ph.D. C. Branton Shearer's article: "Criterion Related Validity of the MIDAS Assessments". Multiple children's multiple intelligence evaluation part was created by the researcher.

[11] The Multiple Children Family Questionnaire was created by the researcher.

modified by the researcher. To supply the validity of the multiple intelligence scale, questions are prepared and shown to the dissertation committee. Ambiguity and abstract words are determined that might be difficult for the 6-12 year children who are at the concrete operational period to understand and answer. As a result of the committee members' comments, the alteration is done in the scale. It is applied as a pilot study that helps us to redesign the scale for their levels. The statements in the original scale are clear, simple and concrete.

One (2017) also pinpoints that "nature of the group, the factors like age, sex, ability level, educational and cultural background influence the test measures (as cited in Freeman, 2006)".

In the pilot study, subjects' names are written on the questionnaire and the telephone interview is conducted as an instrument. However, in the main study, to conduct the survey ethically and not to label students, name tag is not taken place on the Multiple Intelligence Scale (MIS). As a result, in each paper, since their names are not written on the forms, the set number is written to show which paper belongs to which twin or triplet set. For instance, for the 120th set of twins, it is written on Child A's paper: 120, on Child B's paper: 120, if they are triplets; on Child C's paper: 120 and it is written 120 on the multiple children family form. By doing this, it is easy to determine which questionnaire belongs to whom.

The birth order is very significant in the study. As a result, the scale is given according to multiple children's birth orders. Child A means the child who is born first and Child B means the child who is born as a second child. In triplets, Child C represents the last child in the triplets group. To determine who is A, B or C, children are asked. If they do not know who is the first one or the second one, their families are called on the phone and asked.

Subjects are at between 6/7 and 11/12 years old who are at Piaget's concrete operational period (Piaget, 2014). Thus, the age and ability level equality is supplied. There are no students at private schools, all participants are at state schools and have a similar educational background. Since Esenler has migration, it can be said that subjects have a similar cultural background.

According to One (2017), “personal factors influence the students’ response to the test situation and invalidate the test interpretation” (as cited in Anastasi & Urbina, 2002). In order to feel subjects free, they are informed about the study in the Psychology Consultant Department room or a conference hall in the schools. Children are informed that it is not an IQ test. It does not determine who is the more intelligent co-twin or triplet sibling. They are told that the aim of the study is to find their MI and learning style similarities and differences between hirself and hir co-twins. In addition to this information, to support the reliability of the study, children are informed about the frequency quantities: 0= “Never”, 1= “Rarely”, 2= “Sometimes”, 3= “Usually”, 4= “Always”. Since twins and triplets compare each other getting low or high scores, the explanation is given that “0” does not mean failing in a class or getting a low score. Conversely, “4” does not mean getting a high score or being successful. During the application of the study, all twins and triplets are sat in different places so as not to make them affect or cheat from each other.

Some factors such as test length, time, and the difficulty of items, test instructions, the reliability of the scorer, group variability, and environmental conditions might affect the reliability of a scale (HR, n.d.). As a result, these items are considered during the application of the study.

The main study is conducted in 42 schools in Esenler. Since there are no official data about twin and triplet population in the state and the private schools in Istanbul or in MEB, each class (in the school list) is visited and asked whether there are twins or triplets in the class or not.

The length of the scale is appropriate for the students. Enough time is given to the students. 1st grade and 2nd grade students spend approximately 30-40 minutes on the test. For the older students, this process takes approximately 12-20 minutes.

Reliability is an important element of validity analysis used to examine the consistency (unidimensionality) of a set of scale items within a relevant group. Cronbach’s alpha test is conducted to examine the reliability of the instrument (Cronbach, 1951). Reliability coefficient (α) is calculated for each set of items within the corresponding group. The consistency of items is measured by reliability coefficient of between 0 and 1. Thus,

reliability coefficient “0” stands for no relationship between results which means unreliable whereas reliability coefficient “1” indicates the complete relationship between results which means perfectly reliable. Different authors claim different benchmarks for judging results on reliability coefficient score. In this study, reliability coefficient scores are examined and interpreted based on a rule of thumb suggested by Nunnally (1970, 1978). According to Nunnally, the reliability coefficient of 0.70 indicates acceptable consistency reliability across group items.

The instrument of the study is composed of eight dimensions, and each is represented by a group of five items are supposed to measure different aspects of the phenomenon being investigated, namely: verbal/linguistic intelligence, musical intelligence, logical/mathematical intelligence, spatial/visual intelligence, kinesthetic/bodily intelligence, intra-personal/individual intelligence, inter-personal/social intelligence, and nature intelligence.

Before analysis, the raw data are exposed to data screening and cleaning in order to make sure that data are pure and out of mistakes errors, and outliers. Moreover, missing data analysis is conducted and all the scores are thoroughly inspected for missing data. As a result of these analyses, 17 out of 696 subjects are excluded from further analysis due to missing cells. Consequently, the Cronbach’s alpha test is conducted on data with 679 (twins) +33 (triplets) subjects.

3.2.3.2 Personal Information Form for Multiple Children’s Family

“The Personal Information Form for Multiple Children’s Families” is created by the researcher inspiring from (Şinik, 2011) and (Sandbank, 1999). Demographic information is very essential for MC to determine their multiple intelligences. Such as who is born first and later, when they are born, their twin type (identical or fraternal), their weights and birth date (See Appendix 7).

3.2.4 The Ethical Approval

The multiple intelligence scale (See Appendix 8), multiple children family form (See Appendix 7), the primary and secondary school list in Esenler (Appendix 6) are approved by Istanbul Provincial Directorate for National Education Directorate (See

Appendix 1-2) and Istanbul Aydın University Ethics Committee (See Appendix 3). The scale is applied to multiple children voluntarily.

3.2.5 The Procedure

The procedure starts in the Spring term of the 2014-2015 academic year and is carried out in 22 state schools and 4 private schools with 209 sets of twins and 9 sets of triplets from first, second, third, fourth, fifth and sixth grade levels. In total, the questionnaire is responded by 445 children.

Before finding students, the school administrators are visited firstly and they are informed about the study showing the ethical approval of Istanbul Provincial Directorate for National Education Directorate. By the help of administrators, students are found visiting all classes in the schools by one by since there is no official twin or triplet data at MEB. In some visits, the psychological counseling and guidance teachers help us to visit the classes and find the twin and triplet students. In some schools, special need co-twins are seen but they are not included in the study as a twin set.

After finding the students, they are gathered in the psychology consultants' rooms or the schools' conference halls. So as not to affect each other, twins and triplets are sat in different places during the process. Before the application, getting their permission, a photo is taken with twins and triplets.

Before given to the questionnaire to each twin and triplet students, their birth order, types of twin, gender, grade and class sharing information are asked and responses are written on the questionnaire. As an ethic value, name tag is not written consciously on the questionnaire not to label students. Instead, the number of twin set is written on the questionnaire to understand which questionnaire belongs to which twin set. Then, the questionnaire is given to the subjects and explained that there are 40 items that show their interests or preferences. For each statement, they are asked to choose the best number 0, 1, 2, 3, and 4 and put thick in the boxes that showing their interest to the items. They are told that "0" does not mean that failing or getting a low score or "4" does not mean that passing the class or getting a high score. Beside this, it is explained to them that the study is not an IQ test and they should feel them free during the process.

During the Spring term of the 2014-2015 academic year, 1st grade students are in the second term and know how to read and write. As a result, they read the questionnaire own their own. Administering the questionnaire for the 1st and 2nd grade levels take approximately 30-40 minutes. For older students this process takes approximately 12-20 minutes.

Because of time limitation, the study is carried out in the Fall term of the 2015-2016 academic year and n= 139 sets of twins and n= 2 triplets are surveyed in 16 state schools. In total, n= 284 children answered the questionnaire. During this academic year, 1st grade students do not know how to read and write. At this point, questions are read for the 1st grade students to be completed. For the first grade students, 0= "Never", 1= "Rarely", 2= "Sometimes", 3= "Usually", 4= "Always" statements are explained drawing a five-step stairs on the board that shows their highest and lowest interest related to the relevant items. If they climb the stairs that means they love the statement. However, if they go down the stairs, they do not like/love the statement.

During the visiting schools, it is seen that all twins and triplets are happy to participate in the study. Since so far, this is the first twin or triplet event or activity that all twins and triplets come together at their schools. As a result, they feel themselves very special. In addition to this, it is observed that the birth order: the first born child is known by twin or triplet siblings. They think that being the first born child is being elder brother or sister.

Since the schools have morning and afternoon classes, the schools are visited three times. The first visit is for the morning classes when MIS is applied and students are given the family background form. The second visit is for the afternoon classes and getting the morning students' family background form. The third visit is for getting the afternoon students' family background forms and completing the other scales. As a result, 42 schools are visited 3 times, thus, 126 school visits are undertaken during the research.

During the study, it is also observed that teachers and school administrators are curious about twin studies and the frequently asked question is whether they should attend same class or not. Additionally, it is registered that some school administrators prefer to put

twin or triplet siblings into different classes thinking that it might be beneficial for twin or triplet siblings.

3.2.6 Data Analysis

Data analysis is performed using IBM Statistical Package for the Social Sciences (SPSS Version 23) software. Before running statistical analyses, data screening is conducted to make sure that the data are clean and appropriate for the analyses to be conducted. Data screening involve checking normality of data, inspecting potential outliers and problematic cases, and dealing with missing data.

To analyze the internal consistency of the Multiple Intelligence Scale, Cronbach's alpha is conducted with 679+33 subjects. To find out the inter-correlations between the eight multiple intelligence scales in twins and triplets, Pearson Correlation Analysis is used and Levene's test is conducted to examine the homogeneity of eight dimensions of multiple intelligence.

Independent sample t-test is conducted to examine how twins' multiple intelligence scores on eight dimensions are differentiated with respect to birth order in twins (Child A: the first born or Child B: the second born), type of twins (identical/MZ or fraternal/DZ), gender factor in twins and triplets (female or male) respectively. Their mean, standard deviations, Skewness and Kurtosis are given.

One-way Analysis of Variance (ANOVA) is first applied to compare the birth order factor (Child A, Child B and Child C) in triplets on eight dimensions of multiple intelligence, secondly; it is conducted to compare the effects of grade level factor (1^{st}, 2^{nd}, 3^{rd}, 4^{th}, 5^{th} and 6^{th} grade levels) on eight dimensions of multiple intelligence in twins and triplets. Post-hoc analysis is conducted in order to detect what grade specifically was better than the other both in twins and triplets.

4. FINDINGS AND DISCUSSION

In this chapter, the reliability of the instrument and the findings are analyzed statistically in connection with each research question namely;

- the birth order effect on multiple children's multiple intelligence types,
- the twin type effect: identical/monozygotic (MZ) twins or fraternal/dizygotic (DZ) twins on multiple intelligence types,
- the gender effect on multiple intelligences in twins and triplets
- the grade level effect (between the 1st and 6th grade levels) on multiple intelligence types.

4.1 Reliability Analysis of Multiple Intelligence Scale

The data of the present study is collected by using the Multiple Intelligence Scale with subjects (n= 679). 17 out of 696 subjects are excluded from further analysis due to missing data. Consequently, the Cronbach's alpha test is conducted on data with 679 subjects who are at between the 1st and 6th grade levels.

The results of Cronbach's alpha of eight dimensions for multiple intelligences are as in Table 4.1. According to Nunnaly (1970, 1978), the reliability coefficient of .70 indicates acceptable consistency reliability across group items. According to George and Mallery (2003), if the result (X) > .90, it is "Excellent", if X> .80, it is "Good", if X> .70, it is "Acceptable", if X> .60, it is "Questionable", if X> .50, it is "Poor", and if X< .50, it is "Unacceptable". The reliability coefficient of each dimension of eight intelligences is given respectively from higher value to lower value: inter-personal/individual intelligence (α= .64), nature intelligence (α= .60), spatial/visual and kinesthetic/bodily intelligence (α= .57), verbal/linguistic intelligence (α= .56), musical intelligence (α= .54), intra-personal/social intelligence (α= .50) and mathematical/logical intelligence (α= .43). Except for the aspect of mathematical/logical intelligence with the reliability coefficient of (α= .43), all the other aspects have reliability coefficient in the range of

(α= .50) and (α= .64), which is considered to be a poor indication of the internal consistency of the items in each segment. A low value of alpha can be attributed to a low number of questions and poor correlations across the items in the same group.

Table 4.1. Internal Consistency of Eight Dimensions of Multiple Intelligence

Eight Dimensions	Number of Items	Cronbach Alpha Results
Verbal/Linguistic Intelligence	5	.56
Musical Intelligence	5	.54
Mathematical/Logical Intelligence	5	.43
Spatial/Visual Intelligence	5	.57
Kinesthetic/Bodily Intelligence	5	.57
Intra-personal/Individual Intelligence	5	.50
Inter-personal/Social Intelligence	5	.64
Nature Intelligence	5	.60

4.2 The Findings Related to Inter-Correlation of Multiple Intelligence Scale in Multiple Children

The inter-correlation of eight dimensions of multiple intelligence is analyzed using Pearson correlation analysis for twins and triplets and the results are given in in this heading.

4.2.1 Inter-Correlation Results of Multiple Intelligence Scale in Co-twins

The Multiple Intelligence construct is considered to have included eight dimensions. Since different dimensions of the same construct are not discrete parts, they are required to be correlated with one another to a certain extent. In order to provide necessary

evidence that eight dimensions- verbal/linguistic intelligence, musical intelligence, mathematical/logical intelligence, spatial/visual intelligence, kinesthetic/bodily intelligence, intra-personal/individual intelligence, inter-personal/social intelligence and nature intelligence- measure different parts of the same construct, Pearson correlation analysis is conducted to examine the degree of association across eight dimensions of multiple intelligences. As it is given in Table 4.2 below, all eight dimensions of multiple intelligences are significantly correlated with each other, corroborating the evidence at the .05 significance level that eight dimensions of multiple intelligence are likely to measure different aspects of multiple intelligences.

Table 4.2. Inter-correlation of Eight Dimensions of Multiple Intelligence and Eight Intelligence Measures for Co-twins (n= 679)

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Verbal	-							
2. Musical	.40*	-						
3**. Mathematical**	.47*	.39*	-					
4. Spatial	.51*	.47*	.53*	-				
5. Kinesthetic	.47*	.50*	.47*	.58*	-			
6. Intra-personal	.41*	.33*	.44*	.51*	.53*	-		
7. Inter-personal	.47*	.43*	.51*	.59*	.61*	.52*	-	
8. Nature	.38*	.36*	.42*	.47*	.52*	.42*	.51*	-

Note. All coefficient are significant at *$p < .05$

As shown in Table 4.2, all the correlations are positive and significant. As for the strength of the correlation, the results show that musical intelligence and mathematical/logical intelligence are moderately correlated with verbal/linguistic intelligence. However, spatial/visual intelligence is highly correlated with mathematical/logical intelligence. Whereas kinesthetic/bodily intelligence is highly correlated with spatial/visual intelligence, inter-personal/social intelligence, intra-personal/individual intelligence and nature intelligence is highly correlated with kinesthetic/bodily intelligence.

4.2.2 Inter-Correlation Results of Multiple Intelligence Scale in Triplet Siblings

Triplet siblings' multiple intelligence scores are calculated on eight dimensions including verbal/linguistic intelligence, musical intelligence, mathematical/logical intelligence, spatial/visual intelligence, kinesthetic/bodily intelligence, intra-personal/individual intelligence, inter-personal/social intelligence, and nature intelligence. Correlation analysis is conducted to inspect the association across eight dimensions of multiple intelligences for triplet siblings. The results of these analyses are provided and reported along with necessary and relevant statistics.

Table 4.3. Inter-correlation of Eight Dimensions of Multiple Intelligence Measures for Triplet Siblings (n= 33)

Measure	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1. Verbal	-							
2. Musical	.369*	-						
3. Mathematical	.439*	.384*	-					
4. Spatial	0.195	.344*	.615*	-				
5. Kinesthetic	.391*	.575*	.667*	.368*	-			
6. Intra-personal	0.249	0.172	.587*	.690*	.457*	-		
7. Inter-personal	0.275	0.301	0.297	.500*	.442*	.530*	-	
8. Nature	0.259	.520*	.475*	.644*	.533*	.477*	.486*	-

Note. Correlation is significant at *$p < .05$

Pearson correlation analysis is conducted to examine the degree of association across eight multiple intelligence dimensions. Table 4.3. above demonstrates that verbal/linguistic intelligence is not significantly associated with spatial/visual, intra-personal/individual, inter-personal/social, and nature intelligent. It is highly correlated with musical intelligence and mathematical/logical intelligence. Additionally, musical

intelligence is not significantly correlated with other intelligences. However, as clearly shown in Table 4.3., all other correlations are statistically correlated. Inter-personal/social intelligence is highly correlated with inter-personal/social intelligence. It is seen that spatial/visual intelligence is highly correlated with four intelligences, spatial/visual intelligence, mathematical/logical intelligence, kinesthetic/bodily intelligence, intra-personal/individual intelligence, and nature intelligence.

4.3 The Findings of Multiple Intelligence Rates in Multiple Children

Multiple Intelligence Scale is consisting of 40 items and they are responded by 679 co-twins and 33 triplet siblings. Their responses to each item are given below.

4.3.1 Multiple Intelligence Results in Co-twins

Multiple Intelligence Scale is applied to 679 co-twins. There are five items related to each of the eight dimensions of multiple intelligences. In total, 40 items are to be answered and then analyzed. Subjects respond to each item using the five-point Likert scale 0= "never", 1= "rarely", 2= "sometimes", 3= "usually", 4= "always" that show their interest frequency quantities. Mean scores, standard deviations, scores of Skewness and Kurtosis of each intelligence are given in Table 4.4.

The mean scores of each item in verbal/linguistic intelligence are given respectively: item 2: *"I speak clearly"*, (*M*= 4.31, *SD*= 1.00), item 3: *"I like tales and stories"*, (*M*= 4.27, *SD*=1.04), item 5: *"I like writing"*, (*M*= 4.16, *SD*= 1.07), item 1: *"I like poems/ riddles/tongue twister and proverbs"*, (*M*= 4.12, *SD*= 1.16) and item 4: *"I never forget what I listen or hear"*, (*M*= 4.05, *SD*= 1.12).

For musical intelligence, the mean scores of each item are given from the highest to the lowest: item 4: *"I want to play any musical instrument"*, (*M*= 4.09, *SD*= 1.31), item 1: *"I enjoy singing"*, (*M*= 3.78, *SD*= 1.48), item 5: *"I love dancing"*, (*M*= 3.64, *SD*= 1.44), item 3: *"When I hear or listen to music, I began to thump out or sing"*, (*M*= 3.33, *SD*= 1.49) and item 2: *"I write song lyrics"*, (*M*= 3.09, *SD*= 1.43).

The mean scores of each item in mathematical/logical intelligence are presented from the highest to the lowest: item 1: *"I enjoy solving mathematic problems"*, (*M*= 4.40, *SD*= 1.04), item 3: *"I like playing mind games"*, (*M*= 4.32, *SD*= 1.11), item 5: *"I*

wonder how machines work", (*M*= 4.18, *SD*= 1.24), item 4: *"I like doing scientific experiment"*, (*M*= 3.73, *SD*= 1.33) and item 2: *"I can solve mathematic problems easily"*, (*M*= 3.65, *SD*= 1.30).

Table 4.4. Mean, Standard Deviation, Skewness, and Kurtosis for each item in Eight Dimensions of Multiple Intelligence in Co-twins (n=679)

	Variable	Mean	SD	Skewness	Kurtosis
Verbal	Item 1	4,12	1,16	-1,23	0,56
	Item 2	4,31	1,00	-1,52	1,81
	Item 3	4,27	1,04	-1,34	0,97
	Item 4	4,05	1,12	-1,14	0,58
	Item 5	4,16	1,07	-1,34	1,23
Musical	Item 1	3,78	1,48	-0,84	-0,77
	Item 2	3,09	1,43	-0,09	-1,28
	Item 3	3,33	1,49	-0,35	-1,27
	Item 4	4,09	1,31	-1,25	0,26
	Item 5	3,64	1,44	-0,70	-0,88
Mathematical	Item 1	4,40	1,04	-1,94	3,14
	Item 2	3,65	1,30	-0,77	-0,45
	Item 3	4,32	1,11	-1,70	2,02
	Item 4	3,73	1,33	-0,75	-0,64
	Item 5	4,18	1,24	-1,41	0,85
Spatial	Item 1	4,43	1,02	-1,91	3,00
	Item 2	3,72	1,20	-0,82	-0,13
	Item 3	4,10	1,13	-1,20	0,65
	Item 4	3,54	1,30	-0,54	-0,77
	Item 5	3,91	1,30	-0,96	-0,27
Kinesthetic	Item 1	4,61	0,93	-2,57	5,85
	Item 2	4,25	1,16	-1,57	1,47
	Item 3	4,17	1,18	-1,37	0,89
	Item 4	4,01	1,23	-1,11	0,21
	Item 5	3,56	1,43	-0,61	-0,95
Intra-personal	Item 1	4,51	0,98	-2,28	4,68
	Item 2	3,52	1,46	-0,58	-1,01
	Item 3	4,12	1,14	-1,23	0,67
	Item 4	4,40	0,99	-1,86	2,98
	Item 5	4,09	1,24	-1,23	0,38
Inter-personal	Item 1	4,68	0,79	-2,90	8,66
	Item 2	3,56	1,35	-0,71	-0,65
	Item 3	3,85	1,26	-0,93	-0,16
	Item 4	4,24	1,09	-1,46	1,42
	Item 5	4,41	1,00	-1,86	2,89

Natural	Item 1	4,49	0,99	-2,17	4,05
	Item 2	4,21	1,16	-1,51	1,34
	Item 3	3,74	1,37	-0,79	-0,63
	Item 4	4,28	1,24	-1,65	1,46
	Item 5	4,38	1,08	-1,89	2,77

For spatial/visual intelligence, the mean scores of each intelligence are given respectively: item 1: *"I care the color harmony when I wear or paint"*, (*M*= 4.43, *SD*= 1.02), item 3: *"I never forget the places that I visited before"*, (*M*= 4.10, *SD*= 1.13), item 5: *"I design new things with whatever I find"*, (*M*= 3.91, *SD*= 1.30), item 2: *"I never forget tables, maps or graphics"*, (*M*= 3.72, *SD*= 1.20) and item 4: *"I remember my dreams in details"*, (*M*= 3.54, *SD*= 1.30).

The mean scores of each item in kinesthetic/bodily intelligence are represented respectively: item 1: *"I like PE classes"*, *M*= 4.61, *SD*= 0.93, item 2: *"I like playing Tabu, pantomime"*, (*M*= 4.25, *SD*= 1.16), item 3: *"I like physical actives: running, swimming, role-playing, ballet and dance"*, (*M*= 4.17, *SD*= 1.18), item 4: *"I like hand craft things"*, (*M*= 4.01, *SD*= 1.23) and item 5: *"When I talk, I use my mimics"*, (*M*= 3.56, *SD*= 1.43).

For intra-personal/individual intelligence, the mean scores of each item are given respectively: item 1: *"I know my personality: my strength and weaknesses"*, (*M*= 4.51, *SD*= 0.98), item 4: *"I am good at doing my duties and responsibilities"*, (*M*= 4.40, *SD*= 0.99), item 3: *"I do my duties on my own"*, (*M*= 4.12, *SD*= 1.14), item 5: *"I plan my future"*, (*M*= 4.09, *SD*= 1.24) and item 2: *"I enjoy being myself"*, (*M*= 3.52, *SD*= 1.46).

In inter-personal/social intelligence, the mean scores of each item are shown respectively: item1: *"I love being with my friends"*, (*M*= 4.68, *SD*= 0.79), item 5: *"My friends enjoy being with me"*, (*M*= 4.41, *SD*= 1.00), item 4: *"I pay attention when my friends have problems"*, (*M*= 4.24, *SD*= 1.09), item 3: *"I like organizing an event, meeting or trip"*, (*M*= 3.85, *SD*= 1.26) and item 2: *"I can guess my friends' thoughts and feelings"*, (*M*= 3.56, *SD*= 1.35).

