An Investigation of the Students' Required Intelligence Profiles for Different Fields of Study

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ABSTRACT

Gardner's theory of intelligence drew considerable attention from educational area. Although there are appreciations to Multiple Intelligences Theory in elementary and primary schools, enough attention is not paid to the practical usage of Multiple Intelligences Theory at university level.

Also, even though researchers highlighted the importance of career guidance of students during their transition to university education in the light of Multiple Intelligence Theory, there is no known empirical study done to reveal the necessary intelligence profiles for different fields of study. Students do not have the opportunity to be guided in terms of their multiple intelligence profiles which can be one of the reasons of lack of motivation and leaving school without graduating.

Therefore, with this survey research it is aimed to develop a Multiple Intelligence Inventory for the adult learners which can be a self-check tool so that adult learners can use to find out their dominant intelligence areas. Secondly, a Multiple Intelligence Scale for Fields of Study was developed so that it can be used to find out the relevant Multiple Intelligence areas for different field of studies. As a final step, Multiple Intelligence Scale for Fields of Study was administered to instructors teaching at Faculty of Education and Faculty of Engineering aiming to find out their students' required multiple intelligence areas in order to be successful in their faculties.

The results showed that considerable differences exist between the expectations of instructors from Faculties of Education and Engineering in terms of Multiple Intelligence profiles of students studying at the Faculty of Engineering and Education.

Keywords: learning styles, intelligence, intelligence quotient, multiple intelligence theory.

ÖZ

Gardner'in Çoklu Zeka ile ilgili teorisi eğitim alanında oldukça ilgi görmüştür. Günümüzde, Çoklu Zeka Teorisi'nin ilk ve ortaöğretimdeki eğitime katkısı kabul görmüş olmasına karşın, yükseköğretim üzerindeki kullanım alanları ilk ve ortaöğretimdeki kadar irdelenmemiştir.

Çoklu Zeka Teorisi'nin sağladığı bilgiler ışığında yükseköğretime geçiş sırasında kariyer yönlendirilmesi yapılması konusunun araştırmacılar tarafından gündeme getirilmesine karşın, üniversite öğrencilerinin farklı alanlarda başarılı olabilmesi için hangi zeka alanlarının gerekli olduğunu ortaya çıkarmayı amaçlayan her hangi bir bilimsel çalışmaya raslanmamıştır.

Bu çalışmanın amaçlarından birisi yükseköğretimde farklı alanlarda okumakta olan öğrencilerin başarılı olabilmeleri için hangi çoklu zeka alanlarına sahip olmaları gerektiğini sorgulamada kullanılabilecek bir Çoklu Zeka Ölçeği geliştirmektir. Geçerlik ve güvenirlik kontrolleri yapılmış olan bir ölçeğin üniversitede okuyacak olan öğrencilere Çoklu Zeka Teorisi ışığında kariyer yönlendirmesi verilebilmesi amacıyla geliştirilmesi bu konuda bir başlangıç sayılacaktır. Bununla birlikte, çalışmanın amaçlardan bir diğeri de yetişkin öğrencilerin kendi zeka alanlarını tespit edebilmeleri için kullanabilecekleri bir Çoklu Zeka Envanteri uyarlamaktır.

Çalışmanın diğer bir amacı da geliştirilen Çoklu Zeka Ölçeği'nin Kuzey Kıbrıs ve Türkiye'de Eğitim ve Mühendislik Fakülteleri'nde eğitim vermekte olan öğretim elemanlarına uygulanıp, Eğitim ve Mühendislik Fakülteleri'nde okumakta olan

öğrencilerin akademik olarak başarılı olabilmeleri için hangi zeka alanlarına sahip olmaları gerektiğini öğretim elemanları görüşleriyle ortaya çıkarmaktır.

Araştırmanın sonuçlarının üniversite düzeyinde eğitim almak isteyen öğrenciler tarafından kullanılması ve Eğitim ve Mühendislik Fakülteleri'nde okumak isteyen öğrencilere hangi Çoklu Zeka alanlarının gerekli olduğunu ortaya koyması beklenmektedir. Aynı zamanda, araştırma sonuçları, rehber öğretmenlere daha iyi kariyer yönlendirmesi yapmanın yolunu açacaktır. Son olarak, rehber öğretmenlerin yardımılarıyla çalışma sonuçlarının, üniversite adayı öğrencilerin kendilerini Çoklu zeka bağlamında değerlendirip kariyer seçiminde ufuklarının genişlemesine yol açması beklenmektedir.

Anahtar kelimeler: öğrenme stilleri, zeka, zeka katsayısı (IQ), çoklu zeka kuramı.

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To My Family

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Chapter 1

INTRODUCTION

This chapter aims to present the background of the study, problem, purpose and significance of the study, assumptions, and definitions of terms which are used throughout the study.

1.1 Background of the Study

Schooling and the factors effecting the schooling process have always taken the attention of academic researchers (Alvarez & Frey, 2012; Billig, 2012; Purkey & Smith, 1983; Wright, 2015). As Armstrong (2000) specified, the idea of 'intelligence', which was thought to be among these factors, became more apparent in the twentieth century, when psychology was accepted as a respectable branch of science. According to Sternberg and Kaufman (2011), it is difficult to measure human "intelligence" without having a theory of what intelligence is and also nobody would be interested in measuring human intelligence unless they believe that people differ in intelligence.

Although there were some attempts to measure human intelligence before Alfred Binet, he was considered to be the first to introduce an intelligence test in the 1900s. With the efforts of Alfred Binet and a group of his colleagues, the first intelligence test was developed for the aim of identifying the special educational needs of French students. With this test, they thought that they were able to measure intelligence objectively and represent intelligence as a number or score (Armstrong, 2000; Davis et al., 2011).

Years after Binet's first intelligence tests, the traditional view of intelligence, which was limited to quantitative and linguistic abilities (verbal and computational intelligences), was abandoned with Howard Gardner's proposition of a new view of intelligence (Brualdi, 1998; Cerruti, 2013; Derakhshan & Faribi, 2015). Gardner's Multiple Intelligence (MI) Theory is based on cognitive research, studies with young children, psychological testing, sociological studies and the works of Piaget, Bruner, Eisner, and Dewey (Reiff, 1997). With the proposition of MI, Gardner drew considerable attention from educational area for the reason that he expanded the concept of intelligence so that intelligence types included such areas as, natural issues, visual/spatial relations, and social issues (Derakhshan & Faribi, 2015; Valdez & Pathak, 2014). According to Gardner (1999), intelligences are neural capacities that will be or will not be activated depending upon the society or opportunities found in that region, and choices done by people and/or their teachers and parents.

In his book, *Intelligence Reframed*, Gardner (1999) proposed that intelligence can represent itself in multiple ways as existential, logical/mathematical, intrapersonal, musical, bodily/kinesthetic, interpersonal, visual/spatial, naturalistic, and verbal/linguistic.

With his theory, Gardner introduced the pluralistic view of the mind which goes beyond quantitative and verbal abilities (Cerruti, 2013) and encouraged people to recognize and respect the variety of human intelligence. Before his theory, some students finished school without ever being successful in any area which caused a loss of confidence and lifelong difficulties in achievement. By applying MI Theory students are provided with a chance to experience the feeling that they can be successful at least in some areas which leads to an increase in self-esteem among a broader number of students (Kezar, 2001).

Pedagogically, Gardner's theory has encouraged variety in class in terms of activities, revision of curriculum, assessment, and provided guidance for students (Haley, 2001; Klein, 1997; Valdez & Pathak, 2014). This can be partly because of the shift from behaviorism to constructivism which emphasizes learners' internalizing knowledge and partly because practitioners'' view intelligence as an important aspect of learning. Gardner's theory of MI has brought important changes in beliefs about classroom practice. Enthusiasm for MI Theory has grown and many educators have engrossed in the educational implications of it (Valdez & Pathak, 2014). Propositions for this educational improvement and classroom applications contain a variety of teaching methods, curriculum changes, and revision of student assessment (Gardner & Moran, 2006; Stanford, 2003; Valdez & Pathak, 2014).

There are a quite a number of research done worldwide to reveal how activities prepared by the principles of MI Theory foster learners' performance in a variety of subjects (Barbulet, 2014; Derakhshan & Faribi, 2015; Douglas, et al., 2008; Haley, 2001). Furthermore, a meta-analysis done in Turkey covering 71 studies reports similar findings, revealing that activities designed based on multiple intelligences foster student achievement significantly (Yurt & Polat, 2015). Today MI is seen as a valid and valuable tool for teaching children (Hoerr, et al. 2010; Kezar, 2001). Research on educational settings have not only revealed that taking into the principles of Gardner's theory enhances learning by maximizing learner potential for success both in class and in real life, but also showed that using the MI theory makes it possible to teach large classes effectively by increasing student motivation and inspiration (Barrington, 2004; Chen, 2004; Haley, 2001; Nicholson-Nelson, 1998; Norel & Necsoi, 2011). Also Kivunja (2015) believes that teaching learners according to their dominant intelligences could trigger the development learners' critical thinking skills.

1.2 Problem Statement

Since formulation of Gardner's Multiple Intelligences Theory, quite a number of research was done, many books were written, articles published and numerous studies are done on the effects of Multiple Intelligences on school settings all over the world (Haley, 2001). Although there are some negative views regarding Gardner's MI theory (Ceci, 1996; Kagan and Kagan, 1998; Sternberg, 1994; Waterhouse, 2006; Willingham, 2004), many researchers state the positive effects of applying Multiple Intelligence Theory in school settings (Emig, 1997; Gardner & Moran, 2006; Giles, Pitre and Womack, 2003; Lazear, 1991; Haley, 2001; Hoerr, et al. 2010; Shearer & Willingham, 2005; Tai, 2014). The environment that educators create should not be underestimated since it stimulates both intelligence development and learning. Furthermore, the components of intelligence identified by theory can help the guidance of curriculum planning and classroom strategies (Jordan, Carlile, & Stack, 2008).

Ever since the emergence of Gardner's theory, the implications are meaningful for primary and elementary education and schools have moved from traditional teacher-centered curriculum to student-centered because there is a gratitude of students' uniqueness of intelligence (Kezar, 2001). Although there are appreciations to MI Theory in primary and elementary schools in the USA and in many parts of the world, enough attention has not been paid to the practical use of MI theory in higher education (Barrington, 2004; Kezar, 2001; Sherarer, & Luzzo, 2009).

Similar to the world, recently many studies were done on MI Theory in Turkey and in North Cyprus. A content analysis of the studies done on MI in Turkey revealed that most of the MI studies were conducted in elementary schools on elementary students (Kılıç, Baki, & Bayram, 2014; Kırmızı, 2006; Kolaç, 2008; Kutluca, 2009; Saban, 2009). According to Barrington (2004) and Hürsen and Özçınar (2008), the number of MI studies done at higher education is not sufficient. Although there are some studies done in higher education settings (Abacı & Baran, 2007; Akpınar & Doğan, 2012; Durmaz & Yıldırım, 2005; Hamurcu, Günay, & Özyılmaz, 2002; Saban, Kayıran, Işık, & Shearer, 2012), little attention was given to the practical usage of MI theory in higher education even though abilities are considered as an important element in career choice (Barrington, 2004; Gottfredson, 2003). Furthermore, because there is no known empirical study done to reveal the necessary intelligence profiles for different fields of study, students do not have the opportunity to be guided in terms of their multiple intelligence profiles which can be one of the reasons of leaving school without graduating. There should be a harmony between learners' intellectual ability and performance versus school's intellectual expectations. According to Hermanowicz (2003), there should be a link between the school's intellectual expectations from the students and students' intellectual capacity.

Yorke (2004) states that students face difficulty of choosing an area or field to study. Shearer (2009) suggests to put emphasis on career guidance so as to encourage not only educational accomplishment but also learners' career planning and decision making. Shearer (2009) also states that obtaining a university diploma and having a successful transition to a career is a problem for many young students. Many students leave schools because of several reasons. Students with no clear career goals will be unclear about their career choices and will probably display low confidence, and poor academic performance and will likely drop out of schools (Hull-Banks, et al., 2005; Shearer & Luzzo, 2009). There is a high dropout rate for university students before completing their degrees (Wintre, Bowers, Gordner, & Lange, 2006) and it is not surprising to see the absence of clear career goals as one important factor which directly affects dropout rates (Hull-Banks, et al., 2005). Moreover, with the uncertainty of career goals there is a risk of poor academic performance but still not enough attention is given to the studies which focus on the relationship between learners' career goals and their enrollment (Hull-Banks, et al., 2005).

A study by Akıntuğ and Birol (2011) in North Cyprus has revealed that taking responsibility for themselves for high school students is not at the desired level and having low maturity level can be considered an important factor in choosing the right area of study and choosing the right career. The researchers suggest putting effort on guiding students by experts so to higher their maturity levels which will result in a better career choice.

According to Germeijs and Verschueren (2006), students' low maturity level can raise three items to consider: (1) whether or not students actually registered to an area of study which they intended to choose, (2) commitment to the area of study they are registered to, and (3) academic adjustment which includes learner motivation, effort, and efficacy.

Shearer (2009) recommends to use students Multiple Intelligences profiles for academic and career counseling to guide them into suitable career tracks which will in turn lessen career confused students resulting a decrease in school drop-out rates.

Similarly, Wu (2004) advices to use a process approach which uses a Multiple Intelligence inspired career assessment not only for undecided students but also for the indecisive students for more intensive and personalized assistance. Wu (2004) also suggests school counsellors and instructors to use students MI strengths both to increase academic performance and help students select an area of study, in terms of higher education, which will in turn lead to a successful shift into the career of student preference.

As a result, it can be concluded that enough study has not been done to find a relationship between intelligence profiles of students and fields of study in higher education. This study aims to investigate this relationship.

1.3 Purpose of the Study

One of the aims of this study is to develop a Multiple Intelligences Scale for Field of Study (MISFS) which will be used to identify the intelligence profile required for success in any field of study at university level. Also, a Multiple Intelligences Instrument (MII) is developed for the adult students so that by responding to the items in the MII, they will be able to find out which intelligence areas they are superior.

Another purpose of the research is to test MISFS on two different fields of study namely education and engineering. For this purpose, MISFS was used to find out the dominant intelligence of students in the Faculty of Education and in the Faculty of

Engineering to pursue successful study in their departments. The study seeks answers to the following research questions:

1) Which intelligence areas should students be superior in order to be successful in:
    a) the Faculty of Education, and
    b) the Faculty of Engineering?
2) How is the difference about each intelligence of students in the Faculty of Education and in the Faculty of Engineering?
3) What are the MI profiles of the students studying at the:
    a) Faculty of Education, and
    b) Faculty of Engineering?

1.4 Significance of the Study

It is a known fact that in Turkey and in North Cyprus, most of the students register to universities after the University Entrance Examination which comprises a multiple choice test that assesses the mathematical and verbal abilities of the students. For students to be successful in a particular department, certain skills and intelligences are required. As the students taking the University Entrance Examination are not tested and placed to different departments according to their skills or Multiple Intelligence profiles, there is a possibility of finding themselves studying in departments which require different types of intelligences then their own (Sözüdoğru, 2009).

Gardner (2011) stated that schools should help students reach career goals that are suitable with their intelligence profiles. To this aim, educators should help learners identify their Multiple Intelligence profiles so as to enable intrapersonal understanding which would lead to self-actualization. After intrapersonal understanding, students can be expected to take active role for their own lives and learning. It should also be kept in mind that among the Fundamental Principles of Turkish National Education ‘orientation’ and ‘individual and social needs’ are highly stressed (Özdemir, 2012; Taşdemir & Şişman, 2013).

As suggested by Shearer (2009), studies are needed to bring out in what ways universities can encourage self-awareness, so as to enable students to choose a major area of study which will lead logically for a career compatible with learners’ exceptional potencies. The results of those research studies would have immediate as well as life-long implications for the transition from secondary education to higher education. Shearer and Luzzo (2009) also invite researchers, counsellors, and teachers to do studies on the effectiveness of the MI theory to prepare a baseline for educational planning and career counselling. Erkoç and Bayrak (2008) also suggest researchers to conduct studies at university level to reveal the necessary intelligence domains for different areas of studies for career counselling.

After all, Gardner and Moran (2006) stated about the MI theory that there is interaction among intelligences when the mind works and for different aims, unconsciously human beings use a group of intelligence to solve problems.

Hence it can be concluded that for different areas of study, the necessary intelligence types can be grouped so that university student candidates can be guided to choose the most suitable area/s of study before starting their freshman year.

In career counselling process MI can be used in various ways to assist learners (Kerka, 1999).

1) Self-knowledge: This is similar to Shearer's concept of intrapersonal understanding (2009). It is important for learners to be conscious of their MI weaknesses and strengths so that individuals will have some intra knowledge which is seen as a prerequisite for successful career choice.
2) Expansion of career choices: Learners educated in classrooms where MI activities are used broaden their parameters of career choices (Mantzaris, 1999).

Shearer and Luzzo (2009) also believe that MI can be used to guide learners to choose the suitable area of study which will in turn lead them to their career. Breen (2011) believes that school counsellors and teachers should be aware of the MI principles. Hence, counsellors should show learners how to explore their strengths in terms of intelligence so as to know themselves. As a result, studying in an area of their MI strengths can be the solution to high dropout rates of the freshman students. Also, it should be noted that Akıntuğ and Birol (2011) believe that for choosing the right career, high school students should know about themselves and know the details about the career they want to choose.

As stated by Gottfredson (2003), there are a few career literature about people's abilities and their role in counselling and after a thorough search of the related literature, studies done on how to use MI in career guidance at schools could not be found. Although several scholars attempted to associate intelligences with professions (Armstrong, 2000; Demirel, et al., 2006), empirical studies specifying required intelligence types for different fields of study could not be found.

Considering the possibility of a mismatch between students' dominant intelligence/s and the required intelligence/s for different fields of study at university level, career counsellors need a list of fields of study with the corresponding required intelligence types. By using this list, counsellors will be able to advice their students to apply to departments suitable to their intelligence profiles.

1.5 Assumptions

It was assumed that both the instructor participants and student participants would respond accurately to the data collection instruments. Also it is assumed that there isn't any Common Method Variance.

1.6 Definition of Terms

Some important terms and concepts within the context of this research study is presented below.

Learning Styles: different ways in which a learner takes in information (Fleetham, 2006, p. 11)

Intelligence: 'involves language and the capacity to develop and transmit culture, to think, reason, test hypothesis, and understand rules and ....' (Mackintosh, 2011, p. 1).

Intelligence Quotient (IQ): The ratio of a person's mental age to their chronological age multiplied by 100 (Fleetham, 2006, p. 18).

Multiple Intelligence Theory: a theory which proposes that individuals can be intelligent in many ways.

Chapter 2

LITERATURE REVIEW

This chapter consists of three sections. The first section contains literature review about intelligence in general. The second section includes detailed literature review about Gardner's Multiple Intelligence Theory and its relation with education and learning styles. The final section contains the findings of studies done on Multiple Intelligence Theory.

2.1 Intelligence

For most of human history, scientific description of intelligence was missing. People often talked about intelligence and tried to label others as more or less bright or dull. Psychologists have been trying to define intelligence and they have always tried to design tests that would measure it (Gardner, 2011). In fact, psychologists believed that people differ in intelligence otherwise they would not attempt to measure it. Today there are more than 202 tests aimed to measure intelligence (Urbina 2011).

At the beginning, a group of psychologists, Charles Spearman and Lewis Terman described intelligence as an ability for problem solving and cognition. They aimed to prove that the test scores showed only general intelligence and Spearman contributed to the explanation of intelligence by introducing the concept of 'g' which he called as 'mental energy' (Gardner, 2011; Mackintosh, 2011; Demirel, Başbay & Erdem, 2006). In 1890, James McKeen Cattell attempted to measure the differences in mental abilities. Later, Alfred Binet and his friends managed to develop a satisfactory measure of intelligence. According to Binet, various capacities and a diversity of complex psychological abilities such as common sense, responsiveness, retention, abstraction, imagination, and judgement were involved in the concept of intelligence and intelligence was represented by an IQ (intelligence quotient) score, which is similar to the concept of ‘g’ (Fleetham, 2014). With his test, Binet aimed to find out whether children were at risk of failure in school, so that the authorities could give them appropriate support (Armstrong, 2009; Fleetham, 2006; Davis, et al., 2011).

Many proponents of the general intelligence believed that intelligence development is not affected by the environment we live in or the experiences we have but they believed that intelligence is something innate which humans are born with and we cannot add on it (Davis, et al., 2011).

The proposition of intelligence as a test score and intelligence tests in general were criticized by psychologists like Thorndike, L. L., Thurstone and J. P. Guilford (Demirel, et al., 2006). According to the critics, intelligence test could only measure limited sets of human talents such as verbal reasoning, numerical reasoning, visual thinking and logical problem solving and IQ testing only brings feelings of shame or pride for the test takers and their families (Armstrong, 2009; Christison, 1996; Fleetham, 2006; Gardner & Moran, 2006).

Thorndike, Thurstone and Guilford argued for the existence of other factors or components of intelligence which proposes a pluralistic view of intelligence (Davis, et al., 2011; Demirel, et al., 2006; Gardner, 2011). Thurstone stated that intelligence is formed by seven main capacities and Guilford defined intelligence as involving of six products, five operational, and four content types (Davis, et al., 2011). However, until the development of cognitive theories in psychology and education, the focus was on measuring individual differences (what sets them apart) than on studying the general nature of human intelligence, which is what people have in common (Mackintosh, 2011).

2.2 Gardner's Theory of Multiple Intelligence

The definition of intelligence as a general capacity for problem solving and conceptualization is challenged by Gardner's alternative vision of mind (Armstrong, 2009; Demirel, et al., 2006; Gardner, 2006b). Gardner (2006) proposed a pluralist view of cognition, identifying several different and separate sides of mind. According to Gardner, the proposition of general intelligence 'g' which Spearman calls it as human 'mental energy' fails to comprehend the broad range of human cognition (Davis, et al., 2011).

Based on the findings of cognitive science and neuro science, which were not available during Binet's time, Gardner acknowledged that people have diverse cognitive abilities and distinct cognitive styles. He criticized the significance which was given to the IQ scores and said that mental capability should be viewed as a group of abilities, capacities, or mental skills. According to Gardner, human intellect possesses a set of semi-independent computational devices and these devices have developed to process different kinds of information in different ways (Gardner, 2006b). Gardner's theory for intelligence is an alternative to the IQ score and allowed the assessment of individuals as a whole rather than just for his or her linguistic and mathematical skills (McKenzie, 2005). Gardner states that intelligence should be more than a score which comes out from a standardized test and multiple intelligences theory can provide a holistic and natural profile of human potential (Fogarty & Stoehr, 2008). Gardner states that:

> “a description of individuals in terms of a small number of relatively independent computational capacities is more useful to cognitive scientists, psychologists, and educators than a description in terms of an innumerable collection of sensory-perceptual modules, on the one hand, or a single, all-purpose intelligence, on the other” (Gardner & Moran, 2006, p. 227).

Gardner (2006) uses the term *intelligences* instead of *intelligence* to show the pluralistic view of mind and defines intelligence as a potential to process information accepted by a cultural setting to overcome difficulties or produce some goods valued by that particular setting (Gardner, 1999). According to Multiple Intelligence Theory, individuals who show a talent in one intelligence area may not always demonstrate talent in other intelligence areas. Alternatively, individuals might show aptitude in several or all intelligence areas. Gardner (2011) states that human beings possess all kinds of intelligences to some extent. However, nobody has the same profile of intelligence strength or weaknesses with another.

Multiple Intelligence theory also has an important key distinction concerning the origins of intelligence different from the proponents of general intelligence. Gardner argues for the belief of the proponents of general intelligence that intelligence is something innate that only comes from birth, but he states that intelligence is both innate and also it is something which is possible to develop in different ways through experiences and schooling (Davis, et al., 2011).

According to Gardner (1999, pp. 36-40), a potential can be seen as intelligence if it meets the below criteria.

i) Intelligence is located in the brain. That means a possible brain damage should cause the loss of that potential. Gardner worked with people who suffered brain damages and observed that, damages to one part of the brain harmed one intelligence while leaving the others unharmed.

ii) There should be evidence about the potential intelligence within the evolution of our species and our ancestors should have exhibited that potential. For instance, visual-spatial intelligence can be seen in cave drawings and musical intelligence can be traced back by exploring musical instruments in ancient times.

iii) There must be a recognizable core process or set of processes. Specific intelligences function in rich environments and work in harmony with other intelligences. For example, in performing a piece of music with an instrument, both musical and bodily-kinesthetic intelligences are used.

iv) Intelligence must be capable of being represented symbolically. For bodily-kinesthetic intelligence, there are sign languages and braille, for linguistic intelligence there are different languages like Turkish, English, and so forth. For logical-mathematic intelligence, there are computer languages and mathematical symbols like basic, for musical intelligence there are Morse Code and musical notational systems, for interpersonal intelligence there are social cues and facial expressions, and so forth.

v) Intelligence must have a distinct developmental account, with a unique final performance like an expert does. For instance, performances like a trained musician with good musical skills. According to Gardner a human growth for an intelligence goes through a developmental pattern and this pattern is different for each of the intelligence areas. For each of the intelligences there is a time in our life which we can display our best but also there is a time when that intelligence will start to decline gradually. For logical-mathematical Intelligence, Armstrong (2009) suggests the peak age to be 40. For the ‘end-state’ performances of different intelligence areas, Gardner provides some exceptional individuals like Beethoven for musical intelligence, Darwin with his theory of evolution for the naturalistic intelligence, Michelangelo for visual-spatial intelligence.

vi) Intelligence should be demonstrated by the presence of idiot experts, geniuses, and other extraordinary people like autistic people performing outstanding mathematical performance. While these savants show superior abilities in one intelligence, they can perform poorly for the other intelligences.

vii) There should be support from experimental psychological tasks showing that the intelligence is distinct from other intelligences. Gardner suggests that while solving problems intelligences can work together or work in isolation from one another and this can be proved by research.

viii) The presence of intelligence should be supported by psychometric findings. Gardner suggests that there are lots of tests for the theory of multiple intelligences.

According to Armstrong (2000, pp. 15-16), there are some key points to be remembered in Multiple Intelligence Theory.

i) Each person possesses each kind of intelligence to some degree. There can be some people who possess extremely high levels in all kinds of intelligences or some developmentally disabled ones may possess some or most intelligence at elementary level. However, most of the people are between these two poles.

ii) Almost everybody can improve each intelligence to a certain point. Although some people may accept it as something innate for their deficiency in an area of intelligence, Gardner (cited in Armstrong, 2009) believes that if enough encouragement, enrichment, and instruction are provided, people could develop all intelligence types for a good level of performance.

iii) Intelligences process with each other together in a complex way. It is proposed that intelligence cannot be present by itself and intelligences are cooperatively working with each other. A player in a match may use the bodily-kinesthetic intelligence to pass the ball to the opponent’s area, but at the same time may use the linguistic/verbal intelligence to warn the teammates and use the interpersonal intelligence to guess what the opponents are intending to do next.

iv) Within each intelligence area, a person can be intelligent in various ways. To be considered intelligent in an area, there isn’t any standard set of attributes. A person may not be able to sing perfectly but can be a successful composer. Similarly, a person may not possess superior bodily-kinesthetic intelligence on a football pitch but can be highly successful in weaving a carpet. Multiple Intelligence Theory does not only emphasize the rich diversity people can possess within intelligences but also emphasizes the rich diversity people can possess between intelligence.

2.2.1 What are Multiple Intelligences

As proposed in his book Frames of Mind, Gardner originally identified seven areas of intelligence; linguistic intelligence, logical-mathematical intelligence, musical intelligence, bodily-kinesthetic intelligence, spatial intelligence, interpersonal intelligence, and intrapersonal intelligence. However later he added the 8^{th} intelligence which is naturalistic and then the 9^{th} intelligence which is existential (Gardner, 1997).

2.2.1.1 Linguistic/Verbal Intelligence

Gardner (1999) describes linguistic/verbal intelligence as being sensitive to oral and printed language and the capability to pick up other languages and the talent to use the languages to achieve objectives. According to McKenzie (2005), linguistic/verbal intelligence is heavily emphasized in traditional classrooms and some observable actions for this kind of intelligence are: reading, writing, telling, asking, reporting, discussing, clarifying, lecturing, announcing, narrating, and so forth. Some sample professions that linguistic/verbal intelligence can be associated with are writer, poet, journalist, teacher, politician, lawyer, and so forth (Demirel, et al., 2006).

2.2.1.2 Logical/Mathematical Intelligence

According to Gardner (1999), logical-mathematical intelligence is the ability of evaluating problems logically, and it contains the ability of carrying out computational operations and studying issues in a scientific way. McKenzie (2005) defines logical-mathematical intelligence as the ability of reasoning and states that it is also highly valued in traditional instruction alongside with linguistic intelligence. Some observable actions for logical-mathematical intelligence are: organizing, solving, theorizing, ranking, experimenting, predicting, proving, measuring, analyzing, verifying, calculating, questioning, simplifying, and so forth. (Fogarty and Stoehr, 2008; McKenzie, 2005). The professions that can be associated with this kind of intelligence are: judge, economist, statistician, engineer, accountant, mathematician, computer programmer, and so forth. (Demirel, et al., 2006).

2.2.1.3 Musical Intelligence

Musical intelligence involves the skill to perform, create, and appreciation of musical forms (Gardner, 1999). McKenzie (2005) states that musical intelligence does not only include musical patterns but also patterns of poetry, instruments, and environmental sounds. Some observable talents that a person who has a developed musical intelligence can demonstrate are: clapping, auditing, singing, repeating, composing, listening, chanting, modelling, and so forth. (McKenzie, 2005). The professions that can be associated with this kind of intelligence are: musician, composer, dancer, conductor, and music teacher (Demirel, et al., 2006).

2.2.1.4 Bodily-Kinesthetic Intelligence

Bodily-kinesthetic intelligence involves the ability to use the body or some parts of the body to show emotions, thoughts, and moods, to play games, to overcome difficulties, and to produce new things or transform things (Armstrong, 2000; Gardner, 1999). According to McKenzie (2005), some observable actions for bodily-kinesthetic intelligence are building, constructing, manufacturing, imitating, playing, performing, dancing, jumping, shaping, exercising, and, transporting. People who have a developed bodily-kinesthetic intelligence can be a surgeon, pantomime, ballet dancer, technician, and actor (Demirel, et al., 2006).

2.2.1.5 Visual-Spatial Intelligence

Visual-spatial intelligence features the skills to see objects from different viewpoints and angles and the skill in visual arts, navigation, mapmaking, and architecture (Gardner, 1999). According to Armstrong (2009), this intelligence involves sensitivity to shapes, different colors, lines, space, form, and the associations which exist between them. Some observable actions for this kind of intelligence are drawing, sketching, drafting, painting, coloring, outlining, designing, imagining, visualizing, pretending, and so forth (McKenzie, 2005) and some professions that can be associated with this kind of intelligence are: painter, architect, photographer, designer, cartoonist, sculptor, and decorator (Demirel, et al., 2006).

2.2.1.6 Interpersonal Intelligence

Interpersonal intelligence is about the ability to comprehend the inspirations, desires, and intentions of others and to work cooperatively in a team by being aware of others' motivations, feelings, intentions, and moods. It includes being sensitive to human speech, facial expressions and gestures (Armstrong, 2000; Gardner, 1999). Some observable actions for this kind of intelligence are: interacting, sharing, empathizing, caring, socializing, gathering with others, communicating, and so forth. (Fogarty & Stoehr, 2008). The professions that can be associated with this kind of intelligence are: teacher, politician, leader, psychologist, counsellor, and sociologist (Demirel, et al,. 2005).

2.2.1.7 Intrapersonal Intelligence

Intrapersonal intelligence involves the skills to know ourselves, our wishes, capacities, and fears and the ability of using that information effectively in regulating everyday life by self-confidence, self-discipline, and intrapersonal understanding (Armstrong, 2000; Gardner, 1999). Some observable actions for intrapersonal intelligence are: mediating, thinking, self-assessing, writing, self-expressing, and setting goals (Fogarty & Stoehr, 2008; McKenzie, 2005). Some professions that can be associated with this kind of intelligence are: psychologist, philosopher, poet, writer, religious man, and so forth. (Demirel, et al., 2006).

2.2.1.8 Naturalistic Intelligence

Naturalistic intelligence encompasses the expertise in the identification or grouping of the plants and wildlife and the ability to recognize non-living forms in nature and urban environment (Armstrong, 2000; Gardner, 1999). A person who has a naturalistic intelligence would demonstrate actions like, watching, observing, classifying, categorizing, hiking, climbing, taking nature photographs, and so forth. (Fogarty & Stoehr, 2008; McKenzie, 2005). Some professions associated with this intelligence area are: biologist, zoologist, geologist, agriculture engineer, farmer, and ecologist (Demirel, et al., 2006).

2.2.1.9 Existential Intelligence

Existential intelligence spirituality shows an interest to know about experiences and planetary entities that are not yet experienced in a material sense but still seem important to human beings (Gardner, 1999; Gardner & Moran, 2006). Some actions associated with this intelligence area are: questioning, hypothesize, philosophize, inventing, studying the universe, and visualizing (Fogarty & Stoehr, 2008; McKenzie, 2005). Some professions which can be associated with this intelligence type are: physicists, philosopher, religious leader, and so forth. (Fogarty & Stoehr, 2008).

2.3 Factors that Affect the Development of Intelligences

According to Armstrong (2000, p. 17), intelligence development depends on three main factors: personal life history, cultural-historical background, and biologic endowment. Biological factor is about the inherited or genomic issues and insults or damages to the brain. The second factor which is personal history includes the experiences with people around who can stimulate intelligences or prevent them from developing. The last factor cultural-historical experience is about the time and setting where one is born and grown up. It is about the environment and state of cultural-historical improvements in different domains.

Armstrong (2000, p. 18) also named two other important key processes which can directly affect personal life history in the development of intelligences; crystallizing and paralyzing experiences.

Crystallizing experiences are the milestone in the growth of one's capacities and skills which usually occur in early childhood and occasionally any time of one's life. Crystallizing experiences can trigger somebody to develop a special talent or ability which can help develop an intelligence area. On the other hand, paralyzing experiences are the ones that cause the shutting down of developing intelligences. These experiences often consist of shame, anger, guilt, fear, or some other negative emotions.

According to Armstrong (2000, p. 18), there are also some other environmental experiences which can facilitate or prevent the progress of intelligences. These are:

i) Access to Resources or Mentors: in order to develop intelligences one needs to access some resources or somebody should help you develop a particular intelligence. People who lack resources may have some type of intelligence as undeveloped. For instance, a child from a poor family who doesn't have any chance to train on a musical instrument may have his musical intelligence remain undeveloped.

ii) Historical-Cultural Factors: In a culture where some kind/kinds of intelligence is favored, people are likely to have those intelligences developed. In a culture where musical intelligence is favored, children are likely to have musical intelligence developed.

iii) Geographical Factors: where people live may promote or lack the development of certain intelligences. A child born in a rural area would have more opportunities to develop the naturalist and bodily-kinesthetic intelligences.

iv) Family Factors: parents' insistence on some choices would surely promote or hinder the development of some intelligences. Parents who insist their child to be a musician may promote development of child's musical intelligence.

v) Situational Factors: if a child is busy earning his life starting from the childhood, he would have less time to create opportunities to develop his potentials.

2.4 Criticism of the MI Theory

Although the MI theory drawn considerable attention from the educators and psychologists, there are several reviews and critiques about it (Armstrong, 2009; Ceci, 1996; Kagan & Kagan, 1998; Sternberg, 1994; Visser, et al., 2006; Visser, et al., 2006b; Waterhouse, 2006; Willingham, 2004).

Firstly, some critics argue that the MI theory is not build on realistic research and therefore it cannot be proved (Visser, et al., 2006; Waterhouse, 2006; Schaler, 2006). Schaler (2006) criticizes Gardner's set of intelligences and states that Gardner's classification of intelligence types is subjective and if other psychologists attempted to classify intelligences, they would arrive with a different set of intelligences.

However, the proponents of MI theory posits that the MI theory was based on the out comings of hundreds of studies of empirical findings which synthesize experimental, theoretical, and observational research and that the criteria from these studies formed the basis of methodical research of candidate faculties through different disciplinary views, including sociology, biology, anthropology, arts, humanities, neurology, and psychology (Armstrong, 2009; Davis, et al. 2011; Gardner & Moran, 2006; Rauscher & Hinton, 2006).

Some other critics state that the number of intelligences are not specific enough and that there might be several sub-intelligences related to various dimensions of an intelligence type (Visser, et al., 2006; Visser, et al., 2006b). Gardner agrees with the proposition of sub-intelligences but he claims that it would be very difficult to define or differentiate these sub-intelligences from an intelligence type and also there will be the danger of high correlation of these sub-intelligences with each other. Also, although there might be other types of intelligences that can be added to his proposed intelligence types, Gardner and Moran believe that by adding a lot to the number of intelligences would bring the difficulty of translating it to educators. However, still they remind that restricting the concept of intelligence only to verbal-linguistic and logical-mathematical dimensions would be a restriction and would fail to define the variety of human intelligence functions (Gardner & Moran, 2006).

There are some critics about how Gardner determined the borders of an intelligence and it is a demanding issue to differentiate between intelligences and other capacities like sensory systems, skills, memory, or critical thinking. Gardner believes that intelligence is different from all the other capacities. Sensory systems help the brain receive information from the surroundings and intelligences are the computational systems which make sense of the information. Gardner thinks that sensory systems and intelligences are independent systems. (Davis, et al., 2011; Gardner, 2006). Gardner also perceives skills as a product of the operation of one or more intelligences and they are formed by the help and limitations of the environment we live in. To display any skill in swimming, an individual should find the opportunity to access a pool or live near the sea and by using the bodily/kinesthetic and visual/spatial intelligences one can perform how skillful he is (Gardner and Moran, 2006). Gardner believes that critical thinking and memory rely on the work of various neural operations of the brain and neuropsychological data proves that memory or critical thinking for different skills like use of language requires different types of memory than making of music (Gardner, 2006).

Visser, et al., (2006) criticize Gardner of introducing the domains of intelligence without mentioning how these domains could be assessed independently with a standardized test. However, efforts of developing standard tests to measure intelligence domains are seen by different researchers and among these are Teele Inventory of Multiple Intelligences (TIMI) (Teele, 1992), Multiple Intelligences Survey (Armstrong, 1993), Multiple Intelligence Development Assessment Scales (MIDAS) (Shearer, 1996), and Multiple Intelligence Inventory prepared by McKenzie (2005).

2.5 MI and Learning Styles

Learning styles and multiple intelligences are distinctive but they are not opposite conceptions and together they facilitate learning (Denig, 2004; Fleetham, 2014; Pritchard, 2009). Both multiple intelligences and learning styles together are related with diversity in learning and both agree that the delivery system should be changed to have learner-centered classrooms (Denig, 2004; Dunn, Denig, & Loverance, 2001; Haley, 2001). However, they are different when learning process is considered.

Learning styles and intelligences are different psychological constructs because learning styles are diverse techniques in which a students take in information and learning styles try to describe the ways learners choose to concentrate on, filter new information and recall information. Psychologists try to explain how information could be taught to learners according to their learning styles and each learner is said to have a primary and a secondary learning style and can be guided to teach to study according to their dominant learning styles (Denig, 2004; Fleetham, 2014; Dunn, et al., 2001).

On the other hand, multiple intelligences can be defined as various talents and skills that humans use to produce something and find solution to problems. (Fleetham, 2006; Prashnig, 2005; Silver, Strong, & Perini, 1997). According to McKenzie (2005), learning styles are not consistent with Multiple Intelligence Theory because there is labeling the learners as kinesthetic, verbal, and so forth.

Learning style proponents suggest teachers to use activities that would match with learners primary or secondary learning styles which in turn is criticized by multiple intelligence proponents mainly because they believe it would restrict the variety of activities to be used in class. However, Multiple Intelligence Theory proponents suggest providing a variety of instructional opportunities which will promote all the nine intelligence areas (Denig, 2004; McKenzie, 2005). Fogarty and Stoehr (2008) compares Multiple Intelligences and Learning Styles in Table 1.

Table 1. Multiple Intelligences and Learning Styles

Attributes	Multiple Intelligences	Learning Styles
Theory Base	Neuro/Biological/Psychological/ Anthropological	Psychological
Domain	Cognitive	Affective
Origin	Evolutionary/Developmental	Personality/Tendency
Nomenclature	Frames of Mind, Ways of Knowing, Intelligences	Styles, Mind Styles, Modalities
Components	Intelligences 1) Verbal/Linguistic 2) Logical/Mathematical 3) Musical/Rhythmic 4) Bodily/Kinesthetic 5) Visual/Spatial 6) Interpersonal/Social 7) Intrapersonal/Introspective 8) Naturalist/Physical World 9) Existential	Various Combinations 1) Concrete/Sequential Abstract/Random 2) Concrete/Abstract Active/Reflective 3) Thinking/Feeling Intuitive/Sensing
Worth	Culturally Valued	Individual Awareness
Teaching Tool	Curriculum Planning and Instructional Methodology	
Learning Tool	Conceptualizing/Performing (Receptive/Expressive)	
Assessment Tool	Authentic Assessment and Self-Assessment	
Researchers	Howard Gardner	Meyers/Briggs, Gregorc, McCarthy, Butler, Dunn & Dunn

(Adapted from Fogarty & Stoehr, 2008, p. 191)

According to Gardner and Hatch (1989), understanding the learners' strengths and using them for a basis for engagement and learning is important and also they state that having information about our learners will surely contribute to their learning.

2.6 Multiple Intelligences and Implications for Education

Multiple Intelligence Theory can be considered as a philosophy of education and was enthusiastically accepted by many educators and implications of it include taking multiple intelligences into their schools' mission, extended classroom applications, curriculum revisions, and alternative testing methods which in turn all help to increase student motivation (Barrington, 2004; Chen, Moran, & Gardner, 2009; Gardner & Moran, 2006; Diaz-Lefebvre, 2004; Gardner, 1997; Stanford, 2003). There are several reasons why Multiple Intelligence Theory has been accepted by educators. Firstly, the theory supports teachers' everyday practice and learners are thought and educated in different ways. Secondly it enables teachers with a theoretical framework for organizing and doing pedagogical practices, testing, and curriculum (Gardner, 2005).

Gardner (1997) himself considered multiple intelligences as among the most effective new ideas for education that can help to create excellent schools and stated that there could be two principal educational implications of Multiple Intelligence Theory. They are Individualization and Pluralization.

a) Individualization is the consideration of each student's unique potential and taking it into account when teaching, mentoring and nurturing.
b) Pluralization is the teaching of the materials in multiple ways to ensure reaching out for more students, as every learner would prefer learning in a different way. Pluralization also includes assessing learners in multiple ways.

In terms of curriculum development, Multiple Intelligence Theory contributes a lot to schools by guiding instructors to alter or broaden their methods of teaching, tools, and plans which in turn help them go beyond the verbal/linguistic and logical/mathematical intelligence (Armstrong, 2009).

Gardner (2011) also suggests that children's dominant intelligence areas can be identified at an early age and their educational opportunities and options can be designed according to this knowledge. According to him individuals with outstanding talents can be channeled into special programs where they can add more to their present talents.

In terms of teaching practice, Multiple Intelligence Theory helps to change the monotonous teaching practices and suggests a "metamodeling" for bringing the valued educational innovations into classrooms so to leave the old fashioned approach to learning. The theory also assists teachers to alter their current practices and offers a wide range of materials, techniques, and methods. Therefore, it helps for catering a wider and more diverse group of learners (Armstrong, 2009). Moreover, teaching in the light of Multiple Intelligence theory could improve assignment completion, attendance, and motivation in schools. (Barrington, 2004). Cluck and Hess (2003) proved that enthusiasm was enhanced during multiple intelligence lessons. A study carried out in schools where Multiple Intelligence Theory was applied in 41 schools revealed progresses in students exam results, classroom and school management, increased school-parent cooperation, and improvement of the performances of students with learning disabilities (Kornhaber, Fierros, & Veenema, 2004).

Inspired by the Multiple Intelligence Theory, a science park and museum complex "the Explorama" was also built in Denmark where children and adults can experience Gardner's intelligences using meaningful materials in meaningful situations. In the "Universe" part of the science park, nearly 50 games are available for individuals or groups where they experience different intelligence areas on task where they have an opportunity to understand how there can be multiple abilities or intelligences (Gardner & Moran, 2006).

Gardner (2011) criticizes standardized tests for their stress on linguistic and logical-mathematical skills only and suggests a fresh approach to assessment which involves testing of student's talents in multiple ways. According to Gardner, traditional paperpencil tests are bias toward linguistic and logical-mathematical skills and since each intelligence displays a characteristic set of psychological processes, they should be evaluated in an intelligence fair way.

Gardner (2011) suggests a new approach for assessment system for children called ‘Project Spectrum’ which is a new way of testing where children are presented with rich opportunities to work with different materials. Project Spectrum goes beyond traditional assessment in some ways. Firstly, it aims to measure components of thought like musical competence which is neglected in traditional assessment. Secondly, Project Spectrum assessment is based on hands on activities which is more meaningful for children. Finally, while finding out the strengths and weaknesses, it also aims to find out the approaches to learning (Davis et al., 2011). With this intelligence-fair and individual-focused assessment system it is aimed to capture the dynamic interactions among intelligences (Gardner & Moran, 2006).

All in all, today Gardner’s Multiple Intelligence Theory can be considered among the best known pluralistic theory of intelligence. Hundreds of schools all around the world have been inspired by the principles of the theory and they incorporated its principles into their school missions, curriculum, and pedagogy. Moreover, many books and articles have been written about how educators, policy makers of education, and educational institutions can benefit from the Multiple Intelligence Theory (Gardner, 2011).

2.7 Current Selected Applications of Multiple Intelligences in Education

Gardner’s Multiple Intelligences theory has deeply inspired the researchers and there are many studies in different areas of education in the literature done on multiple intelligences. There are many studies done on different subjects aiming to prove that using activities based on Multiple Intelligence Theory fosters student learning.

The results of two experimental studies tested the effects of employing Multiple Intelligence based teaching in English language classes. The findings showed student performance increase in oral and written skills in the target language. Also it was obvious that students who experienced Multiple Intelligence based instruction displayed constructive attitudes and a good level of satisfaction towards the target language. Hence, learner motivation was increased and classroom management problems were lessen (Halley, 2001; Halley, 2004).

In a mixed method approach which employed interviews, observations, and video recordings, Ghamrawi (2014) examined the teachers’ use of traditional teaching methods versus activities designed based on MI Theory on vocabulary acquisition at pre-school level in English Language classrooms. The sample of the study was 80 pre-school students aged 5 and 8 kindergarten teachers. The results revealed that retention for new vocabulary was faster than it was with conventional teaching activities. Also the results showed that there was meaningful relationship between the multiple intelligence profiles of teachers and their teaching style and delivery of lessons.

In another study done aiming to reveal the effects of multiple intelligence based instruction on English as a Foreign Language freshman students' listening comprehension, Naeini (2015) employed an experimental research method. By using McKenzie's (2005) MI inventory, the researcher identified the dominant intelligence types of the two groups of Iranian English as a Foreign Language students. Activities across intelligences was presented to the experimental group of 30 students and instruction according to their dominant intelligences was presented to the control group of another 30 students. The results revealed that the students in experimental group outperformed when compared to the students in the control group. This proved that teachers would be more effective if they integrate all the intelligences to their activities in class.

In a mixed method study which lasted for sixteen weeks, Yıldırım and Tarım (2008) tried to find out the outcomes of cooperative learning designed with Multiple Intelligence Theory on learner's retention and achievement. The findings revealed that cooperative learning activities designed with Multiple Intelligence Theory had significantly fostered learner achievement and retention. A similar research topic was also elaborated with an experimental study by Kırmızı (2006) with a sample of 178 students at primary school level in Turkish lesson in İzmir, Turkey. The findings were showing that cooperative learning activities based on multiple intelligences was effective. Another recent experimental study by Kolaç (2008) on the same topic was done in teaching Turkish reading at primary school level. The findings were similar to the previous studies done on using a MI based cooperative teaching method. The results showed that students who experienced cooperative learning method with MI based instruction achieved better than the one who received traditional teaching when the post test results are announced.

An experimental study done in a primary school setting by Kutluca (2008), did a research on the effects of the activities prepared using the principles of Multiple Intelligences Theory in mathematics lesson. The evaluation of the pre and post assessment results revealed that students in the experiment group where classroom experiences were based on Multiple Intelligence Theory outperformed when associated with the outcomes of the students in control group.

In a survey study done with a sample drawn from 390 middle school 5th grade students, Dolu and Ürek (2014) designed a research to find out the multiple intelligence domains of Turkish gifted and talented students so that according to their MI domains, they could be offered special education to improve their talents more and also work on their weak domains. According to the descriptive analysis, the dominant intelligence areas were determined as naturalistic, mathematical, and verbal/linguistic respectively.

In another experimental study done with 90 nursing students (experimental group 46 and control group 44) tried to compare the usefulness of teaching clinical skills using activities designed with multiple intelligences with the conventional teaching approach. The effectiveness of the two approach was measured by pre and post assessment results and participants in the experimental group who were taught with activities designed with MI Theory principles obtained higher test scores suggesting that activities designed with MI Theory had fostered the teaching of clinical skills (Sheahan, While, & Bloomfield, 2015).

In a survey study done with 905 secondary school students (542 boys and 363 girls) in Pakistan aimed to reveal the difference between the multiple intelligence profiles of boys and girls and the dominant MI profiles of boys and girls. The analysis of data showed that female students verbal/linguistic, interpersonal, and intrapersonal intelligences were more dominant and male students bodily/kinesthetic and naturalistic intelligence were dominant. Also significant differences were not found between male and female student when logical/mathematical and visual/spatial, musical, and existential intelligences considered (Shahzada, Khan, Ghazi, & Hayat, 2015).

In a study where survey method was applied, Akkaya and Memnun (2015) aimed to investigate the multiple intelligence domains of 145 mathematics pre-service teachers and also tried to determine the relationship between pre-service teachers' MI domains and the type of high school they were graduated. The outcomes showed that logical-mathematical, interpersonal, and intrapersonal intelligence domains of mathematics pre-service teachers were developed but the others were temperately developed. Also, there were no significance relationship between pre-service teachers' MI domains and the type of high school they were graduated.

In a content analysis, researchers investigated the frequency level of activities designed with multiple intelligences in the secondary school 8th grade reading books. Unfortunately, the results revealed that most of the activities aimed to improve logical-mathematical and verbal-linguistic intelligences and activities for the rest of MI areas are a few (Kılıç, Baki, & Bayram, 2014).

Shahzada (2011) in a survey tried to reveal the relationship between mother’s level of education and multiple intelligence levels of their children. The sample consisted of 714 first year college students whom 382 of them from urban schools and 332 of them from rural schools. It was revealed that there was meaningful correlation between mother’s level education and verbal-linguistic, logical-mathematical, and musical intelligences of their children.

In a mixed method approach study, researchers tried to find out whether there would be an increase in the reading enthusiasm of students from elementary and middle school. To this aim, students’ dominant intelligence areas were found out with questionnaires and they were guided to read books according to their dominant intelligences. After semi-structured questionnaires and teacher observation, a boost in reading at home, going to the library, feeling relaxed and self-confident when introduced with a new vocabulary during reading were observed (Buschick., et al., 2007).

Wu and Alrabah (2009) in their research aimed to find out a correlation between learner’s multiple intelligences and learning styles. The survey study was conducted in two different countries, Taiwan and Kuwait on freshman English as a Foreign Language students. The sample consisted of 138 students from Taiwan and 112 students from Kuwait. According to the data analysis, Taiwanese students were found to be visual, global, closure-oriented, and extroverted, whilst Kuwaiti group preferred global learning style and intuitive style. As for the multiple intelligence, Taiwanese students were found to be dominant at visual, interpersonal, musical, and linguistic, while the group from Kuwait was dominant on, logical-mathematical, kinesthetic, visual, and interpersonal.

Kaur and Chhikara (2008) conducted a survey study to assess the MI levels among young adolescents and whether there would be any difference in the dominant intelligence types when gender is considered. The study was done in India with a sample of 200 students aged 12-14. The results revealed that all the nine intelligence types were developed averagely. However, the linguistic and musical intelligences of the female students were found to be more developed when compared to the boys. On the contrary, boys were ahead of girls when logical and bodily-kinesthetic intelligences are considered.

Şakir (2013) in an experimental study, aimed to compare the effects of MI based teaching over traditional instruction in the unit of basic compounds of living organisms and attitude towards biology with a sample of 59 students studying the 9th grade in Kırşehir, Turkey. The students were randomly assigned into the experimental group where they received MI based activities and into the control group where they received traditional activities. An achievement test about the subject and an attitude scale towards biology were submitted to the groups as pre and post assessment. The results revealed that MI based instruction was more effective and there was an improvement on students' achievement. However, no significant effects of the either instruction affected the students' attitude towards biology.

Maglin (2014) conducted a study employing non-participant observations, portfolio assessment, and semi-structured interviews to examine the effects of MI based activities on kindergarten children, teachers, and parents in Thailand. The results showed that MI based activities improved children's engagement in class, parents supporting roles, and teachers' willingness to teach. Also children developed a wide range of skills and competences because of the use of hands on activities in class. Hence cooperative learning was fostered because most tasks were completed with friends.

Gün (2012), in an experimental and mixed method study, investigated the effects of MI based instruction on student success, retention, and motivation. The population of the study was 5th grade primary school students in Ankara, where 37 students were from the experiment group and 34 students were in the control group. The pre and post assessment results exposed that the experiment group which received MI based instruction achieved considerably better than the control group which received normal instruction. The interview results also showed that the motivation level of the students in experiment group was increased because of the differentiated instruction they received. After about a month the experimental study was completed, a permanence test was applied to see if there is any meaningful difference in students' retention. The results revealed that student retention was better for the students who received MI based instruction than the student in control group. Öner (2012), conducted a similar mixed method experimental study on 7th grade secondary school students in Elazığ and the findings were similar to Gün's (2012) findings.

As seen in the studies mentioned above, there is enough evidence proving that taking into consideration of students' multiple intelligence domains and applying Multiple Intelligences based activities enhance learning, help motivating students and their parents, improve task completion, class participation, and motivation of learners and helps classroom management. In other words, MI Theory had direct application to instruction and curriculum design. As a result of this, many schools around the world, in Turkey and in North Cyprus claim that they take into consideration of Gardner's Multiple Intelligence Theory and they revised their curriculum and offer activities based on MI Theory. However, MI Theory based counselling at all levels should also be considered in schools for the betterment of education.

Chapter 3

METHOD

This chapter aims to describe the methods employed during the current study. Specifically, the research design, setting, population, sampling, ethical issues, data collection instruments and procedures, and data analysis are discussed.

3.1 Research Design

The research design of this current study is Quantitative. Most researchers point out quantification as a powerful research form (Cohen, Manion, & Morrison, 2007) and with statistics, researchers can discuss the findings in a more constructive way because statistics can provide an agreed set of principles (Rugg & Petre, 2007).

According to Clark and Creswel (2014, p. 193) the steps to be followed for Quantitative Research can be summarized as in Figure 1.

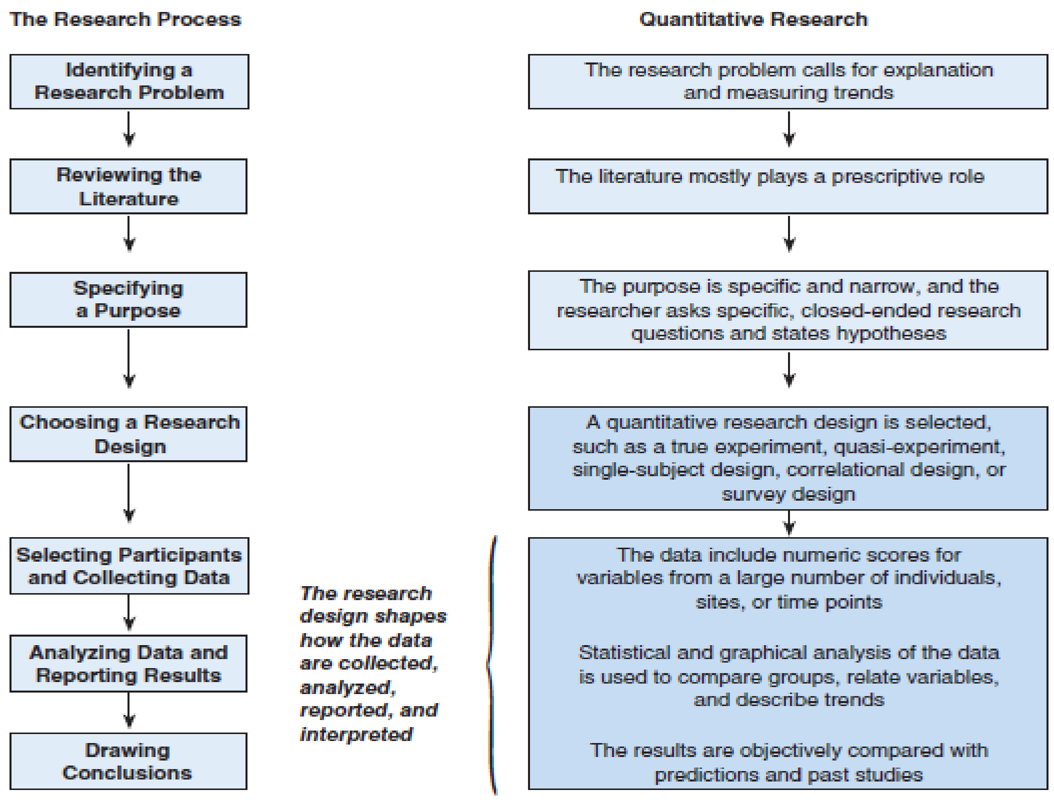

Figure 1. Steps in quantitative research

Within the Quantitative Research Design, there can be 5 research designs. These are: true experiment, quasi experiment, single subject, correlational, and survey research designs (Clark & Creswel, 2014). In this current study, survey method was used to collect the data. Most surveys possess three main characteristics (Fraenkel, Wallen, & Hyun, 2008).

1) Information is collected from a group of people in order to describe some aspects or characteristics (such as abilities, opinions, attitudes, beliefs, and/or knowledge) of the population of which that group is a part.
2) The main way in which the information is collected is through asking questions; the answers to these questions by the members of the group constitute the data of the study.
3) Information is collected from a sample rather than from every member of the population (p. 393).

The advantages of using the survey method can be summarized as:

1) data is gathered at a point in time so it is economical and efficient,

2) if the sample is drawn carefully, data represents a wide target population,
3) generates numerical data and can be easily analyzed to provide descriptive, inferential, and explanatory information,
4) standardized instruments can be used for all the participants,
5) correlations can be ascertained,
6) generalizations can be made,
7) data can be processed statistically (Cohen, et al., 2007).