As a last intelligence, the mean scores of each item in nature intelligence are given respectively: item 1: *"I like being outdoors"*, (*M*= 4.49, *SD*= 0.99), item 5: *"I want to grow a plant up"*, (*M*= 4.38, *SD*= 1.08), item 4: *"I want to have a pet"*, (*M*= 4.28, *SD*=

1.24), item 2: *"I wonder animals' worlds: how they live, feed or multiply"*, (*M*= 4.21,

Eight Dimensions	Mean	*SD*	Skewness	Kurtosis
Verbal/Linguistic Intelligence	20,90	3,22	-1,07	1,31
Musical Intelligence	17,93	4,45	-0,49	-0,34
Mathematical/Logical Intelligence	20,28	3,42	-0,81	0,62
Spatial/Visual Intelligence	19,70	3,65	-0,76	0,47
Kinesthetic/Bodily Intelligence	20,61	3,57	-1,12	1,77
Intra-personal/Individual Intelligence	20,64	3,37	-0,79	0,18
Inter-personal/Social Intelligence	20,75	3,56	-1,20	1,98
Nature intelligence	21,11	3,63	-1,25	1,77

SD= 1.16) and item 3: *"I enjoy watching documentaries"*, (*M*= 3.74, *SD*= 1.37).

Multiple intelligence Scale for co-twins is analyzed statistically and the mean scores, standard deviations, scores of Skewness and Kurtosis were given in Table 4.5.

Table 4.5. Mean, Standard Deviation, Skewness, and Kurtosis for Eight Dimensions of Multiple Intelligence in Co-twins (n=679)

According to Hair, Anderson, Tatham and Black (1998), Skewness and Kurtosis values between +3.00 and -3.00 are indicative of normal distribution data. As can be examined in Table 4.5 and Table 4.7, the values of Skewness and Kurtosis for all of the items are in the range of +3.00 and -3.00, suggesting that the normality of data have been met.

Multiple intelligence mean scores of co-twins, from the highest to the lowest are cited respectively: nature intelligence (*M*= 21.11, *SD*= 3.63) > verbal/linguistic intelligence (*M*= 20.90, *SD*= 3.22) > inter-personal/social intelligence (*M*= 20.75, *SD*= 3.56) > intra-personal/individual intelligence (*M*= 20.64, *SD*= 3.37) > kinesthetic/bodily intelligence (*M*= 20.61, *SD*= 3.57) > mathematical/logical intelligence (*M*= 20.28, *SD*= 3.42) > spatial/visual intelligence (*M*= 19.70, *SD*= 3.65), and musical intelligence (*M*= 17.93, *SD*= 4.45).

It seems to be in Table 4.5. that the three most developed intelligences in co-twins are nature intelligence, verbal/linguistic intelligence and inter-personal/social intelligence. However, the three least developed intelligences in co-twins are musical intelligence, spatial/visual intelligence and mathematical/logical intelligence.

There might be some reasons for nature intelligence being the most developed or preferred intelligence in co-twins. These children are at the concrete operational period, they also live indoor places and spend a lot of their time on electronic devices. Kulman (2015) mentions that children, who are between eight and 18, spend 7 hours 38 minutes on digital media in a day. The time span can be true not only for American children but also for Turkish children. According to TUİK (2013), in Turkey, 24,4 % of children, who are between six and 15 years of age have their personal laptop, 13,1 % have their cell-phone and 2,9 % have play station. As a result, the accessibility of these devices might cause their spending time with them. 38,2 % of children spend two hours weekly, 47,4 % spend between three and ten hours, 11,8 % spend 11-24 hours and 2,6 % spend +24 hours. As a result, they might need nature or a plant or a pet as a friend, from nature to share their inner thoughts. As seen in Table 4.4., the most preferred item in nature intelligence is item 1: *"I like being outdoors".* That can be related to families might not find enough time to take their children to outdoor places and as a result, children might not spending enough time in nature. In addition, metropolitan families generally prefer to take children to shopping centers instead of outdoor places since they are secure places and organize many activities for children. Yaraş et al. (2016) support that these are the most important reasons for people to choose shopping centers. In fact, families can find nice activities for their children in nature instead of taking them to shopping centers. Moreover, this biased behavior might also affect children's preferences. The second reason can be related to the second most preferred item being is item 5: *"I want to grow a plant up or have a pet".* Since twins are a small group and if they cannot share their thoughts or feelings with their co-twins, they might need a friend from nature. However, when the socio-economic backgrounds of the subjects are considered, children might not have any pet or plant to spend time with and as a result, they can be passionate about having a pet or plant.

Louv (2009) says that naturalist intelligence is not directly related to biological evidence, however, the other intelligences are. Other intelligences might develop according to cognitive development but not the nature intelligence. The nature activities likely to help us activate our brain and to calm and feel peace from childhood to old ages.

The second most developed intelligence is determined as verbal/linguistic intelligence. As it is pointed in Chapter 2, in Turkish education system (starting from the 1st grade to 6th grade levels), children are exposed to 10 hours of verbal/linguistic classes in a week. This might be one of the reasons for seeing the verbal intelligence as the second most developed intelligence. Besides this reason, since twins or triplets are always together and interact with each other, it might help them to improve their verbal/linguistic and inter-personal/social intelligence. Gao (2016) states that all of these (being together and interaction between them) might improve their brain and lead a higher IQ than otherwise. Talking and interacting might develop not only their verbal/linguistic intelligence but also their inter-personal/social intelligence. There might also be a positive correlation between being social and starting school. As Piaget (1964) indicates, at the 3rd stage of cognitive development, individualism ends and socialism begins. This result might affect seeing the inter-personal/social intelligence as the third most developed intelligence in co-twins.

Since musical and spatial/visual intelligences do not have the excepted popularity in our society, to see these as the least developed intelligences are not surprising, in other words, this is an expected result. The results are also coincident with other Turkish studies. As it is mentioned in Chapter 2, only one hour of music and visual arts classes are taken weekly in schools that might affect children's preferences related to these intelligences negatively. In addition, these intelligences are required special interest and talent that might affect twins' and triplets' not preferring these intelligences. For mathematical/logical intelligence, seeing it as one of the least developed intelligences can be related to the subjects can have the problem to understand mathematics. In many twin studies, as it is stated in Chapter 2, IQ scores of them can be seen lower than singletons. IQ differences are explained generally with their early births. Since they are

not born full term, this might lead some problems with their biological or cognitive development. As a result, mathematical or logical abilities can be difficult for them.

4.3.2 Multiple Intelligence Results in Triplet Siblings

The same Multiple Intelligence Scale is applied to 11 sets of triplets (n = 33 triplet siblings) and the statistical results are given in Table 4.6. The mean scores of each item in verbal/linguistic intelligence are given respectively: item 3: *"I like tales and stories"*, (*M*= 4.55, *SD*=0.75), item 1: *"I like poems/ riddles/tongue twister and proverbs"*, (*M*= 4.42, *SD*= 0.87), item 2: *"I speak clearly"*, (*M*= 4.36, *SD*= 0.86), item 5: *"I like writing"*, (*M*= 4.33, *SD*= 0.92) and item 4: *"I never forget what I listen or hear"*, (*M*= 3.88, *SD*= 1.14). When co-twins' and triplet siblings' item mean scores are compared, it is seen that co-twins' preferences are item 2, item 3, item 5 and item 1 respectively different from triplet siblings', item 3, item 1, item 2 and item 5. In the last item, item 4, as the last preferred item both in co-twins and triplet siblings.

For musical intelligence, the mean scores of each item are given from the highest to the lowest: item 1: *"I enjoy singing"*, (*M*= 3.94, *SD*= 1.37), item 4: *"I want to play any musical instrument"*, (*M*= 3.85, *SD*= 1.30), item 5: *"I love dancing"*, (*M*= 3.79, *SD*= 1.58), item 2: *"I write song lyrics"*, (*M*= 3.24, *SD*= 1.44) and item 3: *"When I hear or listen to music, I began to thump out or sing"*, (*M*= 2.85, *SD*= 1.62). When they are compared with co-twins' item preferences, it is seen that they are item 1, item 4, item 5, item 2 and item 3 respectively. However, triplets' item preferences are item 4, item 1, item 5, item 3 and item 2. It is seen that their preferences are different but they are common in item 5.

For spatial/visual intelligence in triplet siblings, the mean scores of each item are put order respectively: item 1: *"I care the color harmony when I wear or paint"*, (*M*= 4.67, *SD*= 0.65), item 3: *"I never forget the places that I visited before"*, (*M*= 4.10, *SD*= 1.13), item 5: *"I design new things with whatever I find"*, (*M*= 3.91, *SD*= 1.30), item 2: *"I never forget tables, maps or graphics"*, (*M*= 3.72, *SD*= 1.20) and item 4: *"I remember my dreams in details"*, (*M*= 3.54, *SD*= 1.30). In item 1, co-twins and triplet siblings are common, however, in other item preferences, they are different. While item

3, item 5, item 4 and item 2 are preferred among co-twins, item 4, item 2, and item 5 and item 3 respectively are preferred among triplet siblings.

The mean scores of each item in mathematical/logical intelligence are given respectively: item 3: *"I like playing mind games"*, (*M*= 4.45, *SD*= 1.15), item 1: *"I enjoy solving mathematic problems"*, (*M*= 4.36, *SD*= 1.25), item 5: *"I wonder how machines work"*, (*M*= 4.21, *SD*= 1.27), item 4: *"I like doing scientific experiment"*, (*M*= 3.83, *SD*= 1.36) and item 2: *"I can solve mathematic problems easily"*, (*M*= 4.36, *SD*= 1.25). As other intelligences, in mathematical intelligence, co-twins' and triplet siblings' item preferences are different from each other. While item 1, item 3, item 5, item 4 and item 2

Table 4.6. Mean, Standard Deviation, Skewness, and Kurtosis for each item in Eight Dimensions of Multiple Intelligence in Triplet Siblings (n=33)

	Variable	Mean	SD	Skewness	Kurtosis
Verbal	Item 1	4,42	0,87	-1,28	0,54
	Item 2	4,36	0,86	-1,12	0,27
	Item 3	4,55	0,75	-1,33	0,19
	Item 4	3,88	1,14	-0,83	-0,16
	Item 5	4,33	0,92	-1,25	0,61
Musical	Item 1	3,94	1,37	-0,90	-0,66
	Item 2	3,24	1,44	-0,19	-1,28
	Item 3	2,85	1,62	0,17	-1,66
	Item 4	3,85	1,30	-0,97	-0,04
	Item 5	3,79	1,58	-0,90	-0,78
Mathematical	Item 1	4,36	1,25	-2,10	3,26
	Item 2	3,27	1,72	-0,33	-1,63
	Item 3	4,45	1,15	-2,19	3,91
	Item 4	3,83	1,36	-0,79	-0,56
	Item 5	4,21	1,27	-1,40	0,77
Spatial	Item 1	4,67	0,65	-1,79	2,01
	Item 2	3,70	1,38	-0,86	-0,48
	Item 3	4,09	1,31	-1,34	0,73
	Item 4	3,36	1,29	-0,28	-0,66
	Item 5	3,88	1,47	-1,03	-0,49
Kinesthetic	Item 1	4,76	0,87	-3,78	13,88
	Item 2	4,09	1,40	-1,41	0,64
	Item 3	4,03	1,36	-1,18	0,13
	Item 4	4,36	0,96	-1,71	3,23
	Item 5	3,55	1,64	-0,60	-1,34
Intra-personal	Item 1	4,39	1,17	-1,97	2,97
	Item 2	3,42	1,77	-0,52	-1,60

	Item 3	4,24	1,09	-1,44	1,41
	Item 4	4,42	1,06	-2,29	5,18
	Item 5	3,88	1,49	-1,03	-0,38
Inter-personal	Item 1	4,73	0,76	-3,10	9,23
	Item 2	4,42	1,00	-2,17	4,55
	Item 3	4,21	1,22	-1,54	1,40
	Item 4	4,52	0,91	-2,33	6,24
	Item 5	4,61	0,97	-2,64	6,62
Natural	Item 1	4,88	0,55	-5,02	26,24
	Item 2	3,48	1,54	-0,62	-1,07
	Item 3	4,03	1,38	-1,04	-0,45
	Item 4	4,61	1,00	-2,72	6,67
	Item 5	4,67	0,82	-3,33	12,80

are preferred by co-twins, item 3, item 1, item 5, item 4 and item 2 are preferred by triplet siblings. However, they are common in item 4.

The mean scores of each item in kinesthetic/bodily intelligence are represented respectively: item 1: *"I like PE classes"*, (*M*= 4.76, *SD*= 0.65), item 4: *"I like hand craft things"*, (*M*= 4.36, *SD*= 0.96), item 2: *"I like playing Tabu, pantomime"*, (*M*= 4.09, *SD*= 1.40), item 3: *"I like psychical actives: running, swimming, role-playing, ballet and dance"*, (*M*= 4.03, *SD*= 1.36), and item 5: *"When I talk, I use my mimics"*, (*M*= 3.55, *SD*= 1.64). Co-twins and triplet siblings are common in item 1 and item 5 and different in other items. While item 2, item 3 and item 4 are preferred by co-twins, item 4, item 2 and item 3 are preferred by triplet siblings.

For intra-personal/individual intelligence, the mean scores of each item are given respectively: item 4: *"I am good at doing my duties and responsibilities"*, (*M*= 4.42, *SD*= 1.06), item 1: *"I know my personality: my strength and weaknesses"*, (*M*= 4.39, *SD*= 1.17), item 3: *"I do my duties on my own"*, (*M*= 4.24, *SD*= 1.09), item 5: *"I plan my future"*, (*M*= 3.88, *SD*= 1.49) and item 2: *"I enjoy being myself"*, (*M*= 3.42, *SD*= 1.77). Co-twins and triplet siblings are common in item 3 and in other items (however, their preferences are different from each other). Co-twins' preferences are respectively, item 1, item 4, item 5 and item 2. However, triplet siblings' are item 4, item 1, item 5 and item 4 respectively.

In inter-personal/social intelligence, the mean scores of each item are shown respectively: item1: *"I love being with my friends"*, (*M*= 4.73, *SD*= 0.76), item 5: *"My*

friends enjoy being with me", (*M*= 4.61, *SD*= 0.97), item 4: *"I pay attention when my friends have problems"*, *M*= 4.52, *SD*= 0.91), item 2: *"I can guess my friends' thoughts and feelings"*, (*M*= 3.42, *SD*= 1.00) and item 3: *"I like organizing an event, meeting or trip"*, (*M*= 4.21, *SD*= 1.22). Co-twins and triplet siblings are common in item 1, item 4 and item 5, however, different in item 3 and item 2 in inter-personal intelligence.

As a last intelligence, the mean scores of each item in nature intelligence are given respectively: item 1: *"I like being outdoors"*, (*M*= 4.88, *SD*= 0.55), item 5: *"I want to grow a plant up, or a pet"*, (*M*= 4.67, *SD*= 0.82), item 4: *"I want to have a pet"*, (*M*= 4.61, *SD*= 1.00), item 3: *"I enjoy watching documentaries"*, (*M*= 4.03, *SD*= 1.38) and item 2: *"I wonder animals' worlds: how they live, feed or multiply"*, (*M*= 3.48, *SD*= 1.54). Co-twins and triplet siblings are common in item 1, item 4 and item 5, however, different in item 2 and item 3.

Multiple intelligence scale is conducted with 11 sets of triplets (33 triplet siblings) and the results are analyzed statistically and mean scores, standard deviations, scores of Skewness and Kurtosis are given in Table 4.7.

Table 4.7. Mean, Standard Deviation, Skewness, and Kurtosis for Eight Dimensions of Multiple Intelligence in Triplet Siblings (n=33)

Eight Dimensions	Mean	*SD*	Skewness	Kurtosis
Verbal/Linguistic Intelligence	4,31	0,46	-0,26	-0,95
Musical Intelligence	3,53	0,86	-0,27	-0,80
Mathematical/Logical Intelligence	4,03	0,80	-0,17	-1,34
Spatial/Visual Intelligence	3,94	0,77	-0,97	1,04
Kinesthetic/Bodily Intelligence	4,16	0,60	-0,14	-1,19
Intra-personal/Individual Intelligence	4,07	0,87	-0,74	-0,66
Inter-personal/Social Intelligence	4,50	0,47	-0,64	-0,79
Nature Intelligence	4,33	0,68	-1,12	0,90

Multiple intelligence mean scores of triplet siblings from the highest to the lowest are cited respectively: inter-personal/social intelligence (n= 33, *M*= 4.50, *SD*= 0.47) > nature intelligence (n= 33, *M*= 4.33, *SD*= 0.68) > verbal/linguistic intelligence (n= 33, *M*= 4.31, *SD*= 0.46) > kinesthetic/bodily intelligence (n= 33, *M*= 4.16, *SD*= 0.60) > intra-personal/indiviudal intelligence (n= 33, *M*= 4.07, *SD*= 0.87) > mathematical/logical intelligence (n= 33, *M*= 4.03, *SD*= 0.80) > spatial/visual intelligence (n= 33, *M*= 3.94, *SD*= 0.77) > and musical intelligence (n= 33, *M*= 3.53, *SD*= 0.86).

If the three most preferred intelligences are considered in triplet siblings, inter-personal/social, nature and verbal/linguistic intelligences are seen. The results are similar with co-twins'. However, their order is different: the three most preferred intelligences are nature intelligence, verbal/linguistic intelligence and inter-personal/social inteligence in co-twins. It can be said that these inteligences might be related to being multiple. Since it is stated before, twins and triplets are born together with their best friends: co-twins or triplet siblings. It can be said that twins and triplets are like a small group and they develop their co-operative skills (verbal/linguistic intelligence and inter-personal/social intelligences that might help them how to talk and behave to others. As a result, these two skills might have a chance to develop themselves in twin and triplet siblings. Nature intelligence preference can be related to as in co-twins' reasons.

The two least developed intelligences in triplets are also the same as in co-twins: spatial/visual intelligence and musical intelligences. These two intelligences are related with individual differences and individual abilities. Children might not be encouraged in these two intelligences by their families or teachers. They might not have these abilities. As it is mentioned in co-twins, the weekly hours of these two subjects are only one hour that might affect their preferences negatively.

4.4 The Findings Related to the Influence of Birth Order Factor on Multiple Children's Multiple Intelligence Types

One of the research questions related to the birth order of multiple children is analyzed statistically to see its effect on multiple intelligence types of multiple children. Children

are labeled Child A, Child B and Child C that shows their birth order. The statistical results are given below.

4.4.1 The Influence of Birth Order: Child A or Child B Factor on Co-Twins' Multiple Intelligence Types

The first research question of the study "what is the effect of birth order in multiple intelligences in multiple children" is tried to explain.

The present study is conducted with 336 Child A and 343 Child B. As in Table 4.8 below, independent sample t-test is performed comparing the mean scores of Child A (n= 336) and Child B (n= 343) on eight dimensions of multiple intelligences. Results indicate that there is not a statistically significant difference between the mean scores of first born children (Child A) and second born children (Child B) on all eight dimensions of multiple intelligences.

Table 4.8. Independent Sample T-test for the Effect of Birth Order Factor on Co-twins' Eight Dimensions of Multiple Intelligence (n= 679) $p < .05$

Eight Dimensions	Birth Order	N	Mean	SD	*t*	*Df*	*p*
Verbal/Linguistic Intelligence	Child A	336	20,93	3,21	0,24	677	0,81
	Child B	343	20,87	3,24			
Musical Intelligence	Child A	336	18,00	4,43	0,38	677	0,70
	Child B	343	17,87	4,48			
Mathematical/Logical Intelligence	Child A	336	20,37	3,36	0,66	677	0,51
	Child B	343	20,20	3,48			
Spatial/Visual Intelligence	Child A	336	19,51	3,71	-1,32	677	0,19
	Child B	343	19,88	3,59			
Kinesthetic/Bodily Intelligence	Child A	336	20,58	3,59	-0,22	677	0,82

	Child B	343	20,64	3,56			
Intra-personal/Individual Intelligence	Child A	336	20,59	3,39	-0,38	677	0,70
	Child B	343	20,69	3,36			
Inter-personal/Social Intelligence	Child A	336	20,72	3,44	-0,20	677	0,84
	Child B	343	20,77	3,67			
Nature Intelligence	Child A	336	21,14	3,48	0,22	677	0,83
	Child B	343	21,08	3,77			

The results of the independent t-test are as follow:

- For verbal/linguistic intelligence, the mean scores are not significantly different between Child As (n= 336, *M*= 20.93, *SD*= 3.21) and Child Bs (n= 343, *M*= 20.87, *SD* = 3, 24), t (677) = 0.24, p = 0, 81.
- In musical intelligence, there is no significant difference between Child As (n=336, *M*= 18.00, *SD*= 4.43) and Child Bs (n= 343, *M*= 17.87, *SD*= 4.48), *t* (677) = 0, 38, *p* = 0, 70.
- For mathematical/logical intelligence, the difference between Child As (n=336, *M*= 20.37, *SD*= 3.36) and Child Bs (n=343, *M*= 20.20, *SD*= 3.48), *t* (677) = 0, 66, *p* = 0, 51. is not statistically significant.
- Results for spatial/visual intelligence indicate that there is no significant difference between Child As (n=336, *M*= 19.51, *SD*= 3.71) and Child Bs (n= 343, *M*= 19.88, *SD*= 3.59, *t* (677) = -1, 32, *p*= 0, 19.
- In kinesthetic/bodily intelligence, no significant difference is seen between Child As (n= 336, *M*=20.58, *SD*= 3.59 and Child Bs (n= 343, *M*= 20.64, *SD*= 3.56), *t* (677) = -0, 22, p= 0, 82.
- For intra-personal/individual intelligence, there is no significant differences between Child As (n= 336, *M*= 20.59, *SD*= 3.39) and Child Bs (n= 343, *M*= 20.69, *SD*= 3.36), *t* (677) = -0, 38, *p*= 0, 70.

- For inter-personal/social intelligence, there is no significant difference between Child As (n=336, *M*= 20.72, *SD*= 3.44) and Child Bs (n=343, *M*= 20.77, *SD*= 3.67), *t* (677) = -0, 20, *p*= 0, 84.
- For the last intelligence, nature intelligence, no significant difference is seen between Child As (n= 336, *M*= 21.14, *SD*= 3.48) and Child Bs (n= 343, *M*= 21.08, *SD*= 3.77), *t* (677) = -0, 22, *p*= 0, 83.

If Child As' and Child Bs' mean scores are compared, it is seen that both Child As and Child Bs' mean scores are directly proportional with their birth order: Child As' mean scores are higher than Child Bs' at four different intelligences: nature intelligence (Child As, n = 336, *M*= 21.14 > Child Bs, n = 343, *M*= 21.08), verbal/linguistic intelligence (Child As, n = 336, *M*= 20.93 > Child Bs, n = 343, *M*= 20.87), mathematical/logical intelligence (Child As, n = 336, *M*= 20.37 > Child Bs, n = 343, *M*= 20.20) and musical intelligence (Child As, n = 336, *M*= 18.00 > Child Bs, n = 343, *M*= 17.87). However, at inter-personal/social intelligence (Child Bs, n = 343, *M*= 20.77, > Child As, n = 336, *M*= 20.72), intra-personal/individual intelligence (Child Bs, n = 343, *M*= 20.69 > Child As, n = 336, 20.59), kinesthetic/bodily intelligence (Child Bs, n = 343, *M*= 20, 64 > Child As, n = 336, *M*= 20.58) and spatial/visual intelligence (Child Bs, n = 343, *M*= 19.88 > Child As, n = 336, *M*= 19.51), children's mean scores are inversely proportional with their birth orders. While Child As have higher mean scores at nature intelligence, verbal/linguistic intelligence, mathematical/logical intelligence and musical intelligence, Child Bs have higher mean scores at inter-personal/social intelligence, intra-personal/individual intelligence, kinesthetic/bodily intelligence and spatial/visual intelligence. However, the mean scores of eight dimensions of multiple intelligence are close to each other; no statistically significant difference is seen between Child As and Child Bs in co-twins.