There are two main kinds of surveys, longitudinal and cross-sectional survey (Fraenkel. et al., 2008). In this current study cross-sectional survey method, which is frequently used by researchers for higher degree research (Cohen, et al., 2007), was used. A cross-sectional survey aims to collect data from a sample from a pre-determined population. The data can be gathered at a point in time, and this time could be a day or a few weeks or more (Fraenkel, et al., 2008).

The main aim of the study is to reveal students' required intelligence profiles for different fields of study, namely for the Faculty of Education and Faculty of Engineering. The other aim of the study is to find out the intelligence profiles of the students studying at the Faculty of Education and Faculty of Engineering. Therefore, survey method was used to gather data so that some conclusions could be drawn from the sample and later some generalization for the populations could be made (Cohen, et al., 2007).

3.2 Population and Sampling

Population is the larger group from which the survey sample is selected. The subset of the larger group is called a sample and data is obtained from this sample (Clark &

Creswell, 2014; Fraenkel, Wallen, & Hyun, 2008). In this current study there were four different populations from which the samples were drawn:

1) all students studying at the Faculty of Education at EMU,
2) all students studying at the Faculty of Engineering at EMU,
3) all faculty members in the Faculties of Education in Turkey and North Cyprus,
4) all faculty members in the Faculties of Engineering in Turkey and North Cyprus

For the student participants, a subset of probability sampling which is a random sampling procedure was employed. Out of 965 participants, 909 student participant's records were found to be valid and 513 student participants were from the Faculty of Education and 396 student participants were from the Faculty of Engineering. The characteristics of the student sample studying at the Faculty of Education are shown in Table 2.

Table 2. Characteristics of the student participants studying at the Faculty of Education (N=513)

Faculty of Education		N	%
Gender	Male	203	39.6
	Female	310	60.4
Semester Studying	1-2	241	47.0
	3-4	123	24.0
	5-6	59	11.5
	7-8	86	16.8
	9 and above	4	0.8
Age	17-18	18	3.5
	19-20	212	41.3
	21-22	189	36.6
	23-24	70	13.6
	25 and above	24	4.7

As can be seen in Table 2, 203 (%39.6) of the student participants studying at the Faculty of Education were male and 310 (%60.4) of the participants were female. Regarding the semester they were studying, 241 (%47.0) of them were in their 1-2, 123 (%24.0) of them were in their 3-4, 59 (%11.5) of them were in their 5-6, 86 (%16.8) of them were in their 7-8 and 4 (%0.8) of them were in their 9 and above semesters.

Table 3. Characteristics of the student participants studying at the Faculty of Engineering (N=396)

Faculty of Engineering		N	%
Gender	Male	345	87.1
	Female	51	12.9
Semester Studying	1-2	149	37.6
	3-4	87	22.0
	5-6	83	21.0
	7-8	68	17.2
	9 and above	9	2.3
Age	17-18	109	27.5
	19-20	120	30.3
	21-22	71	17.9
	23-24	59	14.9
	25 and above	37	9.3

As can be seen in Table 3, 345 (%87.1) of the student participants studying at the Faculty of Engineering were male and 51 (%12.9) of the participants were female. Regarding the semester they were studying, 149 (%37.6) of them were in their 1-2, 87 (%22.0) of them were in their 3-4, 83 (%21.0) of them were in their 5-6, 68 (%17.2) of them were in their 7-8 and 9 (%2.3) of them were in their 9 and above semesters.

The third set of population was all faculty members in the Faculties of Education in Turkey and North Cyprus with at least PhD. degree. Because there were limited number of instructors with PhD. degree teaching at faculties in the universities in North

Cyprus, instructors in Turkey whose e-mail addresses were also available on the internet were contacted via an online survey tool 'Surveymonkey' and they were kindly asked to contribute to the study as participants. Therefore, for the instructor participants, a sub-set of non-probability sampling technique called convenience sampling method was used. Convenience sampling is described as selecting participants who are available and accessible (Clark & Creswell, 2014; Fraenkel, Wallen, & Hyun, 2008).

Table 4. Characteristics of the instructor participants teaching at the Faculties of Education (N=300)

Faculties of Education		N	%
Gender	Male	120	40.0
	Female	180	60.0
Age	21-30	3	1.0
	31-40	113	37.7
	41-50	94	31.3
	51-60	77	25.7
	61 and above	13	4.3
Work Experience	1-5	7	2.3
	6-10	22	7.3
	11-15	74	24.7
	16-20	65	21.7
	21 and more	132	44.0
Academic Rank	Dr.	30	10.0
	Assist. Prof.	106	35.3
	Assoc. Prof.	92	30.7
	Prof. Dr.	72	24.0

The characteristics of the instructor participants who were teaching at the Faculties of Education were displayed in Table 4. As can be seen 120 (%40) of the instructor participants were male and 180 (%60) of the instructor participants were female. Regarding the age of the instructor participants 3 (%1.0) of them were between 21-30, 113 (%37.7) of them were between 31-40, 94 (%31.3) of them were between 41-50, 77 (%25.7) of them were between 51-60, and 13 (%4.3) of them were 61 and above years old. With respect to the work experience, 7 (%2.3) instructor participants had between 1-5 years of work experience, 22 (%7.3) instructor participants had between 6-10 years of work experience, 74 (%24.7) instructor participants had between 11-15 years of work experience, 65 (%21.7) instructor participants had between 16-20 years of work experience, and 132 (%44.0) instructor participants had 21 and more years of work experience. Regarding the academic rank of the participants, 30 (%10.0) of them had Dr. title, 106 (%35.3) of them were Assistant Prof. Dr., 92 (%30.7) of them were Associate Prof. Dr., 72 (%24.0) of them were Prof. Dr.

The characteristics of the instructor participants who were teaching at the Faculties of Engineering were displayed in Table 5.

Table 5. Characteristics of the instructor participants teaching at the Faculties of Engineering (N=259)

Faculties of Engineering		N	%
Gender	Male	193	74.5
	Female	66	25.5
Age	21-30	1	0.4
	31-40	92	35.5
	41-50	111	42.9
	51-60	32	12.4
	61 and above	23	8.9
Work Experience	1-5	6	2.3
	6-10	20	7.7
	11-15	58	22.4
	16-20	65	25.1
	21 and more	110	42.5
Academic Rank	Dr.	22	8.5
	Assist. Prof.	52	20.1
	Assoc. Prof.	111	42.9
	Prof. Dr.	74	28.6

As can be seen 193 (%74.5) of the instructor participants were male and 66 (%25.5) of the instructor participants were female. Regarding the age of the instructor participants 1 (%0.4) of them was between 21-30, 92 (%35.5) of them were between 31-40, 111 (%42.9) of them were between 41-50, 32 (%12.4) of them were between 51-60, and 23 (%8.9) of them were 61 and above years old. With respect to the work experience, 6 (%2.3) instructor participants had between 1-5 years of work experience, 20 (%7.7) instructor participants had between 6-10 years of work experience, 58 (%22.4) instructor participants had between 11-15 years of work experience, 65 (%25.1) instructor participants had between 16-20 years of work experience, and 110 (%42.5) instructor participants had 21 and more years of work experience. Regarding the academic rank of the participants, 22 (%8.5) of them had Dr. title, 52 (%20.1) of them were Assistant Prof. Dr., 111 (%42.9) of them were Associate Prof. Dr., 74 (%28.6) of them were Prof. Dr.

3.3 Data Collection

The data collection for the student participants was done between February-June 2013. In order to collect data from the student participants, Synchronous Technological Administration Method suggested by Yaratan and Suphi (2013) was employed and students were visited during the class hours. Firstly, the students were informed about the aim of the study and those who wished not to participate remained silent during the administration of the questionnaire. Those students who wished to participate were distributed an optic answer sheet, provided a pencil and were asked to mark their answers on the optic answer sheet. By using a power point presentation, the researcher projected the questionnaire items one by one on a screen with the possible answers and read each item aloud so that the student participants both heard and read the questionnaire items at the same time. After, each questionnaire item was answered by the participants, the researcher moved to the next item and this was repeated until the end of the questionnaire. In this way, the students had the chance to ask for any clarifications about the items in the instruments.

In order to collect data from the instructor participants, because there were a limited number of instructors with a PhD. degree teaching at the universities in North Cyprus, instructors teaching at different universities in Turkey were contacted through their e-mails. Therefore, a web-based survey (Multiple Intelligence Scale for Fields of Study) was prepared and administered through "SurveyMonkey", an online survey development company, between July-October 2015. To this aim, an account from the SurveyMonkey was created and the Multiple Intelligence Scale for Fields of Study was transferred to the web to be used over internet.

As the aim was to reach the instructors through their e-mails, the instructors, teaching at the Faculties of Education and Faculties of Engineering in Turkey, whose e-mail addresses were available at the web-pages of their institutions were collected and the survey link was sent to their e-mail addresses. In the e-mail massage, the instructors were informed about the aim of the study, some information about the researcher and the supervisor were provided, and they were kindly invited to fill in the questionnaire by clicking the survey link. There was also a link in the e-mail message which gave the instructors the chance to reject both completing the questionnaire and preventing receiving further messages from the researcher. Another link was also available so that by clicking it, the instructor would not receive any e-mail messages from the SurveyMonkey company forever. The supervisor's and the researcher's e-mail addresses and phone numbers were available in case the instructor participants wished to contact.

Response rates could be followed at the SurveyMonkey web page as the instructor participants completed the questionnaire and after about two weeks time a reminder message were sent to the instructors who had not attempted to complete the questionnaire. After the first reminder message, no more reminder messages were sent to the instructors who did not respond.

3.4 Data Collection Instruments

Two different sets of data were collected to the aim of this study. One set of data was collected from the student participants using the Multiple Intelligence Inventory so that the data would reveal demographic information and the intelligence profiles of the student participants. The other set of data was collected from instructor participants using the Multiple Intelligence Scale for Fields of Study so that the collected data would not only reveal some demographic information about the instructor participants but also the required intelligence profiles for different fields of study.

3.4.1 Multiple Intelligence Inventory (MII)

Although there are a number of different Multiple Intelligence Inventories available like Teele Inventory of Multiple Intelligences (TIMI) and Multiple Intelligence Development Assessment Scales (MIDAS), for student participants McKenzie's Multiple Intelligence Inventory (2005) was adapted and used.

The Multiple Intelligence Inventory for the student participants consisted of two parts. The first part aimed to gather demographic data about the student participants and included questions about participants' faculty/department, student number, gender, age, the semester they were studying, and nationality.

For the second part of the inventory, items from a Multiple Intelligence Inventory prepared by McKenzie (2005) was used to identify the dominant intelligence profiles of student participants. McKenzie's instrument was also used by some researchers (Hashemian & Adibpour, 2012; Oskooei & Salahshoor, 2014; Ramadan, 2014; & Razmjoo, Sahragard & Sadri, 2009) and it was found to be reliable. There were ten items for each intelligence type, total 90 items within the inventory (see Appendix A for the final version of the Multiple Intelligences Inventory). The original inventory was in English and because it was going to be used in a Turkish setting, Translation-Back Translation method was used and firstly the questionnaire was translated into Turkish. Then it was back translated from Turkish to English and the back translated version was compared with the original version to see whether or not the items in the both version had the same meaning. For the content and face validity of the inventory, several checks and modifications were made. Firstly, three English Language Teachers whose native language was Turkish were asked to examine whether there were any unclear items for the Turkish version of the inventory. Then two experts in the area of Multiple Intelligences were asked to examine the items for each intelligence area. Following the review of the experts, some rewordings were made. After the modifications, the supervisor and two members of the Thesis Monitoring Committee were asked to give feedback about the Turkish version of the inventory. Following their feedback some further modifications were made and 47 students were asked to examine the understandability of the inventory and based on their feedback, final modifications were made. The original version of the Multiple Intelligence Inventory consisted of ten items for each intelligence area, total 90 items. However, after validity and reliability analyses and after exploratory and confirmatory factor analyses which will be discussed in detail in the following chapter, some items were deleted and the final version of the Multiple Intelligence Inventory had 40 items. The items in the inventory were presented on a 5 point Likert scale ranging from a to e where (a) totally agree, (b) agree, (c) undecided, (d) disagree, and (e) totally disagree.

3.4.2 Multiple Intelligence Scale for Fields of Study (MISFS)

Multiple Intelligence Scale for Fields of Study for the instructor participants consisted of two parts. The first part of the instructor scale aimed to collect demographic data about instructors and included questions about instructors' Major field of Study, Area of Specialization, Faculty/Department they were currently teaching, Gender, Age, Year of Employment as a Lecturer, Nationality, and Academic Rank.

For the second part of the scale, the same inventory used for the student participants which was originally prepared by McKenzie (2005) was adapted and instructors were asked to respond to the items for the purpose of finding out the required intelligence types of students for different fields of study. The original inventory had 10 items for each intelligence (total 90 items) and the original language was English. Because it was going to be used in a Turkish setting, it was translated into Turkish. For the content related evidence of validity, the items in the questionnaire was checked by the supervisor and by the members of the Thesis Monitoring Committee and some modifications were made for the items which seemed unclear. Then the revised scale was checked by two measurement and evaluation experts and further modifications were made. Finally, the items in the scale were checked by 3 experts and after their feedback, further modifications were made. The original version of the Multiple

Intelligence Scale consisted of ten items for each intelligence area, total 90 items. However, after validity and reliability analyses and after exploratory and confirmatory factor analyses which will be discussed in detail in the following chapter, some items were deleted and the final version of the Multiple Intelligence Inventory had 52 items. The items in the scale were presented on a 5 point Likert scale ranging from a to e where (a) absolutely necessary, (b) necessary, (c) not sure, (d) unnecessary, and (e) absolutely unnecessary (see Appendix B for the final version of the Multiple Intelligences Scale for Fields of Study).

3.5 Reliability

According to Ho (2006), reliability is a prerequisite for the validity test and when a new instrument has been developed, one of the first things that should be considered is to be sure whether the instrument is sufficiently reliable to measure what it intends to measure (Aiken,1999). In other words, the researcher should make sure how consistent the instrument is (Bouma & Ling, 2006). The reliability test is expressed by a positive decimal number and values can range from .00 to 1.00 where 1.00 showing a perfect reliability and .00 showing total absence of reliability (Aiken, 1999).

Reliability in quantitative research can be measured in two ways by the split half technique and by the alpha coefficient both of which show internal consistency (Cohen, et al., 2007). Internal consistency is considered as the most common method of estimating reliability (Furr, 2011). In the present study the alpha coefficient which is popular among researchers was used to check the reliability of the instruments (Furr, 2011).

There are different views for the lower limit of the alpha coefficient. According to Cohen et al. (2007, p. 506) for the alpha coefficient the following guidelines can be used:

- >0.90 very highly reliable
- 0.80-0.90 highly reliable
- 0.70-0.79 reliable
- 0.60-0.69 marginally reliable
- <0.60 unacceptable low reliability

According to Furr (2011) the cut-off values of good and poor reliability are not clear but values of .70 or .80 are generally viewed as sufficient for research.

3.6 Validity

"Validity refers to the appropriateness, meaningfulness, correctness, and the usefulness of the inferences a researcher makes" (Fraenkel and Wallen, and Hyun, 2008, p. 147). For both instruments used in the study, content related evidence of validity was assured by expert feedback. For both of the instruments, construct related validity analysis were done. Construct validity is considered as the queen of all types of validity and it is based on whether items in the instruments (observed variables) are indicators of the underlying latent variables or unobserved variables (Cohen, Manion, and Morrison, 2007; Harriggton, 2009).

In the current study, construct validity was assured by doing convergent and discriminant validity analysis. For the convergent validity, first exploratory factor analysis was completed using Statistical Package for Social Sciences (SPSS) software and then as a second check confirmatory factor analysis was done using AMOS.

Exploratory factor analysis is designed to find out how and to what extent the observed variables are connected to their underlying factors and the relationship between the observed and latent variables (factors) are represented by factor loadings (Byrne, 2001: Harriggton, 2009). In other words, all observed variables are related to every latent variable by a factor loading estimate (Hair, et al., 2009). In this current study the 9 kinds of intelligence proposed by Howard Gardner were the underlying factors and the questionnaire items were the observed variables.

Before the exploratory factor analysis was performed, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Barlett's Test of Sphericity was checked to see whether or not the data was appropriate for factor analysis. When the value of the KMO is around .90, it is said that there is marvelous compatibility and the lowest value of KMO should be .70 for compatibility. For the Barlett's test of Sphericity, when the significance (sig) value is less than the alpha level then it means the data set are appropriate for factor analysis.

After checking the KMO and Barlett's Test of Sphericity values, factor loadings were computed to check whether or not the questionnaire items (variables) were loaded on the relevant factors.

Factor loadings indicate how well the degree of correspondance between the variable and the factor. Higher loadings on a factor indicate that the variables are representing that specific factor. In the literature there are different views about the lower limit of the factor loadings. According to Ho (2006) cut-off value .33 was considered to show practical significance but on the other hand the cut-off value .30 for factor loadings was considered significant by Hair, et al., (2009). According to Furr (2011, p.32) when interpreting the magnitudes of factor loadings, many researchers consider loadings above .30 or .40 as reasonably strong, with loadings of .70 or .80 being very strong.

Hair, et al., (2009, p. 115) suggessts that sample size should be considered when deciding about the significance of the factor loadings. Table 6. displays the quidelines for factor loadings and the related sample size.

Table 6. Factor Loadings and Sample Size Needed for Significance

Factor Loadings	Sample Size Needed for Significance
.30	350
.35	250
.40	200
.45	150
.50	120
.55	100
.60	85
.65	70
.70	60
.75	50

In this current study almost all of the factor loadings both for Multiple Intelligence Instrument and Multiple Intelligence Scale for Fields of Study were found to be higher than the desired levels showing a good representation of the relevant factors.

For the convergent validity, confirmatory factor analysis was done by using AMOS. Confirmatory factor analysis has been one of the techniques of choice of researchers for many disciplines and is seen as a must for researchers in the social sciences (Hooper, Coughlan, & Mullen, 2008; Hu and Bentler, 1999). By using AMOS, the researcher can assess how well the observed (indicator) variables represents the unobserved (latent) variable under the hyphotesized constructs. Confirmatory factor analysis is used to test the model and the model is often represented visually by diagrams (Hair, et al., 2009; Weston and Gore, 2006; Gallagher and Ting, and Palmer, 2008). “The diagram shows the relationships between the observed and the latent variables, among the latent variables and between covariates and the latent variables” (Bartholomew, 2008, p. 291).

To assess the model fit, the reasercher should consider the values of the goodness-of-fit measures. The goodness-of-fit measures can be classified into three sub-titles (Gallagher, et al., 2008; Ho, 2006):

1) Absolute Fit Measures:

By examining the absolute fit measures the researcher can determine how well the proposed model fits the collected data. There are several fit measures like chi-square statistics (x^2), the Goodness-of-fit statistics (GFI), and Root Mean Square Error of Approximation (RMSEA) among the absolute fit measures (Gallagher, et al., 2008; Ho, 2006).

2) Incremental (Comperative) Fit Measures:

By examining the incremental fit measures, the researcher can compare the proposed model and the null (independence) model where in the null model the observed variables are assumed to be uncorrolated with each other. There are five fit measures for the incremental fit measures and they are Tucker-Lewis Index (TLI), Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), and Comperative Fit Index (CFI). The values of the incremental fit measures range from 0 showing poor fit of the model to 1 showing a perfect fit of the model (Ho, 2006).

3) Parsimonious Fit Measures

By examining the parsimonious fit measures the researcher can make sure if the model fit has been achieved. Parsimonious Normed Fit Index (PNFI), Parsimony Goodness-of-fit Index (PGFI), Consistent Akaike Information Criterion (CACI), Expected Cross Validitation Index (ECVI), and Akaike Information Criterion (AIC) are among the fit indices of this measure (Gallagher, et al., 2008; Ho, 2006). As reported above there are many there are many goodness-of-fit measures to assess the Model Fit and which measures to report is a matter of personal preference. However, often multiple indices are reported (Tabachnick and Fidell, 2007). In this current study for the confirmatory factor analysis, the Comperative Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), Goodness-of-fit statistics (GFI), and Incremental Fit Index (IFI) are used to assess the model fit.

The Comperative Fit Index (CFI) and Root Mean Square Error of Approximation (RMSEA) are perhaps the most frequently reported fit indices (Hu and Bentler, 1999; Tabachnick and Fidell, 2007). For RMSEA values from 0.05 to 0.08 are considered acceptable and values from 0.08 to 0.10 indicate mediocre fit. If the value is greater than 0.10 it indicates a poor fit (Ho, 2006). For the CFI, NFI, and IFI values can range from 0 (very poor fit) to 1 where large values show a good fit (Ho, 2006). However, Byrne (2001) suggests 0.90 to be the minimum value for CFI, NFI, and IFI. Similar to CFI, NFI, and IFI, for the GFI any value greater than 0.90 is considered to prove a good fit (Kelloway, 1998). For the discriminant validity analysis, Chi-square values and some goodness-of-fit measures like RMSEA, CFI, AIC, and EVCI were reported to prove the evidence of discriminant validity.

Chapter 4

ANALYSIS AND FINDINGS

In this current chapter, statistical analyses for the instruments and research questions will be presented. First, the results of statistical analyses for reliability and validity of the Multiple Intelligence Inventory, which was administered on student participants will be displayed. Then, reliability and validity analyses for the instructor scale (Multiple Intelligence Scale for Fields of Study) will be presented. Finally, the statistical analyses for each research question will be presented.

As mentioned in the Method section, the original inventory prepared by McKenzie (2005) was adapted and used for MII and MISFS. The original inventory has 10 items for each of the nine intelligence areas. In other words, McKenzie's scale had nine separate sections each of which could be considered as an independent scale. Hence, there were items in one scale that could have high correlations with items in another scale that made it almost impossible to divide the 90-item combined scale into nine separate scales. In this situation for each of the nine scales exploratory factor analysis could be employed separately, but the aim was to reduce the number of scales. To attain discriminant validity between the intelligence areas, it has been decided to do factor analysis for 3 scales at a time. Therefore, during the exploratory and confirmatory factor analyses, intelligence areas were grouped into three groups each comprising three of the least overlapping scales. At the end of the analyses the instrument so obtained had three separate scales instead of nine.

4.1 Statistical Analyses for Multiple Intelligence Inventory (MII)

As stated in the previous chapter, the Multiple Intelligence Inventory was administered to 909 student participants. Apart from the demographic items which constituted the first part of the MII, the second part of the inventory had 90 items. In order to test the factorability of these 90 items, exploratory factor analysis was done using SPSS. To determine whether or not the data were appropriate for factor analysis, Kaiser-Meyer-Olkin Measure of Sampling Adequecy (KMO) and Barlett's Test of Sphericity was checked. As stated in the method section, the lowest value of KMO should be .70 and the Barlett's Test of Sphericity should be significant for the data to be suitable for factor analysis.

As can be seen in Table 7, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) for verbal/linguistic, naturalistic, and bodily/kinesthetic intelligences was found to be .750 which is above the commonly recommended value of .70 and the Barlett's Test of Sphericity was also found significant, $X^2(120) = 1286.627$, $p = .000 < .01$. Hence factor analysis for these three latent variables was appropriate.

Table 7. KMO and Barlett's Test of Sphericity for Verbal/Linguistic, Naturalistic, and Bodily/Kinesthetic Intelligences.

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.750
Barlett's Test of Sphericity	Approx. Chi-Square	1286.627
	df	120
	Sig.	.000

Table 8 presents the values for the logical/mathematical, existential, and musical intelligences. As can be seen from the table below, KMO was found to be .769 which is above the required value, and Barlett's Test of Sphericity was significant, $X^2(153)$

=1881.211, p=.000<.01. Hence, factor analysis for these three latent variables was also appropriate.

Table 8. KMO and Barlett's Test of Sphericity for Logical/Mathematical, Existential, and Musical Intelligences.

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.769
Barlett's Test of Sphericity	Approx.Chi-Square	1881.211
	df	153
	Sig.	.000

As can be seen in Table 9, KMO for interpersonal, intrapersonal, and visual/spatial intelligences was found to be .735 which is above the limits and the Barlett's Test of Sphericity was also found significant, $X^2(153)$ =1413.927,p=.000<.01. Hence, factor analysis for this third set of three latent variables was also appropriate.

Table 9. KMO and Barlett's Test of Sphericity for Interpersonal, Intrapersonal, and Visual/Spatial Intelligences.

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.735
Barlett's Test of Sphericity	Approx. Chi-Square	1413.927
	df	153
	Sig.	.000

After checking the KMO and Barlett's Test of Sphericity values, factor loadings were calculated by principal components analysis with varimax rotation to ensure whether or not the scale items (variables) were loaded on the relevant factors. As three factors were aimed for each factor analysis, the number of factors was fixed to three at the beginning of each analysis.

In the literature there are different views about the lower limit of the factor loadings. According to Ho (2006) cut-off value .33 was considered to show practical significance but on the other hand the cut-off value .30 for factor loadings was considered significant by Hair, et al., (2009). According to Furr (2011) when interpreting the magnitudes of factor loadings, many researchers consider loadings above .30 or .40 as reasonably strong, with loadings of .70 or .80 being very strong. Although some researchers accept lower factor loadings as acceptable, in this current study the suppressed absolute value was set to .33 so any factors with loadings less than .33 was deleted.

Factor loadings of items of verbal/linguistic, naturalistic, and bodily/kinesthetic intelligences are displayed in Table 10. The factor analysis was conducted with 30 items at the beginning and 14 items were eliminated because some of the items were cross-loaded or some items had low factor loadings on any of the factors. Of the remaining sixteen items six of them loaded on naturalistic intelligence, five on verbal/linguistic intelligence, and the remaining five on bodily/kinesthetic intelligence.

Table 10. Factor Loadings of items of Verbal/Linguistic, Naturalistic, and Bodily/Kinesthetic Intelligences

Rotated Component Matrix[a]	1	2	3
Nat5	.719		
Nat2	.719		
Nat8	.653		
Nat4	.591		
Nat7	.548		
Nat9	.482		
Verb/Ling7		.710	
Verb/Ling5		.598	
Verb/Ling10		.595	
Verb/Ling 1		.583	
Verb/Ling 9		.342	
Bod/Kinest 6			.761
Bod/Kinest 5			.690
Bod/Kinest 4			.670
Bod/Kinest10			.593
Bod/Kinest 1			.369

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Factor loadings of items of logical/mathematical, existential, and musical intelligences are displayed in Table 11. Because of low factor loadings some items were deleted. As can be seen in Table 11, after omitting two items from existential and five from both musical and logical/mathematical Intelligences, most factor loadings show reasonably strong and three loadings show to be very strong.

Table 11. Factor Loadings of items of Logical/Mathematical, Existential, and Musical Intelligences

Rotated Component Matrix[a]	1	2	3
Math8	.699		
Math7	.690		
Math1	.681		
Math4	.596		
Math2	.517		
Existent8		.739	
Existent9		.738	
Existent4		.697	
Existent10		.670	
Existent7		.524	
Existent6		.488	
Existent3		.393	
Existent2		.385	
Musical4			.717
Musical3			.695
Musical10			.642
Musical9			.618
Musical2			.490

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 4 iterations.

Factor loadings of items of interpersonal, intrapersonal, and visual/spatial intelligences are displayed in Table 12. Because of low factor loadings or cross-loading, three items from interpersonal intelligence, five items visual/spatial, and four items from intrapersonal intelligences are removed. The remaining factor loadings are either suggesting reasonable or strong factorability.

Table 12. Factor Loadings of items of Interpersonal, Intrapersonal, and Visual/Spatial Intelligences

Rotated Component Matrix[a]	1	2	3
Interpersonal3	.644		
Interpersonal7	.596		
Interpersonal8	.581		
Interpersonal9	.533		
Interpersonal2	.493		
Interpersonal10	.478		
Interpersonal5	.470		
Intrapersonal3		.728	
Intrapersonal9		.689	
Intrapersonal8		.643	
Intrapersonal2		.608	
Intrapersonal1		.540	
Intrapersonal4		.447	
Visual/Spatial5			.782
Visual/Spatial3			.682
Visual/Spatial6			.645
Visual/Spatial9			.566
Visual/Spatial4			.398

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

In this current study almost all of the factor loadings for Multiple Intelligence Instrument were found to be higher than the desired levels showing a good representation of the relevant factors.

4.1.1 Reliability of Multiple Intelligence Inventory

In order to find out the level of internal consistency for the Multiple Intelligence Inventory, an estimation of reliability was done by calculating the alpha coefficient for each intelligence area.

As can be seen in Table 13, the Cronbach Alpha internal consistency values for all intelligence areas are above the cut-off values stated by Cohen. Et al. (2007).

Table 13. Cronbach's alpha values of Multiple Intelligence Inventory

Intelligence Areas	Cronbach's Alpha	N of Items
Verbal/Ling	.731	5
Bodily/Kinesthetic	.640	5
Naturalistic	.674	6
Logic/Maths	.672	5
Existential	.757	8
Musical	.666	5
Interpersonal	.625	7
Intrapersonal	.682	6
Visual/Spatial	.636	5

4.2 Statistical Analysis for Multiple Intelligence Scale (MISFS)

As stated in the previous chapter, the Multiple Intelligence Scale for Fields of Study was administered to 559 instructor participants. Apart from the demographic items which constituted the first part of the MISFS, the second part of the inventory had 90 items. In order to test the factorability of these 90 items, exploratory factor analysis was done using SPSS. However, before taking into consideration the exploratory factor analysis results, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Barlett's Test of Sphericity was checked to see whether or not the data were appropriate for factor analysis. The lowest value of KMO should be .70 and the Barlett's test of Sphericity should be significant for the data to be adequate for exploratory factor analysis.

As can be seen in Table 14, Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) for verbal/linguistic, naturalistic, and bodily/kinesthetic intelligences was found to be .726 which is above the commonly recommended value of .70 and the Barlett's Test of Sphericity was also found significant, $X^2(78) = 1817.59$, $p=.000<.01$. Hence factor analysis for these three latent variables was appropriate.

Table 14. KMO and Barlett's Test of Sphericity for Verbal/Linguistic, Naturalistic, and Bodily/Kinesthetic Intelligences.

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.726
Barlett's Test of Sphericity	Approx. Chi-Square	1817.590
	df	78
	Sig.	.000

Table 15 below presents the values for the logical/mathematical, existential, and musical intelligences. As can be seen in the table, KMO was found to be .781 which is above the required value, and Barlett's Test of Sphericity was significant, $X^2(325) = 1464.01$, $p=.000<.01$. Hence factor analysis for these three latent variables was also appropriate.

Table 15. KMO and Barlett's Test of Sphericity for the Logical/Mathematical, Existential, and Musical Intelligences

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.781
Barlett's Test of Sphericity	Approx. Chi-Square	1464.01
	df	325
	Sig.	.000

Table 16 displays KMO for interpersonal, intrapersonal, and visual/spatial intelligences. As can be seen, KMO was found to be .786 which is above the limits and the Barlett's Test of Sphericity was also found significant, $X^2(171) = 879.63$, $p=.000<.01$. Hence, factor analysıs for this third set of three latent variables was also appropriate.

Table 16. KMO and Barlett's Test of Sphericity for the Interpersonal, Intrapersonal, and Visual/Spatial Intelligences

Keiser-Meyer-Olkin Measure of Sampling Adequacy		.786
Barlett's Test of Sphericity	Approx. Chi-Square	789.63
	df	171
	Sig.	.000

After checking the KMO and Barlett's Test of Sphericity values, factor loadings were computed by using principal components analysis with Varimax rotation to check whether or not the scale items (variables) were loaded on the relevant factors. As three factors were aimed for each factor analysis, the number of factors was fixed to three at the beginning of each analysis.

As mentioned earlier in this chapter, Ho (2006) suggests a cut-off value of .33 for practical significance but on the other hand the cut-off value .30 for factor loadings was considered significant by Hair, et al., (2009). A similar view from Furr (2011) suggests interpreting the magnitudes of factor loadings with .30 or .40 as reasonably strong and factor loadings of .70 or .80 being very strong. In this current study the suppress absolute value was set to .33 so any factors with loadings less than .33 was deleted.

Factor loadings of items of verbal/linguistic, naturalistic, and bodily/kinesthetic intelligences are displayed in Table 17. The factor analysis was conducted with 30 items at the beginning and 14 items were eliminated because of low factor loadings on any of the factors. Of the remaining sixteen items six of them loaded on naturalistic intelligence, five on verbal/linguistic intelligence, and the remaining five on bodily/kinesthetic intelligence.

Table 17. Factor Loadings of items of Verbal/Linguistic, Naturalistic, and Bodily/Kinesthetic Intelligences

Rotated Component Matrix[a]	1	2	3
Nat7	.743		
Nat5	.708		
Nat8	.646		
Nat2	.640		
Nat9	.618		
Nat4	.507		
Verb/Ling6		.809	
Verb/Ling7		.808	
Verb/Ling8		.779	
Verb/Ling 5		.576	
Verb/Ling 1		.359	
Bod/Kinest 6			.719
Bod/Kinest 5			.693
Bod/Kinest 10			.637
Bod/Kinest2			.531
Bod/Kinest 4			.525

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 5 iterations.

Factor analysis of items of the logical/mathematical, existential, and musical intelligences in Table 18 reveals that after omitting 2 items from both existential and musical intelligences, most factor loading show reasonably strong and four loadings show very strong factorability. Because all the factor loadings for logical/mathemetical intelligence items are above the desired levels, no item deletion was needed.

Table 18. Factor Loadings of items of Logical/Mathematical, Existential, and Musical Intelligences

Rotated Component Matrix[a]	1	2	3
Math4	.720		
Math2	.707		
Math1	.634		
Math8	.615		
Math7	.585		
Math5	.559		
Math3	.522		
Math9	.507		
Math10	.496		
Math6	.376		
Existent8		.742	
Existent10		.704	
Existent9		.689	
Existent4		.632	
Existent3		.516	
Existent6		.509	
Existent1		.479	
Existent2		.464	
Musical4			.699
Musical3			.644
Musical8			.634
Musical5			.603
Musical9			.598
Musical10			.557
Musical2			.472
Musical1			.393

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 4 iterations.

Factor loadings of items of interpersonal, intrapersonal, and visual/spatial intelligences are displayed in Table 19. Because of low factor loadings, four items from interpersonal intelligence, four items from visual/spatial, and three items from intrapersonal intelligences are removed. The remaining factor loadings are either suggesting reasonable or strong factorability.

Table 19. Factor Loadings of items of Interpersonal, Intrapersonal, and Visual/Spatial Intelligences

Rotated Component Matrix[a]	1	2	3
Interpersonal6	.707		
Interpersonal5	.703		
Interpersonal3	.697		
Interpersonal7	.626		
Interpersonal2	.592		
Interpersonal9	.424		
Intrapersonal3		.675	
Intrapersonal7		.655	
Intrapersonal9		.653	
Intrapersonal1		.650	
Intrapersonal8		.614	
Intrapersonal10		.469	
Intrapersonal4		.458	
Visual/Spatial7			.663
Visual/Spatial6			.656
Visual/Spatial2			.577
Visual/Spatial10			.576
Visual/Spatial9			.566
Visual/Spatial4			.332

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.
a. Rotation converged in 4 iterations.

In this current study all of the factor loadings for Multiple Intelligence Scale were found to be higher than the desired levels showing a good representation of the relevant factors.

4.2.1 Reliability of Multiple Intelligence Scale for Fields of Study

As reliability is considered as a prerequisite for the validity test when a new instrument is developed (Ho, 2006), and because it is one of the first things that should be considered for being sure whether the instrument is sufficiently reliable to measure what it intends to measure (Aiken,1999), reliability analysis using SPSS was done for the MISFS. In this way, it is aimed to be sure about the consistency of the instrument (Bouma and Ling, 2006). Internal consistency is considered as the most common method of estimating reliability (Furr, 2011). Hence, in the present study the alpha coefficient which is popular among researchers (Furr, 2011) was used to check the reliability of the Multiple Intelligence Scale.

The Cronbach's alpha values for intelligence areas are displayed in Table 20. According to Furr (2011) the cut-off values of good and poor reliability are not clear but Cohen et al. (2007) suggests 0.60 as the lower limit and 0.70 and above as reasonably reliable. As can be seen in Table 20, all the alpha levels for intelligence areas are at the required level.

Table 20. Cronbach's alpha values of intelligence areas

Intelligence Areas	Cronbach's Alpha	N of Items
Verbal/Ling	.731	5
Bodily/Kinesthetic	.650	5
Naturalistic	.725	6
Logic/Maths	.777	10
Existential	.765	8
Musical	.730	8
Interpersonal	.736	6
Intrapersonal	.725	7
Visual/Spatial	.608	6

4.3 Confirmatory Factor Analysis of MII and MISFS

Confirmatory factor analysis was conducted using AMOS to assess the discriminant and convergent validity of the instruments. According to Anderson and Gerbing (1998), factor loadings equal to .40 and higher prove that there is convergent validity. Therefore, after the confirmatory factor analysis, because of cross loading problems and low factor loadings, deletion of some items were needed. Also, as mentioned before in the method section, among the many goodness-of- fit measures, Comperative

Fit Index (CFI), Root Mean Square Error of Approximation (RMSEA), Normed Fit Index (NFI), Goodness-of-fit statistics (GFI), and Incremental Fit Index (IFI) are reported to prove the model fit.

4.3.1 Confirmatory Factor Analysis (CFA) of MII

The CFA of the student inventory is presented below. The model fit of verbal/linguistic, naturalistic, and bodily/kinesthetic intelligences are displayed in Figure 2.

The factor analysis was conducted with 16 items at the beginning and 4 items were eliminated because of low factor loadings on any of the factors. Of the remaining 12 items 5 of them loaded on naturalistic intelligence, 3 on verbal/linguistic intelligence, and the remaining 4 on bodily/kinesthetic intelligence.

The selected goodness-of-fit measures for this model shows that there is a good fit. RMSEA was found to be .049, GFI was found to be .937, NFI was found to be .789, IFI was found to be .855, and CFI was found to be .853 showing a good fit.

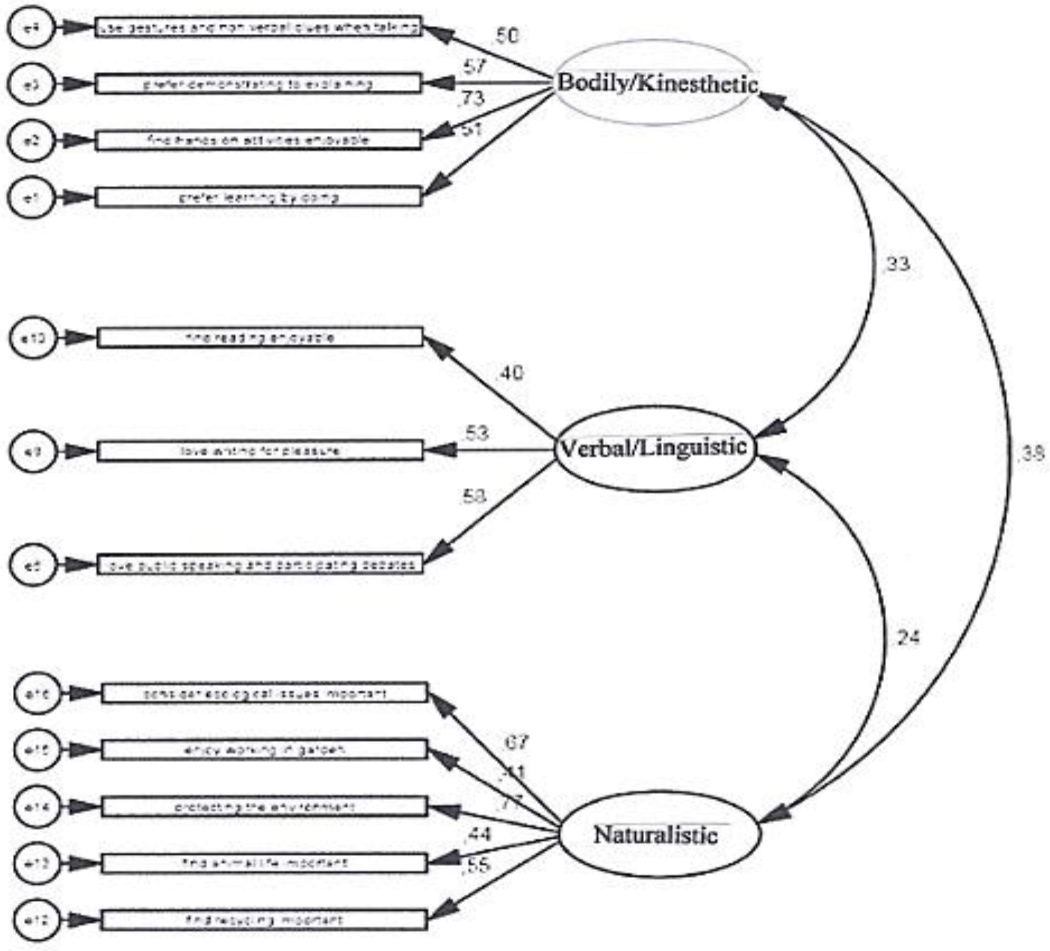

Figure 2. Model Fit of Verbal & Linguistic, Naturalistic, and Bodily & Kinesthetic Intelligences

Figure 3. presents the model fit of interpersonal, intrapersonal, and visual/spatial intelligences. The factor analysis was conducted with 18 items but because of cross-loadings and low factor loadings, 2 items both from the interpersonal and visual/spatial intelligences and 1 item from the intrapersonal intelligence were deleted. After removing those items, 5 items both for intrapersonal and interpersonal intelligence are strongly loaded, and 3 items were loaded on visual/spatial Intelligence and RMSEA was found to be .054, GFI was found to be .960, NFI was found to be .858, IFI was found to be .913, and CFI was found to be .912 which show a good fit.

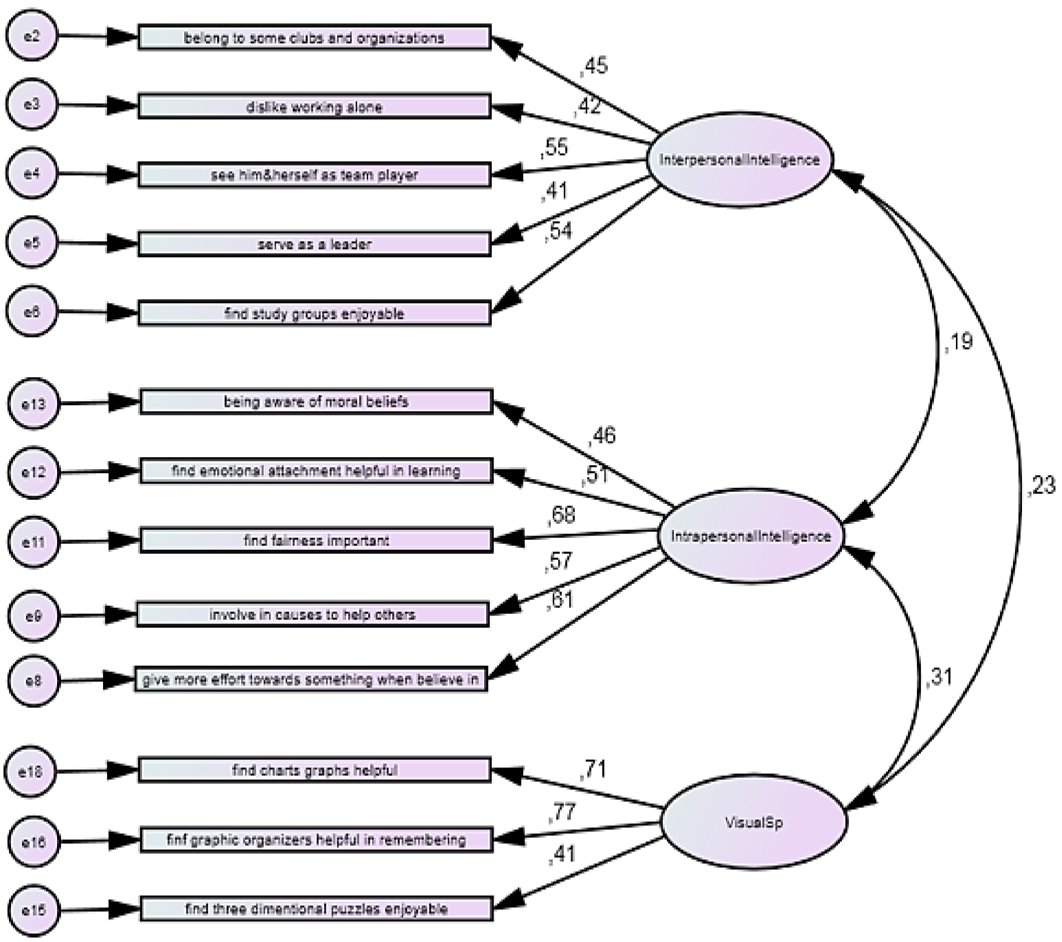

Figure 3. Model Fit of Interpersonal, Intrapersonal, and Visual/Spatial Intelligences

As can be seen in Figure 4, model fit of logical/mathematical, existential, and musical intelligences is presented. Because of low factor loadings, one item from each of the latent variables are deleted.

After deleting those 3 items, existential intelligence has 7 items, logical/mathematical intelligence has 4 items, and musical intelligence has 4 items loaded on them respectively and the model shows a good fit with RMSEA measured as .055, GFI as .931, NFI as .818, IFI as .868, and CFI as .867 which show a good fit.

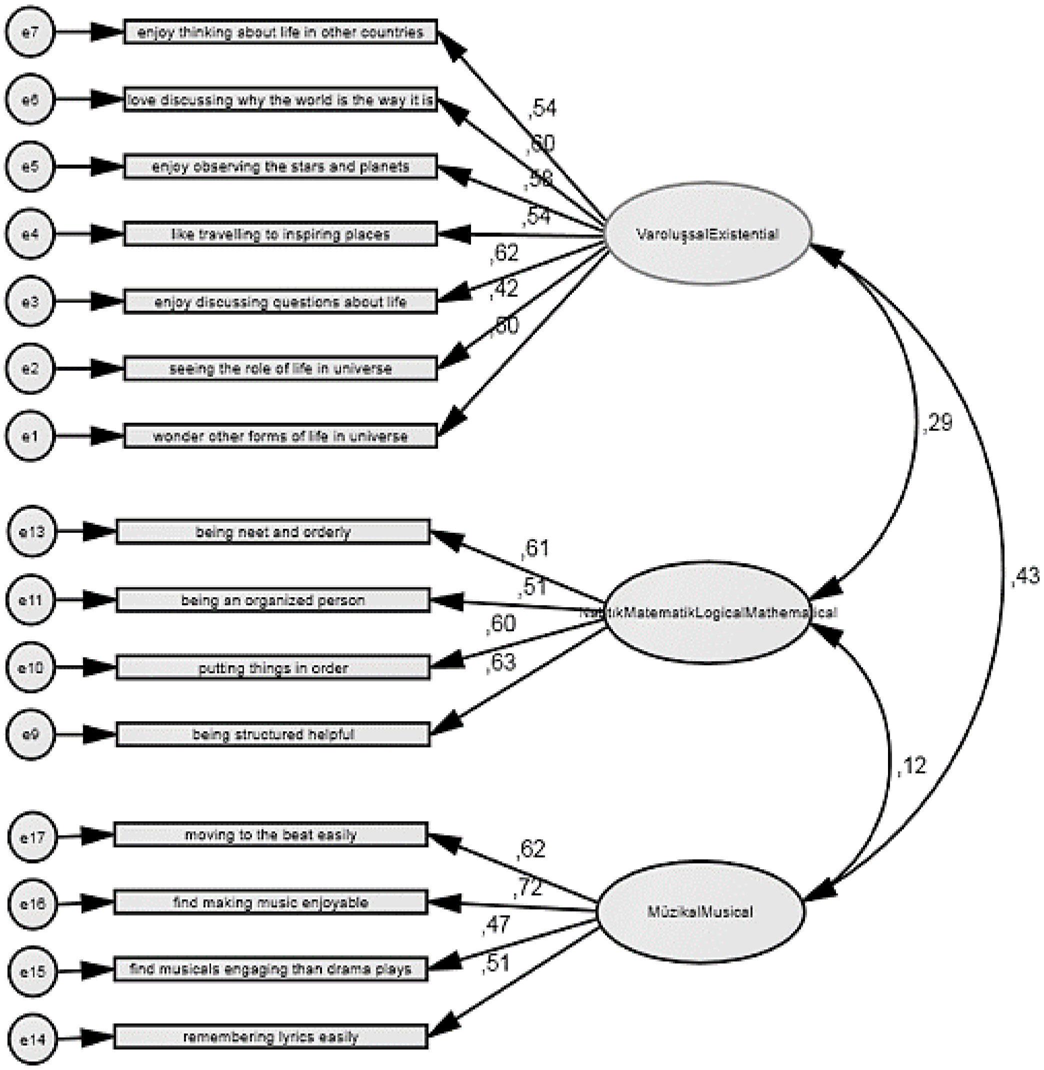

Figure 4. Model Fit of Logical/Mathematical, Existential, and Musical Intelligences

4.3.2 Confirmatory Factor Analysis (CFA) of MISFS

The CFA of the instructor inventory is presented below. The model fit of verbal/linguistic, naturalistic, and bodily/kinesthetic intelligences are displayed in Figure 5. The factor analysis was conducted with 16 items at the beginning and 2 items were eliminated because of low factor loadings on any of the factors.

Of the remaining 14 items 5 of them loaded on naturalistic intelligence, 4 on verbal/linguistic intelligence, and the remaining 5 on bodily/kinesthetic intelligence.

The selected goodness-of-fit measures for this model shows that there is a good fit. RMSEA was found to be .045, GFI was found to be .939, NFI was found to be .854, IFI was found to be .949, and CFI was found to be .947 showing a good fit.

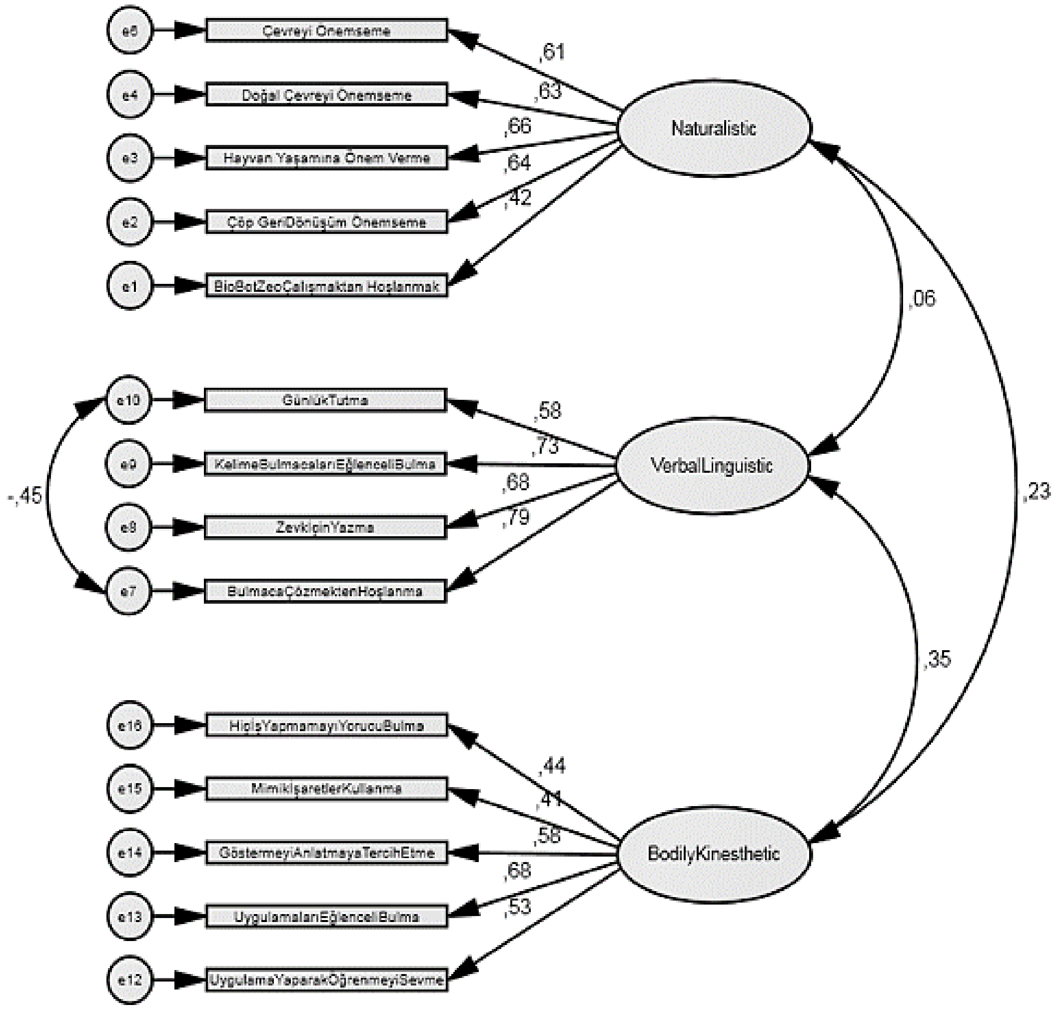

Figure 5. Model Fit of Verbal/Linguistic, Naturalistic, and Bodily/Kinesthetic Intelligences

As can be seen in Figure 6, model fit of logical/mathematical, existential, and musical intelligences is presented. Because of cross-loading problems in confirmatory factor analysis, 4 items from logical/mathematical intelligence, and one item both from existential and musical intelligences were removed. After deleting those items, both existential intelligence and musical intelligence has 7 items each, and logical/mathematical intelligence has 6 items and the model shows a good fit with RMSEA measured as .045, GFI as .910, NFI as .787, IFI as .920, and CFI as .918 which show a good model fit.

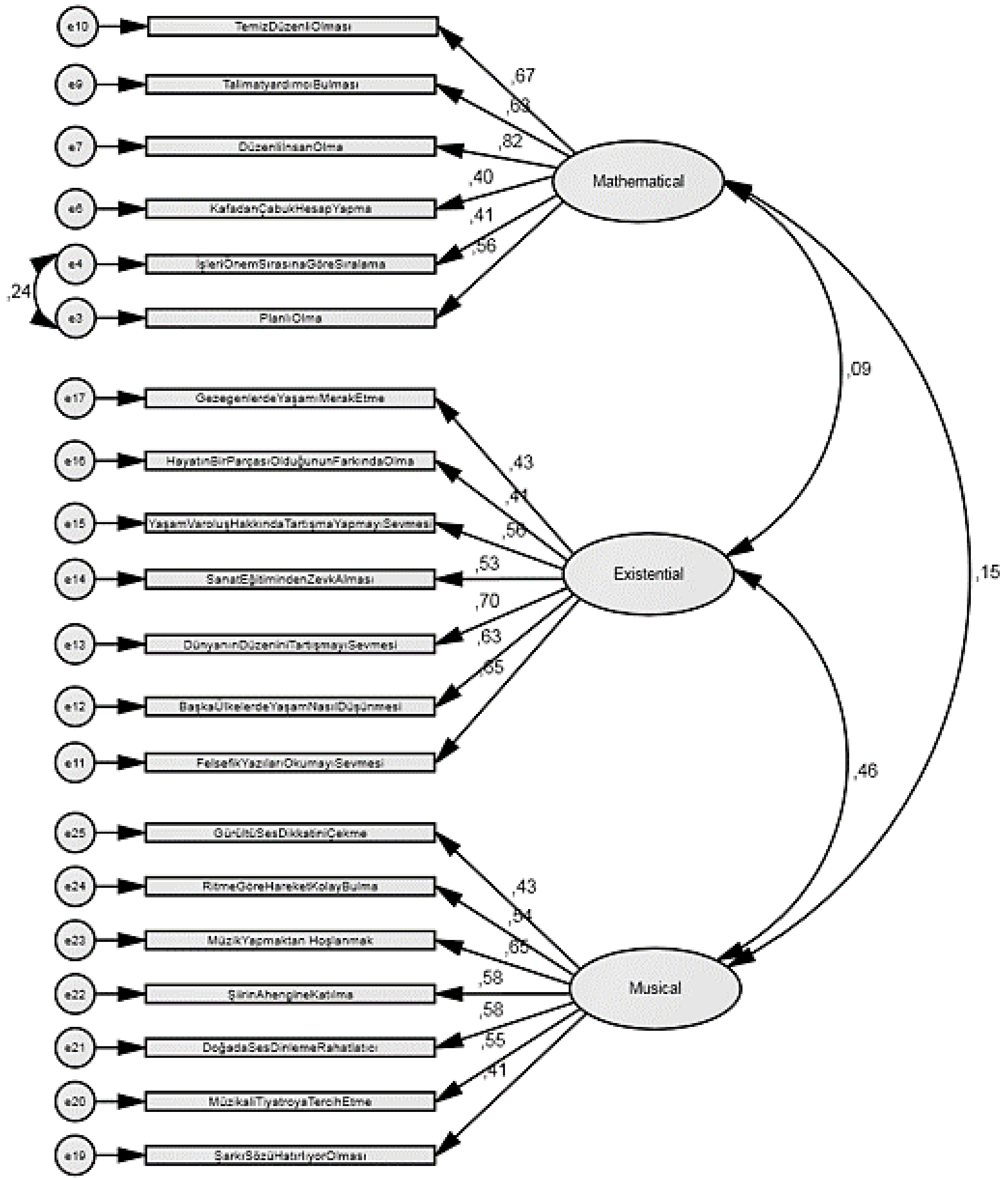

Figure 6. Model Fit of Logical/Mathematical, Existential, and Musical Intelligences

The model fit of interpersonal, intrapersonal, and visual/spatial intelligences are displayed in Figure 7. Confirmatory Factor Analysis was conducted with 19 items and because all factor loadings were within the limits and because there was no cross-loading problems, item removal was not needed. The selected goodness-of-fit measures for this model shows that there is a good fit with RMSEA .039, GFI .926, NFI .790, IFI was found to be .934, and CFI was found to be .932 showing a good fit.