In twin studies, birth order is considered and analyzed to find the differences between Child As and Child Bs. However, most studies are related to IQ differences and birth order in twins. In other words, they try to find out whether IQ varies according to birth order in twins and triplets or not. In the present study, it is tried to investigate the effect of birth order factor on multiple intelligence rates. However, it is seen that there is no significant difference between the birth order and multiple intelligence rates of co-twins.

The reason could be that twins and triplets come from the same family background (biological effect) and share the same environment (shared environment) both at home and generally at school. Tancredy and Fraley (2006) state that "in the case of twins, co-twin is readily accessible object or partner". This accessibility might affect co-twins and triplet siblings both positively and negatively. This probably depends on family attitudes and the relationship between multiple children.

The age range of the subjects is between 6/7 and 11/12 ages and most of the co-twins (n= 595) and triplet siblings (n= 27) are sharing the same class. However, 84 co-twins and 6 triplet sibling are at different classes. As a result, these children still have co-twins, triplet siblings, and family attachment. The differences might be seen after this period; Piaget's concrete operational period. At the 4th period of Piaget where abstract thoughts are seen, children go to different high schools (separation from co-twin or triplet siblings and family might be seen) or universities. It is also known that many twin studies support that the differences are generally seen when they are getting older (even if they are identical/MZ twins) since they get older, their sharing can change (Miller, 2012).

The families of twins and triplets generally, in order to be fair among their children; they try to give them equal educational, financial and social environment opportunities. Hupp and Jewell (2015) indicate that the families of twins, in fact, encourage each twin to be independent trying to keep the balance between them. Even though families encourage their individuality; they might also expect them to have similar scores or abilities. As a result, it might be said that families and educators' beliefs and attitudes can affect multiple intelligence types of twins and triplets negatively or positively or not see the differences between birth order and multiple intelligence rates.

4.4.2 The Influence of Birth Order: Child A, Child B or Child C Factor on Triplet Sibling's Multiple Intelligence Types

As it is found that there is no statistically significant difference between birth order and multiple intelligence types in co-twins, the same research question is investigated in triplet siblings. Child A is the first born child, Child B is the second born child, and

Child C is the last born child in triplet births. The study is carried out with 33 triplet siblings: Child A (n= 11), Child B (n= 11) and Child C (n=11).

One-way analysis of variance (ANOVA) is conducted to compare the effect of birth order (Child A, Child B, Child C) on eight dimensions of multiple intelligence (verbal/linguistic intelligence, musical intelligence, mathematical/logical intelligence, spatial/visual intelligence, kinesthetic/bodily intelligence, intra-personal/individual intelligence, inter-personal/social intelligence, and nature intelligence). Before proceeding to examine the main results, homogeneity of variance assumptions is checked for each dimension. As shown in Table 4.9. below, except for nature intelligence, the homogeneity of variance assumption has not been violated for other dimensions of multiple intelligence. Since ANOVA is a robust test, violation of the homogeneity of variance assumption would not make any significant impact on further analysis (Field, 2009). Therefore, main results are interpreted.

Levene's test in Table 4.9. shows that the assumption of homogeneity of variances have not been violated for verbal/linguistic intelligence F (5,678)= 4.71, p = .63, musical intelligence F (5,678)= 2.31, p = .13, mathematical/logical intelligence F (5,678)= 1.68, p = .20, spatial/visual intelligence F (5,678)= .65, p = .53, kinesthetic/bodily intelligence F (5,678)=.32, p =.73, intra-personal/individual intelligence F (5,678)= .52, p = .60, inter-personal/social intelligence F (5,678)= 2.25, p = .12. However, the assumption of homogeneity of variances have not been violated for nature intelligence F (5,678) = 8.50, p = .001. Table 4.9 shows the results of Levene's test for equality of variances drawn from ANOVA analyses. Significance indicates the violation of homogeneity of variance assumption.

Table 4.9. Homogeneity of Variance Assumptions for Scores of Triplet Siblings on Eight Dimensions of Multiple Intelligence (n=33)

Eight Dimensions	**F**	***p***
Verbal/ Linguistic Intelligence	.471	.63
Musical Intelligence	2.31	.13
Mathematical/ Logical Intelligence	1.68	.20

Spatial/ Visual Intelligence	.65	.53
Kinesthetic/ Bodily Intelligence	.32	.73
Intra-personal/ Individual Intelligence	.52	.60
Inter-personal/ Social Intelligence	2.25	.12
Nature Intelligence	8.50*	.001

Note. The variance is significant at *$p < .05$

To find the relation between the birth order of triplets and multiple intelligences, One-Way Analysis of Variance-ANOVA is conducted.

The ANOVA test results in Table 4.10. indicates that children's mean scores are directly proportional with their birth order. Child As' mean scores are higher than Child Bs' and Child Cs have the lowest mean score in the following four intelligences:

- In verbal/linguistic intelligence (Child As, *M*= 4.38 > Child Bs, *M*= 4.31 > Child Cs, *M*= 4.24),
- In musical intelligence (Child As, *M*= 3.64 > Child Bs, *M*= 3.56 > Child Cs, *M*= 3.40),
- In inter-personal/social intelligence (Child As, *M*= 4.64 > Child Bs, *M*= 4.51 > Child Cs, *M*= 4,35),
- In nature intelligence (Child As, *M*= 4.53> Child Bs, *M*= 4.51 > Child Cs, *M*= 3.96).

Table 4.10. The Means and Standard Deviations for Birth Order Factor on Triplet Siblings' Eight Dimensions of Multiple Intelligence (n= 33)

Eight Dimensions	Birth Order	M	SD
Verbal/Linguistic Intelligence	Child A	4.38	0,45
	Child B	4.31	0,43
	Child C	4.24	0,51
Musical Intelligence	Child A	3.64	0,82
	Child B	3.56	0,66
	Child C	3.40	1,09
Mathematical/Logical Intelligence	Child A	3.91	0,91
	Child B	4.07	0,66
	Child C	4.10	0,86

Spatial/Visual Intelligence	Child A	3,89	0,69
	Child B	4,07	0,58
	Child C	3,85	1,02
Kinesthetic/Bodily Intelligence	Child A	4,24	0,54
	Child B	4,04	0,62
	Child C	4,20	0,68
Intra-personal/Individual Intelligence	Child A	3,96	1,02
	Child B	4,07	0,76
	Child C	4,18	0,87
Inter-personal/Social intelligence	Child A	4,64	0,36
	Child B	4,51	0,48
	Child C	4,35	0,56
Natural intelligence	Child A	4,53	0,40
	Child B	4,51	0,41
	Child C	3,96	0,95

In the following two intelligences, children's mean scores are inversely proportional with their birth order. Child Cs' mean scores are higher than Child Bs' and Child As had the lowest mean score:

- In mathematical/logical intelligence (Child Cs, *M*= 4.10 > Child Bs, *M*= 4.07 > Child As, *M*= 3.91),
- In intra-personal/individual intelligence (Child Cs, *M*= 4.18 > Child Bs, *M*= 4.07 > Child As, *M*= 3.96).

In spatial/visual intelligence, Child Bs' mean scores are higher than Child As' and Child Cs' scores are the lowest (Child Bs, *M*= 4.07 > Child As, *M*= 3.89 > Child Cs, *M*= 3.85).

In kinesthetic/bodily intelligence, Child As' mean scores are higher than Child Cs' and Child Bs have the lowest mean scores (Child As, M= 4.24 > Child Cs, M= 4.20 > Child Bs, M= 4.04).

Table 4.11. One-Way Analysis of Variance for the Birth Order of Triplet Siblings on Eight Dependent Variables in Multiple Intelligence (n= 33)

Variable and Source	*SS*	*MS*	*F*(5, 678)	*P*
Verbal Intelligence				
Between	.116	,058	.267	.767
Within	6.531	,218		
Musical intelligence				
Between	.322	.161	.209	.812
Within	23.091	.770		
Mathematical Intelligence				
Between	.235	.117	.175	.840
Within	20.111	.670		
Spatial Intelligence				
Between	.301	.150	.243	.786
Within	18.538	.618		
Kinesthetic Intelligence				
Between	.250	.125	.331	.721
Within	11.331	.378		
Intra-personal Intelligence				
Between	.262	.131	.166	.848
Within	23.724	.791		
Inter-personal Intelligence				
Between	.468	.234	1.053	.361
Within	6,662	,222		
Nature intelligence				
Between	2.257	1.128	2.722	.082
Within	12.436	.415		

Table 4.11. indicates that ANOVA results of triplet siblings reveal no significant difference between the mean scores of Child As, Child Bs, and Child Cs on the eight dimensions of multiple intelligence: in verbal/linguistic intelligence F (5, 678) = .267, p = .767., in musical intelligence F (5, 678) = .209, p = .812., in mathematical/logical intelligence F (5, 678) = .175, p = .840., in kinesthetic/bodily intelligence F (5, 678) = .331, p = .721., in intra-personal/ individual intelligence F (5, 678) = .166, p = .848., in inter-personal/social intelligence F (5, 678) = 1.053, p = .361. and in nature intelligence F (5, 678) = 2.722, p = .082. There is no significant difference between the birth order of triplet siblings (Child A, Child B and Child C) and their multiple intelligence types. It

can be concluded that Child As, Child Bs, and Child Cs are not different from each other in terms of eight dimensions of multiple intelligences.

The reason, as in co-twins' results, not to see statistically significant difference between the birth order of triplets and their multiple intelligence might be firstly related to their biological factors: sharing the same or half of DNA, being at the same age means having same or similar cognitive development, and secondly, it can be related to the environmental factors: shared environment: coming from the same family, being at the same class. It is seen that most of the triplet siblings are in the same class (n= 27) and only a few are in different classes (n=6). If they are in the same class, their friend sharings might be similar, too. These reasons may affect not to see statistically significant differences between birth order and multiple intelligence types in triplet siblings.

4.5. The Findings Related to the Influence of Twin Type: Identical/MZ or Fraternal/DZ Twin Factor on Co-twins' Multiple Intelligence Types

The second research question of the study is how identical/monozygotic (MZ) co-twins differ from fraternal/dizygotic (DZ) twins in terms of multiple intelligences. Independent sample t-test is conducted to investigate how multiple intelligence scores on eight dimensions are differentiated between identical/MZ (n=137) and fraternal/DZ (n= 542) co-twins. The results, as shown in Table 4.12. below indicate that fraternal/DZ co-twins have significantly higher scores than identical/MZ co-twins on merely: verbal/linguistic intelligence and musical intelligence. However, no significant difference is observed between identical/MZ and fraternal/DZ co-twins for the other six intelligences: mathematical/logical intelligence, spatial/visual intelligence, kinesthetic/bodily intelligence, intra-personal/individual intelligence, inter-personal/social intelligence and nature intelligence of multiple intelligences.

In Table 4.12 below, the means, standard deviations, t-values, the degree of freedom and levels of significance (is accepted at $p < .05$) of the eight dimensions of multiple intelligences of identical/MZ and fraternal/DZ co-twins are given.

Table 4.12. Independent Sample T-test for the Difference between Identical/MZ and Fraternal/DZ Twins' Scores on Eight Dimensions of Multiple Intelligence (n= 679)

Dimensions	Twin Types	N	Mean	SD	*t*	*df*	*P*
Verbal/Linguistic Intelligence	Identical	137	20.26	3.61	-2.39*	189,73	0.02
	Fraternal	542	21.07	3.10			
Musical Intelligence	Identical	137	17.68	4.37	-0.74*	677	0.046
	Fraternal	542	17.99	4.48			
Mathematical/Logical Intelligence	Identical	137	19.96	3.42	-1.23	677	0.22
	Fraternal	542	20.37	3.42			
Spatial/Visual Intelligence	Identical	137	19.58	3.80	-0.42	677	0.67
	Fraternal	542	19.73	3.61			
Kinesthetic/Bodily Intelligence	Identical	137	20.55	3.51	-0.20	677	0.84
	Fraternal	542	20.62	3.59			
Intra-personal/Individual Intelligence	Identical	137	20.99	3.39	1.38	677	0.17
	Fraternal	542	20.55	3.36			
Inter-personal/Social Intelligence	Identical	137	20.75	3.39	0.02	677	0.98
	Fraternal	542	20.74	3.60			
Nature Intelligence	Identical	137	21.04	3.40	-0.27	677	0.79
	Fraternal	542	21.13	3.69			

Note. The difference is significant at *$p < .05$

Significant differences are seen both verbal/linguistic and musical intelligences between fraternal/DZ and identical/MZ twins. Independent-sample t-test results are given:

- Since the homogeneity of variance has been violated, *t* (189, 73) in verbal/linguistic intelligence, statistically significant difference between fraternal/DZ twins (n= 542, *M*= 21.07, *SD*= 3.10) and identical/MZ twins (n= 137, *M*= 20.26, *SD* = 3.61) *t* (189, 73) = -2, 39, *p* = 0.02. is seen.
- For musical intelligence, there is also significant difference between fraternal/DZ twins (n=542, *M*= 17.99, *SD*= 4.48) and identical/MZ twins (n= 137, *M*= 17.68, *SD*= 4.37), *t* (677) = -0, 74, *p* = 0.046.

Since identical/MZ twins share the same genetic codes, they have been analyzed for the scientific studies to find the similarities and differences between them and also to compare the results with fraternal/DZ twins'. In the twin studies, as it is stated in Chapter 2, much more similarities are seen between identical/MZ twins than fraternal/DZ twins. These statements support the findings of the study: much more similarities are seen between identical/MZ co-twins than fraternal/DZ co-twins. The reason can be related that identical/MZ twins share 100 % of their DNA; they also share the same environment (family and school). There might be a positive correlation between identical/MZ twins and their sharings (when sharing increases the similarity also increases in identical/MZ twins or vice versa). Since identical/MZ twins have similar appearance, families and society might expect them to have the same performances or successes that may affect their preferences. However, fraternal/DZ twins share half of their DNA that might affect their point of views. As a result, fraternal/DZ twins might have more fruitful environment than identical/MZ twins. Most twin studies show that there are more similarities in identical/MZ twins than fraternal/DZ twins. If the language ability of twins is considered, there might be some factors that affect their language development. Twin language is one of them. It is a kind of language that twins develop together. The language is used between twins and sometimes other people do not understand it. Beside twin language, language delay can be seen among twins (Stromswold, 2006). Since twins have their co-twins around all the time, they might not receive enough adult interaction that causes them not to develop their language. In addition, Stromswold (2006) states that mothers of twins have less verbal interaction than singletons' mothers (as cited in Conway et al., 1980). As a result, twin language can occur. These reasons may lead to the fact that identical/MZ co-twins

tend to be more linguistically similar than fraternal/DZ co-twins. Ketrez (2011) observes some language delay problems in identical/MZ twins even though they do not have any biological or psychological problems. Twin language and language delay might affect identical twins not to be good at verbal/linguistic intelligence. Therefore, fraternal/DZ twins tend to be better than identical twins at verbal/linguistic intelligence.

Musical intelligence types can be related to children's family background, the society and individual interests and abilities. To see the differences between identical/MZ twins might be related to being fraternal/DZ twins since they do not share same DNA as identical/MZ twins. If one of the fraternal/DZ co-twin has musical knowledge, hir co-twin also becomes familiar with the music and help hir co-twins' musical intelligence to develop.

Gardner (2011) states that musical intelligence emerges earlier than other intelligences. For instance, babies can easily recognize their mother's voice among many voices. This can be also one of the reasons to see the musical differences in fraternal/DZ twins. If babies recognize their mothers' voice, they might also recognize their co-twins' or triplet siblings' voices, either. Since identical/MZ twins have same DNA, their voices also might be similar that is not recognized by hir co-twins or triplet siblings.

In six dimensions of multiple intelligences, no significant difference is found:

- In mathematical/logical intelligence, no statistically significant difference is seen between identical/MZ co-twins (n= 137, *M*= 19.96, *SD*= 3.42) and fraternal/DZ co-twins (n= 542, *M*= 20.37, *SD*= 3.42, *t*(677) = -1, 23, *p* = 0.22),
- For spatial/visual intelligence, there is no significant difference between identical/MZ co-twins (n= 137, *M*= 19.58, *SD*= 3.80) and fraternal/ DZ co-twins (n= 542, *M*= 19.73, *SD*= 3.61, *t* (677) = -0, 42, *p* = 0.67),
- In kinesthetic/bodily intelligence, independent t-test result is not significantly different between identical/MZ co-twins (n= 137, *M*= 20.55 *SD*= 3.51) and fraternal/DZ co-twins (n= 542, *M*= 20.62, *SD*= 3.59, *t* (677) = -0, 20, *p* = 0.84),
- There is no significant difference for intra-personal/individual intelligence between identical/MZ co-twins (n=137, *M*= 20.99 *SD*= 3, 39) and fraternal/DZ co-twins (n= 542, *M*= 20.55, *SD*= 3.36, *t* (677) = 1, 38, *p* = 0.17),

- For inter-personal/social intelligence, there is no significant difference between identical/MZ co-twins (n= 137, *M*= 20.75, *SD*= 3.39) and fraternal/DZ co-twins (n= 542, *M*= 20.74, *SD*= 3.60, *t* (677) = 0, 02, *p* = 0.98),
- For the last intelligence, nature intelligence independent t-test result is not significantly different between identical/MZ co-twins (n= 137, *M*= 21.04, *SD*= 3.40) and fraternal/DZ co-twins (n= 542, *M*= 21.13.*SD*= 3, 69, t (677) = -0, 27, *p* = 0.79).

The reason, not to see the significant difference between identical/MZ and fraternal/DZ twins, can be related to not only their biological sharing but also their environmental sharing. Pinker (2004) states that identical/MZ twins generally share their peer groups that might be one of the reasons for not to seeing any difference in identical/MZ twins in terms of inter-personal/individual intelligence. Carey (1992) explains the reason clearly, "when twin pairs influence each other's behavior, observed variance is greater for identical/MZ twins than for fraternal/DZ twins under at least 1 of 2 conditions: (a) the trait has some heritability and (b) MZ twins influence each other more than do DZ twins". This imitation is not only seen in good behavior but also in untoward behaviors. Imitation can be one of the reasons of not seeing multiple intelligence differences between identical/MZ twins. Buss and Hawley (2011) support this idea saying that association between co-twin similarities in self-rating personality, interest and values and, social closeness yield few meaningful findings. That is to say, close association might be one of the reasons for seeing more similarities among identical/MZ twins than fraternal/DZ twins.

When the mean scores of identical/MZ and fraternal/DZ twins are analyzed statistically, it is seen that fraternal/DZ co-twins' scores are higher than identical/MZ twins in:

- verbal/linguistic intelligence (fraternal/DZ co-twins, n= 542, *M*= 21.07> identical/MZ co-twins, n= 137, *M* = 20.26),
- musical intelligence (fraternal/DZ co-twins, n= 542, *M*= 17.99> identical/MZ co-twins, n= 137, *M* = 17.68),
- mathematical/logical intelligence (fraternal/DZ co-twins, n= 542, *M*= 20.37> identical/MZ co-twins, *M* = 19.96),

- spatial/visual intelligence (fraternal/DZ co-twins, n= 542, *M*= 19.73> identical/MZ co-twins, n= 137, *M* = 19.53),
- kinesthetic/bodily intelligence (fraternal/DZ co-twins, n= 542, *M*= 20.62> identical/MZ co-twins, n= 137, *M* = 20.55),
- nature intelligence (fraternal/DZ co-twins, n= 542, *M*= 21.13 > identical/MZ co-twins, n= 137, *M* = 21.04).

However, it is observed that identical/MZ co-twins' mean scores are higher than fraternal/DZ co-twins in:

- intra-personal/individual intelligence (identical/MZ co-twins, n = 137, *M*= 20.99 > fraternal/DZ co-twins, n = 542, *M* = 20.55),
- inter-personal/social intelligence (identical/MZ co-twins, n = 137, *M*= 20.75 > fraternal/DZ co-twins, n = 542, *M* = 20.74).

The reason to see higher mean scores in intra-personal/individual intelligence and inter-personal/social intelligences in identical/MZ twins might be explained by the fact that identical/MZ twins share their DNA and this might affect their inner thoughts, point of views, and interpretation of life similarly. In addition, their families' attitudes might also have a role in their having similar mean scores.

The three most developed intelligence in identical/MZ co-twins and fraternal/DZ twins are common; nature intelligence, verbal/linguistic intelligence, and inter-personal/social intelligence. The three least developed intelligences are also common: mathematical/logical intelligence, spatial/visual intelligence and musical intelligence.

In the present study, since the zygote type is not considered in triplet siblings, zygote type factor analysis is not analyzed in triplet siblings.

4.6 The Findings Related to the Influence of the Gender Factor on Multiple Children's Multiple Intelligence Types

The Gender difference is one the factors that might affect multiple intelligence types of multiple children. The study is conducted with 385 female and 294 male co-twins and 11 female and 22 male triplet siblings. The gender difference among multiple children is analyzed statistically and the related results are given below.

4.6.1 The Influence of the Gender Factor on Co-twins' Multiple Intelligence Types

The third research question is that whether there is a gender factor in multiple intelligences of multiple children or not? It is known that in most studies, the results vary according to gender. There might be some reasons to see these differences among genders. Such as biological and cognitive development differences, socio-economic status, cultural and social biased behaviors might have a significant role on gender-based differences. These differences are not only seen at home, in society but also in classrooms. As a result, gender difference is one of the individual differences to be considered among learners. In classrooms, females' and males' learning styles can vary according to their genders. Thus, teachers should consider this difference for twin and triplet students.

Considering the gender-based differences among co-twins, the study is carried out with 679 co-twins: 385 female co-twins and 294 male co-twins. Independent sample t-test is run to examine the difference between the mean scores of female (n= 385) and male (n= 294) co-twins on eight dimensions of multiple intelligence, and given in Table 4.13.

Table 4.13. Independent Sample T-test for the Influence of the Gender Factor on Co-twins' Multiple Intelligence Types (n= 679)

Dimensions	**Gender**	**n**	**Mean**	**SD**	***t***	***Df***	***P***
Verbal/Linguistic Intelligence	Female	385	21,23	2,96	3,00*	571,49	0,00
	Male	294	20,47	3,50			
Musical Intelligence	Female	385	18,75	4,13	5,49*	589,62	0,00
	Male	294	16,86	4,64			
Mathematical/Logical Intelligence	Female	385	19,94	3,43	-3,00*	677	0,00
	Male	294	20,73	3,35			
Spatial/Visual Intelligence	Female	385	19,85	3,47	1,25	677	0,21
	Male	294	19,50	3,87			
Kinesthetic/Bodily Intelligence	Female	385	20,78	3,27	1,39	565,04	0,16
	Male	294	20,38	3,92			
Intra-personal/Individual Intelligence	Female	385	20,86	3,31	1,93	677	0,05
	Male	294	20,35	3,43			

Inter-personal/Social intelligence	Female	385	21,00	3,20	2,10*	552,81	0,04
	Male	294	20,41	3,96			
Nature Intelligence	Female	385	20,99	3,41	-0,96	677	0,34
	Male	294	21,27	3,90			

Note. The difference is significant at *$p < .05$

The results of the t-test, as shown in Table 4.13, indicate that the mean scores of female co-twins are significantly different from male co-twins on verbal/linguistic, musical, mathematical/logical, and inter-personal/social intelligence. Specifically, while female co-twins have significantly higher mean scores than male co-twins on linguistic/verbal, musical and inter-personal/social intelligence, male co-twins have significantly higher mean scores than female co-twins on only mathematical intelligence. As it can be seen in Table 4.13., for the other four; spatial/visual, kinesthetic/bodily, intra-personal/individual, and nature intelligences, no significant difference is observed between the mean scores of male and female co-twins.