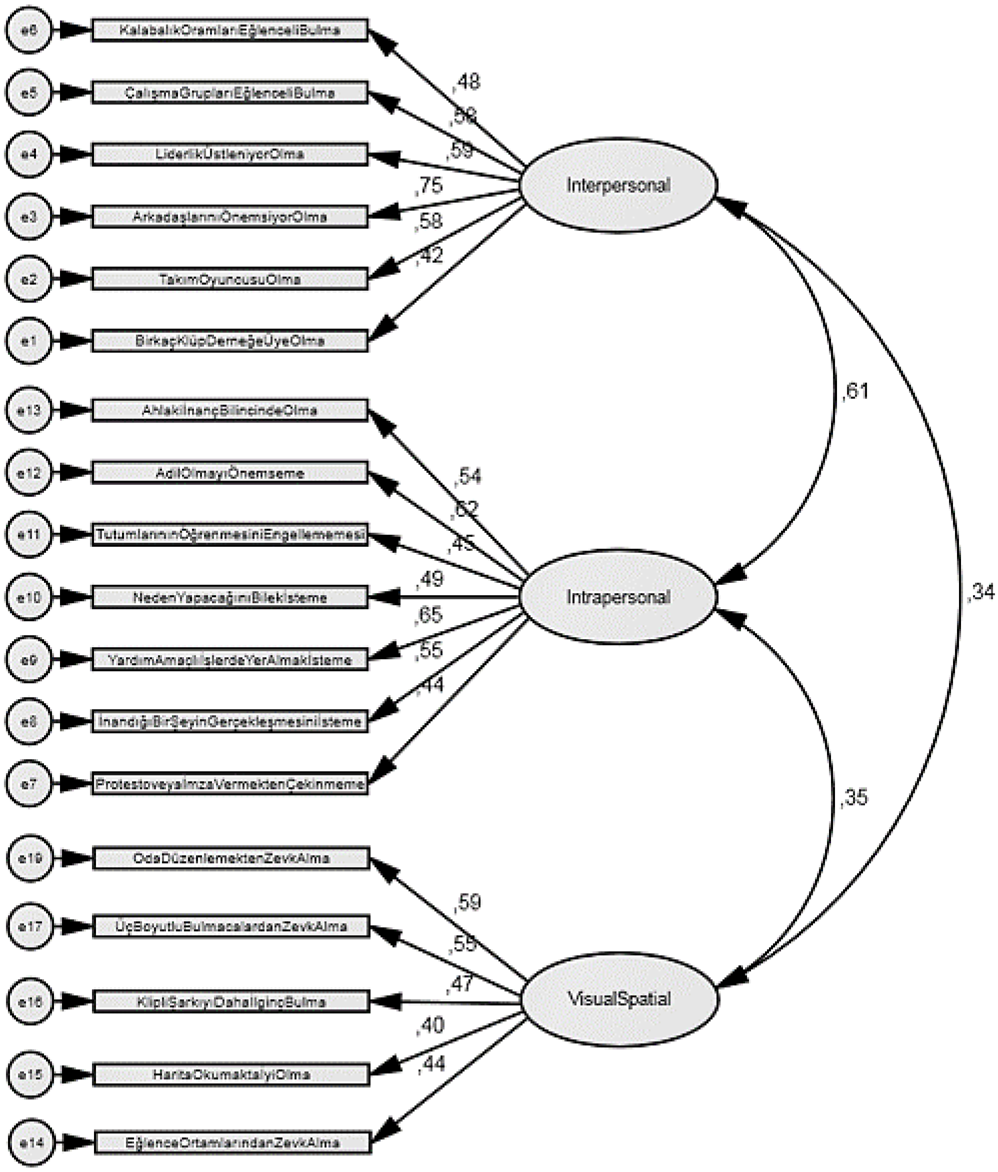

Figure 7. Model Fit of Interpersonal, Intrapersonal, and Visual/Spatial Intelligences

4.4 Disrciminant Validity

As mentioned in the method section, convergent and discriminant validities are assessed for MII and MISFS. The details about the convergent validity analysis were presented earlier and therefore this section aims to present in detail the discriminant validity analysis for both instruments.

The assesment of discriminant validity was performed on chi-square (X^2) difference test. Marsh and Hocevar (1985) suggest that when X^2 is divided by degrees of freedom (df), the obtained value should be between 2 and 5. However, according to Ho (2006), smaller Chi-square value alone proves a better and good model fit. Besides the Chi-square difference test, some goodness-of-fit measures like RMSEA, CFI, AIC, and EVCI were reported to prove the evidence of discriminant validity. Having a value of CFI below .9 and a rise in the values of Chi-square, RMSEA, AIC, and ECVI prove that the model is significantly deteriorated (Byrne, 2001; Ho, 2006; Segars, 1997; Zait & Bertea, 2011).

The steps for discriminant validity analysis were:

a) For the unconstrained models, without correlating the items, each pair of constructs (items for each latent variables) were tested for a model fit with AMOS and the related values are reported,
b) observed variables (items) for the two constructs were correlated and were constrained into a single factor model with AMOS and the related values are reported,

c) Chi-square difference test was done and differences in goodness-of-fit measures were reported for the two models to see if there is evidence for discriminant validity.

4.4.1 Discriminant Validity for MII

Discriminant validity for naturalistic and musical intelligences were presented below. The unconstrained and constrained models can be seen in Figure 8 and 9, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 21.

Table 21. Chi-square and Model Fit Values for Naturalistic and Musical Intelligence

Naturalistic-Musical	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	66.298	26	.000	.055	104.298	.204	.947
constrained model	342.744	27	.000	.151	378.744	.740	.583

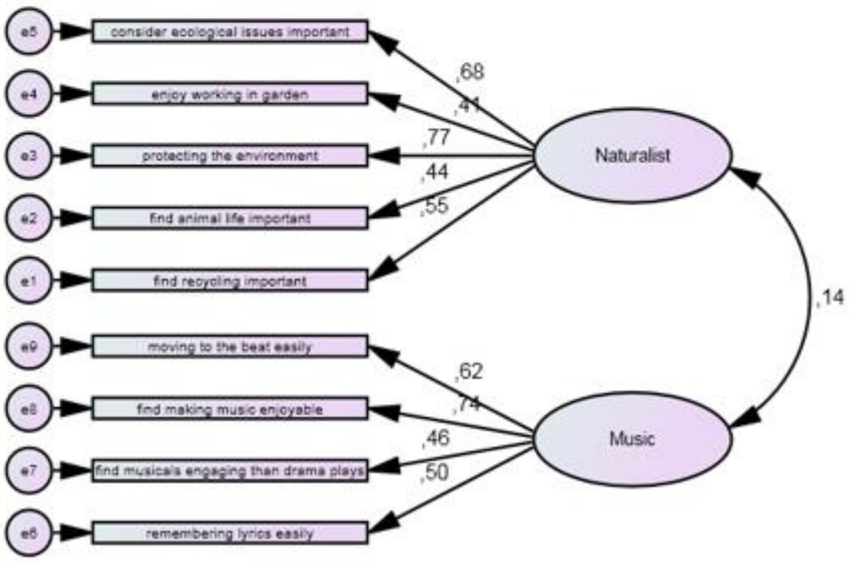

Figure 8. Unconstrained Model Fit of Naturalistic and Musical Intelligences

According to the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit as in Figure 9, a rise of Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed which shows that the model is significantly deteriorated.

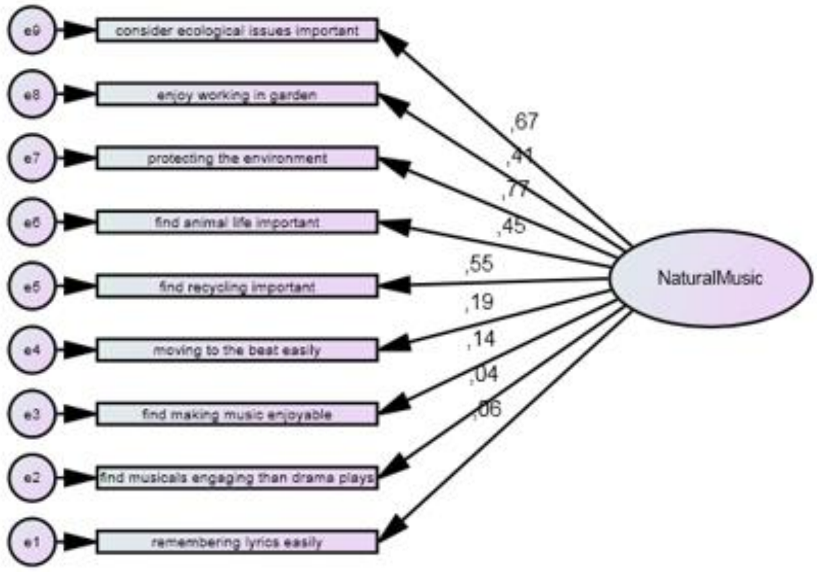

Figure 9. Constrained Model Fit of Naturalistic and Musical Intelligences

Discriminant validity for naturalistic and logical/mathematical intelligences and the unconstrained and constrained models can be seen in Figure 10 and 11.

Table 22. Chi-square and Model Fit Values for Naturalistic and Logical/Mathematical Intelligence

Naturalistic-Log/Mathematical	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	73.504	26	.000	.060	111.504	.218	.941
constrained model	281.140	27	.000	.136	317.140	.619	.683

When, the model is forced into a single fit, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value shows a decrease. The related values reveal that the constrained model is significantly deteriorated. The values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 22. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

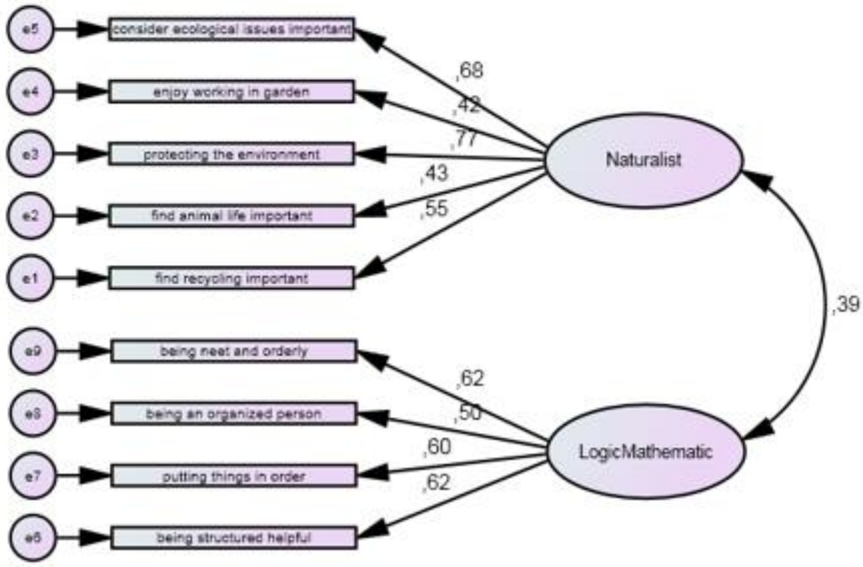

Figure 10. Unconstrained Model Fit of Naturalistic and Logical/Mathematical Intelligences

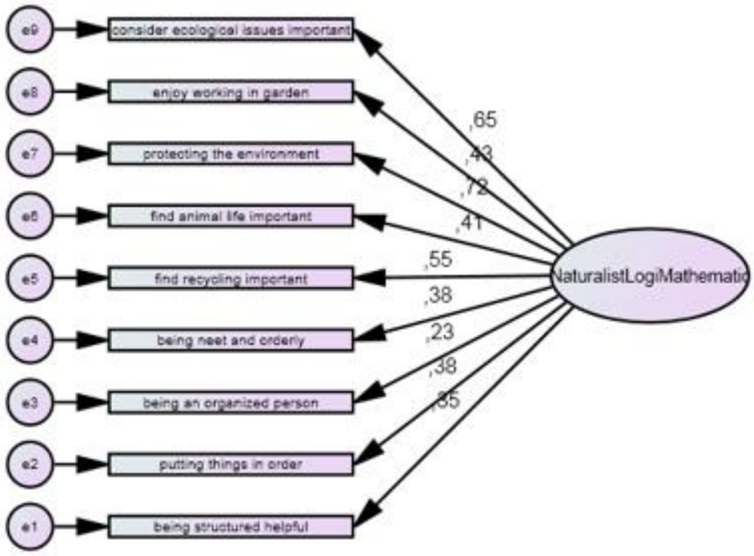

Figure 11. Constrained Model Fit of Naturalistic and Logical/Mathematical Intelligence

Discriminant validity for naturalistic and interpersonal intelligences were presented in the following figures and table.. The two models can be seen in Figure 12 and 13, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 23. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, Chi-square, RMSEA, AIC, and ECVI values increase and CFI value decreases which reveal that the constrained model is significantly deteriorated.

Table 23. Chi-square and Model Fit Values for Naturalistic and Interpersonal Intelligence

Naturalistic-Interpersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	88.775	34	.000	.056	130.775	.255	.920
constrained model	269.518	35	.000	.114	309.518	.605	.657

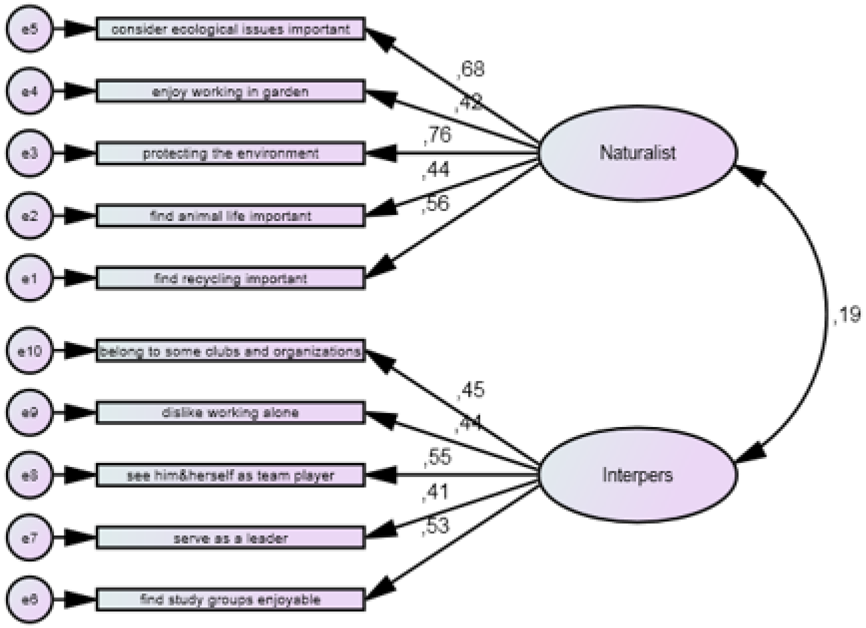

Figure 12. Unconstrained Model Fit of Naturalistic and Interpersonal Intelligence

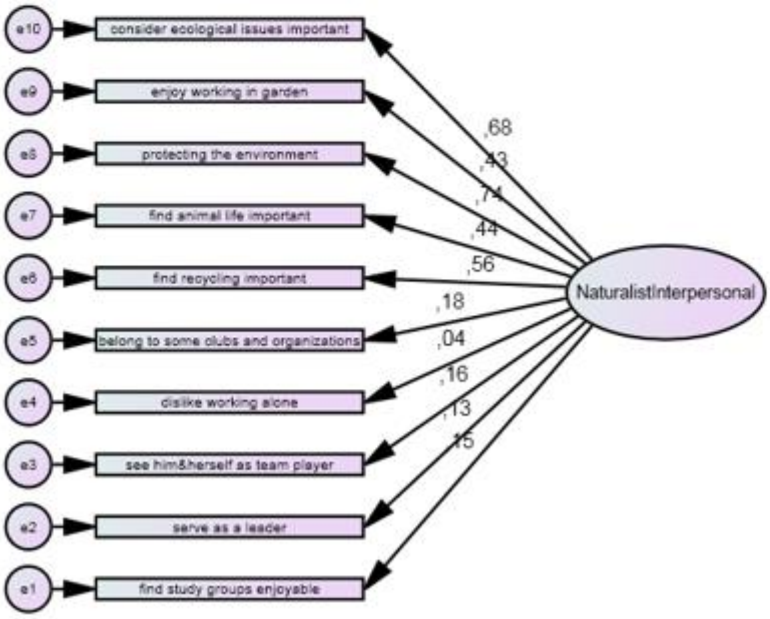

Figure 13. Constrained Model Fit of Naturalistic and Interpersonal Intelligence

Details about discriminant validity analysis for naturalistic and bodily/kinesthetic intelligences were presented in Figures 14 and 15. The values for Chi-square, RMSEA, AIC, ECVI and CFI are presented for the unconstrained and constrained models can in Table 24.

Table 24. Chi-square and Model Fit Values for Naturalistic and Bodily/Kinesthetic Intelligence

Naturalistic-Bodily/Kinesthetic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	46.952	26	.005	.040	84.952	.166	.973
constrained model	252.413	27	.000	.128	288.413	.563	.706

As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

When, the model is forced into a single fit, Chi-square, RMSEA, AIC, and ECVI values increase and CFI value decreases which in turn reveals that the constrained model is significantly deteriorated.

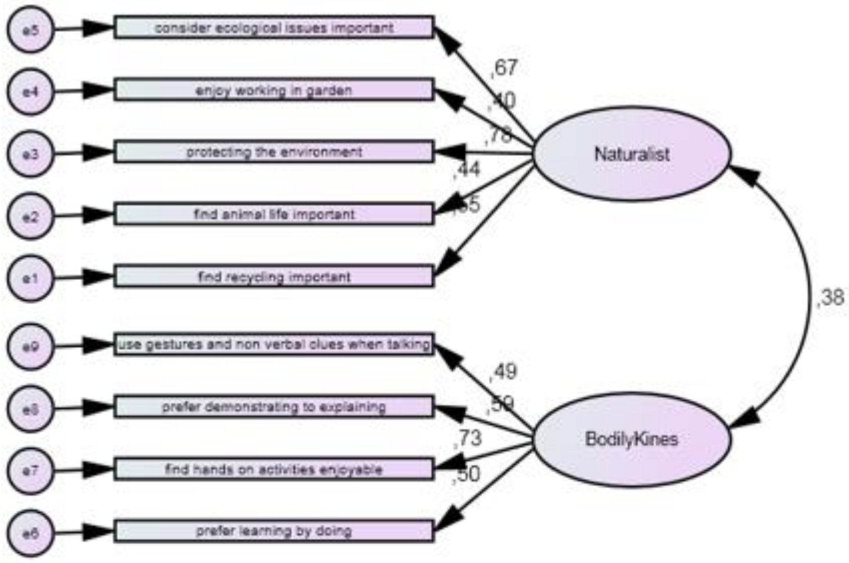

Figure 14. Unconstrained Model Fit of Naturalistic and Bodily/Kinesthetic Intelligence

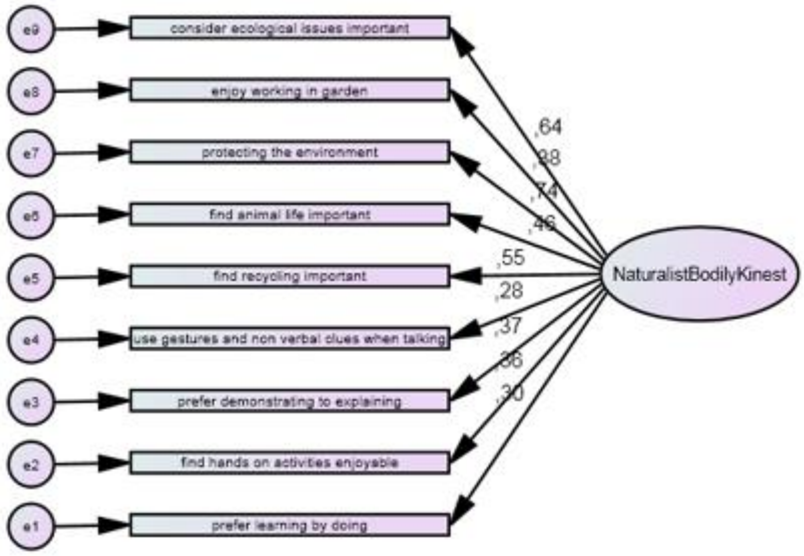

Figure 15. Constrained Model Fit of Naturalistic and Bodily/Kinesthetic Intelligence

Discriminant validity for naturalistic and verbal/linguistic intelligences were presented below. The two models can be seen in Figure 16 and 17, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 25. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit like in Figure 17, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value reveal that the constrained model is significantly deteriorated.

Table 25. Chi-square and Model Fit Values for Naturalistic and Verbal/Linguistic Intelligence

Naturalistic-Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	36.805	19	.000	.043	70.805	.138	.967
constrained model	118.545	20	.000	.098	150.545	.294	.820

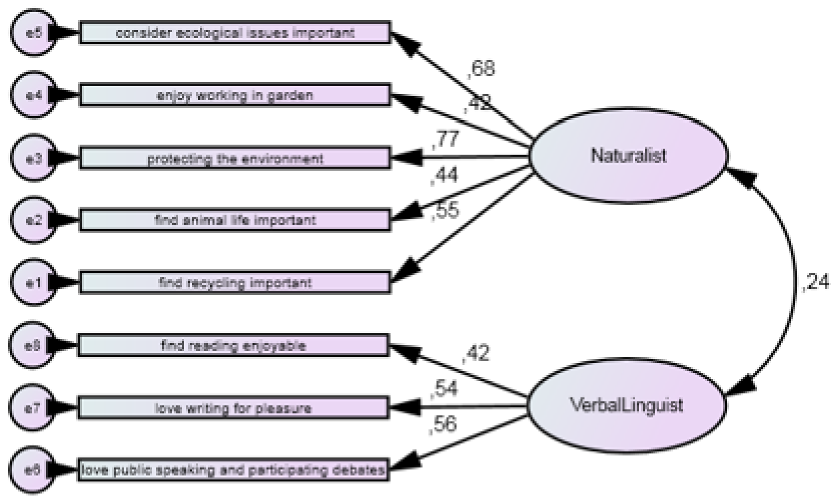

Figure 16. Unconstrained Model Fit of Naturalistic and Verbal/Linguistic Intelligence

Figure 17. Constrained Model Fit of Naturalistic and Verbal/Linguistic Intelligence

Discriminant validity for naturalistic and intrapersonal intelligences were presented below. The two models can be seen in Figure 18 and 19, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 26. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity.

Table 26. Chi-square and Model Fit Values for Naturalistic and Intrapersonal Intelligence

Naturalistic and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	70.049	34	.000	.046	112.049	.219	.963
constrained model	201.009	35	.000	.096	241.009	.471	.828

When, the model is forced into a single fit, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value reveal that the constrained model is significantly deteriorated.

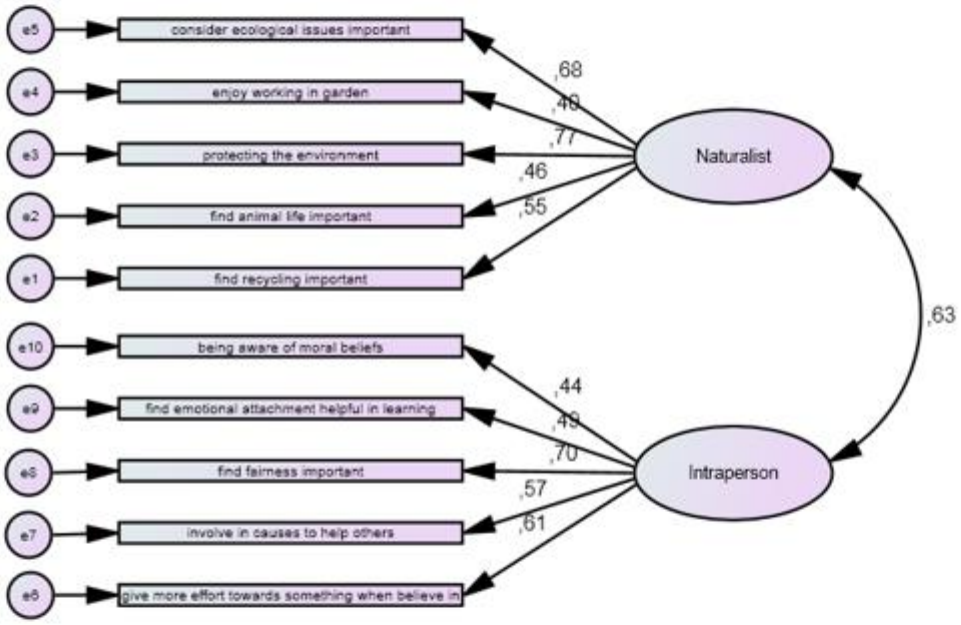

Figure 18. Unconstrained Model Fit of Naturalistic and Intrapersonal Intelligence

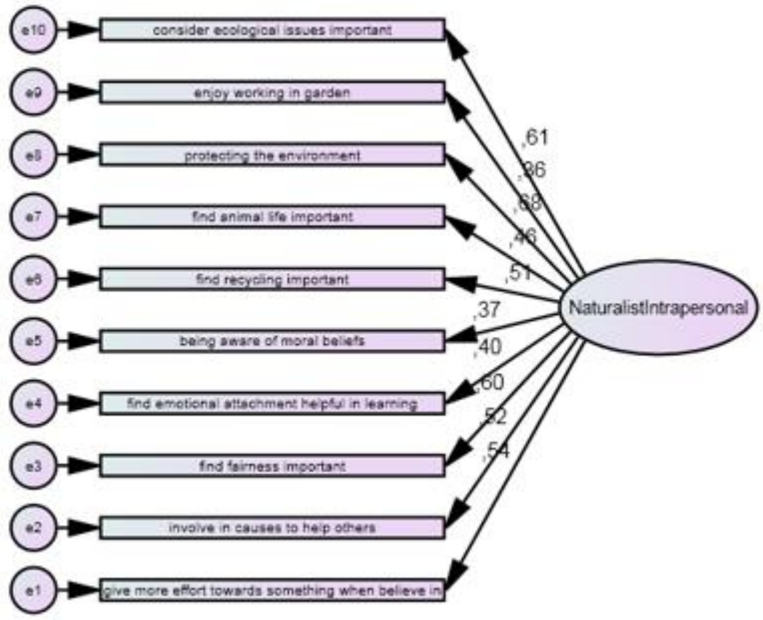

Figure 19. Constrained Model Fit of Naturalistic and Intrapersonal Intelligence

Discriminant validity for naturalistic and visual/spatial intelligences were presented below. The unconstrained and constrained models can be seen in Figure 20 and 21, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 27. According to the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value reveal that the constrained model is significantly deteriorated.

Table 27. Chi-square and Model Fit Values for Naturalistic and Visual/Spatial Intelligence

Naturalistic and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	53.378	19	.000	.059	87.378	.171	.954
constrained model	243.578	20	.000	.148	275.578	.538	.698

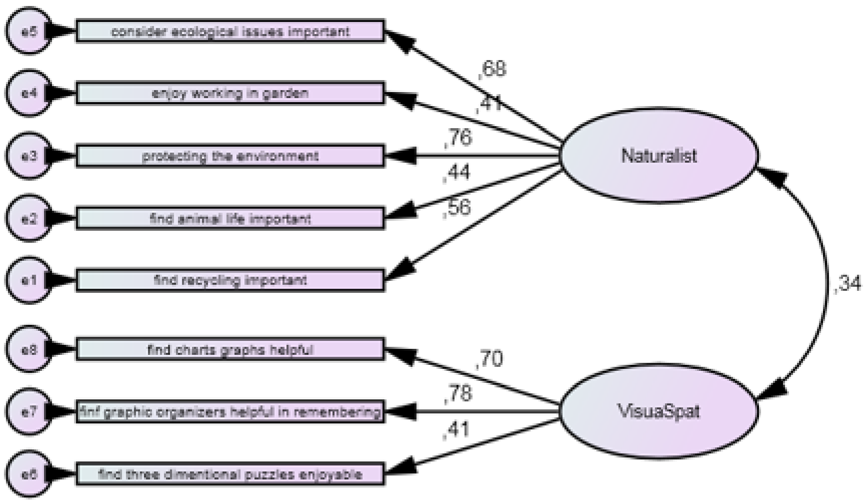

Figure 20. Unconstrained Model Fit of Naturalistic and Visual/Spatial Intelligence

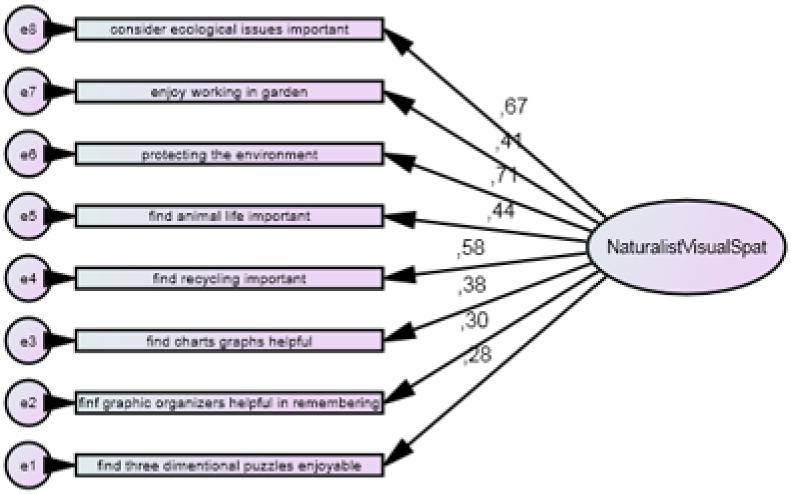

Figure 21. Constrained Model Fit of Naturalistic and Visual/Spatial Intelligence

Details about discriminant validity analysis for naturalistic and existential intelligences were presented in Figures 22-23 and values for the unconstrained and constrained models can be seen in Table 28.

As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 28. Chi-square and Model Fit Values for Naturalistic and Existential Intelligence

Naturalistic and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	196.406	53	.000	.073	246.406	.481	.882
constrained model	405.051	54	.000	.113	453.051	.885	.711

When, the model is forced into a single fit, the related goodness-of-fit values reveal that the constrained model is significantly deteriorated.