Sadker and Sadker, (1994) state that "Sitting in the same classroom, reading the same textbook, listening to the same teacher, boys and girls receive very different educations" which indicates that there are learning differences between genders. Gurian and Arlette (2003) state that "there are some things boys tend to be better at than girls and vice versa"; they also add that there is gender difference in learning. Supporting him, most literature dwells on that while girls are generally better at verbal abilities (Özçalışkan and Goldin-Meadow, 2010); boys are good at mathematical or logical abilities. This difference can be explained by biological factors (Wade, 2013). Choudhury and Benasich (2003) present that language impairments or language delay might be seen among boys rather than girls. Twins (especially, males) also have a higher risk of language delay when they are compared with singletons (Thorpe, 2006). She also states that this language delay reduces when children get older (until middle childhood). As it is seen in the literature, verbal/linguistic intelligence is one of the significant factors that cause differences between gender pairs; same-sex or opposite-sex multiple children.

The present study is coincident with the literature, t-test result of verbal/linguistic intelligence is seen significantly higher for female co-twins (n= 385, *M*= 21.23, *SD*= 2.96) than male co-twins (n= 294, *M*= 20.47, *SD*= 3.50, *t* (571, 49) = 3, 00, *p* = 0.00).

Alantar (2011) mentions that girls tend to be better at verbal/linguistic intelligence (reading and writing) than boys whereas they are better mathematical/logical and spatial/visual intelligences than girls. These differences can be related to their sex hormones, experiences, and socializations. Since, language is one of the most common communication tool, being good at verbal abilities might be helpful to be better at inter-personal/social intelligence. Twins know how to listen, talk, pause, and apologize. There might be a positive correlation between verbal intelligence and inter-personal intelligence. Gurrian and Arlette (2003) also explain that "girls tend to have better verbal abilities, and rely heavily on verbal communication; boys tend to rely heavily on nonverbal communication, being innately less able to verbalize feelings and responses as quickly as girls". As a result of being good at verbal intelligence, female co-twins might be significantly better at inter-personal/social intelligence (n= 385, *M*= 21.00, *SD*= 3.20) than male co-twins (n=294, *M*=20.41, *SD*= 3.96, *t* (552, 81) = 2, 10, *p*= 0.04).

McElroy (2013) says that infants begin to differentiate the sounds in the womb. That means musical ear might start at womb and there might be a positive correlation between musical intelligence and verbal intelligence. Differentiating the sound might help to differentiate the words while someone is speaking. Kaufmann (n.d.) states that males and females have a different interpretation of voice and volume and that "girls have a more finely tuned aural structure; they can hear higher frequencies than boys and are more sensitive to sounds". Girls might have better musical ears than boys. As a result, significant differences are seen between the musical mean scores of female co-twins (n= 385, *M*= 18.75, *SD*= 4.13) and male co-twins (n=294, *M*= 16.86, *SD*= 4.64, *t* (589, 62) = 5, 49, *p*= 0.00). Not only biological factors but also families' attitudes may have an effect to improve female co-twins' musical intelligence better than male co-twins.

As it is mentioned above, gender differences might affect children's interests, learning styles and life-styles. As a result, seeing female co-twins better at verbal/linguistic intelligence or males are better at mathematical/logical intelligence can be explained by biological or social biased behaviors, individual and cultural backgrounds, school policies; families' attitudes. In addition, male co-twins' interests, attitudes towards math or science might affect this result.

For mathematical intelligence, it is seen that the mean scores of male co-twins (n= 294, *M*= 20.73, *SD*= 3.35) are significantly higher than female co-twins (n=385, *M*= 19.94, *SD*= 3.43, *t* (677) = -3, 00, *p*= 0.00). While mathematical/logical intelligence is preferred at the second rate for male co-twins, it is at the sixth rate as the third least developed intelligence for female co-twins.

In other four intelligences; kinesthetic/bodily, spatial/visual, intra-personal/individual, and nature intelligences, no significant differences are found. In kinesthetic/bodily intelligence, the mean scores of female co-twins (n= 385, *M*= 20.78, *SD*= 3.27) and male co-twins' (n=294, *M*= 20.38, *SD*= 3.92, *t* (565, 04) = 1, 39, *p*= 0.16) are different. That might be related to being multiple; they are always active. They try to be interactive with each other. In addition, families' and schools' attitudes might have a role in not seeing a difference in kinesthetic/bodily intelligence. Since they are middle school child, they love being active. The weekly hours of PE lessons and playing hours also might have an effect on kinesthetic/bodily intelligence positively.

The differences in t-test results for spatial/visual intelligence is not significant between female co-twins (n= 385, *M*= 19.85, *SD*= 3.47) and male co-twins (n=294, *M*= 19.50, *SD*= 3.87, *t* (677) = 1, 25, *p*= 0.21). Female and male co-twins have close spatial/visual intelligence.

Intra-personal/individual intelligence difference is not significant between female co-twins (n= 385, *M*= 20.86, *SD*= 3.31) and male co-twins (n=294, *M*= 20.35, *SD*= 3.43, *t* (677) = 1, 93, *p*= 0.05). All twin types can develop their inner thoughts. Being twins and triplets might have a significant role in developing their intra-personal/individual intelligence.

The last intelligence, nature intelligence is not significantly different between female co-twins (n= 385, *M*= 20.99, *SD*= 3.41) and male co-twins (n=294, *M*= 21.27, *SD*= 3.90, *t* (677) = -0, 96, *p*= 0.34). Sharing the same family and education environment may determine both female and male co-twins' nature intelligence preferences.

When female co-twins' most preferred intelligences are analyzed, it is seen as follows:

1 verbal/linguistic intelligence (*M*= 21.20 >
2 inter-personal/social intelligence (M= 21.00) >

3 nature intelligence (*M*= 20.99) >

4 intra-personal/individual intelligence (*M*= 20.86) >

5 kinesthetic/bodily intelligence (*M*= 20.78) >

6 mathematical/logical intelligence (*M*= 19, 85) >

7 spatial/visual intelligence (*M*= 19.85) >

8 musical intelligence (*M*= 18.75).

However, these rates are different in male co-twins as follows;

1 nature intelligence (*M*= 21.27) >

2 mathematical/logical intelligence (*M*= 20.73) >

3 verbal/linguistic intelligence (*M*= 20.47) >

4 inter-personal/social intelligence (*M*= 20.41) >

5 kinesthetic/bodily intelligence (*M*= 20.38) >

6 intra-personal/individual intelligence (*M*= 20.35) >

7 spatial/visual intelligence (*M*= 19.50) >

8 musical intelligence (*M*= 16.86).

The preference similarities between male and female co-twins are seen at kinesthetic/bodily intelligence, spatial/visual intelligence, and musical intelligence. In other intelligences, the preferences are changing according to gender. Such as while the three most develop intelligences are verbal/linguistic, inter-personal/social and nature intelligence for female co-twins, for male co-twins, they are nature intelligence, mathematical/logical intelligence, and verbal/linguistic intelligence. This can be related to their biological preferences, families and school attitudes. Seeing the two least developed intelligences as musical and spatial/visual intelligences can be related to these subjects' weekly hours at school curriculum and they might require special interest or talent that affects their preferences.

4.6.2 The Influence of the Gender Factor on Triplet Siblings' Multiple Intelligence Types

The study is carried out with 11 female triplet siblings (Child A, n= 5, Child B, n= 3 and Child C, n= 3) and 22 male triplet siblings (Child A, n= 6, Child B, n= 8 and Child C, n= 3). Taşdemir et al. (1997) state that when the fetus number increases, boy fetus number

also increases. Yayla and et al. (2004) also mention the same hypothesis that if the fetus number increases especially in triplets, it is normal to see more male fetuses than female fetuses. The results are coincident with their statements in terms of seeing more male fetuses in higher multiple births.

Independent sample t-test is run to examine the difference between the mean scores of female (n=11) and male (n=22) triplet siblings on eight dimensions of multiple intelligences: verbal/linguistic intelligence, musical intelligence, mathematical/logical intelligence, spatial/visual intelligence, kinesthetic/bodily intelligence, intra-personal/individual intelligence, inter-personal/social intelligence, and nature intelligence. The results indicated in Table 4.14 that the mean scores of female triplet siblings are not significantly different than those of male triplet siblings any of all eight dimensions of multiple intelligences. Gender does not seem to be a factor affecting intelligence types in triplet siblings and both female and male triplet siblings have similar multiple intelligence levels.

Table 4.14. Independent Sample T-test for the Influence of the Gender Factor on Triplet Siblings' Multiple Intelligence Rates (n= 33)

Dimensions	**Gender**	**N**	**Mean**	**SD**	***t***	***Df***	***p***
Verbal/Linguistic Intelligence	Female	11	4,36	0,50	0,48	31,00	0,63
	Male	22	4,28	0,44			
Musical Intelligence	Female	11	3,78	1,03	1,19	31,00	0,24
	Male	22	3,41	0,75			
Mathematical/Logical intelligence	Female	11	4,13	0,96	0,46	15,85	0,65
	Male	22	3,98	0,72			
Spatial/Visual intelligence	Female	11	3,95	0,80	0,03	19,57	0,98
	Male	22	3,94	0,77			
Kinesthetic/Bodily intelligence	Female	11	4,42	0,60	1,82	31,00	0,08
	Male	22	4,03	0,57			
Intra-personal/Individual intelligence	Female	11	4,20	1,05	0,59	31,00	0,56
	Male	22	4,01	0,78			
Inter-personal/Social intelligence	Female	11	4,51	0,41	0,10	31,00	0,92
	Male	22	4,49	0,51			
Natural intelligence	Female	11	4,60	0,46	1,64	31,00	0,11
	Male	22	4,20	0,74			

Note. The difference is significant at $*p < .05$

- In verbal/linguistic intelligence, there is no significant difference between female triplet siblings (n= 11, *M*= 4.36, *SD*= 0.50) and male triplet siblings (n=22, *M*= 4.28, *SD*= 0.44, *t* (31,00)= 0,48, *p* = 0.63),
- For musical intelligence, no significant difference is found between female triplet siblings (n= 11, *M*= 3.78, *SD*= 1.03) and male triplet siblings (n=22, *M*= 3.41, *SD* = 0.75, *t* (31,00)= 1,19, *p* = 0.24),
- In mathematical/logical intelligence also there is no significant difference between female triplet siblings (n= 11, *M*= 4.13, *SD*= 0.96) and male triplet siblings (n=22, *M*= 3.98, *SD*= 0.72, *t*(15,85) = 0,46, *p* = 0.65),
- For spatial/visual intelligence, no significant difference is seen between female triplet siblings (n= 11, *M*= 3.95, *SD*= 0.80) and male triplet siblings (n=22, *M*= 3.94, *SD*= 0.77, *t*(19,57) = 0,03, *p* = 0.98),
- In kinesthetic intelligence, there is no significant difference between female triplet siblings (n= 11, *M*= 4.42, *SD*= 0.60) and male triplet siblings (n=22, *M*= 4.03, *SD*= 0.57, *t*(31,00) = 1,82, *p* = 0.08),
- For intra-personal/individual intelligence, there is no significant difference between female triplet siblings (n= 11, *M*= 4.20, *SD*= 1.05) and male triplet siblings (n=22, *M*= 4.01, *SD*= 0.78, *t*(31,00)= 0,59, *p* = 0.56),
- In inter-personal/social intelligence, no significant difference is seen between female triplet siblings (n= 11, *M*= 4.51, *SD*= 0.41) and male triplet siblings (n=22, *M*= 4.49, *SD*= 0.51, *t*(31,00) = 0,10, *p* = 0.92),
- In the last intelligence, no significant difference is seen as other intelligences between female triplet siblings (n= 11, *M*= 4.60, *SD*= 0.46) and male triplet siblings (n=22, *M*= 4.20, *SD*= 0.74, *t* (31, 00) = 1, 64, *p* = 0.11).

Although there is no significant difference between female and male triplet siblings; female triplet siblings' mean scores seem to be higher than those of male triplet siblings. If their multiple intelligence preference order is compared, female triplet siblings' preferences are seen as follows; nature, inter-personal/social, kinesthetic/bodily, verbal/linguistic, intra-personal/individual, mathematical/logical, spatial/visual, and musical intelligences. However, it is seen that these preferences change in male triplet siblings; inter-personal/social, verbal/linguistic, nature, kinesthetic/bodily, intra-

personal/individual, mathematical/logical, spatial/visual and musical intelligences. As it is seen multiple intelligence preferences and rates can change according to gender.

4.7 The Findings Related to the Influence of the Grade Level Factor on Multiple Children's Multiple Intelligence Types

The fourth research question is the effect of grade level factor on multiple intelligence of multiple children. Since the subjects of the study are at concrete operational period: they are between the 1st grade and the 6th grade (6-12 years). It is known that cognitive and biological developments are related to age. Thus, it is expected that multiple intelligence rates to be seen higher in higher grade levels correlating with the cognitive and biological development of multiple children. As a result, it is analyzed to find out whether there is a positive correlation between grade levels and multiple intelligence rates or not.

4.7.1. The Influence of the Grade Level Factor on Co-twins' Multiple Intelligence Types

The study is carried out with 679 co-twins. N= 87 co-twins are registered as 1st graders, n= 127 co-twins as 2nd graders, n= 138 co-twins as 3rd graders, n= 136 co-twins as 4th graders, n= 75 co-twins as 5th graders and n= 116 co-twins as 6th grades. It is seen that the most co-twins are at the 3rd and 4th grade levels.

Table 4.15. One-Way Analysis of Variance for the Effects of Grade Levels on Eight Dependent Dimensions in Co-twins (n= 679) ***p* < .05**

Dimensions and Source	***SS***	***MS***	***F*(5, 678)**	***P***	**η^2**
Verbal Intelligence					
Between	113.61	22.72	2.21	.052*	.02
Within	6933.17	10.30			
Musical Intelligence					
Between	158.96	31.79	1.61	.155	.01
Within	13280.78	19.73			
Mathematical Intelligence					
Between	169.33	33.87	2.94	.012*	.02
Within	7748.81	11.51			
Spatial Intelligence					
Between	27.95	5.59	.42	.84	.003

Within	9008.36	13.39			
Kinesthetic Intelligence					
Between	215.51	43.10	3.44	.004*	.025
Within	8434.28	12.53			
Intra-personal Intelligence					
Between	415.78	83.16	7.68	.00*	.054
Within	7286.32	10.83			
Inter-personal Intelligence					
Between	202.91	40.58	3.27	.006*	.024
Within	8366.01	12.43			
Nature Intelligence					
Between	270.64	54.13	4.21	.001*	.03
Within	8654.86	12.86			

One-way analysis of variance (ANOVA) is conducted to compare the effects of grade levels on eight dimensions of multiple intelligences. As shown in Table 4.15. above, intelligence scores of co-twins from different grade levels are significantly different from each other on six dimensions of multiple intelligences:

- verbal/linguistic intelligence F (5,678) = 2.21, p = .052, partial η^2 = .02,
- mathematical/logical intelligence F (5,678) = 2.94, p = .012, partial η^2 = .02,
- kinesthetic/bodily intelligence F (5,678) = 3.44, p = .004, partial η^2 = .025,
- intra-personal/individual intelligence F (5,678) = 7.68, p = .00, partial η^2 = .054,
- inter-personal/social intelligence F (5,678) = 3.27, p = .006, partial η^2 = .024.
- nature intelligence F (5,678) = 4.21, p = .001, partial η^2 = .03.

However, there is no significant difference between grade levels (1^{st} -6^{th} graders) and musical intelligence F (5,678) = 1.61, p = .155, partial η^2 = .02 and spatial/visual intelligence F (5,678) = .42, p = .84, partial η^2 = .003.

Post-hoc analyses are conducted in order to detect what grade specifically is better than the others. Results of that post-hoc analysis are provided and written as follow. For verbal/linguistic intelligence and inter-personal/social intelligence even if the main effect is found to be significant, post-hoc result indicates no significant difference between the mean scores of co-twins from different grade levels. A possible reason for

this result could be associated with the well-known idea that when sample size becomes larger, the possibility of detecting trivial differences by ANOVA becomes smaller.

Seeing no difference between musical intelligence and spatial/visual intelligence and grade levels can be related to these two intelligences having only one hour lesson weekly in schools that might not draw children's attentions. These two intelligences also require special interest or abilities. If one of the co-twins is not interested in musical or spatial abilities, other co-twins might also not be interested in, either.

Table 4.16. shows the musical intelligence among co-twins between the 1st and 6th graders. The mean scores are given form higher to lower; 3rd graders (n= 138, *M*= 3.73, *SD*= 0.86) > 2nd graders (n= 127, *M*= 3.63, *SD*= 0.94) > 1st graders (n= 87, *M*= 3.60, *SD*= 0.78) > 4th graders (n= 136, *M*= 3.57, *SD*= 0.90), 6th graders (n= 116, *M*= 3.47, *SD*= 0.91) > 5th graders (n= 75, *M*= 3.43, *SD*= 0.92).

Table 4.16. Musical Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Levels in Co-twins

Intelligence	**Grade**	**Mean**	**SD**	**N**
Musical Intelligence	**1st**	3.60	0.78	87
	2nd	3.63	0.94	127
	3rd	3.73	0.86	138
	4th	3.57	0.90	136
	5th	3.43	0.92	75
	6th	3.47	0.91	116

Spatial/visual intelligence mean scores in co-twins from the highest to the lowest are as in Table 4.17. 5th graders (n= 75, *M*= 4.01, *SD*= 0.59 > 6th graders (n= 116, *M*= 3.96, *SD*= 0.63) > 3rd graders (n= 138, *M*= 3.95, *SD*= 0.75) > 1st graders (n= 87, *M*= 3.94, *SD*= 0.63) ≥ 4th graders (n= 136, *M*= 3.94, *SD*= 0.75) > 2nd graders (n= 127, *M*= 3.87, *SD*= 0.88). It is seen that mostly higher graders have higher mean scores in spatial/visual intelligence.

Table 4.17. Spatial/Visual Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Levels in Co-twins

Intelligence	Grade	Mean	SD	N
Spatial/Visual Intelligence	**1st**	3.94	0.63	87
	2nd	3.87	0.88	127
	3rd	3.95	0.75	138
	4th	3.94	0.77	136
	5th	4.01	0.59	75
	6th	3.96	0.63	116

For verbal/linguistic and inter-personal/social intelligences, not seeing a significant difference between grade levels might be related to, as it is mentioned before, being multiple children. Twins, since they are like a small group, they develop their verbal/linguistic intelligence together with inter-personal/social intelligence. In Table 4.18 below, verbal/linguistic intelligence rankings of co-twins are given from the highest to the lowest mean scores; 3rd graders (n= 138, *M*= 4.27, *SD*= 0.59) > 5th graders (n= 75, *M*= 4.24, *SD*= 0.53) > 2nd graders (n= 127, *M*= 4.23, *SD*= 0.72 > 4th graders (n= 136, *M*= 4.18, *SD*= 0.64) > 1st graders (n= 87, *M*= 4.07, *SD*= 0.65) > 6th graders (n= 116, *M*= 4.06, *SD*= 0.67).

Table 4.18. Verbal/Linguistic Intelligence Mean Scores, Standard Deviation and Sample Size for Grade Levels in Co-twins.

Intelligence	Grades	Mean	SD	N
Verbal/Linguistic Intelligence	**1st**	4.07	0.65	87
	2nd	4.23	0.72	127
	3rd	4.27	0.59	138
	4th	4.18	0.64	136
	5th	4.24	0.53	75
	6th	4.06	0.67	116

From the Table 4.19., Inter-personal/social intelligence in co-twins is given from higher to lower as follows: 5th graders (n= 75, *M*= 4.27, *SD*= 0.55) > 6th graders (n= 116, *M*= 4.22, *SD*= 0.60) = 3rd graders (n= 138, *M*= 4.22, *SD*= 0.65) > 4th graders (n= 136, *M*= 4.19, *SD*= 0.76) > 2nd graders (n= 127, *M*= 3.99, *SD*= 0.86) = 1st graders (n= 87, *M*= 3.99, *SD*= 0.70).

Table 4.19. Inter-personal/Social Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Levels in Co-twins

Intelligence	Grade	M	SD	N
Inter-personal/Social Intelligence	**1st**	3.99	0.70	87
	2nd	3.99	0.86	127
	3rd	4.22	0.65	138
	4th	4.19	0.76	136
	5th	4.27	0.55	75
	6th	4.22	0.60	116

For mathematical/logical intelligence, post-hoc results show that only 5th graders (n= 75, *M*= 20.84, *SD*= 3.00) have significantly higher mean scores than 1st graders (n= 87, *M*= 19.29, *SD*= 3.60). It can be related with age, when the children get older as a result of their cognitive development, their mathematical knowledge might improve. In addition, 1st graders generally deal with verbal abilities rather than mathematical abilities, as it is mentioned in Chapter 2.

The mean scores of mathematical/logical intelligence are registered in Table 4.20. The highest mean scores are seen among 5th graders (n= 75, *M*= 4.17, *SD*= 0.60) > 4th graders (n= 136, *M*= 4.13, *SD*= 0.73) > 3rd graders (n= 138, *M*= 4.12, *SD*= 0.70) > 6th graders (n= 116, *M*= 4.08, *SD*= 0.56) > 2nd graders (n= 127, *M*= 3.96, *SD*= 0.72) > 1st graders (n= 87, *M*= 3.86, *SD*= 0.72).

Table 4.20. Mathematical/Logical Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Levels in Co-twins

Intelligence	Grade	M	SD	N
Mathematical/Logical Intelligence	**1st**	3.86	0.72	87
	2nd	3.96	0.72	127
	3rd	4.12	0.70	138
	4th	4.13	0.73	136
	5th	4.17	0.60	75
	6th	4.08	0.56	116

For kinesthetic/bodily intelligence, 5th graders (n= 75, *M*= 21.76) have significantly higher mean scores than 2nd graders (n= 127, *M*= 19.98) and 1st graders (n= 87, *M*= 19.81). The reason can be related to the physical development of children.

Table 4.21. Kinesthetic/Bodily Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Levels in Co-twins

Intelligence	Grade	M	SD	N
Kinesthetic/Bodily Intelligence	**1st**	3.96	0.65	87
	2nd	4.00	0.83	127
	3rd	4.16	0.67	138
	4th	4.14	0.77	136
	5th	4.35	0.59	75
	6th	4.16	0.63	116

Kinesthetic/bodily intelligence means scores of co-twins are given from the highest to the lowest; 5th graders (n= 75, *M*= 4.35 *SD*= 0.59) > 3rd graders (n= 138, *M*= 4.16, *SD*= 0.67) =6th graders (n= 116, *M*= 4.16, *SD*= 0.63) > 4th graders (n= 136, *M*= 4.14, *SD*= 0.77) > 2nd graders (n= 127, *M*= 4.00, *SD*= 0.83) > 1st graders (n= 87, *M*= 3.96, *SD*= 0.65).

For intra-personal/individual intelligence, 5th graders (n= 75, *M*= 21.72), 6th graders (n= 116, *M*= 21.35) and 4th graders (n= 136, *M*= 21.11) have significantly higher mean scores than 2nd graders (n= 127, *M*= 19.71) and 1st graders (n= 87, *M*= 19.43). Puberty begins to be seen especially at 4th, 5th and 6th grade levels. Thus, intra-personal/individual intelligence can be related to puberty. Their inner thoughts might begin to improve at these ages.

Table 4.22. Intra-personal/Individual Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Levels in Co-twins

Intelligence	Grade	M	SD	N
Intra-personal/Individual intelligence	**1st**	3.89	0.72	87
	2nd	3.94	0.82	127
	3rd	4.12	0.66	138
	4th	4.22	0.60	136
	5th	4.34	0.51	75
	6th	4.27	0.55	116

As in Table 4.22., intra-personal/individual intelligence in co-twins are given from the highest to the lowest; 5th graders (n= 75 *M*= 34, *SD*= 0.51) > 6th graders (n= 116, *M*= 4.27, *SD*= 0.55) > 4th graders (n= 136, *M*= 4.22, *SD*= 0.60) > 3rd graders (n= 138, *M*= 4.12, *SD*= 0.66) > 2nd graders (n= 127, *M*= 3.94, *SD*= 0.82) > 1st graders (n= 87, *M*= 3.89, *SD*= 0.72).

For nature intelligence, 3rd graders (n= 138, *M*= 21.55), 4th graders (n= 136, *M*= 21.68) and 5th graders (n= 75, *M*= 21.72) are significantly better than 1st graders (n= 87, *M*= 19.81). The reason can be as in kinesthetic/bodily intelligence, related to age. When children get older, they might need nature more than youngers.

Table 4.23. show the mean scores of co-twins in nature intelligence, they are given from the highest to the lowest; 4th graders (n= 136, *M*= 4.34, *SD*= 0.69) = 5th graders (n= 75, *M*= 4.34, SD= 0.71) > 3rd graders (n= 138, *M*= 4.31, *SD*= 0.68) > 6th graders (n= 116, *M*= 4.18, SD= 0.68) > 2nd graders (n= 127, *M*= 4.15, *SD*= 0.75) > 1st graders (n= 87, *M*= 3.96, SD= 0.81).

Table 4.23. Nature Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Levels in Co-twins

Intelligence	**Grade**	**M**	**SD**	**N**
Nature intelligence	**1st**	3.96	0.81	87
	2st	4.15	0.75	127
	3rd	4.31	0.68	138
	4th	4.34	0.69	136
	5th	4.34	0.71	75
	6th	4.18	0.68	116

4.7.2. The Influence of the Grade Level Factor on Triplet Sibling's Multiple Intelligence Types

One of the research questions is to see the influence of grade levels on multiple children's multiple intelligence types. The study is carried out with 33 triplet siblings who are between the 1st and 6th grade levels. At the 1st grade level: one set of triplets, at the 2nd grade level, four sets of triplets, at the 3rd grade level, two sets of triplets, at the 4th grade level, two sets of triplets, at the 5th grade and 6th grade levels, one set of triplets are registered in the study. Triplets are mostly at the 2nd grade level.

Table 4.24. Homogeneity of Variance Assumptions for the Effects of Grade Level on Eight Dimensions of Multiple Intelligence (n=33)

Dimensions	***F* (5, 27)**	***p***
Verbal intelligence	0.59	0.71
Musical intelligence	1.18	0.35
Mathematical intelligence	2.50	0.06

Spatial intelligence	0.83	0.54
Kinesthetic intelligence	1.99	0.11
Intra-personal intelligence	4.08*	0.01
Inter-personal intelligence	1.35	0.28
Natural intelligence	1.37	0.27

Note. The variance is significant at *$p < .05$

Table 4.24. above shows the homogeneity of variance assumption has not been violated for:

- verbal/linguistic intelligence $F(5,27)= 0.59$, $p = .71$,
- musical intelligence $F(5,27)= 1.18$, $p = .35$,
- mathematical/logical intelligence $F(5,27)= 2.50$, $p = .06$,
- spatial/visual intelligence $F(5,27)= .83$, $p = .54$,
- kinesthetic/bodily intelligence $F(5,27)= 1.99$, $p=.11$,
- inter-personal/social intelligence $F(5,27)= 1.35$, $p= .28$,
- nature intelligence $F(5, 27) = 1.37$, $p = .27$.

Except for the dimension of intra-personal/social intelligence $F(5, 27) = 4.08$, $p = .01$. It is quite likely to seriously violate the homogeneity of variance when the sample size is small in each group. Therefore, an adjustment is applied to alpha level when evaluating ANOVA result for intra-personal/social intelligence. Alpha level decreases from 0.5 to .025. The new alpha level is used for the examination of ANOVA output related to the dimension of intra-personal/social intelligence.

Table 4.25. One-Way Analysis of Variance for the Effects of Grade Level on Eight Dependent Dimensions in Triplets, ***p* < .025**

Dimensions and source	***SS***	***MS***	***F*(5, 32)**	***P***
Verbal intelligence				
Between	1.43	.27	1.48	.23
Within	5.22	.19		
Musical intelligence				
Between	4.53	.91	2.43	.30
Within	18.88	.70		

Mathematical intelligence				
Between	6.31	1.26	2.43	.06
Within	14.03	.52		
Spatial intelligence				
Between	8.52	1.71	4.47*	.00
Within	10.31	.38		
Kinesthetic intelligence				
Between	1.99	.40	1.12	.37
Within	9.59	.36		
Intra-personal intelligence				
Between	8.94	1.79	3.21	.021
Within	15.05	.56		
Inter-personal intelligence				
Between	1.64	.33	1.61	.19
Within	5.49	.20		
Natural intelligence				
Between	2.49	.50	1.10	.38
Within	12.21	.45		

One-way analysis of variance (ANOVA) is conducted to compare the effect of grade levels on eight dimensions of multiple intelligences. As shown in Table 4.25. above, except for spatial/visual intelligence F (5.32) = 4.47, p = .00, the results reveal no significant effect of grade level on the remaining multiple intelligence dimensions:

- verbal/linguistic intelligence F (5, 32) = 1.48, p = .23.,
- musical intelligence F (5, 32) = 2.43, p = .30.,
- mathematical/logical intelligence F (5, 32) = 2.43, p = .06.,
- kinesthetic/bodily intelligence F (5, 32) = 1.12, p = .37.,
- intra-personal/individual intelligence F (5, 32) = 3.21, p = .021.,
- inter-personal/social intelligence F (5, 32) = 1.61, p = .19.
- in nature intelligence F (5, 32) = 1.10, p = .38.

Related to spatial/visual intelligence, the mean scores of students from different grade are found to be significantly different from each other. Post-hoc analyses are conducted in order to detect what grade specifically is better than the other. Results of those post-hoc tests show that 6th, 5th and 4th graders have significantly higher spatial/visual intelligence mean scores than 1st graders

The mean scores, standard deviations, and sample sizes of triplet siblings are given as in Tables from 4.26. to 4.33. As the sample size is small in each group, the results are not significant (except spatial/visual intelligence).

Table 4.26. Verbal/Linguistic Intelligence Mean Scores, Standard Deviation and Sample Size for Grade Levels in Triplets

Intelligence	**Grade**	**M**	**SD**	**N**
Verbal Intelligence	**1st**	4.40	0.60	3
	2nd	4.08	0.46	12
	3rd	4.43	0.37	6
	4th	4.27	0.45	6
	5th	4.53	0.42	3
	6th	4.73	0.23	3

In Table 4.26. verbal/linguistic intelligence rankings of triplet siblings are given from the highest to the lowest mean scores; 6th graders (n= 3, *M*= 4.73, *SD*= 0.23) > 5th graders (n= 3, *M*= 4.53, *SD*= 0.42) > 3rd grades (n = 6, *M*= 4.43, *SD*= 0.37) > 1st grades (n= 3, *M*= 4.40, *SD*= 0.60) > 4th graders (n = 6, *M*= 4.27, *SD*= 0.45) and 2nd graders (n = 12, *M*= 4.08, *SD*= 0.46). It is seen that generally older graders have higher mean scores at verbal intelligence.

Table 4.27. Musical Intelligence Mean Scores, Standard Deviation and Sample Size for Grade Levels in Triplets

Intelligence	**Grade**	**M**	**SD**	**N**
Musical Intelligence	**1st**	3.80	0.69	3
	2nd	3.43	0.83	12
	3rd	3.77	0.80	6
	4th	3.03	1.07	6
	5th	3.33	0.42	3
	6th	4.40	0.69	3

Table 4.27. above, shows triplet siblings' musical intelligence rankings from the highest to the lowest mean scores; 6th graders (n = 3, *M*= 4.40, *SD*= 0.69) > 1st graders (n= 3,

M= 3.80, *SD*= 0.69) > 3rd graders (n = 6, *M*= 3.43, *SD*= 0.83) > 2nd graders (n= 12, *M*= 3.43, *SD*= 0.83) > 5th graders (n = 3, *M*= 3.35, *SD*= 0.42) and 4th graders (n = 6, *M*= 3.03, *SD*= 1.07). Musical intelligence is seen highest in the oldest grade, at 6th. However, the distributions of the mean scores were differentiating from grades to grades.

Table 4.28. Mathematical/Logical Intelligence Mean Scores, Standard Deviation and Sample Size for Grade Levels in Triplets

Intelligence	**Grade**	**M**	**SD**	**N**
Mathematical Intelligence	**1st**	3.53	0.61	3
	2nd	3.69	0.68	12
	3rd	3.90	0.97	6
	4th	4.30	0.81	6
	5th	4.67	0.31	3
	6th	4.93	0.12	3

As in Table 4.28., mathematical/logical intelligence in triplet siblings are inversely proportional. The results are coincident with the literature, depending on their cognitive development, their mathematical intelligence mean scores are seen the highest at the 6th graders (n= 3, *M*= 4.93, *SD*= 0.12). Then come 5th graders (n= 3, *M*= 4.67, *SD*= 0.31) > 4th graders (n = 6, *M*= 4.30, *SD*= 0.81) > 3rd graders (n = 6, *M*= 3.90, *SD*= 0.97) > 2nd graders (n= 12, *M*= 3.69, *SD*= 0.68) > 1st graders (n= 3, *M*= 3.53, *SD*= 0.61).

Table 4.29. Spatial/Visual Intelligence Mean Scores, Standard Deviation and Sample Size for Grade Level in Triplets

Intelligence	**Grade**	**M**	**SD**	**N**
Spatial Intelligence	**1st**	2.60	0.80	3
	2nd	3.85	0.70	12
	3rd	3.97	0.70	6
	4th	4.07	0.41	6
	5th	4.73	0.23	3
	6th	4.53	0.31	3

In spatial/visual intelligence rates are seen in Table 4.29. Respectively; 5th graders (n = 3, *M*= 4.73, *SD*= 0.23) > 6th graders, (n = 3, *M*= 4.53, *SD*= 0.31) > 4th graders (n = 6, *M*= 4.07, *SD*= 0.41) > 3rd graders (n = 6, *M*= 3.97, *SD*= 0.70) > 2nd graders (n= 12, *M*= 3.85, *SD*= 0.70) > 1st graders (n= 3, *M*= 3.85, *SD*= 0.80). Related to spatial intelligence, the

mean scores of students from different grade are found to be significantly different from each other. Post-hoc analyses are conducted in order to detect what grade specifically is better than the other. Results of those post-hoc tests show that 6th, 5th and 4th graders have significantly higher spatial/visual intelligence mean scores than 1st graders. It can be said that spatial/visual intelligence improves depending on cognitive development of triplet siblings. In addition, spatial intelligence is one of the intelligences that requires special talent. It means triplet siblings in the study might have visual talents. If so, they should be encouraged and supported.

Table 4.30. Kinesthetic/Bodily Intelligence Mean Scores, Standard Deviation and Sample Size for Grade Levels in Triplets

Intelligence	**Grade**	**M**	**SD**	**N**
Kinesthetic Intelligence	**1st**	4.13	0.31	3
	2nd	4.03	0.56	12
	3rd	3.97	0.73	6
	4th	4.27	0.69	6
	5th	4.13	0.61	3
	6th	4.87	0.23	3

Table 4.30. shows that kinesthetic/bodily intelligence in triplet siblings' change according to grade levels. The mean scores are seen higher at 6th graders (n= 3, *M*= 4.87, *SD*= 0.23) than 4th graders (n= 6, *M*= 4.27, *SD*= 0.69). 1st and 5th graders have the same mean scores (*M*= 4.13), if their standard deviation is considered, 1st graders have higher mean scores than 5th graders the come 2nd graders (n= 12, *M*= 4.03, *SD*= 0.56) > 3rd graders (n = 6, *M*= 3.97, *SD*= 0.73). Higher graders have higher mean scores in kinesthetic/bodily intelligence. The reason can be related to their physical development.

Table 4.31. Intra-personal/Individual Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Level in Triplets

Intelligence	**Grade**	**M**	**SD**	**N**
Intra-Personal Intelligence	**1st**	2.93	0.50	3
	2nd	3.98	0.83	12
	3rd	3.73	1.13	6
	4th	4.73	0.27	6
	5th	4.20	0.00	3
	6th	4.80	0.35	3

As in Table 4.31., intra-personal/Individual intelligence in triplet siblings are seen higher at 6th graders (n = 3, *M*= 4.80, *SD*= 0.35) > 4th graders (n = 6, *M*= 4.73, *SD*= 0.27) > 5th graders (n = 3, *M*= 4.20, *SD*= 0.00) > 2nd graders (n= 12, *M*= 3.98, *SD*= 0.83) > 3rd graders (n = 6, *M*= 3.73, *SD*= 1.13) > 1st graders (n= 3, *M*= 2.93, *SD*= 0.50). Cognitive development effect might have a role on intra-personal/individual intelligence score. Puberty effect also can have a role on intra-personal/individual intelligence that higher graders have higher mean scores in intra-personal intelligence. 1st graders or 2nd graders might not know themselves (their good and bad sides or abilities) very well as they are at the beginning of cognitive development.

Table 4.32. Inter-personal/Social Intelligence Mean Scores, Standard Deviations and Sample Size for Grade Level in Triplets

Intelligence	**Grade**	**M**	**SD**	**N**
Inter-Personal Intelligence	**1st**	4.13	0.81	3
	2nd	4.65	0.45	12
	3rd	4.17	0.48	6
	4th	4.70	0.30	6
	5th	4.40	0.20	3
	6th	4.60	0.35	3

Inter-personal/social intelligence mean scores of triplet siblings are as in Table 4.32. Inter-personal/social intelligence is developed at 4th graders (n= 6, *M*= 4.70, *SD*= 0.30) > 2nd graders (n= 12, *M*= 4.65, *SD*= 0.45) > 6th graders (n= 3, *M*= 4.60, *SD*= 0.35) > 5th graders (n= 3, *M*= 4.40, *SD*= 0.20) > 3rd graders (n= 6, *M*= 4.17, *SD*= 0.48) > 1st graders (n= 3, *M*= 4.13, *SD*= 0.81). Inter-personal/social intelligence is different than the others which depend on their being multiple children. Since they are like a small group, they can improve their inter-personal/social intelligence.

Table 4.33. Nature Intelligence Mean Scores, Standard Deviation and Sample Size for Grade Level in Triplets

Intelligence	**Grade**	**M**	**SD**	**N**
Nature Intelligence	**1st**	4.13	0.50	3
	2nd	4.10	0.85	12
	3rd	4.23	0.65	6
	4th	4.53	0.52	6
	5th	4.67	0.42	3
	6th	4.93	0.12	3

Nature intelligence rankings are given in Table 4.33. 6th graders (n= 3, *M*= 4.93, *SD*= 0.12) have higher mean scores that others: 5th graders (n= 3, *M*= 4.67, *SD*= 0.42) > 4th graders (n= 6, *M*= 4.53, *SD*= 0.52) > 3rd graders (n= 6, *M*= 4.23, *SD*= 0.65) > 1st graders (n= 3, *M*= 4.13, *SD*= 0.81) > 2nd grades (n= 12, *M*= 4.10, *SD*= 0.85). To see nature intelligence rate at higher graders might be related to children's cognitive development.

4.8 Discussion of the Findings

The aim of this dissertation is to analyze Gardner's multiple intelligence theory among multiple children: twins and triplets. As multiple children are born together, they are expected to have similar success, scores, abilities, and interests. Sometimes, they are labeled the most hardworking one or a lazy one. Although, they share many things together: DNA, same family, same room, same clothes, same friends, they have their own individualities. To support their individuality, it is assumed that multiple intelligence theory would be a good alternative for them. As a result, the multiple intelligence scale which is inspired from Shearer (2007) is applied to co-twins (n = 679) and triplet siblings (n= 33).

Most of the twin studies are related to genetics, psychology, and medical sciences. There are only a few studies related to their educational process. These studies generally try to find the differences between identical/MZ and fraternal/DZ twins. Since identical/MZ twins share their DNA, they are fine examples to analyze. Besides zygote type, birth order is one of the factors that drive scientists' and researchers' attention. For example, in many studies, IQ difference is searched using birth order. Gender factor is also one of the effects on multiple children. It is known that gender-based differences can be seen related to biological and environmental factors. Grade level might also have an effect on multiple children. It is known that children have their cognitive, biological, social and emotional developments. These developments occur in a sequence. As a result, age or grade factor might have an effect on multiple children. Finally, in the present study, birth order, zygote type, gender and grade level factors are considered in multiple children, the data collected is analyzed to find whether there are statistically significant differences among multiple children (twins and triplets) or not.

4.8.1 Discussion of the Findings Related to Multiple Intelligence Scale for Twins and Triplets

The study is conducted with the forty-item scale that measures eight dimensions of multiple intelligence. The reliability of the scale is analyzed using Cronbach's alpha and the reliability similarities are seen among inter-personal/social intelligence as in Tirri and Nokelainen (2008) and Saeidi et al. (2012). The highest reliability mean score of inter-personal/social intelligence (α = .89, .85) are registered in their studies that is similar with on the present scale. In most of the studies, the reliability of intra-personal/individual intelligence have the highest reliability scores (Aleksic and Ivanovic, 2016).

The scale is applied to 679 co-twins and 33 triplet siblings. Both in co-twins and triplet siblings, nature intelligence, inter-personal/social intelligence, and verbal/linguistic intelligence are observed as the three most developed intelligences. The reason to them as the most developed intelligences can be related to being multiple children. If multiple children are considered as a small group, their verbal/linguistic intelligence might develop together with their inter-personal/social intelligence that affects the dynamics of a group (Chand, n.d.). These two intelligences might have a chance to develop themselves among co-twins or triplet siblings since they have to talk to and interact with each other all the time. The three least mean scores are seen at mathematical/logical intelligence, spatial/visual intelligence and musical intelligence both in co-twins and triplet siblings. Since spatial/visual and musical intelligences might require special abilities or talent, children might not have a chance to develop or they may not be encouraged to develop these two intelligences. These two intelligence types also vary from culture to culture. Since there is no study related to multiple intelligence types of twins and triplets, the results cannot be compared (According to scholarly databases, academia.edu and YOK, Council of Higher Education and Thesis Center results, 2017). The results of the study are tried to compare with other studies (considering singletons) and seen that the results are consistent with multiple intelligence studies.

The result of the present study is coincident with Çamurcu (2007). The similar results are found in her study respectively; nature intelligence, intra-personal/individual intelligence, inter-personal/social intelligence, verbal/linguistic intelligence,

mathematical/logical intelligence, spatial/visual intelligence, musical intelligence, kinesthetic/bodily intelligence. Even though our three most developed intelligences are similar, her study is not for multiple children and the subjects are at 6th, 7th and 8th grade levels. In her study, to see the kinesthetic/bodily intelligence as least developed intelligence might be related to as it is mentioned before, at 7th and 8th grade levels, children prepare for the TEOG exam. On the other hand, the results of spatial/visual and musical intelligences are similar with our study. Akar (2006) also finds similar results; verbal/linguistic intelligence, inter-personal/social intelligence and mathematical/logical intelligence are the three most developed intelligences among 6th, 7th and 8th graders. Dolu and Urek (2014) also support our study stating musical intelligence as the least developed intelligence. They analyze multiple intelligence among gifted and talented children who are 5th graders and find that verbal/linguistic intelligence, mathematical/logical intelligence and spatial/visual intelligence as the three most developed intelligences. Since they work with gifted and talented children at science and art centers (SACs), it can be normal to see these intelligences at the top. In their results, inter-personal/social intelligence, intra-personal/social and bodily/kinesthetic intelligences are at the bottom. Seeing them as the least developed intelligences might be related to academic achievement of these children: gifted and talented. Karakurt (2012) also finds intra-personal/individual intelligence, mathematical/logical and kinesthetic/bodily intelligence as the three most developed intelligences among 6th, 7th and 8th graders. Kaur (2014) reports that 8th graders are significantly better at spatial/visual intelligence whereas 9th graders are significantly better at musical intelligence, mathematical/logical intelligence and kinesthetic/bodily intelligence and nature intelligence.

4.8.2 Discussion of the Findings Related to the Influence of Birth Order Factor on Multiple Children's Multiple Intelligence Types

When the first research question is analyzed statistically, the results showed that birth order factor is not statistically significant in multiple intelligence types of multiple children: co-twins and triplet siblings. The birth order in the present study shows who the first, the second or the third born in twins and triplets during delivery time. In the present study, the first born child is called Child A as first born, Child B as the second

born and Child C as the last born. Thus, the question is whether a birth order has a role on multiple intelligence types or not. In the study, it is found that birth order does not have a statistically significant effect on multiple intelligence types of neither co-twins nor triplet siblings. Since the results of the study are described for the first time in Turkey (YÖK, Council of Higher Education and Thesis Center, 2017); there is no opportunity to compare the results with previous studies not only in Turkey but also in the world. When it is searched on scholarly databases (Scholar Google, 2017) and academia.edu (2017), it is seen that there is nothing related to multiple intelligence types of multiple children: twins and triplets. Moreover, the existing studies are generally medical studies, such as Young et al. (1985) find that the second-born twin has a higher susceptibility to hypoxia and trauma. This can be related to problems that occur during the delivery time of twins and triplets. Nakano and Takemura (1988) state that the second born twin (Child B) is disadvantageous for mortality since the first born child (Child A) gets oxygen earlier than the second born. In addition, in some studies, as evidence, the first child can be born vaginally, however; the second one can be born via C-section that can affect children's biology or psychology. Although these are limited studies about the effect of birth order on of multiple children, it is tried to compare the results with similar studies, related to their cognitive development, birth order and multiple intelligences but the studies are limited.

These findings concur with other studies that Child As have higher IQ than Child Bs due to delivery problems as Segal (1999) mentions. Supporting Segal, Tüyel (2011) finds similar results in her study that Child As have better performance than Child Bs in terms of their attention processes in twins. Belmont and Marolla (1973) also find a correlation between birth order and intelligence. They express that first born is better than the second born and the second born is better than the third born. However, their study is not related to twins or triplets, it is about the place of a child in a family (the study that referencing to Adler's birth order theory[12]). In addition, the participants' age span is 19 years old and their genders are male.

[12]According to Adler (1929), the position (birth order) of the children; first borns, middle borns, last borns, and only child, affect their personalities and roles in the family.

4.8.3 Discussion of the Findings Related to the Influence of Twin Type: Identical/MZ and Fraternal/DZ Twin Factor on Co-twins' Multiple Intelligence Types

The second research question is whether being identical/MZ or fraternal/DZ twins have an effect on multiple intelligence types or not. Since the results of many similar studies are in favor of identical/MZ twins, it is expected to see more similarities in identical/MZ twins rather than fraternal/DZ twins in the present study.

The study is carried out with 137 identical/MZ twins and 542 fraternal/DZ twins. The zygote type findings are also similar to the literature. Hall (2003) states that identical/MZ twins are rarer than fraternal/DZ twins all around the world and Segal (2012) explains that "natural twinning rate is nearly 1 in 80 births in Western countries and identical/MZ twins are only a 3rd of those". To register the twinning rate in Turkey, it is written to TÜIK and Turkish Ministry of the Interior General Directorate of Civil Registration and Nationality (2017), as a response, it is seen that it has still not been known how many identical/MZ and fraternal/DZ twins there are in Turkey.