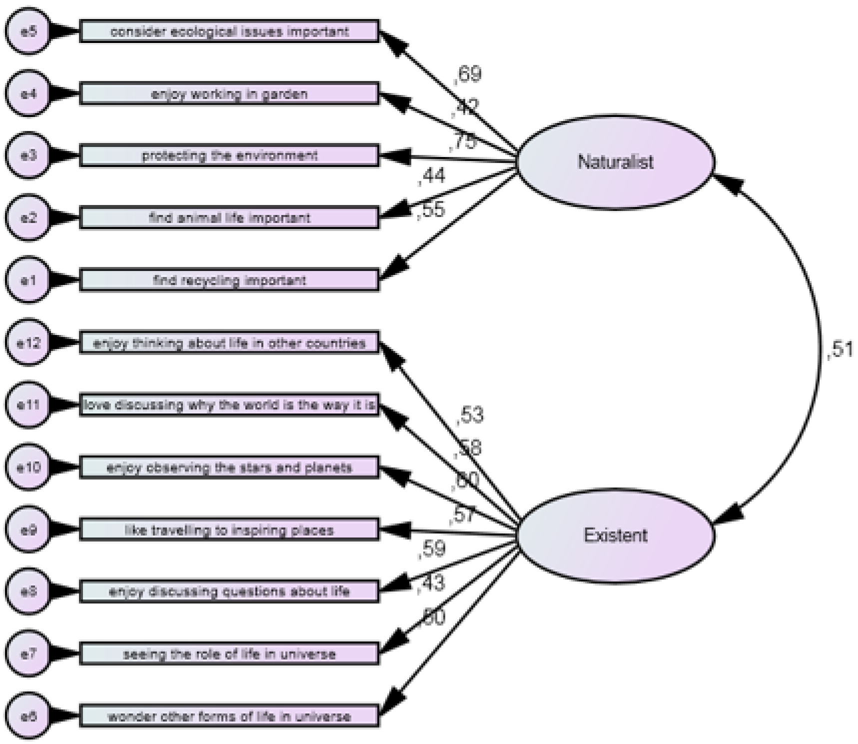

Figure 22. Unconstrained Model Fit of Naturalistic and Existential Intelligence

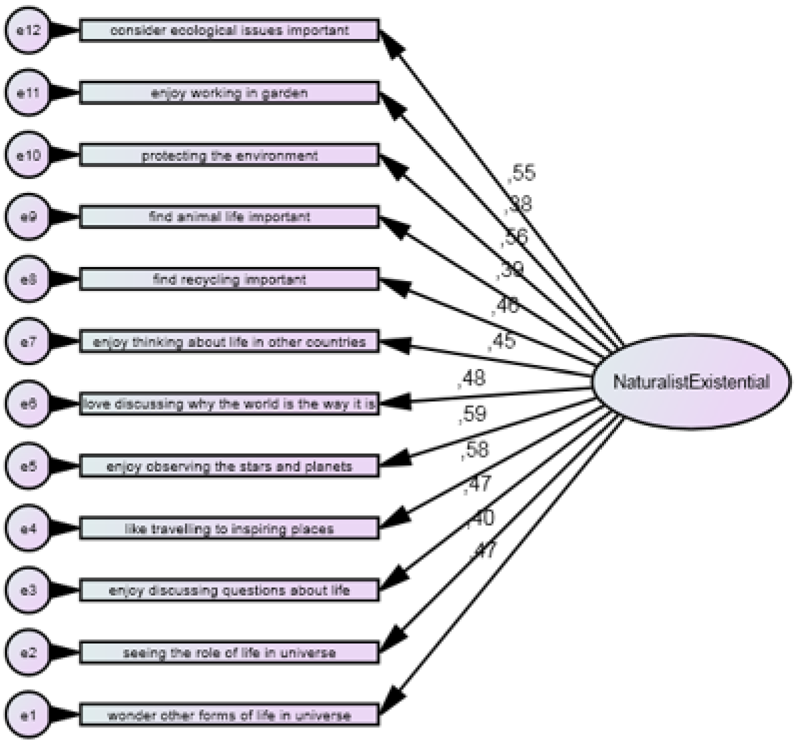

Figure 23. Constrained Model Fit of Naturalistic and Existential Intelligence

Details about discriminant validity analysis for musical and logical/mathematical intelligences were presented in Figures 24-25 and values for the unconstrained and constrained models can be seen in Table 29.

Table 29. Chi-square and Model Fit Values for Musical and Logical/Mathematical Intelligence

Musical and Logical/Mathematical	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	69.134	19	.000	.072	103.134	.201	.919
constrained model	347.735	20	.000	.179	379.735	.742	.474

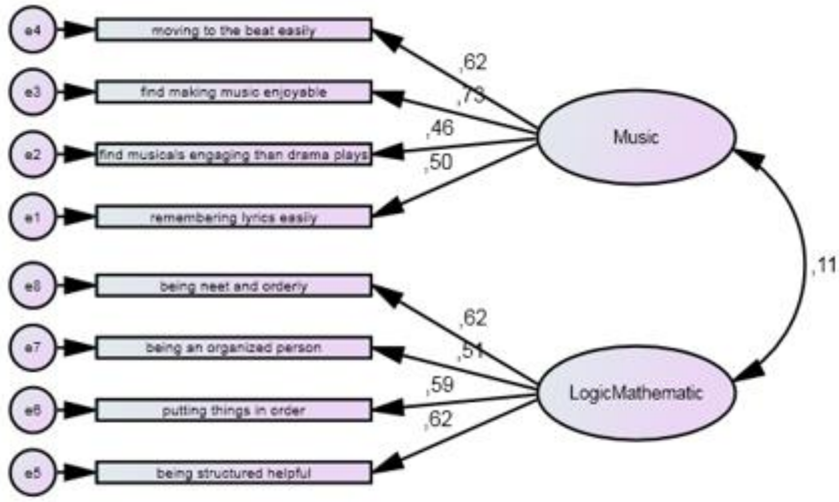

Figure 24. Unconstrained Model Fit of Musical and Logical/Mathematical Intelligence

As an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value can be seen for the constrained model, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, the related values reveal that the model is significantly deteriorated.

Figure 25. Constrained Model Fit of Musical and Logical/Mathematical Intelligence

Discriminant validity for musical and interpersonal intelligences were presented below. The unconstrained and constrained models can be seen in Figure 26 and 27, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 30.

According to the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 30. Chi-square and Model Fit Values for Musical and Interpersonal Intelligence

Musical and Interpersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	91.065	27	.000	.068	127.065	.248	.882
constrained model	229.174	27	.000	.121	265.174	.518	.628

When, the model is forced into a single fit, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed which reveal that the constrained model is significantly deteriorated.

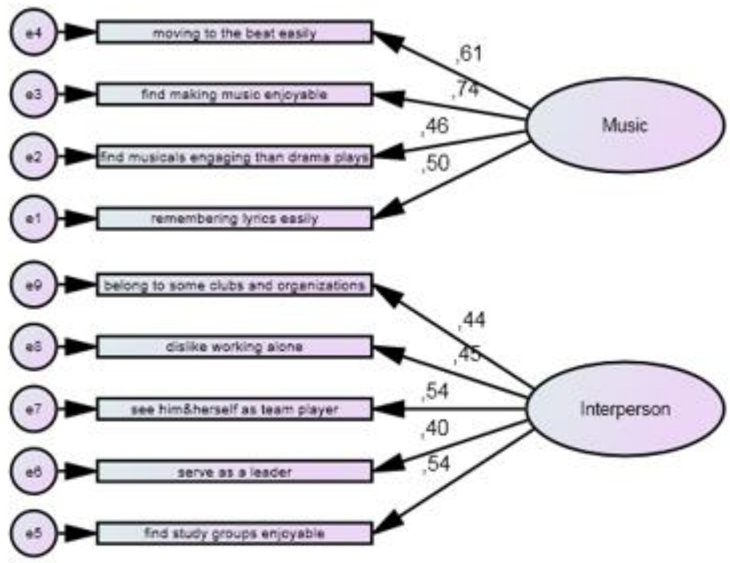

Figure 26. Unconstrained Model Fit of Musical and Interpersonal Intelligence

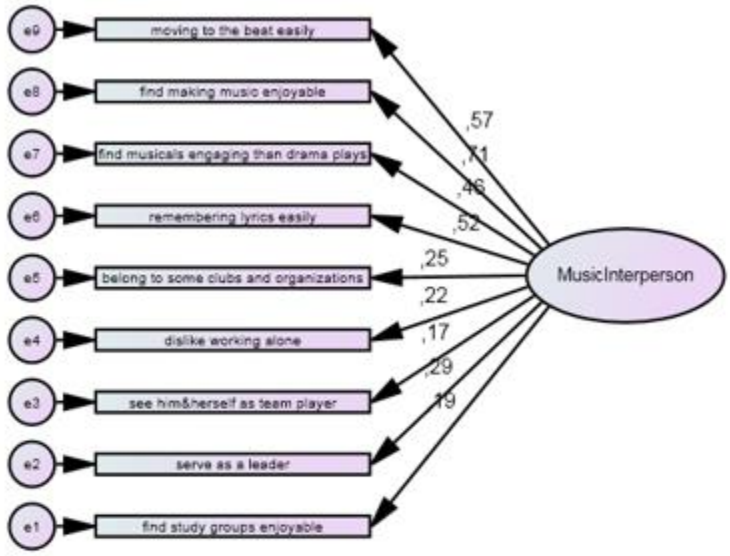

Figure 27. Constrained Model Fit of Musical and Interpersonal Intelligence

As can be seen in Figures 28-29 and Table 31, discriminant validity analysis for musical and bodily/kinesthetic intelligences were presented. The unconstrained and constrained models can be seen in Figure 28 and 29, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 31. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 31. Chi-square and Model Fit Values for Musical and Bodily/Kinesthetic Intelligence

Musical and Bodily/Kinesthetic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	63.862	19	.000	.068	97.862	.191	.931
constrained model	221.243	20	.000	.140	253.243	.495	.690

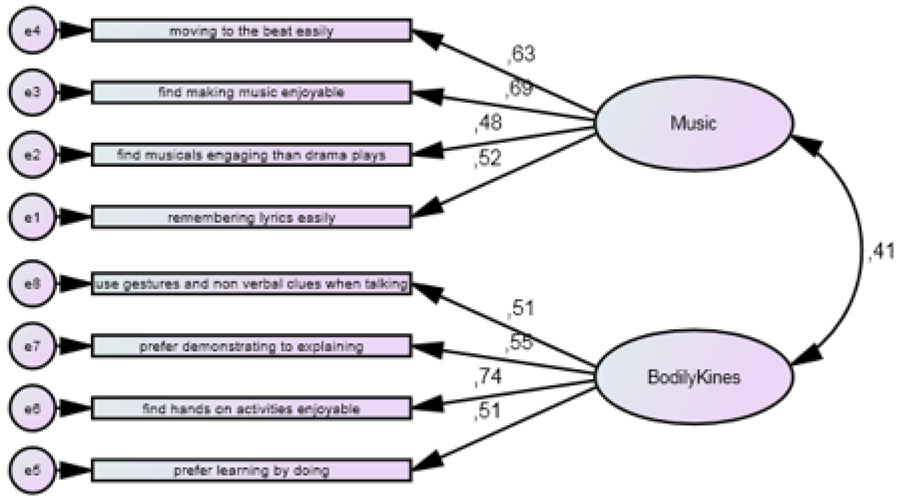

Figure 28. Unconstrained Model Fit of Musical and Bodily/Kinesthetic Intelligence

It can be seen in Figure 29 clearly that when, the model is constrained as one factor, its values confirm that the constrained model is significantly deteriorated.

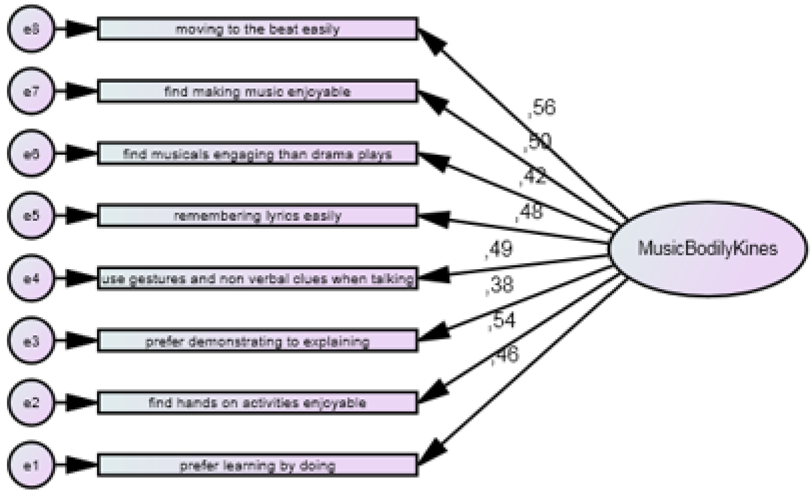

Figure 29. Constrained Model Fit of Musical and Bodily/Kinesthetic Intelligence

Discriminant validity for musical and verbal/linguistic intelligences and the two models can be seen in Figure 30 and 31, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 32.

Table 32. Chi-square and Model Fit Values for Musical and Verbal/Linguistic Intelligence

Musical and Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	45.536	13	.000	.070	75.536	.148	.927
constrained model	106.119	14	.000	.113	134.119	.262	.793

The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When the model is forced into a single fit like in Figure 32, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are seen. This reveals that the constrained model is significantly deteriorated.

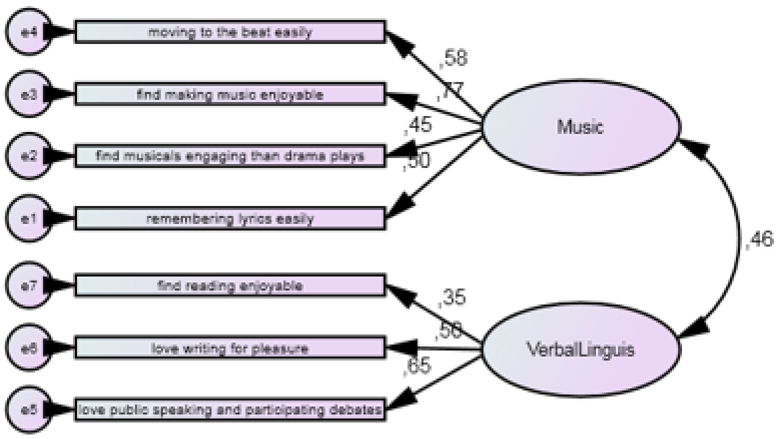

Figure 30. Unconstrained Model Fit of Musical and Verbal/Linguistic Intelligence

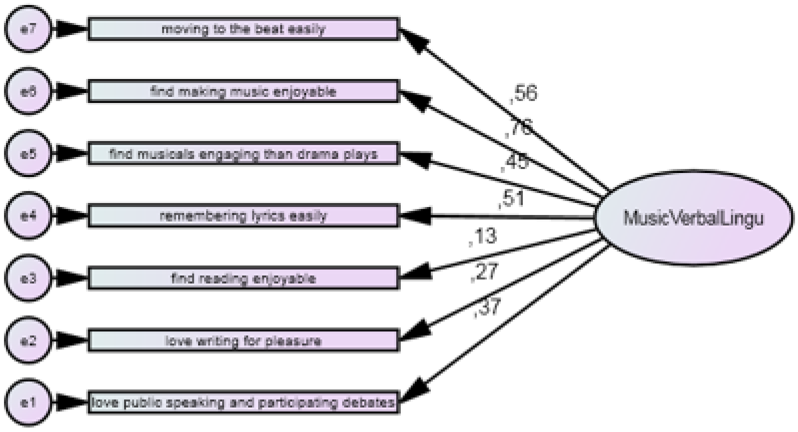

Figure 31. Constrained Model Fit of Musical and Verbal/Linguistic Intelligence

Next, the discriminant validity analysis for musical and intrapersonal intelligences were presented. The unconstrained and constrained models can be seen in Figure 32 and 33, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 33. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

When, the model is constrained as one factor, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed. This reveals that the constrained model is significantly deteriorated.

Table 33. Chi-square and Model Fit Values for Musical and Intrapersonal Intelligence

Musical and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	57.144	26	.000	.048	95.144	.186	.956
constrained model	284.821	27	.000	.137	320.821	.627	.639

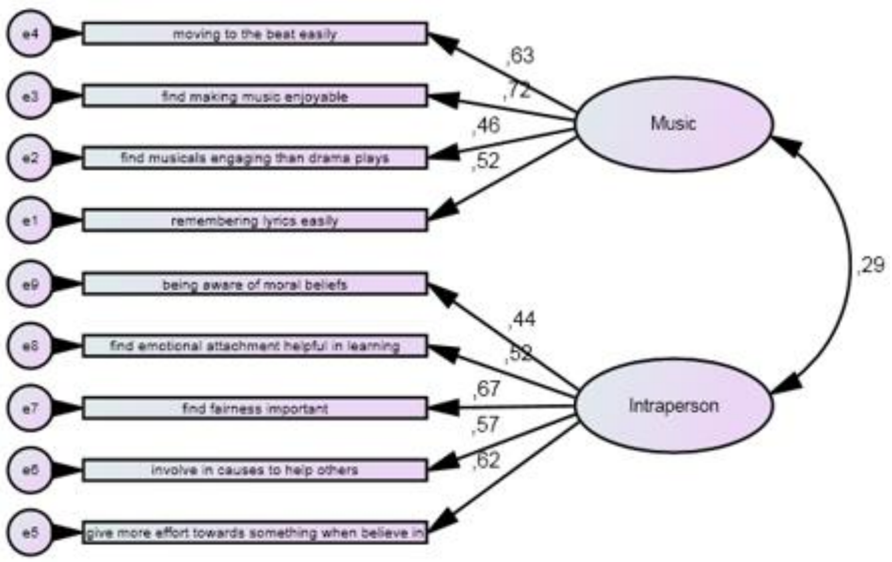

Figure 32. Unconstrained Model Fit of Musical and Intrapersonal Intelligence

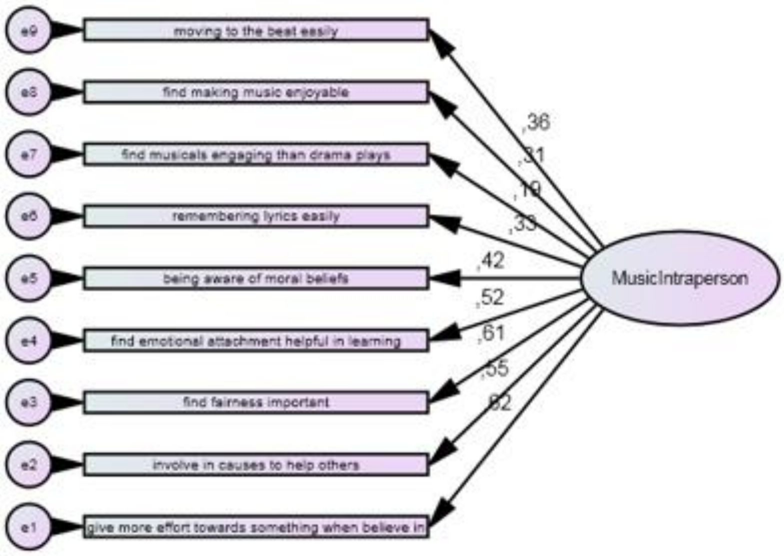

Figure 33. Constrained Model Fit of Musical and Intrapersonal Intelligence

Discriminant validity analysis for Musical and Visual/Spatial Intelligences were presented in the following table and figures. The unconstrained and constrained models can be seen in Figure 34 and 35, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 34.

Table 34. Chi-square and Model Fit Values for Musical and Visual/Spatial Intelligence

Musical and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	41.619	13	.000	.066	71.619	.140	.950
constrained model	298.965	14	.000	.199	326.965	.639	.502

According to the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

When, the model is forced into a single fit, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value shows a decrease which reveal that the constrained model is significantly deteriorated.

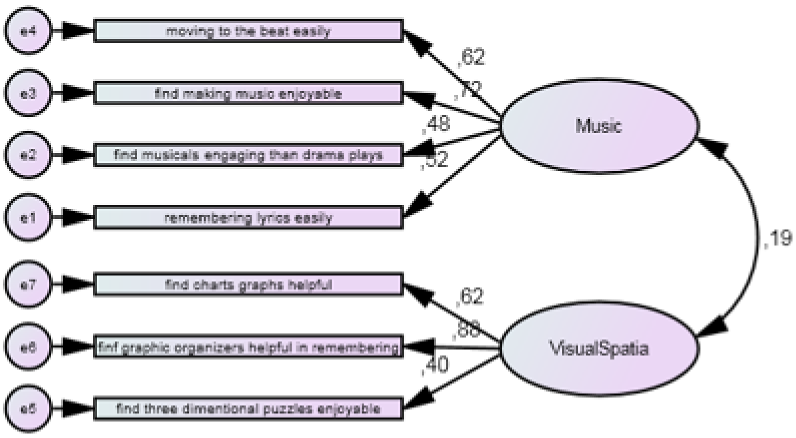

Figure 34. Unconstrained Model Fit of Musical and Visual/Spatial Intelligence

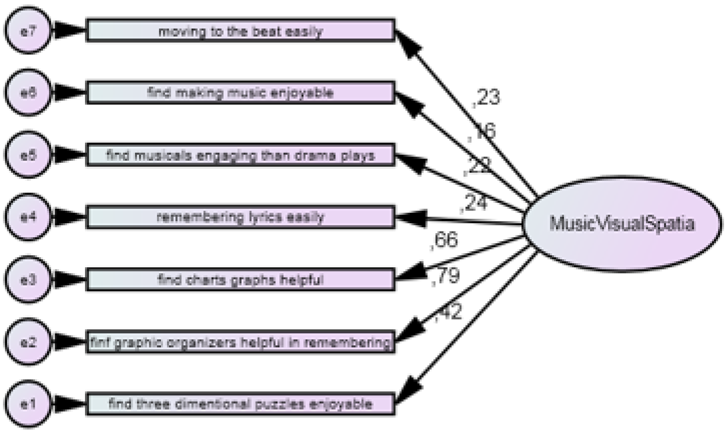

Figure 35. Constrained Model Fit of Musical and Visual/Spatial Intelligence

Details about discriminant validity analysis for musical and existential intelligences were presented in Figures 36-37 and values for the unconstrained and constrained models can be seen in Table 35. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed. The related values reveal that the constrained model is significantly deteriorated.

Table 35. Chi-square and Model Fit Values for Musical and Existential Intelligence

Musical and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	169.447	43	.000	.076	215.447	.421	.877
constrained model	364.184	44	.000	.119	408.184	.797	.688

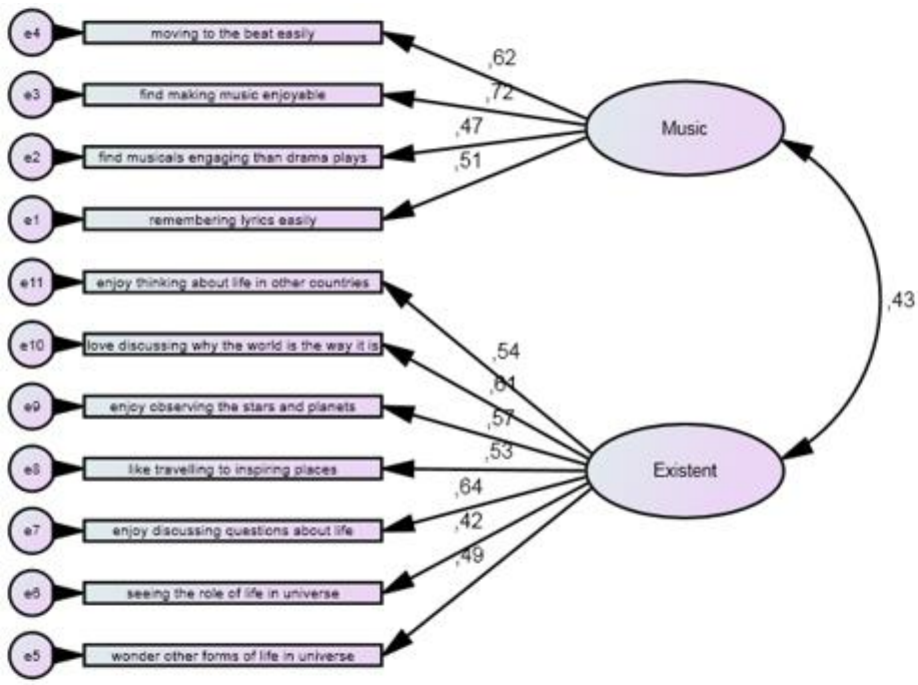

Figure 36. Unconstrained Model Fit of Musical and Existential Intelligence

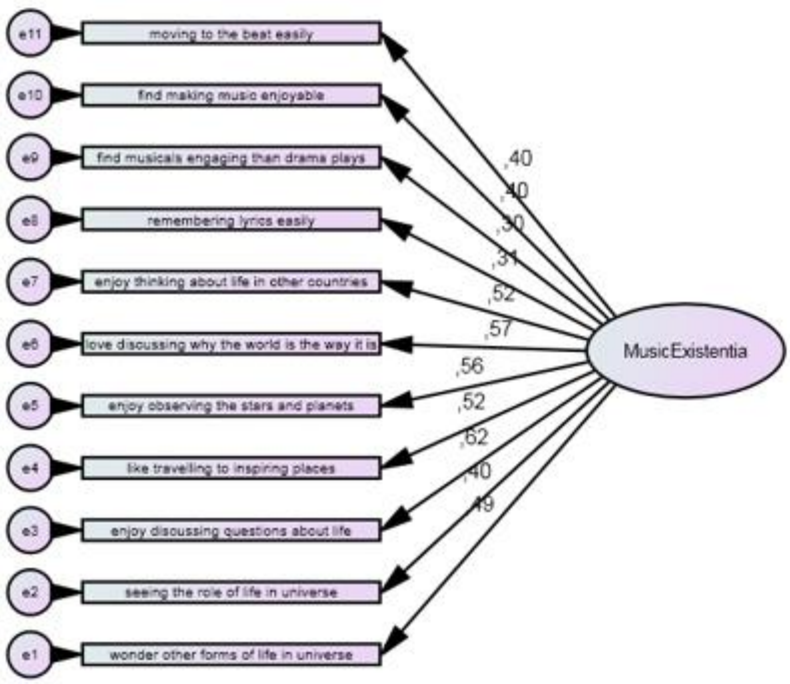

Figure 37. Constrained Model Fit of Musical and Existential Intelligence

Discriminant validity for logical/mathematical and interpersonal intelligences were presented in the following figures and table. The two models can be seen in Figure 38 and 39, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 36. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity.

Table 36. Chi-square and Model Fit Values for Logical/Mathematical and Interpersonal Intelligence

Logical/Mathematical and Interpersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	109.844	26	.000	.079	147.844	.289	.851
constrained model	397.643	27	.000	.164	433.643	.847	.341

When, the model is forced into a single fit like in Figure 39, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed which reveal that the single factor model is significantly deteriorated.

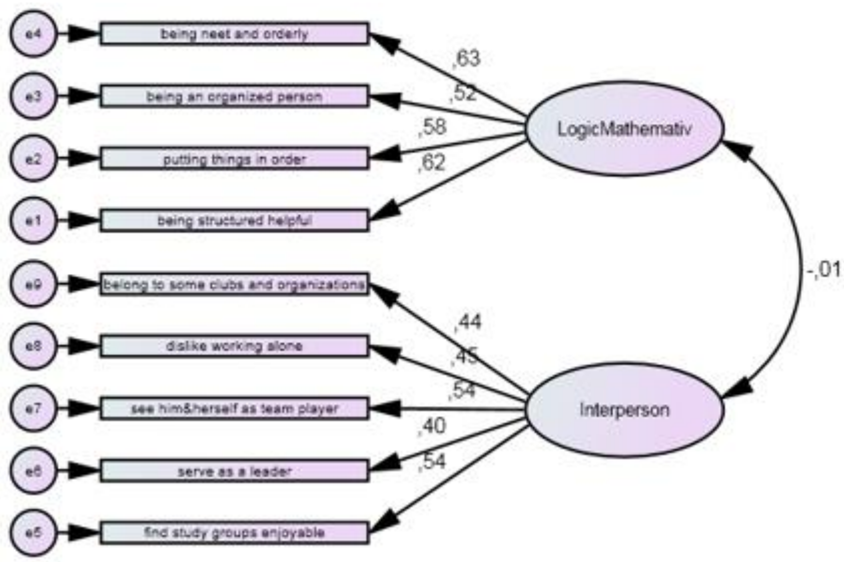

Figure 38. Unconstrained Model Fit of Logical/Mathematical and Interpersonal Intelligence

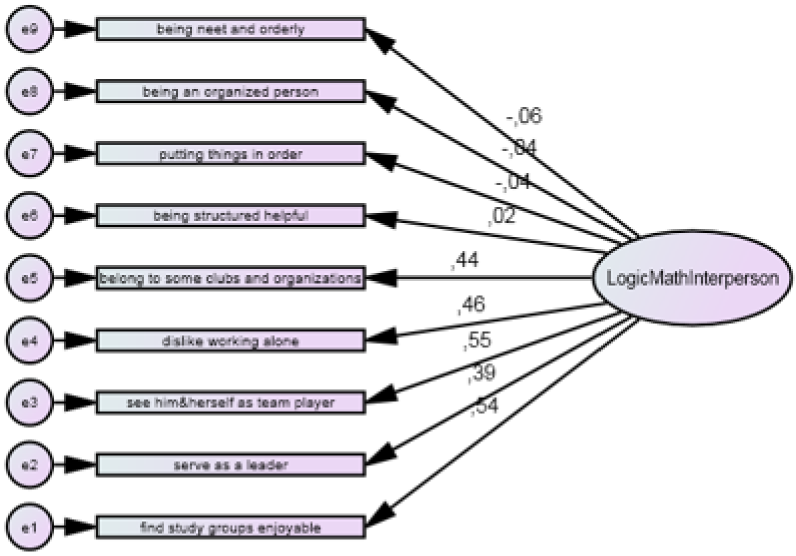

Figure 39. Constrained Model Fit of Logical/Mathematical and Interpersonal Intelligence

As can be seen below, discriminant validity for logical/mathematical and bodily/kinesthetic intelligences were presented. The unconstrained and constrained models can be seen in Figure 40 and 41, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 37. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is constrained as one factor, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed which confirm that the constrained model is significantly deteriorated.