When the effect of twin type: identical/MZ or fraternal/DZ twins are analyzed, the results show that fraternal/DZ twins have significantly higher mean scores, especially in verbal/linguistic and musical intelligences than identical/MZ twins. The results are as they are expected and they are consistent with prior studies. These findings are in accord with Gardner (2006) that "even if they are identical/MZ twins, their multiple intelligences were different from each other". When it is written to Gardner (2015) as an e-mail question, at the beginning of the study, he mentions that most probably, the results will be more similar in identical twins than fraternal/DZ twins. His statement is in accord with the present results: the differences are seen among fraternal/DZ twins. Besides Gardner, it is written to Segal (2015), twin expert in the USA, and her advice is taken for the dissertation. Her statements are also mentioned similar with Gardner: more similarities will be seen in identical/MZ twins than fraternal/DZ twins. Green and Elizabeth (1984) explain the reason to see more similarities among identical/MZ twins that they are genetically and phenotypically more similar than fraternal/DZ twins. As it is mentioned before, most of the twin studies are related to twins in medical, psychology

and genetic sciences. Since there are limited studies related to multiple intelligence types of multiple children, the results are tried to compare with the following studies. Faraon (2009) finds the strongest IQ correlation in identical/MZ twins than fraternal/DZ twins. Wingfield (1928) also find similar IQ differences in favor for identical/MZ twins than fraternal/DZ twins. Same as Faraon and Wingfiel, Haider and Hussein (2009) find fewer personality differences in identical/MZ twins than fraternal/DZ twins. Walker et al. (2004) analyze 1,189 7-year-old identical/MZ and fraternal/DZ twins and find that identical/MZ twins have more similar Mathematics, English and a total score assessments than fraternal/DZ twins. Bratko (1996) finds similar scores between identical/MZ (n= 71) twins and fraternal/DZ (n=78) twins' verbal and spatial ability tests. Theorell and et al. (2014) find the association between musical practice and alexithymia genetically. In contrast, the following studies are not related to multiple intelligence of multiple children, no statistically significant difference is seen between identical/MZ twins and fraternal/DZ twins in these studies. For example, Yılmaz and et al. (2013) do not find any significant difference between receptive language development of preschool age twins and their types of twins: identical/MZ or fraternal/DZ. DiLalla (2006) also finds no anti-social behavior difference between identical/MZ and fraternal/DZ twins. Tüyel (2011) also does not find any statistical relation between identical/MZ and fraternal/DZ twins' cognitive development. Like Tüyel, in Nation and Wetherbee's research (1985), no difference is found in the hearing, motor behavioral and for the most part of cognitive-mental measures of identical/MZ male twins who are between 16 and 25 months old. Åkerman and Suurvee (2003) find no significant difference between, 16-year-old identical/MZ twins and fraternal/DZ twins in their verbal, numerical and spatial test scores.

In musical intelligence, (supporting our results), as a part of the study, after musical intelligence developed students are determined; they are gathered together and performed a musical chorus with the cooperation of Esenler Municipality. The study is conducted with seven sets of twins (n= 14 co-twins), none of them are identical/MZ twins and they are 5 male and 9 female co-twins. The twin sex-pairs are in 5 male-female co-twins and 2 female-female co-twins. However, Cytomic (2002) finds more heredity similarity on musical intelligence among identical/MZ twins than fraternal/DZ

twins. Mosing and et al. (2014) express the importance of heredity influence on music in their twin study. The last two studies are coincident with the present study that more similarities might be seen among identical/MZ twins (who share their genes fully) than fraternal/DZ twins (who share half of their genes).

4.8.4 Discussion of the Findings Related to the Influence of the Gender Factor on Multiple Children's Multiple Intelligence Types

The third research question of the present study is to analyze the gender factor on multiple intelligence types of co-twins and triplet siblings. Gender differences have been analyzed to find in what way there are differences between males and females. To analyze the gender effect on multiple intelligence types, the study is conducted with 385 female and 294 male co-twins, and 11 female and 22 male triplet siblings. At the end of the study, it is seen that there are significant differences between female and male co-twins on verbal/linguistic, musical, inter-personal and mathematical/logical intelligences. The results are as they are expected. Female co-twins have significantly higher mean scores than male co-twins on verbal/linguistic intelligence, musical intelligence and inter-personal intelligence. Additionally, the only subject that male students have significantly higher mean scores than female students is mathematical/logical intelligence. However, in triplets, there is no significant difference in terms of gender factor in multiple intelligence.

The results related to gender are consistent with other twin studies in the literature. For example, Bratko (1996) supports the results of the present study demonstrating that female co-twins have higher mean scores than male co-twins on word fluency, whereas male co-twins have higher mean scores than female co-twins on visualisation and spatial orientation. DiLalla (2006) finds that male co-twins are significantly more aggressive than female co-twins, a result which might be related to the fact that male co-twins do not develop their inter-personal/social intelligences whereas female co-twins do. In another twin study, Tüyel (2011) finds that female co-twins' attention scores are higher than male co-twins. While Mosing and et al (2014) find the significant effect on musical intelligence for males scoring higher than females on Pitch, they find no gender difference in rhythm and melody. Besides supporting our results, there are also some studies where no significant difference is found between genders. For example,

Åkerman and Suurvee (2003) find no significant difference between 16-year-old male co-twins and female co-twins in their verbal, numerical and spatial test scores.

Since there are limited studies about multiple children's multiple intelligence types, they are tried to be compared to other multiple intelligence studies. Göğebakan (2003) finds significant differences in musical intelligence in favor of female students whereas at mathematical/logical intelligence for male students. However, she does not find any significant gender differences in verbal/linguistic and inter-personal/social intelligence. Tirri and Komulainen (2002) find similar results among preadolescent boys who have higher mean scores in mathematical/logical intelligence than girls whereas females have higher mean scores at verbal/linguistic intelligence than the males in their both studies (Tirri, K., Komulainen, Nokelainen & Tirri, H., 2002). Teele (2000) also finds similar findings, supporting our and prior results, male students have higher mean scores at mathematical/logical and spatial/visual intelligence than female students as 4^{th} graders whereas female students have higher mean scores at verbal/linguistic intelligences than male students at each grade level (1^{st}, 4^{th}, 7^{th}, 9^{th}, 12^{th}). Female students also have higher scores at inter-personal/social intelligence than male students as in our study. Kaur (2014) also finds higher scores at musical intelligence, mathematical/logical intelligence, kinesthetic/bodily intelligence and nature intelligence in favor of girls at the 8^{th} and 9^{th} grade levels.

The results of the study are similar with Filiz (2010); she demonstrates that female students have higher mean scores at verbal/linguistic intelligence, musical intelligence, and inter-personal intelligence whereas male students have higher mean scores at intra-personal/individual intelligence and mathematical/logical intelligence among primary school students. Çamurcu (2007) also finds in her nontwin study that female students are significantly better than male students at verbal/linguistic intelligence, musical intelligence, spatial/visual intelligence and inter-personal/social intelligence at the 6^{th}, 7^{th} and 8^{th} grade levels. However, male students are better than female students at mathematic/logical intelligence in her study and in Avanoğlu's (2006) study. Karakurt (2012) and Kabataş (2006) (although, their studies are not related to twins and triplets, and the participants are at 6^{th}, 7^{th} and 8^{th} grade levels) find similar results as those in the present study that male students are significantly better than females at mathematical

intelligence. However, females are significantly better at spatial/visual intelligence in the same studies. In Pakdemir and Akyol's study (2011), it is seen that there is a significant relation between gender factor and multiple intelligence types and that female students (at 5th grade levels) are significantly better at kinesthetic/bodily, musical and inter-personal/social intelligence than male students.

Hyde and Linn (1988) find no difference at verbal/linguistic intelligence difference between girls and boys (among 165 studies). In one of her studies (Hyde et al., 1990), they mention that there is no large difference at math performance levels in terms of gender factor (among 100 studies). Harris et al. (2007) find no significant interaction among the students' multiple intelligence mean scores according to gender factor.

4.8.5 Discussion of the Findings Related to Influence of the Grade Level Factor on Multiple Children's Multiple Intelligence Types

The fourth research question is to analyze the grade level factor on multiple intelligence types of co-twins and triplet siblings. Grade level develops depending on cognitive and biological development. In the study, it is expected that higher grade levels would have higher mean scores in multiple intelligence. The study is limited to 1st – 6th grade levels that represent Piaget's concrete operational period. In the study, 87 co-twins and three triplet siblings are 1st graders, 127 co-twins and 12 triplet siblings are 2nd graders, 138 co-twins and six triplet siblings are 3rd graders, 136 co-twins and six triplet siblings are 4th graders, 75 co-twins and three triplet siblings are 5th graders and 116 co-twins and three triplet siblings are 6th graders. In the study, it is found that 5th graders have significantly higher scores than 1st graders at mathematical/logical intelligence. At kinesthetic/bodily intelligence, same as in mathematical intelligence, 5th graders have significantly higher mean scores than 1st graders and 2nd graders. At intra-personal/individual intelligence, older participants' (4th, 5th and 6th graders') mean scores are significantly higher than lower grade levels (1st grade). At nature intelligence, 3rd, 4th and 5th graders have significantly higher mean scores than other graders. In triplet siblings, it is observed that there is a significance difference between spatial/visual intelligence and grade levels; 6th, 5th and 4th graders have significantly better spatial/visual intelligence mean score than 1st graders.

Supporting our results in which higher graders have higher mean scores, Webbink et al. (2008) also find that 4th grader twins have higher mean scores in language and arithmetic tests than 2nd grade level twins. Bratko (2008) finds that older graders have higher word fluency and visualization mean scores than younger graders. Similar, nontwin higher graders are seen that they have significantly higher mean scores at kinesthetic/bodily intelligence and intra-personal/individual intelligence. However, in mathematical/logical intelligence (primary graders have higher mean scores than high school graders) in Teele's (2000) study. Edmond et al. (2008) find similar results in their study that older participants have better visual performances than younger participants. However, their age span is between 7 and 17 years old and they analyze their cognitive abilities. Tirri and Nokelainen (2008) also find that higher graders have higher mean scores than youngers.

Shaikh et al. (2016) find higher mean scores in favor of higher (9th) graders at kinesthetic/bodily intelligence, inter-personal/social intelligence, intra-personal/individual intelligence, musical intelligence, nature and existential intelligence than younger (7th) graders. As in Shaikh's study, Karakurt (2012) reports that there is a significant relation between multiple intelligence and grades. At verbal, mathematic/logical, inter-personal/social, kinesthetic/bodily and intra-personal/individual intelligences, 7th graders have higher mean scores than others. At nature intelligence, 6th graders are found better than others. Çamurcu (2007) finds significant difference only at kinesthetic/bodily intelligence between 6th graders and 8th graders. It is in favor of 8th graders. In contrast, Filiz (2010) cites that 6th graders have higher mean scores than 8th graders in their multiple intelligence tests.

Konur (2010) finds no significant relation between verbal/linguistic, mathematical/logical and intra-personal/social intelligence, and grade level factor. However, the significant relation is found between inter-personal/social intelligence (at 4th graders), spatial/visual intelligence (at 5th graders), musical intelligence (at 5th graders), kinesthetic/bodily intelligence (at 4th graders), nature intelligence (at 4th graders) and grade level factor. Our triplet students' findings (except spatial intelligence) are similar with Göğebakan's study (2003); she also finds no significant interaction

among the students' multiple intelligence mean scores according to grade level factor (participants are at the 1st, 3rd, 5th and 8th grade levels).

5. CONCLUSION and SUGGESTIONS

5.1 Conclusion

The purpose of the study is to investigate multiple children's (co-twins and triplet siblings) multiple intelligence types in Turkish context and to find out how they differ in terms of birth order, zygote type, gender, and grade level factors.

The study is conducted in 42 state schools in Esenler district during the Spring term of 2014-2015 and the Fall term of 2015-2016 academic years with 679 co-twins and 33 triplet siblings who are between the 1st grade and 6th grade levels that represent the Piaget's concrete operational period. The multiple intelligence scale is inspired from Shearer (2007) and modified using the statements in the article by the researcher for multiple children in a 5-point Likert scale version. After the application of the scale, the results are analyzed using Cronbach's alpha, Pearson, t-test, ANOVA, Levene, Post-hoc analysis.

The results of the study are as follow:

- The highest mean scores are seen as nature, verbal/linguistic and inter-personal/social intelligence both among co-twins and triplet siblings. Whereas, the lowest mean scores are seen in mathematical/logical, musical and spatial/visual intelligences both among co-twins and triplet siblings.
- The birth order factor is analyzed in co-twins and triplet siblings and it is found that there is no significant relation between birth order and multiple intelligence types.
- Zygote type (identical/MZ or fraternal/DZ twin) effect on multiple intelligence is analyzed among co-twins and significant differences are found at verbal/linguistic intelligence and musical intelligence in favor of fraternal/DZ co-

twins. Since the zygote type is not considered in triplet siblings, it is not analyzed among triplet siblings.

- The gender factor is analyzed and it is found that there is a significant relation between genders of multiple children and their multiple intelligence scores. Significant differences are seen at verbal/linguistic intelligence, inter-personal/social intelligence, musical intelligence and mathematical/logical intelligence. The results are as expected: female co-twins have significantly higher mean scores at verbal/linguistic intelligence, inter-personal intelligence, and musical intelligence; whereas male co-twins have higher mean scores at mathematical/logical intelligence. The gender difference does not have any significant effect on multiple intelligence of triplet siblings.
- When grade level factor is analyzed in co-twins, it is seen that there is no significant relation between kinesthetic/bodily intelligence, mathematical/logical intelligence, intra-personal/individual intelligence and nature intelligence, and the grade levels. It was expected that higher mean scores might be seen in higher grade levels. As a result, it is found that at kinesthetic/bodily intelligence, 5^{th} graders have significantly higher mean scores than 1^{st} and 2^{nd} graders. At mathematical/logical intelligence, 5^{th} graders have higher mean scores than 1^{st} graders. At intra-personal/individual intelligence, 3^{rd}, 4^{th}, 5^{th} and 6^{th} graders have significantly higher mean scores than 1^{st} and 2^{nd} graders. Among triplet siblings, 4^{th}, 5^{th} and 6^{th} graders have significantly higher spatial/visual intelligence scores than 1^{st} graders.

5.2 Suggestions

From the obtained results, there might be some suggestions related to pedagogical implications of the study and further research.

The suggestions for the pedagogical implications;

- In co-twins and triplets siblings, it is seen that nature intelligence, verbal/linguistic intelligence and inter-personal/social intelligence have higher mean scores whereas musical intelligence, spatial/visual intelligence and

mathematical/logical intelligence have lower mean scores. As a result, educators should spend time for nature, animals, and plants during their classes and encourage naturalist children to prove themselves in the classes. Teachers can apply topic-based curriculum to encourage naturalist students. The topics can consist of things that are related to nature. In addition, families of multiple children are suggested also spend time with their children at outdoor places.

- It is known that language delay or twin language is seen among multiple children. Hence, families at home and teachers at school should encourage multiple children to develop their verbal/linguistic abilities individually.
- Since multiple children might good at inter-personal/social relations. As a result, they can be encouraged to participate in cooperative activities. They can also be motivated to choose public relations as a profession.
- The least developed intelligences (musical and spatial) should be encouraged among multiple children. These two intelligences require special talent; if they have it then they should be encouraged so that they might be more successful during their educational lives. However, if they are not encouraged, these intelligences can diminish or disappear. As scientists mention, musical intelligence comes genetically. Thus, it is expected to see these special talents in identical/MZ twins rather than fraternal/DZ twins; however, the difference is seen among fraternal/DZ twins. The families and teachers of identical/MZ twins should encourage these children if they have high musical intelligence. Music chorus, music band or visual art classes or courses that they can attend individually or together can be good alternatives for multiple children.
- Multiple children are likely to be behind their peers but they catch them up in later ages. As a result, they might not be good at mathematical/logical intelligence during the concrete operational period. However, they might be more successful after this period (formal operational period). Teachers and families should keep that in mind, be patient and support them.
- The first born child in twins or triplets can have a higher IQ score than hir sibling(s). Although IQ difference labels children, multiple intelligence gives

every child the opportunity to prove hirself. Hence, the teachers who deal with multiple children should include MIT in their curriculum and keep in mind that each twin or triplet sibling is special, and that they can demonstrate themselves in eight or nine types of intelligence. Teachers also should get in touch with families about these children's strongest and weakest multiple intelligences so that they do not compare them as a hardworking or lazy ones

- There are two types of twins (identical/MZ twins and fraternal/DZ twins). Since identical/MZ twins look like each other more than fraternal/DZ twins, they might be assumed to be two-in-one. Of course, this is not only related to their appearance but also their biological and physical development sharings. As a result, more similarities can be seen among identical/MZ twins than fraternal/DZ twins. Considering this, families and educators should give identical/MZ twins much more opportunities to develop their individualities. The differences among identical/MZ twins and fraternal/DZ twins can be seen in verbal/linguistic intelligence in favor of fraternal/DZ twins. Multiple children's language development is an essential issue. Twin language seen more in identical/MZ twins, is a language that is created among themselves and sometimes other people do not understand. The effect of twin language can be seen more at early ages. If it continues in older ages, it can cause communication problems in their social relations. If necessary, pronunciation therapy can be taken from professionals. If twins, triplets or one/two of them have higher linguistic intelligence, there should not be one who is always the spokesperson; they should know how to handle their problems individually. Families and educators can pay attention to their reading and listening skills individually. The weak one/s should be supported and the strong one/s should be encouraged.
- Twins can be in same-sex (female-female, male-male) or opposite-sex (female-male). It is also true for triplets; three males or three females are seen as same-sex and two males- a female or two females-a male are seen as opposite-sex in triplets. As a result of the gender effect, many differences can be seen not only in multiple children's educational lives but also in their social lives. Generally, it is said that females are good at verbal/linguistic abilities whereas males are good at

mathematical/logical abilities. This generalization is approved in the present study; female co-twins have significantly higher mean scores at verbal/linguistic intelligence, inter-personal intelligence and musical intelligence whereas males' higher mean scores are seen in mathematical/logical intelligence. Families and educators should take the gender effect into consideration. They should not compare them, not only physically but also mentally, because their mental and physical development can change depending on their genders. Females can get into puberty earlier than males, males can develop physically earlier or they can be heavier than females. Beside these differences, biased behaviors can have an essential role on gender differences. Females are generally encouraged to verbal/linguistic or inter-personal/social professions whereas males are encouraged to kinesthetic/bodily or mathematical/logical professions. In our culture, musical abilities, talents are not given enough importance.

- It is seen that female co-twins have higher mean scores at musical intelligence. Thus, each child should be encouraged according to their talents, abilities, and tendencies.
- For linguistic/verbal intelligence, linguistic problems like language delay can be seen more among male-male co-twins than female-female co-twins. Thus, the parents and educators should encourage male-male twins' language skills individually and prevent the language problems among male-male twins.
- Children develop both mentally and physically. These developments occur depending on the age factor. When children get older, their cognitive development also increases. Since twins are born earlier, sometimes premature, it is said that they can follow their peers in a small difference. This point should be kept in mind and both families and educators should not compare them with their peers mentally and physically, they should be patient and wait for them to complete their developmental processes. In the study, it is seen that older children's mean scores are higher than younger children.
- At nature intelligence, kinesthetic/bodily intelligence, mathematical/logical intelligence and intra-personal intelligence, older co-twins are more successful

than the youngers. Again for families and educators, when children get older especially reaching puberty, they might develop their intra-personal intelligence by listening to themselves and developing their inner thoughts. At this point, they should be respected, given time to spend time by themselves, encouraged to express their thoughts somehow: writing, singing or drawing. Children should be given enough time to spend time in nature. While they are dealing with nature, they also develop their kinesthetic/bodily intelligence, intra-personal/individual intelligence. To have a healthy puberty and end it in a healthy way might depend on spending time in nature and on doing physical activities. Children who are at concrete operational period should be encouraged to do physical activities, go to sports centers or sports areas.

- Multiple intelligence environments should be created both at home and at school for children. Instead of preparing for the exams (answering verbal, mathematical multiple choice tests) children should be encouraged to use or develop not only two intelligences (generally verbal and mathematical intelligence are given the priority) but also all nine intelligences.
- During the research, it is seen that both educators and parents of multiple children are curious. Educational programs, courses, and seminars should be organized for them. The government should have special institutions for multiple children and their families and support them scientifically and financially.
- It is observed that twin and triplet students are happy to come together in special activities that are prepared only for them. The school administrators, MEB and the government should organize special activities for multiple children so that they show their feelings, talents, and interests.

Suggestions for further research;

- This study analyzes multiple children's, multiple intelligence types in Turkish context and Piaget's concrete operational period of cognitive development is taken as the age limit. It might be beneficial to apply the study in Piaget's (1964) other periods; pre-operational period (from age 2 to age 7), and formal operational period (from age 11 onwards) among twins and triplets.

- The scale, which is inspired from Shearer's (2007) "Multiple Intelligences Development Assessment Scales (MIDAS)" model, is modified by the researcher for twins and triplets. The scale's reliability scores might be developed and another scale might be prepared especially for twins and triplets at Piaget's other two periods; pre-operational and formal operational period. Then follow-up and comparative studies might be conducted.
- The subjects of the study are from the district of Esenler (2013), which receives many immigrants from other cities and which has many problems about education. The socio-economic rates of the subjects might affect their multiple intelligence preferences, rates, and types. The results of the study might be beneficial for Esenler Municipality to organize some activities and programs for twins, triplets and their families. In addition, similar studies can be conducted in other districts to compare the results.
- The study might be conducted in richer districts and then the results might be compared to find the effect of multiple children's families' welfare level on their multiple intelligence types. No subjects are found in private schools in Esenler. As a result, the same study can be applied in multiple children who are educated in private schools to find the effect of school factor (state or private) on multiple intelligence types of multiple children.
- Multiple intelligence types in same-sex (female-female, male-male) and in opposite sex (male-female) can be compared and the effect of co-twin cooperation can be studied. The same study can be applied in triplets: three males, three females, two males-a female, two females-a male and then comparative studies can be conducted.
- In multiple children, intra-personal/individual and inter-personal/social intelligences should be analyzed, and problems and solutions should be given as a further study. In addition, multiple children's emotional intelligence should be analyzed and compared with singletons.
- During the research, it is seen that there is a considerable amount of multiple children. However, their statistical data is not recorded by official institutions. Beside their total numbers, the number of identical/MZ and fraternal/DZ twins

should be recorded. As a result, fruitful comparative researches in terms of districts can be done.

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APPENDICES

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APPENDIX 1

Istanbul National Education Directorate Permission

T.C.
İSTANBUL VALİLİĞİ
İl Millî Eğitim Müdürlüğü

Sayı : 59090411/44/2984564 18/03/2015
Konu: Araştırma İzni

Sayın: Özlem Pakize ŞİNİK

İlgi: a) 12.03.2015 tarihli dilekçe.
b) Valilik Makamının 17.03.2015 tarih ve 2938871 sayılı oluru.

"İkiz Üçüz Çocuklarda Çoklu Zeka Değerlendirmesi" konulu tezinize dair araştırma çalışmanız hakkındaki ilgi (a) dilekçeniz ilgi (b) valilik onayı ile uygun görülmüştür.

Bilgilerinizi ve araştırmacının söz konusu talebi; bilimsel amaç dışında kullanılmaması, ***uygulama sırasında bir örneği müdürlüğümüzde muhafaza edilen mühürlü ve imzalı veri toplama araçlarının uygulanması,*** katılımcıların gönüllülük esasına göre seçilmesi, araştırma sonuç raporunun müdürlüğümüzden izin alınmadan kamuoyuyla paylaşılmaması koşuluyla, gerekli duyurunun araştırmacı tarafından yapılmasını, okul idarelerinin denetim, gözetim ve sorumluluğunda, eğitim -öğretimi aksatmayacak şekilde ilgi (b) Valilik Onayı doğrultusunda işlem bittikten sonra 2 (iki) hafta içinde sonuçtan Müdürlüğümüz Strateji Geliştirme Bölümüne rapor halinde bilgi verilmesini rica ederim.

Murat ADALI
Şube Müdürü

EK:1- Valilik Onayı
2- Ölçekler
3- Okul Listesi

Elektronik İmzalı Aslı Sistemimizde Mevcuttur
Adı Soyadı : Mualla ÇELEBİ
Ünvanı : Bölüm Şefi
Tarih :
İmza :

İl Milli Eğitim Müdürlüğü D/Blok Bab-ı Ali Cad. No:13 Cağaloğlu
E-Posta: sgb34@meb.gov.tr

A. BALTA VHKİ
Tel: (0 212) 455 04 00-239
Faks: (0 212)455 06 52

APPENDIX 2

Istanbul National Education Directorate Permission

T.C.
İSTANBUL VALİLİĞİ
İl Millî Eğitim Müdürlüğü

Sayı : 59090411/20/2938871 17/03/2015
Konu: Özlem Pakize ŞİNİK

VALİLİK MAKAMINA

İlgi:a) 12.03.2015 tarihli dilekçe.
b) MEB. Yen. ve Eğ. Tek. Gn Md. 07.03.2012 tarih ve 3616 sayılı 2012/13 nolu gen.
c) Milli Eğitim Araştırma ve Anket Komisyonunun 16.03.2015 tarihli tutanağı.

İstanbul Aydın Üniversitesi Sosyal Bilimler Enstitüsü doktora programı öğrencisi Özlem Pakize ŞİNİK'in ***"İkiz, Üçüz Çocuklarda Çoklu Zeka Değerlendirmesi"*** konulu tezine dair araştırma çalışmasını ilimiz Esenler içesinde bulunan tüm resmi/özel ilk ve orta okullarda; çoğul çocuklar hakkında genel bilgi formu, çoklu çocuklarda çoklu zeka kuramı değerlendirme ölçeğini uygulama istemi hakkındaki ilgi (a) dilekçe ve ekleri Müdürlüğümüzce incelenmiştir.

Araştırmacının; söz konusu talebi; bilimsel amaç dışında kullanılmaması, uygulama sırasında bir örneği müdürlüğümüzde muhafaza edilen mühürlü ve imzalı veri toplama araçlarının uygulanılması, katılımcıların gönüllülük esasına göre seçilmesi, araştırma sonuç raporunun müdürlüğümüzden izin alınmadan kamuoyuyla paylaşılmaması koşuluyla, okul idarelerinin denetim, gözetim ve sorumluluğunda, eğitim -öğretimi aksatmayacak şekilde ilgi (b) Bakanlık emri esasları dâhilinde uygulanması, sonuçtan Müdürlüğümüze rapor halinde (CD formatında) bilgi verilmesi kaydıyla Müdürlüğümüzce uygun görülmektedir.

Makamlarınızca da uygun görülmesi halinde olurlarınıza arz ederim.

Dr. Muammer YILDIZ
Milli Eğitim Müdürü

OLUR
17/03/2015

Yusuf Ziya KARACAEV
Vali a.
Vali Yardımcısı

Ek:1- Genelge
2- Komisyon Tutanağı

İl Milli Eğitim Müdürlüğü D/Blok Bab-ı Ali Cad. No:13 Cağaloğlu
E-Posta: sgb34@meb.gov.tr

A. BALTA VHKİ
Tel: (0 212) 455 04 00-239
Faks: (0 212)455 06 52

APPENDIX 3

The Ethical Approval by Istanbul Aydın University Ethic Committee

TÜRKİYE CUMHURİYETİ
İSTANBUL AYDIN ÜNİVERSİTESİ

THE REPUBLIC OF TURKEY
ISTANBUL AYDIN UNIVERSITY

SOSYAL BİLİMLER ENSTİTÜSÜ

Sayı:B.30.2.AYD.0.41.00.00/0 20-939

09.06.2015

Konu: ANKET

Sayın Özlem Pakize ŞİNİK

Enstitümüz Y1112.620007 numaralı İngiliz Dili ve Edebiyatı Ana Bilim Dalı İngiliz Dili ve Edebiyatı Doktora programı öğrencilerinden Özlem Pakize ŞİNİK' in "MULTIPLE INTELLIGENCES IN MULTIPLES" adlı tez çalışması gereği "Çoklu Çocuklarda Çoklu Zeka Kuramı Değerlendirme Ölçeği" ve "İkiz, Üçüz Aileleri Bilgi Edinme Formu" anketlerini 7-12 yaş aralığındaki ikiz, üçüz öğrencilere uyguladığı anket ve ölçeklerin 09.03.2015 tarih ve 2015/02 İstanbul Aydın Üniversitesi Etik Komisyon Kararı ile etik olarak uygun olduğuna karar verilmiştir.

Bilgilerinize rica ederim.

Yrd. Doç. Dr. Çiğdem ÖZARI
Enstitü Müdür V.

APPENDIX 4

The Questionnaire Permission that approved by Istanbul Aydın University

TÜRKİYE CUMHURİYETİ
İSTANBUL AYDIN ÜNİVERSİTESİ

THE REPUBLIC OF TURKEY
ISTANBUL AYDIN UNIVERSITY

REKTÖRLÜK
Sayı : B.30.2.AYD.0.00.00-500/1195
Konu : Özlem Pakize ŞİNİK'in Anket Uygulaması Hk.

13/03/2015
İstanbul

T.C.
İSTANBUL VALİLİĞİ
İL MİLLİ EĞİTİM MÜDÜRLÜĞÜNE

Üniversitemiz Sosyal Bilimler Enstitüsü Y1112.620007 numaralı İngiliz Dili ve Edebiyatı Ana Bilim Dalı İngiliz Dili ve Edebiyatı lisans sonrası doktora programı öğrencilerinden **Özlem Pakize ŞİNİK**'in "MULTIPLE INTELLIGENCES IN MULTIPLES" adlı tez çalışması gereği "Çoklu Çocuklarda Çoklu Zeka Kuramı Değerlendirme Ölçeği" ve "İkiz, Üçüz Aileleri Bilgi Edinme Formu" ile ilgili anketi İstanbul ili Esenler İlçesi Milli Eğitime bağlı devlet, özel ilkokul ve ortaokullarda öğretim gören 7-12 yaş aralığındaki ikiz, üçüz öğrencilere uygulamak istemektedir.

Adı geçen doktora öğrencisine yapacağı anket çalışmaları için izin verilmesini saygı ile arz ederim.

Prof. Dr. Mustafa ÇIKRIKÇI
Rektör Vekili

EKLER:
Ek.1 Dilekçe
Ek.2 Tez Önerisi
Ek.3 Çocuklarda Çoklu Zekâ Kuramı Değerlendirme Ölçeği
Ek.4 İkiz, Üçüz Aileleri Bilgi Edinme Formu
Ek.5 Veli Onay Mektubu
Ek.6 Anket ve Araştırma İzin Komisyonu Araştırma Ön İnceleme Formu
Ek.7 Kurum Listesi

Büyükçekmece Mah. İnönü Cad. No:38 Sefaköy, 34295 Küçükçekmece / İSTANBUL
www.aydin.edu.tr | 444 1 428

APPENDIX 5

The Multiple Children: Twin and Triplet Birth Rate from 2002 through 2009 that were given by General Directorate of Civil Registration and Nationality

T.C.
İÇİŞLERİ BAKANLIĞI
Nüfus ve Vatandaşlık İşleri Genel Müdürlüğü

K-Q TSE-ISO-EN 9000

Sayı : 92395685-522-E.91787 22/10/2015
Konu : Bilgi Edinme

Sayın: Özlem Pakize ŞİNİK
Beşyol Mah.İnönü Cad.
No:38 K blok3.kat 7406 Nolu Ofis
İstanbul Aydın Üniversitesi Kampüsü
İSTANBUL

28.09.2015 tarihli Bilgi Edinme başvuru formunuz incelenmiştir.

Başvurunuzla çoğul doğumlara ilişkin istemiş olduğunuz bilgiler CD ortamında yazımız ekinde gönderilmiştir.

Bilgilerinizi rica ederim.

Orhan AKKAYA
Genel Müdür a.
Daire Başkanı

EK: CD (1 adet)

*Bu belge elektronik imzalıdır. İmzalı suretinin aslını görmek için https://www.e-icisleri.gov.tr/BelgeDogrulama adresine şifrenek [illegible] kodunu yazınız.

Çankaya Mh. 4CR Cd. No:136 Tlf:06200 Yenimahalle / Ankara
Telefon No: (312)691 21 97 Faks No: (312)397 19 82
e-Posta: İnternet Adresi: www.nvi.gov.tr

Bilgi için: İnci ŞAHİN
VERİ HAZIRLAMA VE KONT İŞLETMENİ
Telefon No:

APPENDIX 6

The Primary and Secondary School List in Esenler

Esenler İlçe Milli Eğitim Müdürlüğüne Bağlı Anketin Uygulanacağı Okullar

1- İSTANBUL - ESENLER - 125 Yıl Ortaokulu
2- İSTANBUL - ESENLER - Ayvalıdere Anaokulu
3- İSTANBUL - ESENLER - Ayvalıdere Ortaokulu
4- İSTANBUL - ESENLER - Atışalanı İsmetpaşa İlkokulu
5- İSTANBUL - ESENLER - Engin Can Güre İlkokulu
6- İSTANBUL - ESENLER - Öz-De-Bir Ortaokulu
7- İSTANBUL - ESENLER - Oruç Reis Ortaokulu
8- İSTANBUL - ESENLER - Ressam Şevket Dağ İlkokulu
9- İSTANBUL - ESENLER - Fatih İmam Hatip Ortaokulu
10- İSTANBUL - ESENLER - Ayvalıdere İlkokulu
11- İSTANBUL - ESENLER - Nine Hatun İmam Hatip Ortaokulu
12- İSTANBUL - ESENLER - Atatürk İlkokulu
13- İSTANBUL - ESENLER - Atışalanı Ortaokulu
14- İSTANBUL - ESENLER - Kemer İlkokulu
15- İSTANBUL - ESENLER - Neyyir Turhan Ortaokulu
16- İSTANBUL - ESENLER - Mareşal Fevzi Çakmak İlkokulu
17- İSTANBUL - ESENLER - Dr İlhami Faydagör Ortaokulu
18- İSTANBUL - ESENLER - Dr İlhami Faydagör İlkokulu
19- İSTANBUL - ESENLER - Oruç Reis İlkokulu
20- İSTANBUL - ESENLER - 50 Yıl Tuna İlkokulu
21- İSTANBUL - ESENLER - Aksoy Ortaokulu
22- İSTANBUL - ESENLER - Yunus Emre Ortaokulu
23- İSTANBUL - ESENLER - Esenler-Tacirler Özel Eğitim İş Uygulama Merkezi(Okulu)
24- İSTANBUL - ESENLER - Neyyir Turhan İlkokulu
25- İSTANBUL - ESENLER - Kazım Karabekir İlkokulu
26- İSTANBUL - ESENLER - Kazım Karabekir İmam Hatip Ortaokulu
27- İSTANBUL - ESENLER - Türk - İsveç Kardeşlik İlkokulu
28- İSTANBUL - ESENLER - Örfi Çetinkaya İlkokulu
29- İSTANBUL - ESENLER - Örfi Çetinkaya Ortaokulu
30- İSTANBUL - ESENLER - Birlik Ortaokulu
31- İSTANBUL - ESENLER - Cumhuriyet İlkokulu
32- İSTANBUL - ESENLER - Fidan Demircioğlu Ortaokulu
33- İSTANBUL - ESENLER - Engin Can Güre Ortaokulu
34- İSTANBUL - ESENLER - Yunus Emre İlkokulu
35- İSTANBUL - ESENLER - Hasip Dinçsoy İlkokulu
36- İSTANBUL - ESENLER - Menderes Ortaokulu
37- İSTANBUL - ESENLER - Türk - İsveç Kardeşlik Ortaokulu
38- İSTANBUL - ESENLER - Mehmet Akif Ersoy İlkokulu
39- İSTANBUL - ESENLER - Tacirler Eğitim Vakfı İlkokulu
40- İSTANBUL - ESENLER - Tacirler Eğitim Vakfı İmam Hatip Ortaokulu
41- Özel Esenler Gülten Nakipoğlu Fatih Koleji: İlkokul ve Ortaokul Bölümleri
42- Özel Devran Koleji: İlkokul ve Ortaokul Bölümleri

APPENDIX 7

Personal Information Form for Multiple Children's Families

İkiz, Üçüz Çocuk Sahibi Aileler Hakkında Bilgi Edinme Formu

_____ÇİFT

A- COĞUL ÇOCUKLAR HAKKINDA GENEL BİLGİ

Lütfen çocuklarınızla ilgili olarak bilgileri doğum sırasına göre (ilk doğandan başlayarak) A, B, C olarak yazınız.

***Çocuk A:** 1. Doğan Çocuk* ***Çocuk B:** 2. Doğan Çocuk* ***Çocuk C:** 3. Doğan Çocuk*

Çocuklarınızın Doğum Tarihleri Nedir? Gün/ Ay/Yıl: _____.

Çocuklarınızın Doğum yeri:_____.

Çocuklarınız doğduklarından itibaren aynı ilde mi yaşıyorlar? Evet/ Hayır (Hayır ise daha önce nerede yaşıyordunuz?)_____.

Çocuklarınızın cinsiyetleri nedir?_____.

İkiz Türleri Nedir? ***(Daire içine alınız).***

A-) Tek Yumurta İkizi

B-) Çift Yumurta İkizi

Tek Yumurta/ Çift Yumurta İkizi Olduklarını nereden biliyorsunuz? ***(Doğru cevabı daire içine alınız).***

A-) Kan gruplarımız aynı

B-) Kan gruplarımız farklı

C-) Doktorumuz söyledi

D-) DNA testi yaptırdık

Abi/Abla veya kardeşleri var mı? Kaç yaşında? _____.

B- DOĞUM HİKÂYELERİ

Çocuklarınız,

A-) Beklenen/planlı bebeklerdi.

B-) Sürpriz bebeklerdi.

Ailenizde ikiz geni bulunuyor mu? Ailenizde başka ikiz çocuklar da var mı?

A-) Evet

B-) Hayır

Çocuklarınız kaç haftalıkken doğdular? _____.

Çocuklarınız kaç dakika ya da kaç saat ara ile doğdular?_____.

İkizleriniz,

A-) Normal gebelik

B-) Tüp bebek

Doğum şekli nasıldı? ***(Daire içine alınız).***

A-) Sezaryen

B-) Normal Doğum

1

Yoğun bakımda kaldılar mı? Hayır/ Evet. Evet ise Ne kadar süre? _____.

Hangi çocuk ne kadar süre yoğun bakımda kaldı?

Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

Çocuklarınızın doğum kiloları neydi?

Çocuk A (1. Doğan)_____gr.

Çocuk B (2. Doğan) _____gr.

Çocuk C (3. Doğan) _____gr.

C- **SAĞLIK GELİŞİMLERİ**

- **Çocuklarınızın doğumdan kaynaklı sağlık sorunu bulunuyor mu?**
  - o Hayır.
  - o Evet. Nedir?_____.
- **Çocuklarınızda şu an itibari ile her hangi bir sağlık problemleri var mı? (Görme, İşitme, Konuşma problemi, Sara, Astım, Egzama, Alerji, vb.) Hangisinde?**

_____.

D- **SOSYAL GELİŞİMLERİ**

- **Çocuklarınıza siz mi baktınız? Bakıcı desteği aldınız mı? (Kimden?)**

_____.
- **Çocuklarınızı emzirdiniz mi? Mama ile mi beslediniz? Emzirdiyseniz, ne kadar süre emzirdiniz?**

_____.
- **Çocuklarınız, okul hayatından önce birbirlerinden ayrıldılar mı? Ne kadar süreliğine? Neden?**

_____.
- **Evde aynı odayı paylaşıyorlar.** ***(Daire içine alınız).*** Evet/ Hayır
- **Kıyafetleri kendilerine aittir.** ***(Daire içine alınız).*** Evet/ Hayır
- **İkizlerin arkadaş seçimleri aynıdır.** ***(Daire içine alınız).*** Evet/ Hayır

E- **KARDEŞ İLİŞKİLERİ**

- **İkizlerden yâda üçüzlerden baskın karakterde olan var mı? Hangisi,** ***daire içine alınız***
  Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)
- **Çocukların baskın olma durumu sırası ile değişiklik gösteriyor mu?** ***(Daire içine alınız).***
  Evet/ Hayır
- **Çoğullardan birisi, diğerinin daima daha iyi olduğunu düşünür? Hangisi?**
  Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)
- **İkizler+ kendi aralarında daima rekabet halindedirler. Hangileri arasında böyle bir rekabet var?** ***(Daire içine alınız).***
  Çocuk A (1. Doğan)- Çocuk B (2. Doğan)
  Çocuk B (2. Doğan)- Çocuk C (3. Doğan)
  Çocuk A (1. Doğan)- Çocuk C (3. Doğan)
- **İkizler+ daima birbirlerine destek olurlar.** ***(Daire içine alınız).*** Evet/ Hayır

F- **BENZERLİKLER VE FARKLILIKLAR**

İkizleriniz hangi yönden birbirlerine benziyorlar? ***(Daire içine alınız, birden fazla seçeneği işaretleyebilirsiniz)***

- o Fiziksel olarak
- o Sosyallik açısından
- o Duygusallık açısından
- o Dil gelişimi ve konuşma tarzı açısından
- o Beslenme açısından

Aşağıdaki sorularda sizin için doğru olanı daire içine alınız.

İkizleriniz aynı cinsiyette ise onları aynı mı giydiriyorsunuz? Evet/ Hayır

Saç kesimleri ve tarzları birbirine benzerdir. Evet/ Hayır

Çocuklarımın isimleri ritmiktir. Birbirine uyumludur. Ece-Efe gibi. Evet/ Hayır

Çocuklarım arasındaki fiziksel farklılıkların farkındayım. Evet/ Hayır

Çocuklarımın fiziksel gelişimleri birbirinden farklıdır. Evet/Hayır

Çocuklarımın zihinsel gelişimleri birbirinden farklıdır. Evet/Hayır

Çocuklarımın ruhsal gelişimleri birbirinden farklıdır. Evet/ Hayır

Kendi başına hayatını devam ettiremez. Yanında mutlaka ya kardeşi ya da biz olmalıyız. Hangisi? *Daire içine alınız.*

Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

İkizlerden+ biri ne yaparsa diğeri de aynısını yapar mı? Özellikle hangisi?

Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

Çocuklarımda dikkat dağınıklığı var. Hangisinde

Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

Çocuklarımda, birbirlerinden ayrılma ya da ikiz tekini kaybetme korkusu var? Hangisinde?

Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

G- **ÇOCUKLARIMIN EĞİTİMİ**

- **Hangisi sağ elini kullanıyor? (Daire içine alınız).**

Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

- **Hangisi SOL elini kullanıyor?**

Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

- **Kaç yaşında kreşe başladılar?**_____.
- **Kaç yaşında Anaokuluna başladılar?**_____.
- **Kaç yaşında ilkokula başladılar?**_____.
- **Anaokulunda aynı sınıfta mı eğitim aldılar. (Daire içine alınız)** Evet / Hayır
- **İlkokulda aynı sınıfta okudular.** Evet / Hayır
- **İlkokulda aynı sırada oturdular.** Evet / Hayır
- **Çocuklarıma toplu olarak hitap eder ve onlarla toplu olarak ilgilenirim.** Evet/ Hayır
- **Çoğul çocuklarımın yetenekleri ve ilgi alanları birbirinden farklıdır.** Evet/ Hayır
- **Çocuklarımın eğitimi ile yakından ilgilenirim.** Evet/ Hayır

H- **ÇOCUKLARIMIN ZEKA TÜRLERİ**

1- **Çocuklarım, dinleyerek ve yazarak öğrenir. Hangisi?**
Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

2- Çocuklarım, müzik ile uğraşmaktan keyif alırlar. Hangisi?
Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

3- Çocuklarım, matematik ile meşgul olmaktan hoşlanırlar. Hangisi?
Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

4- Çocuklarım, daha önce gittikleri yeri asla unutmazlar? Hangisi?
Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

5- Çocuklarım, bedensel faaliyetleri severler? Hangisi?
Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

6- Çocuklarım, bireysel olarak vakit geçirmeyi sever? Hangisi?
Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

7- Çocuklarımın arkadaş ilişkileri kuvvetlidir? Hangisi?
Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

8- Çocuklarım hayvanları, bitkileri ve doğayı sever? Hangisi?
Çocuk A (1. Doğan) Çocuk B (2. Doğan) Çocuk C (3. Doğan)

İ- <u>ANNE- BABA TANIMA</u>

- **Anne Doğum Yeri:**_____.
- **Annenin Memleketi Neresi?**_____.
- **Kaç yıldır İstanbul'da yaşıyorsunuz?**_____.
- **Anne Okul Mezuniyeti** *(Daire içine alınız).*
  İlkokul/ Orta Okul/ Lise/ Üniversite/ Yüksek Lisans/ Doktora
- **Baba Doğum Yeri:**_____
- **Babanın Memleketi Neresi?**_____.
- **Baba Kaç yıldır İstanbul'da yaşıyorsunuz?**_____.
- **Baba Okul Mezuniyet** *(Daire içine alınız).*
  İlkokul/ Orta Okul/ Lise/ Üniversite/ Yüksek Lisans/ Doktora
- **Anne Çalışıyor mu?** *(Daire içine alınız).* Evet / Hayır
- **Anne-baba evliliği devam ediyor mu?** Evet / Hayır
- **Evliliğiniz bittiğinde çocuklarınız kaç yaşındaydı?**_____.
- **Evliliğiniz bittiğinde çocuklarınız kaçıncı sınıfta okuyorlardı?**_____.
- **Anne- baba sağ mı?** *(Daire içine alınız).* Evet/ Hayır
- **Anne veya babanın ölümü gerçekleştiğinde, çocuklar kaçıncı sınıfta ve kaç yaşındaydı(lar)?**
  _____.
- **Aylık gelir seviyesi** *(Daire içine alınız).*
  - 1000-1500 TL
  - 1500-2000 TL
  - 2000-3000 TL
  - 3000+ TL

Bu bilgiler, sadece doktora tez çalışması için kullanılacaktır. 3. şahıslar ile paylaşılmayacaktır. Desteğiniz ve emekleriniz için teşekkür ederim.

Özlem Pakize ŞİNİK

APPENDIX 8

Multiple Intelligence Scale in Multiple Children (in Turkish) approved by Istanbul National Education Directorate and Istanbul Aydın University Ethic Committee

ÇOKLU ÇOCUKLARDA[1] ÇOKLU ZEKÂ KURAMI DEĞERLENDİRME ÖLÇEĞİ[2]

Çocuk A[3]; Cinsiyeti: Kız/ Erkek _____. ÇİFT İKİZ

İkiz Türü[4]: Tek Yumurta İkizi/ Çift Yumurta İkizi: _____

Kaçıncı Sınıf Öğrencisi: Doğum Yılı: Aynı sınıftalar/ Ayrı Sınıftalar

0=Hiçbir Zaman	1= Nadiren	2=Bazen	3= Genelde	4= Her zaman

ÇOKLU ÇOCUKLARDA DEĞERLENDİRİLMESİ GEREKEN ZEKÂ DAVRANIŞLARI	NİTELEMELER				
1- SÖZEL / DİLSEL ZEKÂ	**0**	**1**	**2**	**3**	**4**
1- Şiir, tekerleme, bilmece ve atasözlerini severim.	0	1	2	3	4
2- Konuşurken, düzgün ve tane tane konuşmaya dikkat ederim.	0	1	2	3	4
3- Masal ve hikâyeleri severim.	0	1	2	3	4
4- Dinlediğim şeyleri kolay kolay unutmam.	0	1	2	3	4
5- Yazı yazmayı severim.	0	1	2	3	
2- MÜZİKAL / RİTMİK ZEKÂ	**NİTELEMELER**				
1- Şarkı söylemekten keyif alırım.	**0**	**1**	**2**	**3**	**4**
2- Kendi kendime şiir yazarım.	0	1	2	3	4
3- Bir müzik sesi duyduğumda, şarkıya elimle, ayağımla eşlik ederim.	0	1	2	3	4
4- Bir müzik aleti çalmayı isterim.	0	1	2	3	4
5- Çalan müziğe uygun dans etmeyi severim.	0	1	2	3	4
3- MANTIKSAL / MATEMATİKSEL ZEKÂ	**NİTELEMELER**				
1- Toplama, çıkarma, çarpma ve bölme işlemlerini çözmekten hoşlanırım.	**0**	**1**	**2**	**3**	**4**
2- Matematik problemlerini, kalem kâğıt kullanmadan (kafamdan) çözebilirim.	0	1	2	3	4
3- Zekâ oyunlarını oynamayı severim.	0	1	2	3	4
4- Bilimsel deneyler yapmayı severim.	0	1	2	3	4
5- Bilgisayar gibi makinaların nasıl çalıştıklarını merak ederim.	0	1	2	3	4

[1] İkiz, Üçüz, Dördüz Çocukları ifade etmektedir.