Table 37. Chi-square and Model Fit Values for Logical/Mathematical and Bodily/Kinesthetic Intelligence

Logical/Mathematical and Bodily/Kinesthetic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	60.206	19	.000	.065	94.206	.184	.936
constrained model	249.138	20	.000	.150	281.138	.549	.641

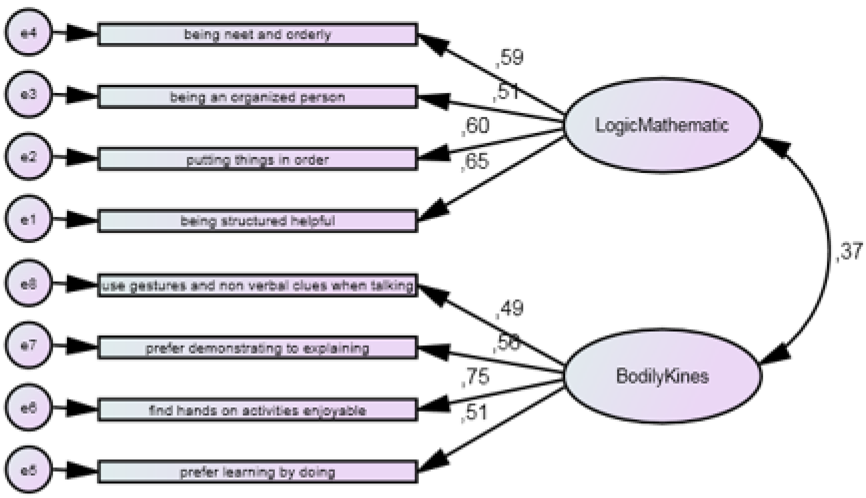

Figure 40. Unconstrained Model Fit of Logical/Mathematical and Bodily/Kinesthetic Intelligence

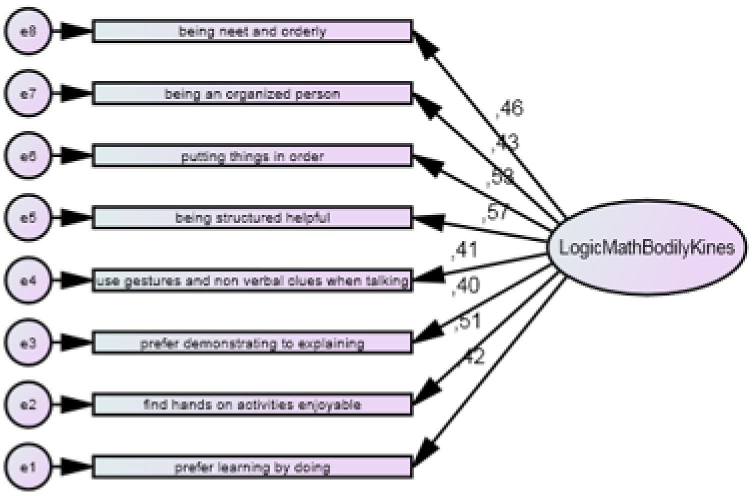

Figure 41. Constrained Model Fit of Logical/Mathematical and Bodily/Kinesthetic Intelligence

Details about discriminant validity analysis for logical/mathematical and verbal/linguistic intelligences were presented in Figures 42-43 and values for the unconstrained and constrained models can be seen in Table 38. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 38. Chi-square and Model Fit Values for Logical/Mathematical and Verbal/Linguistic Intelligence

Logical/Mathematical and Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	40.875	13	.000	.065	70.875	.138	.933
constrained model	116.953	14	.000	.120	144.953	.283	.753

When the model is forced into a single fit, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. The related values reveal that the single factor model is significantly deteriorated.

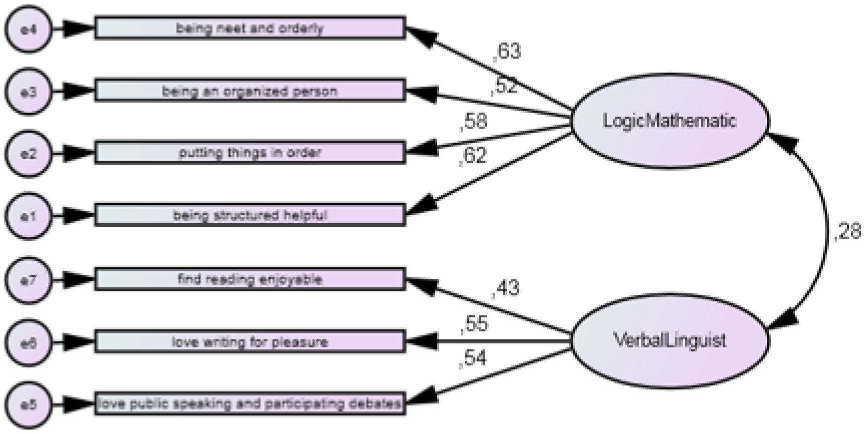

Figure 42. Unconstrained Model Fit of Logical/Mathematical and Verbal/Linguistic Intelligence

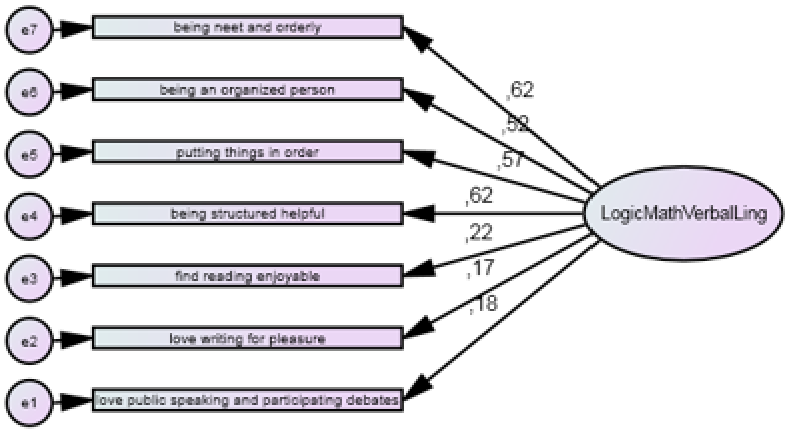

Figure 43.Constrained Model Fit of Logical/Mathematical and Verbal/Linguistic Intelligence

Discriminant validity for logical/mathematical and intrapersonal intelligences were presented below. The two models can be seen in Figure 44 and 45, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 39. When, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit like in Figure 44, the related values reveal that the model is significantly deteriorated.

Table 39. Chi-square and Model Fit Values for Logical/Mathematical and Intrapersonal Intelligence

Logical/Mathematical and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	65.613	26	.000	.055	103.613	.202	.950
constrained model	116.953	27	.000	.104	213.958	.418	.811

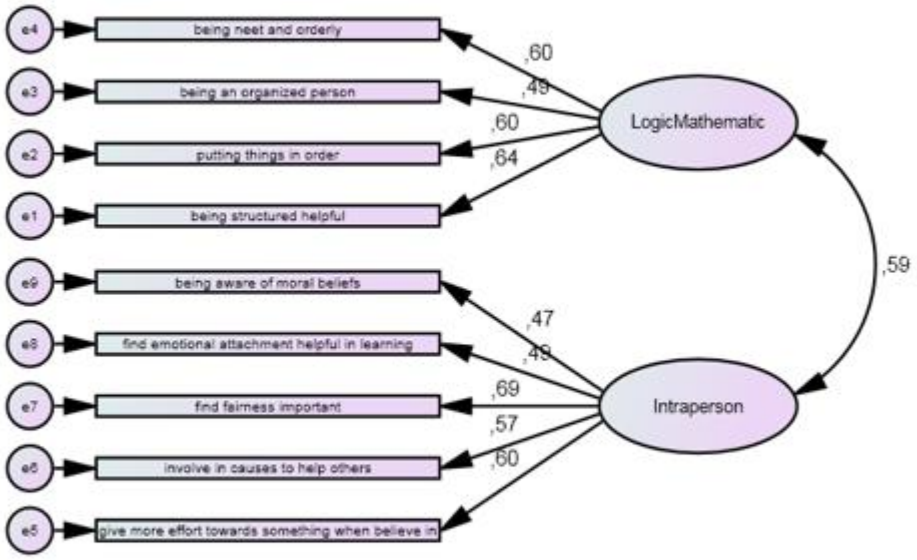

Figure 44. Unconstrained Model Fit of Logical/Mathematical and Intrapersonal Intelligence

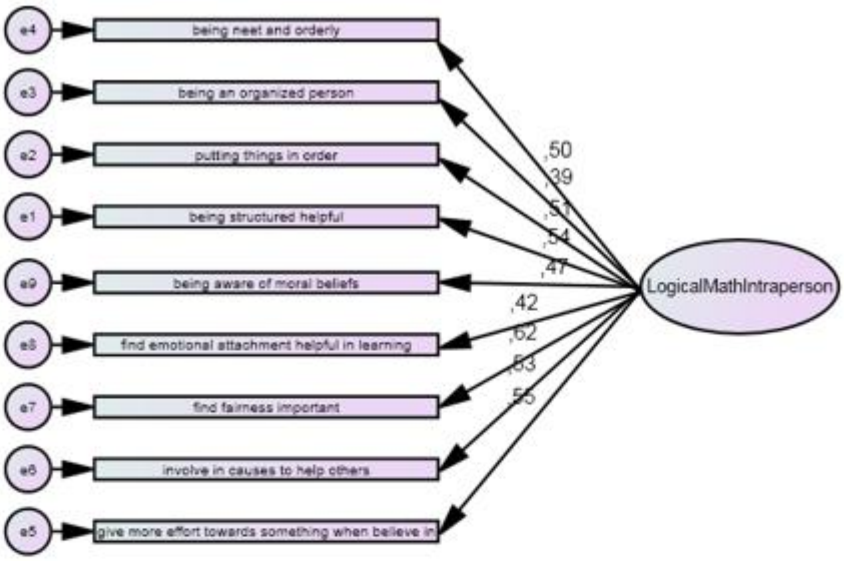

Figure 45. Constrained Model Fit of Logical/Mathematical and Intrapersonal Intelligence

Discriminant validity analysis for logical/mathematical and visual/spatial intelligences were presented and the two models can be seen in Figure 46 and 47, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 40.

Table 40. Chi-square and Model Fit Values for Logical/Mathematical and Visual/Spatial Intelligence

Logical/Mathematical and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	44.561	13	.000	.069	74.561	.146	.947
constrained model	254.096	14	.000	.183	282.096	.551	.593

The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit model like in Figure 46, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

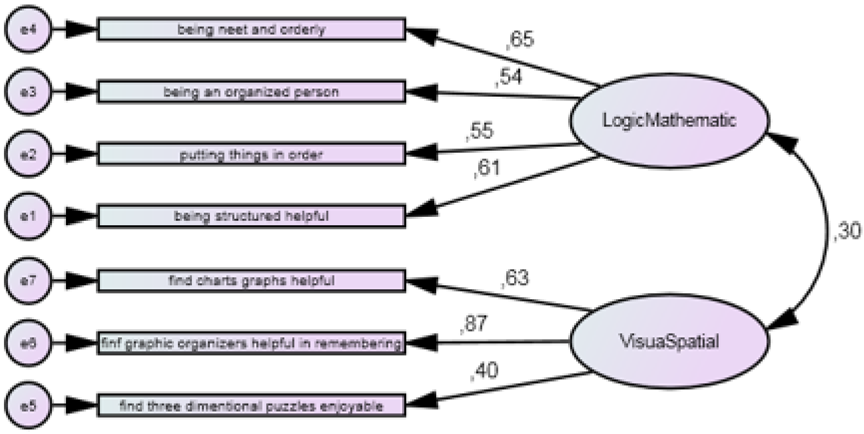

Figure 46. Unconstrained Model Fit of Logical/Mathematical and Visual/Spatial Intelligence

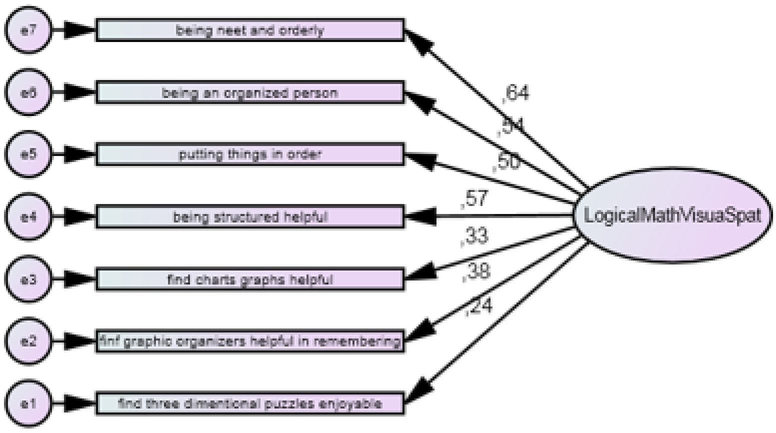

Figure 47. Constrained Model Fit of Logical/Mathematical and Visual/Spatial Intelligence

Discriminant validity analysis for logical/mathematical and existential intelligences were presented in the following figures and table. The unconstrained and constrained models can be seen in Figure 48 and 49, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 41.

Table 41. Chi-square and Model Fit Values for Logical/Mathematical and Existential Intelligence

Logical/Mathematical and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	203.164	43	.000	.085	249.164	.487	.845
constrained model	445.222	44	.000	.133	489.222	.556	.611

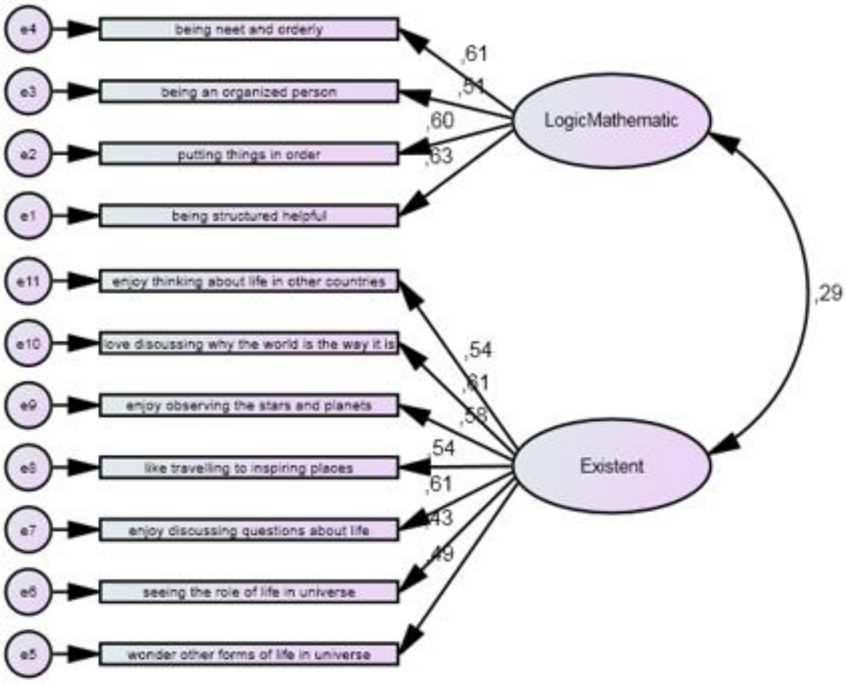

Figure 48. Unconstrained Model Fit of Logical/Mathematical and Existential Intelligence

The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated.

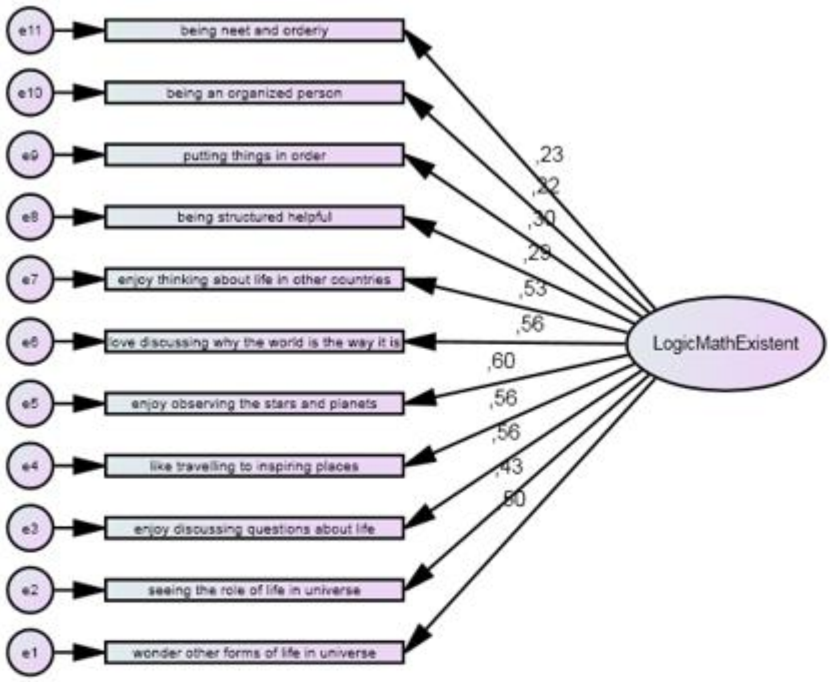

Figure 49. Constrained Model Fit of Logical/Mathematical and Existential Intelligence

Discriminant validity analysis for interpersonal and bodily/kinesthetic intelligences were presented below. The two models can be seen in Figure 50 and 51, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 42. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity.

When, the model is forced into a single fit model like in Figure 50, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

Table 42. Chi-square and Model Fit Values for Interpersonal and Bodily/Kinesthetic Intelligence

Interpersonal and Bodily/Kinesthetic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	74.630	26	.000	.060	112.630	.220	.909
constrained model	243.358	27	.000	.125	279.358	.546	.594

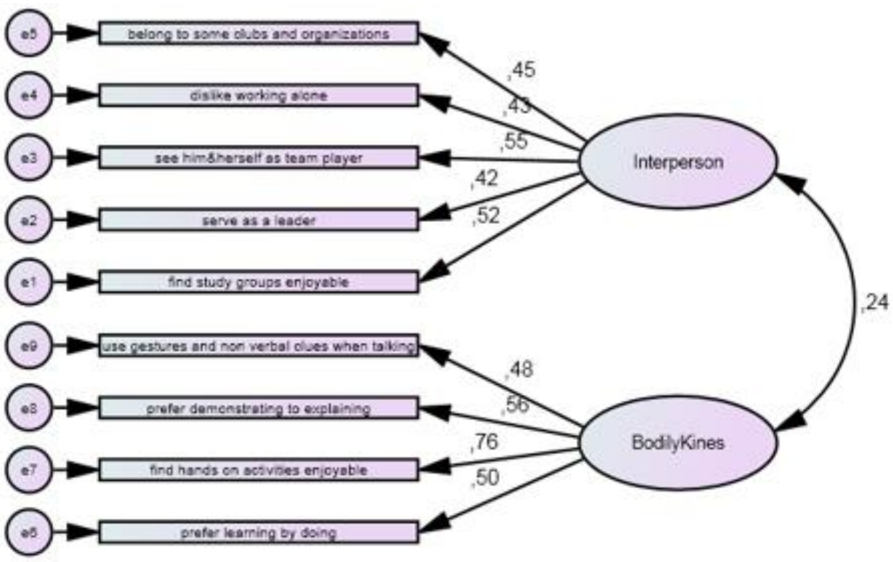

Figure 50. Unconstrained Model Fit of Interpersonal and Bodily/Kinesthetic Intelligence

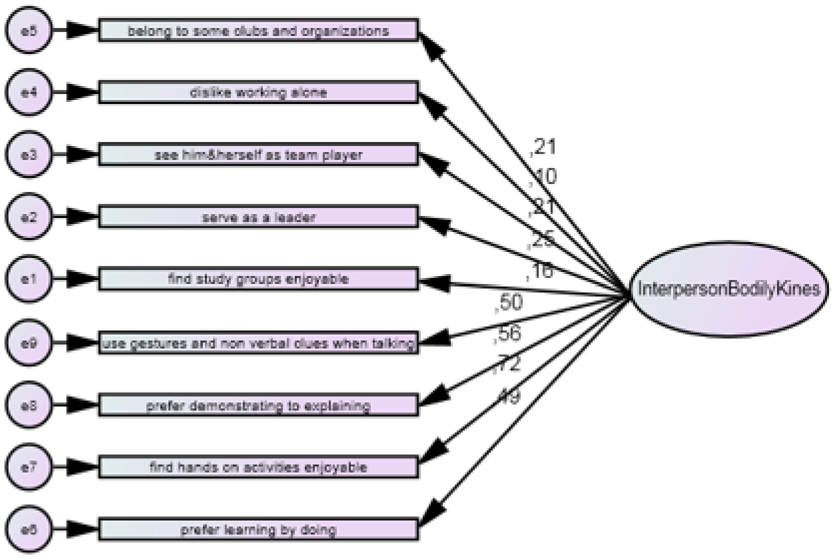

Figure 51. Constrained Model Fit of Interpersonal and Bodily/Kinesthetic Intelligence

Details about discriminant validity analysis for interpersonal and verbal/linguistic intelligences were presented below in Figures 52-53 and values for the unconstrained and constrained models can be seen in Table 43. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 43. Chi-square and Model Fit Values for Interpersonal and Verbal/Linguistic Intelligence

Interpersonal and Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	84.152	19	.000	.082	118.152	.231	.856
constrained model	96.134	20	.000	.086	128.134	.250	.832

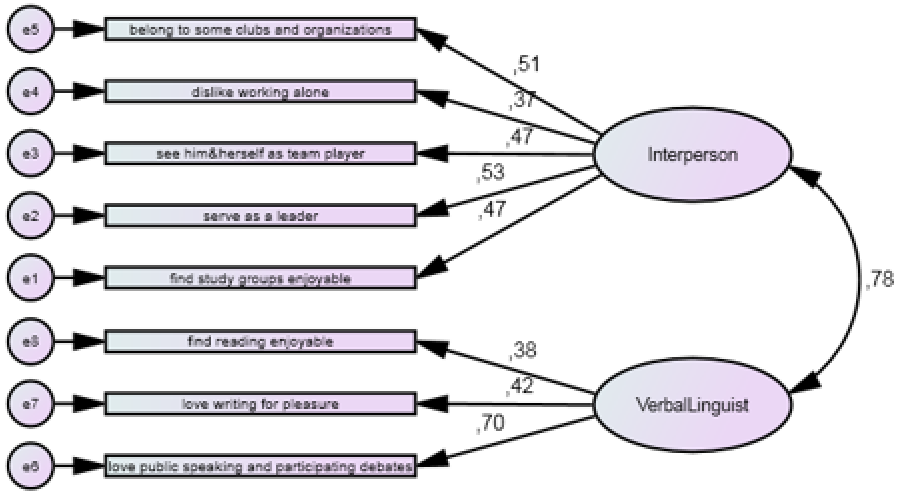

Figure 52. Unconstrained Model Fit of Interpersonal and Verbal/Linguistic Intelligence

When, the model is forced into a single fit, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. The related values reveal that the single factor model is significantly deteriorated.

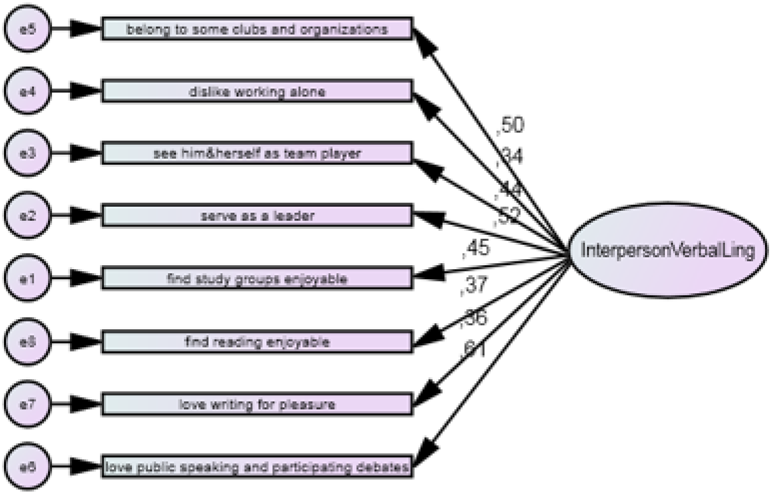

Figure 53. Constrained Model Fit of Interpersonal and Verbal/Linguistic Intelligence

Table 44 displays the Chi-square and model fit values and figures 54 and 55 represents the unconstrained and constrained model for interpersonal and intrapersonal intelligences for discriminant validity analysis.

Table 44. Chi-square and Model Fit Values for Interpersonal and Intrapersonal Intelligence

Interpersonal and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	95.298	34	.000	.059	137.298	.268	.904
constrained model	96.134	35	.000	.114	307.969	.602	.636

As can be seen from the values in Table 44, when, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated. Therefore, the values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity. Hence the factor loadings for the interpersonal intelligence in the constrained model goes below the required level proving that unconstrained model is better.

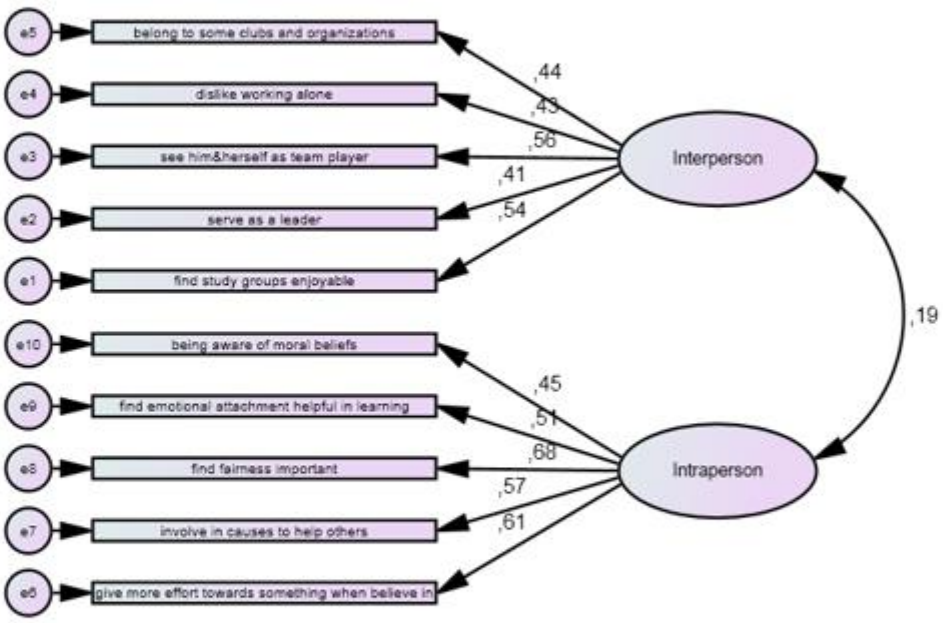

Figure 54. Unconstrained Model Fit of Interpersonal and Intrapersonal Intelligence

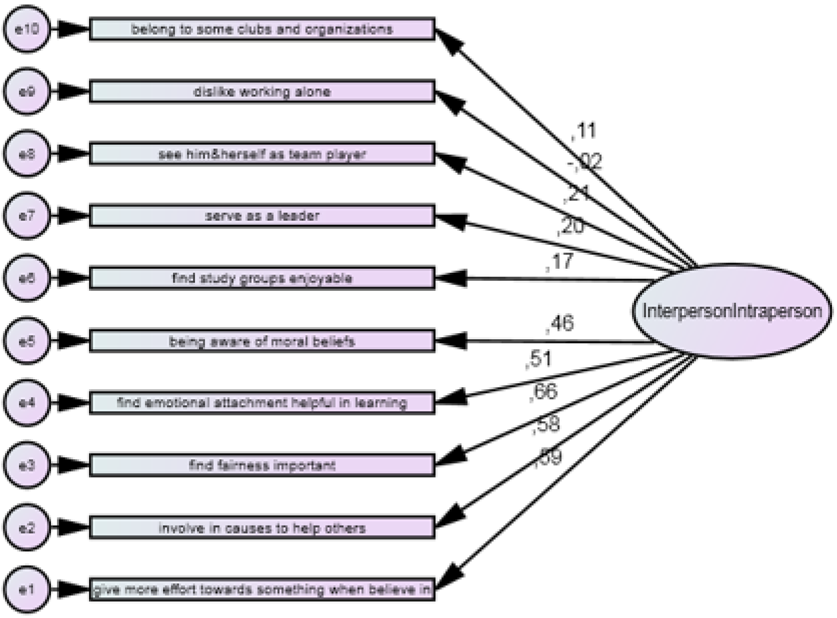

Figure 55. Constrained Model Fit of Interpersonal and Intrapersonal Intelligence

As can be seen below, discriminant validity analysis for Interpersonal and visual/spatial intelligences were presented. The unconstrained and constrained models can be seen in Figure 56 and 57, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 45. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 45. Chi-square and Model Fit Values for Interpersonal and Visual/Spatial Intelligence

Interpersonal and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	57.257	19	.000	.063	91.257	.178	.922
constrained model	235.044	20	.000	.145	267.044	.522	.561

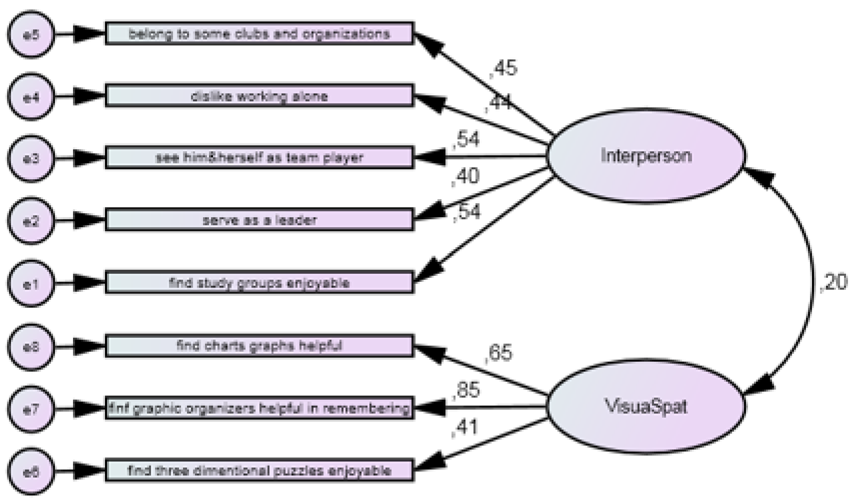

Figure 56. Unconstrained Model Fit of Interpersonal and Visual/Spatial Intelligence

When the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated.