[2] Bu Ölçek, Howard Gardner'ın "Çoklu Zekâ Kuramı, ZİHİN ÇERÇEVELERİ" kitabından ve Ph. D C. Branton Shearer'ın "Criterion Related Validity of The MIDAS Assessments" makalesinden yararlanılarak "Çoğul Çocuklar" için ayarlanmıştır. Zekâ sıralaması, Howard Gardner'ın "Çoklu Zekâ Kuramı, ZİHİN ÇERÇEVELERİ" kitabına göre yapılmıştır.

[3] A,B,C harfleri, çoğul çocukların doğum sırasını göstermektedir.

[4] Çoğul çocukların, anne karnında oluşumlarının göstergesidir. Zekâ konusunda önemli bir ölçüttür.

4- UZAMSAL ZEKÂ*	NİTELEMLER				
1- Resim yaparken ve giyinirken renklerin birbiri ile uyumlu olmasına özen gösteririm.	**0**	**1**	**2**	**3**	**4**
2- Tablo, harita ve grafikleri bir kez gördüğümde bir daha unutmam.	0	1	2	3	4
3- Daha önce gittiğim yerleri asla unutmam.	0	1	2	3	4
4- Rüyalarımı en ince ayrıntılarına kadar hatırlarım.	0	1	2	3	4
5- Elime geçen malzemeler ile yeni yeni ürünler tasarlamayı severim.	0	1	2	3	4
5- BEDENSEL / KİNESTETİK ZEKÂ	**NİTELEMELER**				
1- Spor derslerini severim.	**0**	**1**	**2**	**3**	**4**
2- Sessiz sinema gibi oyunlar oynamayı severim.	0	1	2	3	4
3- Koşma, yüzme, tiyatro, bale ve dans gibi sportif etkinliklere ilgi duyarım.	0	1	2	3	4
4- El sanatları gibi etkinlikler ile uğraşmayı severim.	0	1	2	3	4
5- Konuşurken beden dilimi (elimi, kolumu, mimiklerimi) kullanırım.	0	1	2	3	4
6- KİŞİSEL / İÇSEL ZEKÂ	**NİTELEMELER**				
1- Kendimi tanıyorum: Zayıf ve güçlü özelliklerimi biliyorum.	**0**	**1**	**2**	**3**	**4**
2- Kendi kendime vakit geçirmeyi severim.	0	1	2	3	4
3- Kendi işimi kendim yaparım.	0	1	2	3	4
4- Kendime ait ödevlerimi ve görevlerimi yerine getirme konusunda iyiyimdir.	0	1	2	3	4
5- Geleceğime yönelik hedeflerimi belirledim.	0	1	2	3	4
7- KİŞİLERARASI ZEKÂ	**NİTELEMELER**				
1- Arkadaşlarımla birlikte vakit geçirmeyi severim.	**0**	**1**	**2**	**3**	**4**
2- Arkadaşlarımın kendilerini nasıl hissettiklerini tahmin edebilirim.	0	1	2	3	4
3- Bir etkinlik- gezi- toplantı organize etmeyi severim.	0	1	2	3	4
4- Arkadaşlarımın sorunları olduğunda onlarla ilgilenirim.	0	1	2	3	4
5- Arkadaşlarım, benimle vakit geçirmekten keyif alırlar.	0	1	2	3	4
8- DOĞA ZEKÂSI	**NİTELEMELER**				
1- Doğada vakit geçirmeyi seviyorum.	**0**	**1**	**2**	**3**	**4**
2- Hayvanların dünyalarını: yaşam, üreme ve beslenme şekillerini merak ederim.	0	1	2	3	4
3- Belgesel filmleri zevkle izlerim.	0	1	2	3	4
4- Bir evcil hayvana sahip olmayı isterim.	0	1	2	3	4
5- Bir bitki yetiştirmek isterim.	0	1	2	3	4

***Görsel Zekâ olarak yer verilmemiştir. Kuramın babası olan Howard Gardner, Zihnin Çerçeveleri kitabında Uzamsal zekânın, görsel zekâ olarak isimlendirilemeyeceğini öne ürmüştür.**

ÇOKLU ÇOCUKLARDA ÇOKLU ZEKÂ KURAMI DEĞERLENDİRME ÖLÇEĞİ

Çocuk B: Cinsiyeti: Kız/ Erkek _____. ÇİFT İKİZ

İkiz Türü[5]: Tek Yumurta İkizi/ Çift Yumurta İkizi:

Kaçıncı Sınıf Öğrencisi: Doğum Yılı: Aynı Sınıftalar/ Ayrı Sınıftalar

0=Hiçbir Zaman	1= Nadiren	2=Bazen	3= Genelde	4= Her zaman

ÇOKLU ÇOCUKLARDA DEĞERLENDİRİLMESİ GEREKEN ZEKÂ DAVRANIŞLARI	NİTELEMELER				
1- SÖZEL / DİLSEL ZEKÂ	**0**	**1**	**2**	**3**	**4**
1- Şiir, tekerleme, bilmece ve atasözlerini severim.	0	1	2	3	4
2- Konuşurken, düzgün ve tane tane konuşmaya dikkat ederim.	0	1	2	3	4
3- Masal ve hikâyeleri severim.	0	1	2	3	4
4- Dinlediğim şeyleri kolay kolay unutmam.	0	1	2	3	4
5- Yazı yazmayı severim.	0	1	2	3	
2- MÜZİKAL / RİTMİK ZEKÂ	**NİTELEMELER**				
1- Şarkı söylemekten keyif alırım.	**0**	**1**	**2**	**3**	**4**
2- Kendi kendime şiir yazarım.	0	1	2	3	4
3- Bir müzik sesi duyduğumda, şarkıya elimle, ayağımla eşlik ederim.	0	1	2	3	4
4- Bir müzik aleti çalmayı isterim.	0	1	2	3	4
5- Çalan müziğe uygun dans etmeyi severim.	0	1	2	3	4
3- MANTIKSAL / MATEMATİKSEL ZEKÂ	**NİTELEMELER**				
1- Toplama, çıkarma, çarpma ve bölme işlemlerini çözmekten hoşlanırım.	**0**	**1**	**2**	**3**	**4**
2- Matematik problemlerini, kalem kâğıt kullanmadan (kafamdan) çözebilirim.	0	1	2	3	4
3- Zeka oyunları oynamayı severim.	0	1	2	3	4
4- Bilimsel deneyler yapmayı severim.	0	1	2	3	4
5- Bilgisayar gibi makinaların nasıl çalıştıklarını merak ederim.	0	1	2	3	4

[5] Çoğul çocukların, anne karnında oluşumlarının göstergesidir. Zekâ konusunda önemli bir ölçüttür.

4- UZAMSAL ZEKÂ*	NİTELEMELER				
1- Resim yaparken ve giyinirken renklerin birbiri ile uyumlu olmasına özen gösteririm.	0	1	2	3	4
2- Tablo, harita ve grafikleri bir kez gördüğümde bir daha unutmam.	0	1	2	3	4
3- Daha önce gittiğim yerleri asla unutmam.	0	1	2	3	4
4- Rüyalarımı en ince ayrıntılarına kadar hatırlarım.	0	1	2	3	4
5- Elime geçen malzemeler ile yeni yeni ürünler tasarlamayı severim.	0	1	2	3	4
5- BEDENSEL / KİNESTETİK ZEKÂ	**NİTELEMELER**				
1- Spor derslerini severim.	**0**	**1**	**2**	**3**	**4**
2- Sessiz sinema gibi oyunlar oynamayı severim.	0	1	2	3	4
3- Koşma, yüzme, tiyatro, bale ve dans gibi sportif etkinliklere ilgi duyarım.	0	1	2	3	4
4- El sanatları gibi etkinlikler ile uğraşmayı severim.	0	1	2	3	4
5- Konuşurken beden dilimi (elimi, kolumu, mimiklerimi) kullanırım.	0	1	2	3	4
6- KİŞİSEL / İÇSEL ZEKÂ	**NİTELEMELER**				
1- Kendimi tanıyorum: Zayıf ve güçlü özelliklerimi biliyorum.	**0**	**1**	**2**	**3**	**4**
2- Kendi kendime vakit geçirmeyi severim.	0	1	2	3	4
3- Kendi işimi kendim yaparım.	0	1	2	3	4
4- Kendime ait ödevlerimi ve görevlerimi yerine getirme konusunda iyiyimdir.	0	1	2	3	4
5- Geleceğime yönelik hedeflerimi belirledim.	0	1	2	3	4
7- KİŞİLERARASI ZEKÂ	**NİTELEMELER**				
1- Arkadaşlarımla birlikte vakit geçirmeyi severim.	**0**	**1**	**2**	**3**	**4**
2- Arkadaşlarımın kendilerini nasıl hissettiklerini tahmin edebilirim.	0	1	2	3	4
3- Bir etkinlik- gezi- toplantı organize etmeyi severim.	0	1	2	3	4
4- Arkadaşlarımın sorunları olduğunda onlarla ilgilenirim.	0	1	2	3	4
5- Arkadaşlarım, benimle vakit geçirmekten keyif alırlar.	0	1	2	3	4
8- DOĞA ZEKÂSI	**NİTELEMELER**				
1- Doğada vakit geçirmeyi seviyorum.	**0**	**1**	**2**	**3**	**4**
2- Hayvanların dünyalarını: yaşam, üreme ve beslenme şekillerini merak ederim.	0	1	2	3	4
3- Belgesel filmleri zevkle izlerim.	0	1	2	3	4
4- Bir evcil hayvana sahip olmayı isterim.	0	1	2	3	4
5- Bir bitki yetiştirmek isterim.	0	1	2	3	4

***Görsel Zekâ olarak yer verilmemiştir. Kuramın babası olan Howard Gardner, Zihnin Çerçeveleri kitabında Uzamsal zekânın, görsel zekâ olarak isimlendirilemeyeceğini öne ürmüştür.**

ÇOKLU ÇOCUKLARDA ÇOKLU ZEKÂ KURAMI DEĞERLENDİRME ÖLÇEĞİ

_____. ÇİFT İKİZ

Çocuk C:
İkiz Türü[6]: Tek Yumurta İkizi/ Çift Yumurta İkizi:
Kaçıncı Sınıf Öğrencisi:

Cinsiyeti: Kız/ Erkek

Doğum Yılı:

Aynı Sınıftalar/ Ayrı Sınıftalar

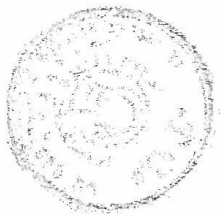
0=Hiçbir Zaman	1= Nadiren	2=Bazen	3= Genelde	4= Her zaman

ÇOKLU ÇOCUKLARDA DEĞERLENDİRİLMESİ GEREKEN ZEKÂ DAVRANIŞLARI	NİTELEMELER				
1- SÖZEL / DİLSEL ZEKÂ	**0**	**1**	**2**	**3**	**4**
1- Şiir, tekerleme, bilmece ve atasözlerini severim.	0	1	2	3	4
2- Konuşurken, düzgün ve tane tane konuşmaya dikkat ederim.	0	1	2	3	4
3- Masal ve hikâyeleri severim.	0	1	2	3	4
4- Dinlediğim şeyleri kolay kolay unutmam.	0	1	2	3	4
5- Yazı yazmayı severim.	0	1	2	3	
2- MÜZİKAL / RİTMİK ZEKÂ	**NİTELEMELER**				
1- Şarkı söylemekten keyif alırım.	**0**	**1**	**2**	**3**	**4**
2- Kendi kendime şiir yazarım.	0	1	2	3	4
3- Bir müzik sesi duyduğumda, şarkıya elimle, ayağımla eşlik ederim.	0	1	2	3	4
4- Bir müzik aleti çalmayı isterim.	0	1	2	3	4
5- Çalan müziğe uygun dans etmeyi severim.	0	1	2	3	4
3- MANTIKSAL / MATEMATİKSEL ZEKÂ	**NİTELEMELER**				
1- Toplama, çıkarma, çarpma ve bölme işlemlerini çözmekten hoşlanırım.	**0**	**1**	**2**	**3**	**4**
2- Matematik problemlerini, kalem kâğıt kullanmadan (kafamdan) çözebilirim.	0	1	2	3	4
3- Zeka oyunlar oynamayı severim.	0	1	2	3	4
4- Bilimsel deneyler yapmayı severim.	0	1	2	3	4
5- Bilgisayar gibi makinaların nasıl çalıştıklarını merak ederim.	0	1	2	3	4

[6] Çoğul çocukların, anne karnında oluşumlarının göstergesidir. Zekâ konusunda önemli bir ölçüttür.

4- UZAMSAL ZEKÂ*	NİTELEMELER				
1- Resim yaparken ve giyinirken renklerin birbiri ile uyumlu olmasına özen gösteririm.	0	1	2	3	4
2- Tablo, harita ve grafikleri bir kez gördüğümde bir daha unutmam.	0	1	2	3	4
3- Daha önce gittiğim yerleri asla unutmam.	0	1	2	3	4
4- Rüyalarımı en ince ayrıntılarına kadar hatırlarım.	0	1	2	3	4
5- Elime geçen malzemeler ile yeni yeni ürünler tasarlamayı severim.	0	1	2	3	4
5- BEDENSEL / KİNESTETİK ZEKÂ	**NİTELEMELER**				
1- Spor derslerini severim.	**0**	**1**	**2**	**3**	**4**
2- Sessiz sinema gibi oyunlar oynamayı severim.	0	1	2	3	4
3- Koşma, yüzme, tiyatro, bale ve dans gibi etkinliklere ilgi duyarım.	0	1	2	3	4
4- El sanatları gibi etkinlikler ile uğraşmayı severim.	0	1	2	3	4
5- Konuşurken beden dilimi (elimi, kolumu, mimiklerimi) kullanırım.	0	1	2	3	4
6- KİŞİSEL / İÇSEL ZEKÂ	**NİTELEMELER**				
1- Kendimi tanıyorum: Zayıf ve güçlü özelliklerimi biliyorum.	**0**	**1**	**2**	**3**	**4**
2- Kendi kendime vakit geçirmeyi severim.	0	1	2	3	4
3- Kendi işimi kendim yaparım.	0	1	2	3	4
4- Kendime ait ödevlerimi ve görevlerimi yerine getirme konusunda iyiyimdir.	0	1	2	3	4
5- Geleceğime yönelik hedeflerimi belirledim.	0	1	2	3	4
7- KİŞİLERARASI ZEKÂ	**NİTELEMELER**				
1- Arkadaşlarımla birlikte vakit geçirmeyi severim.	**0**	**1**	**2**	**3**	**4**
2- Arkadaşlarımın kendilerini nasıl hissettiklerini tahmin edebilirim.	0	1	2	3	4
3- Bir etkinlik- gezi- toplantı organize etmeyi severim.	0	1	2	3	4
4- Arkadaşlarımın sorunları olduğunda onlarla ilgilenirim.	0	1	2	3	4
5- Arkadaşlarım, benimle vakit geçirmekten keyif alırlar.	0	1	2	3	4
8- DOĞA ZEKÂSI	**NİTELEMELER**				
1- Doğada vakit geçirmekten keyif alırım.	**0**	**1**	**2**	**3**	**4**
2- Hayvanların dünyalarını: yaşam, üreme ve beslenme şekillerini merak ederim.	0	1	2	3	4
3- Belgesel filmleri zevkle izlerim.	0	1	2	3	4
4- Bir evcil hayvana sahip olmayı isterim.	0	1	2	3	4
5- Bir bitki yetiştirmek isterim.	0	1	2	3	4

***Görsel Zekâ olarak yer verilmemiştir. Kuramın babası olan Howard Gardner, Zihnin Çerçeveleri kitabında Uzamsal zekânın, görsel zekâ olarak isimlendirilemeyeceğini öne sürmüştür.**



PUANLAMA ÇİZELGESİ

SEÇENEKLER	HER BİR ALANDA ELDE EDİLEN TOPLAM PUAN	BU ZEKÂ ALANINDA GELİŞMİŞLİK DÜZEYİ
4= Her Zaman	16-20 Arası	Çok Gelişmiş
3= Genelde	12-15 Arası	Gelişmiş
2= Bazen	8-11 Arası	Orta Düzeyde Gelişmiş
1= Nadiren	4-7 Arası	Biraz Gelişmiş
0= Hiçbir zaman	0-3 Arası	Gelişmemiş

ÇOKLU ÇOCUKLARDA ÇOKLU ZEKÂ GELİŞMİŞLİK DÜZEYİ

	ÇOCUK A Zekâ Gelişmişlik Düzeyi						ÇOCUK B Zekâ Gelişmişlik Düzeyi						ÇOCUK C Zekâ Gelişmişlik Düzeyi					
ZEKÂ TÜRÜ	Puanı	Çok G.	Gelişmiş	Orta D. G.	Biraz G.	Geliş memiş	Puanı	Çok G.	Gelişm iş	Orta D. G.	Biraz G.	Geliş memiş	Puanı	Çok G.	Gelişm iş	Orta D. G.	Biraz G.	Geliş memiş
Sözel / Dilsel Z.																		
Müzikal / Ritmik Z.																		
Mantıksal / Matematiksel Zekâ																		
Uzamsal Zekâ																		
Bedensel / Kinestetik Zekâ																		
Kişisel / İçsel Zekâ																		
Kişilerarası Zekâ																		
Doğa Zekâsı																		

ÇOKLU ÇOCUKLARDA ÇOKLU ZEKÂ ORTAKLIĞI
Kutulara A/ B/ C Yazılacak.

ZEKÂ TÜRÜ	Çok Gelişmiş	Gelişmiş	Orta Düzede Gelişmiş	Biraz Gelişmiş	Gelişmemiş
Sözel/Dilsel Zekâ					
Müzikal / Ritmik Z.					
Mantıksal / Matematiksel Zekâ					
Uzamsal Zekâ					
Bedensel / Kinestetik Zekâ					
Kişisel / İçsel Zekâ					
Kişilerarası Zekâ					
Doğa Zekâsı					

ÇOKLU ÇOCUKLARDA ÇOKLU
ZEKÂ GELİŞMİŞLİK MİKTARI

Çoklu Zekâ Gelişmişlik Düzey Miktarı	Çocuk A	Çocuk B	Çocuk C
Çok Gelişmiş			
Gelişmiş			
Orta Düzeyde Gelişmiş			
Biraz Gelişmiş			
Gelişmemiş			

APPENDIX 9
The Photographs of Subjects: Twin and Triplet Students in Esenler District

14.05.2015

Yunus Emre Primary School Afternoon Students

14.05.2015

Yunus Emre Primary School Morning Students

01.06.2015

Mehmet Akif Ersoy Primary School Morning Students

01.06.2015

Mehmet Akif Ersoy Primary School Afternoon Students

01.06.2015

Turk- Isveç Kardeşlik Primary School Morning Students

01.06.2015

Turk- Isveç Kardeşlik Secondary School Students

12.10.2015

Ayvalıdere Secondary School Students

12.10.2015

Ayvalıdere Primary School Morning Students

12.10.2015

Ayvalıdere Primary School Afternoon Students

15.10.2015

Ressam Şevket Dağ Primary School Afternoon Students

19.10.2015

125. Yıl Secondary School Students

19.10.2015

Oz-de Bir Secondary School Students

19.10.2015

Menderes Secondary School Students

19.10.2015

Ressam Şevket Dağ Primary School Morning Students

26.10.2015

Oruç Reis Secondary School Students

26.10.2015

Örfi Çetinkaya Secondary School Students

26.05.2015

Tacirler Vakfı Imam Hatip Secondary School

26.05.2015

Tacirler Vakfı Primary School Afternoon Students

27.10.2016

Dr. İlhami Faydagör Primary School Students

27.10.2015

Hasip Dinçsoy Primary School Morning Students

27.10.2015

Hasip Dinçsoy Primary School Afternoon Students

28.05.2015

Fidan Demircioğlu Secondary School Students

28.05.2015

Tacirler Vakfı Imam Hatip Secondary School Students

28.05.2015

Tacirler Vakfı Primary School Morning Students

29.05.2015

Türk-Isveç Kardeşlik Primary School Morning Students

03.06.2015

Oruç Reis Primary School Afternoon Students

03.06.2015

Oruç Reis Primary School Morning Students

50. Yıl Tuna Primary School Morning Students

Atışalanı Secondary School Students

Birlik Secondary School Students

05.05.2015

Cumhuriyet Primary School Afternoon Students

07.05.2015

Cumhuriyet Primary School Morning Students

Engin Can Güre Primary School Afternoon Students

Engin Can Güre Primary School Morning Students

29.05.2015

Fatih Imam Hatip Secondary School Students

28.05.2015

Atışalanı Ismet Paşa Primary School Afternoon Students

03.06.2015

Atışalanı Ismet Paşa Primary School Morning Students

07.05.2015

Kazım Karabekir Primary School Morning Students

07.05.2015

Kazım Karabekir Primary School Afternoon Students

08.05.2015

Kemer Primary School Afternoon Students

08.05.2015

Kemer Primary School Morning Students

Neyyir Turhan Secondary School Students

Neyyir Turhan Primary School Afternoon Students

RESUME

Name Surname: Özlem Pakize ŞİNİK
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EDUCATION:
M.A: 2011, Joint Ph.D., Istanbul Aydın University, English Literature and English Language
B.A : 2002, Selçuk University, Education Faculty, English Language Teaching

WORK EXPERIENCE
2008-2016 Istanbul Aydın University, Instructor

LIST OF BOOKS
2011, Sıra Dışı Hamilelik, İkiz Hamileliği
2011, Sıra Dışı Annelik, İkiz Anneliği

PUBLISHED ARTICLES

1. Şinik, Ö. P., (2016), *"The First Official Twin Birth rates in Turkey during 2004-2009"*, International Journal of Scientific Research and Innovative Technology, ISSN: 2313-3759 Vol. 3 No. 8, (Pages: 81-86).
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WORKSHOPS and CONFERENCES
2013, Mugla Sitki Kocman University, IATEFL TTed SIG Conference, *"Teaching Foreign Language Through Bilingual Cartoons"*.

TALKS

1. 22 December 2016, *"Multiple Intelligence in Multiple Children*" a seminar for parents of twins in Medeni Berk Primary School in Ataköy district.
2. 7 May 2015, *"The Milestones for Mothers of Twins"* Meeting and brainstorming with mothers of twins, Esenler Esma Biltaci; Mother and Children Campus.
3. 21 December 2015, *"Multiple Intelligences in Multiple Children"* a seminar for mothers of twins in Ismet Pasa Primary School in Esenler district.

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2- "Twin Chorus" 2015-2016 Spring term and 2016-2017 Fall and Spring terms, cooperation with Esenler Municipality (The project is the first and unique in Turkey).
3- She is the founder of the first multiple births association foundation (2012) in Turkey.

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1- 12 Ekim 2016, *Alternatif Anne*, "Çoğul Ebeveynler, Dayanışmaya Ne dersiniz?" http://alternatifanne.com/cogul-ebeveynler-dayanismaya-ne-dersiniz/
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Blog: www.siradisiannelik.com
Foundation: www.siradisiannelik.org
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