Figure 57. Constrained Model Fit of Interpersonal and Visual/Spatial Intelligence

Following, discriminant validity analysis for interpersonal and existential intelligences were presented. The two models can be seen in Figure 58 and 59, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 46.

Table 46. Chi-square and Model Fit Values for Interpersonal and Existential Intelligence

Interpersonal and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	226.728	53	.000	.080	276.728	.540	.818
constrained model	375.007	54	.000	.108	423.005	.826	.663

The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit model like in Figure 59, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

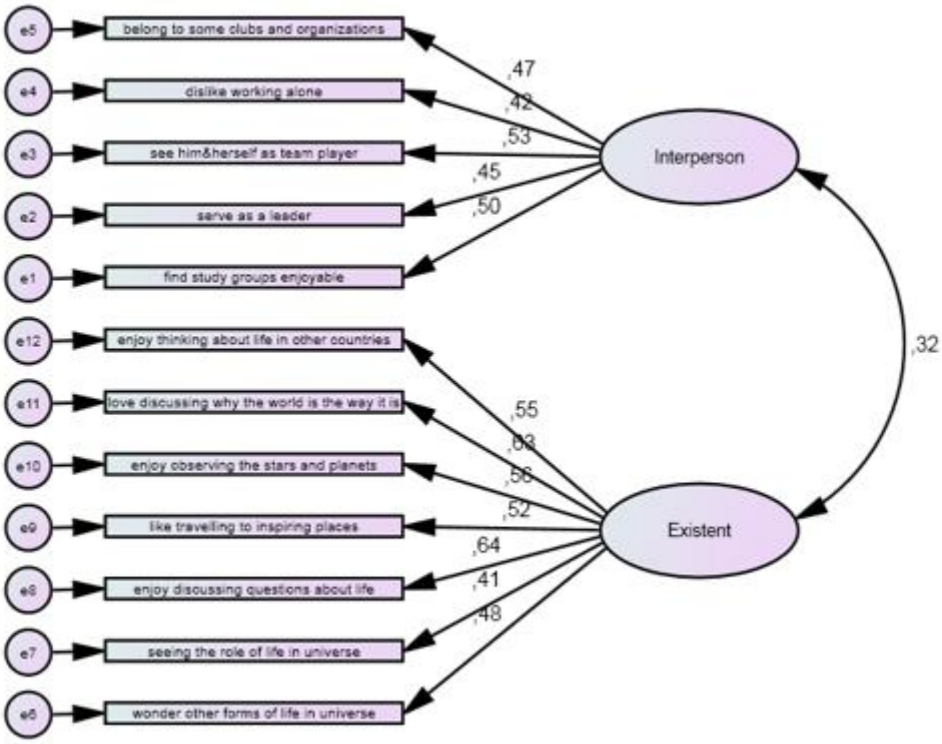

Figure 58. Unconstrained Model Fit of Interpersonal and Existential Intelligence

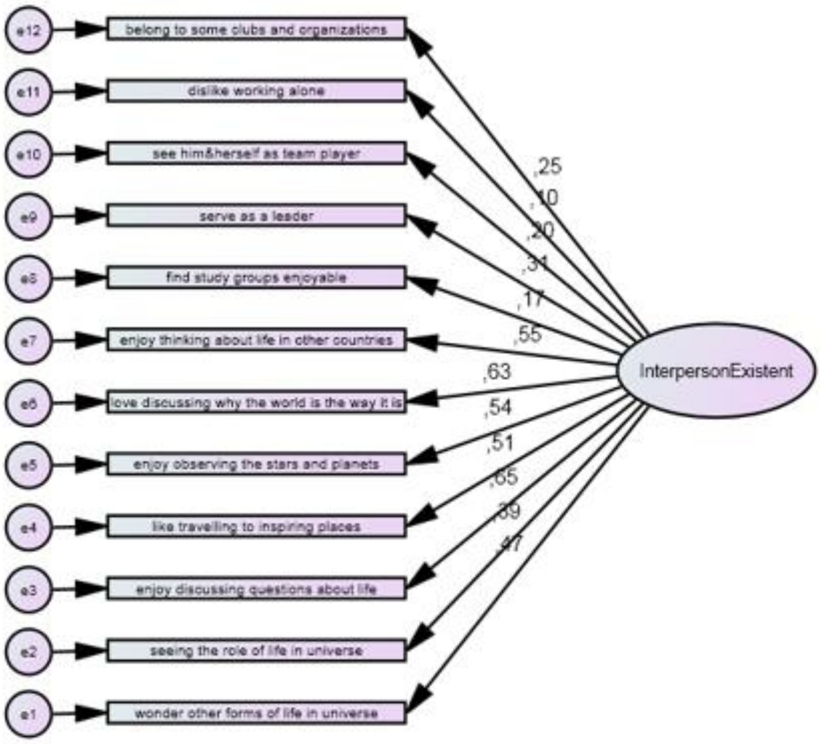

Figure 59. Constrained Model Fit of Interpersonal and Existential Intelligence

Details about discriminant validity analysis for bodily/kinesthetic and verbal/linguistic Intelligences were presented below in Figures 60-61 and values for the unconstrained and constrained models can be seen in Table 47.

Table 47. Chi-square and Model Fit Values for Bodily/Kinesthetic and Verbal/Linguistic Intelligence

Bodily/Kinesthetic and Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	31.239	13	.003	.052	61.239	.120	.955
constrained model	105.158	14	.000	.113	133.158	.260	.776

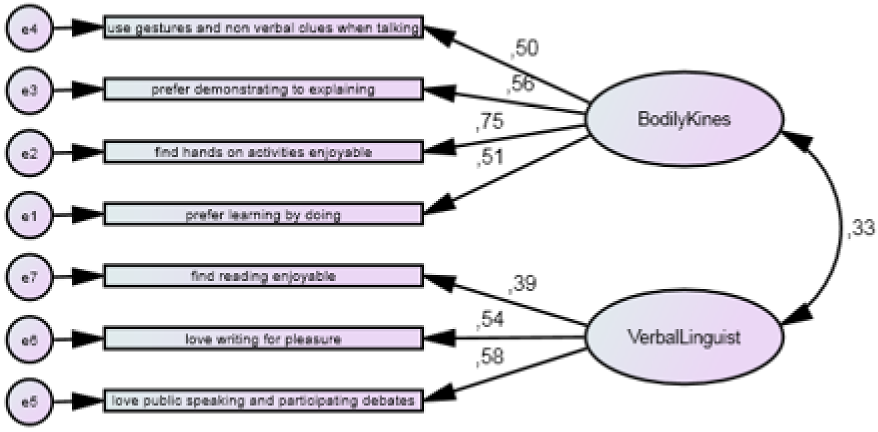

Figure 60. Unconstrained Model Fit of Bodily/Kinesthetic and Verbal/Linguistic Intelligence

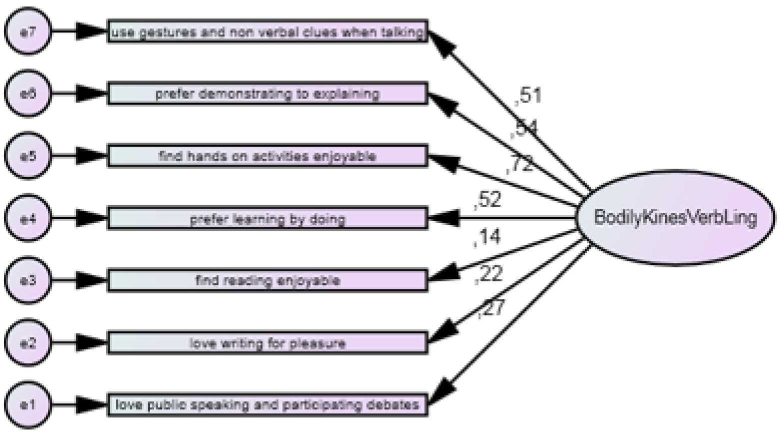

Figure 61. Constrained Model Fit of Bodily/Kinesthetic and Verbal/Linguistic Intelligence

As can be seen from the values of chi-square and the goodness-of-fit measures in Table 47, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. The related values reveal that the single factor model for bodily/kinesthetic and verbal/linguistic Intelligences is significantly deteriorated.

The next figures 62 and 63 represents the unconstrained and constrained model for bodily/kinesthetic and intrapersonal intelligences for discriminant validity analysis. As can be seen from the values in Table 48, when, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases.

Table 48. Chi-square and Model Fit Values for Bodily/Kinesthetic and Intrapersonal Intelligence

Bodily/Kinesthetic and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	29.802	26	.000	.017	67.802	.132	.995
constrained model	65.465	27	.000	.053	101.465	.198	.954

These values confirm that the single factor model is significantly deteriorated. Therefore, the values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

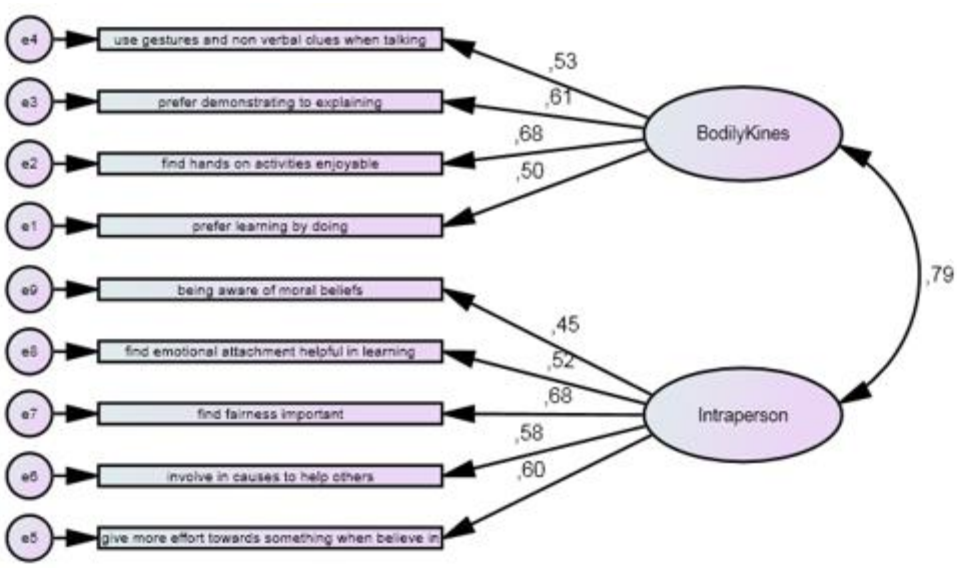

Figure 62. Unconstrained Model Fit of Bodily/Kinesthetic and Intrapersonal Intelligence

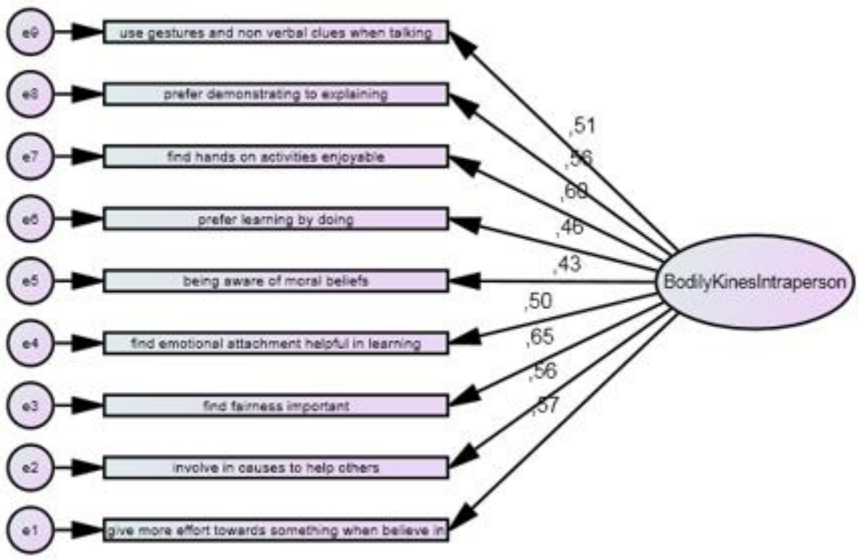

Figure 63. Constrained Model Fit of Bodily/Kinesthetic and Intrapersonal Intelligence

As can be seen below, discriminant validity analysis for bodily/kinesthetic and visual/spatial intelligences were presented. The unconstrained and constrained models can be seen in Figure 64 and 65, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 49. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 49. Chi-square and Model Fit Values for Bodily/Kinesthetic and Visual/Spatial Intelligence

Bodily/Kinesthetic and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	18.066	13	.000	.028	48.066	.094	.991
constrained model	164.634	14	.000	.145	192.634	.376	.746

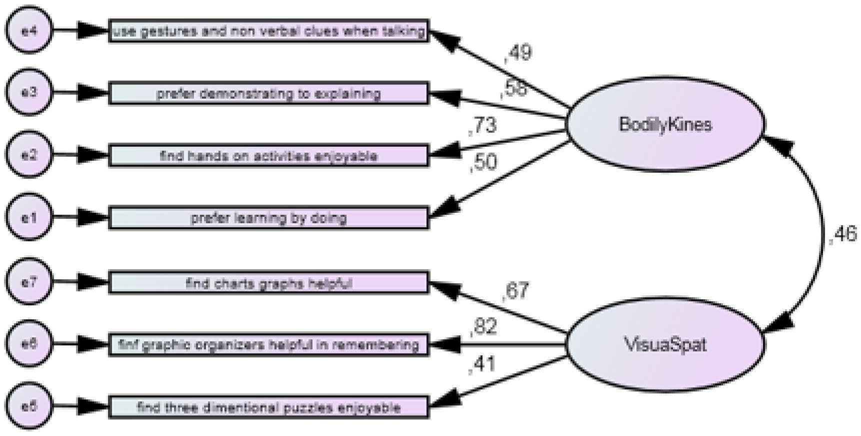

Figure 64. Unconstrained Model Fit of Bodily/Kinesthetic and Visual/Spatial Intelligence

When, the model is constrained as one factor as in figure 65, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated.

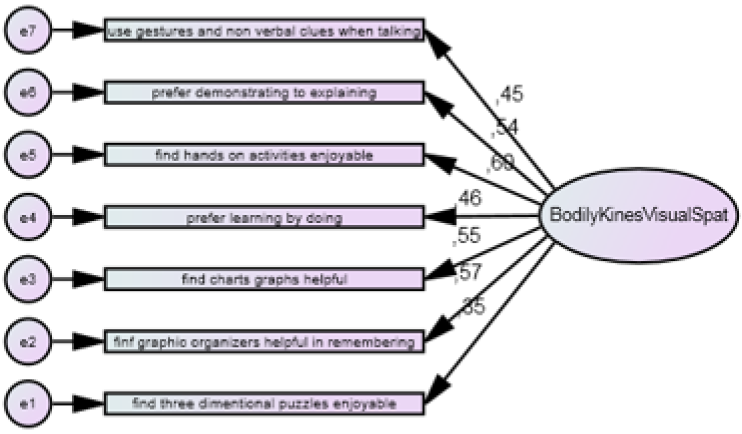

Figure 65. Constrained Model Fit of Bodily/Kinesthetic and Visual/Spatial Intelligence

Next, discriminant validity analysis for bodily/kinesthetic and existential intelligences are presented. The two models can be seen in Figure 66 and 67, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 50. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit model like in Figure 67, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

Table 50. Chi-square and Model Fit Values for Bodily/Kinesthetic and Existential Intelligence

Bodily/Kinesthetic and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	223.997	43	.000	.091	269.997	.527	.837
constrained model	337.878	44	.000	.114	381.878	.746	.736

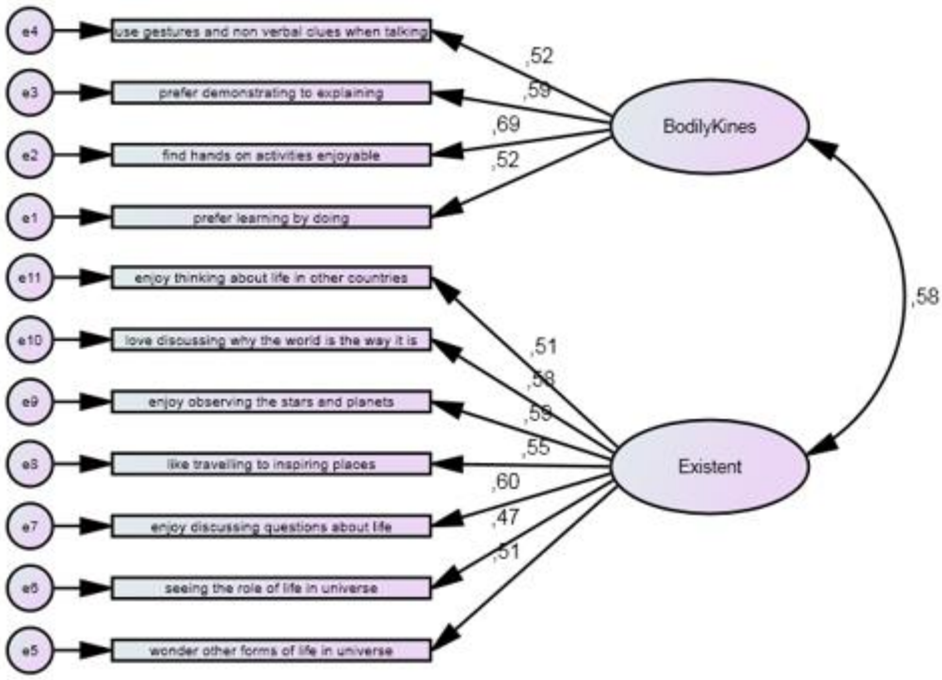

Figure 66. Unconstrained Model Fit of Bodily/Kinesthetic and Existential Intelligence

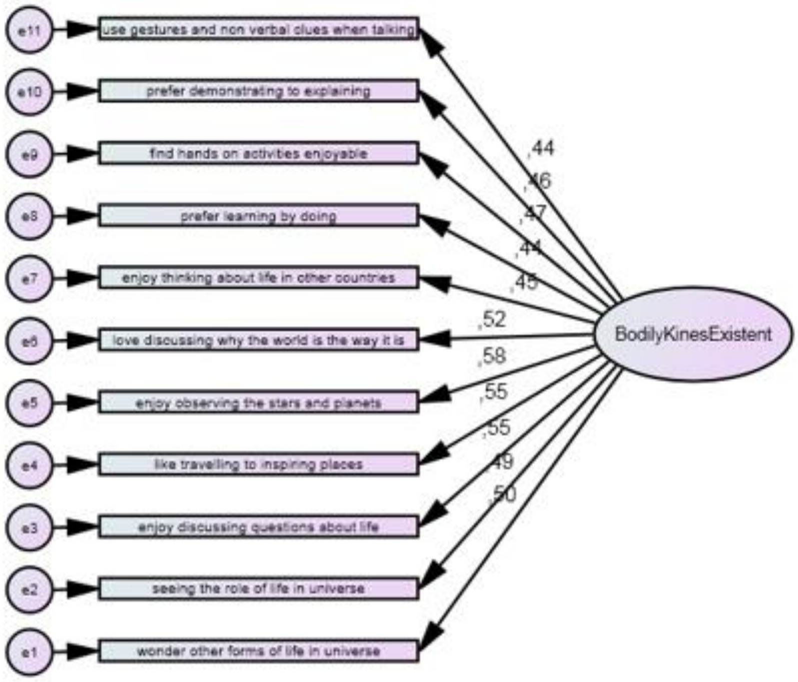

Figure 67. Constrained Model Fit of Bodily/Kinesthetic and Existential Intelligence

Details about discriminant validity analysis for verbal/linguistic and intrapersonal intelligences were presented in Figures 68-69 and values for the unconstrained and constrained models can be seen in Table 51. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit like in Figure 69, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. The related values reveal that the single factor model is significantly deteriorated.

Table 51. Chi-square and Model Fit Values for Verbal/Linguistic and Intrapersonal Intelligence

Verbal/Linguistic and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	17.574	19	.000	.000	51.574	.101	.100
constrained model	337.878	20	.000	.087	129.307	.253	.839

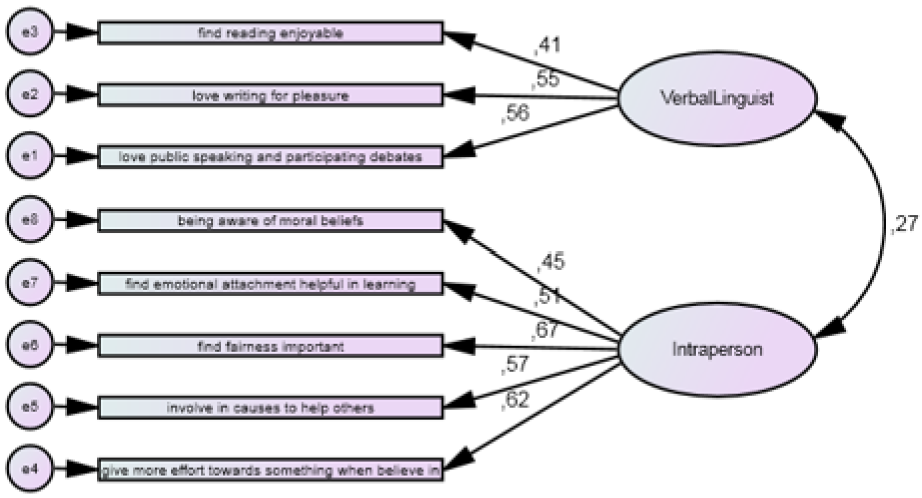

Figure 68. Unconstrained Model Fit of Verbal/Linguistic and Intrapersonal Intelligence

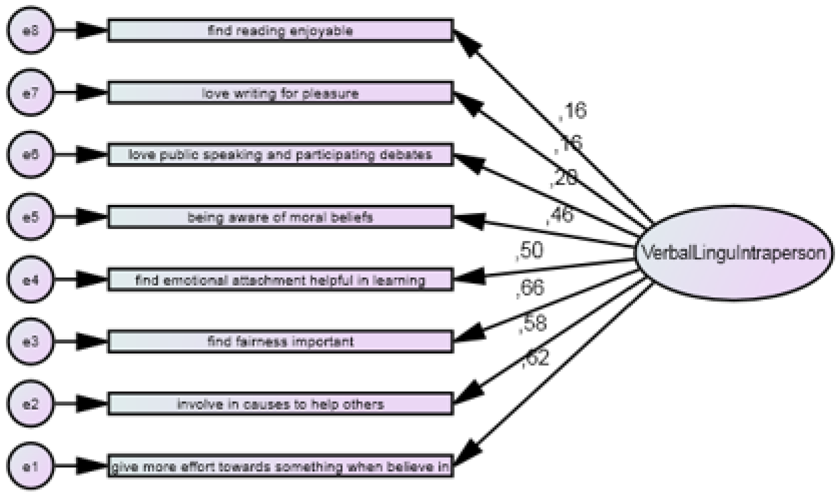

Figure 69. Constrained Model Fit of Verbal/Linguistic and Intrapersonal Intelligence

Figure 70 and 71 the unconstrained and constrained model for verbal/linguistic and visual spatial intelligences for discriminant validity analysis are presented. As can be seen from the values in Table 52, when, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases.

Table 52. Chi-square and Model Fit Values for Verbal/Linguistic and Visual Spatial Intelligence

Verbal/Linguistic and Visual Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	39.386	8	.000	.088	65.386	.128	.917
constrained model	117.081	9	.000	.153	141.081	.276	.715

These values confirm that the single factor model is significantly deteriorated. Therefore, the values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

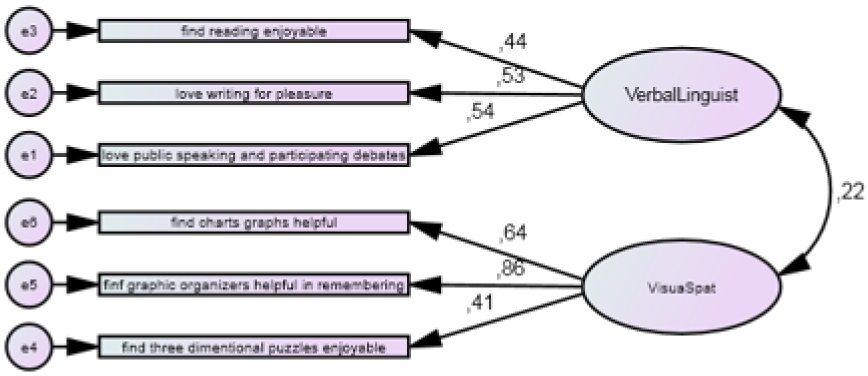

Figure 70. Unconstrained Model Fit of Verbal/Linguistic and Visual Spatial Intelligence

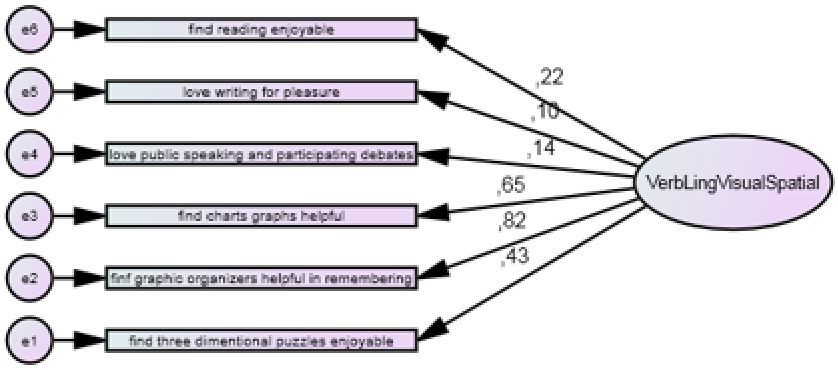

Figure 71. Constrained Model Fit of Verbal/Linguistic and Visual Spatial Intelligence

Discriminant validity analysis for verbal/linguistic and existential intelligences were presented in Figures 72-73 and in table 53. The unconstrained model can be seen in Figure 72 and the constrained model in Figure 73, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 53. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 53. Chi-square and Model Fit Values for Verbal/Linguistic and Existential Intelligence

Verbal/Linguistic and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	182.703	34	.000	.092	224.703	.439	.837
constrained model	207.368	35	.000	.098	247.368	.483	.811

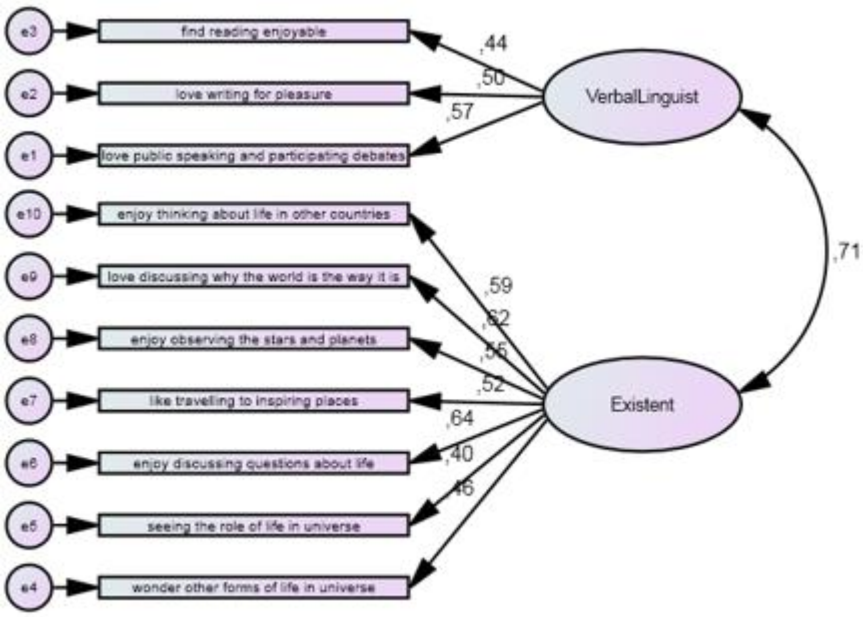

Figure 72. Unconstrained Model Fit of Verbal/Linguistic and Existential Intelligence

When the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated.

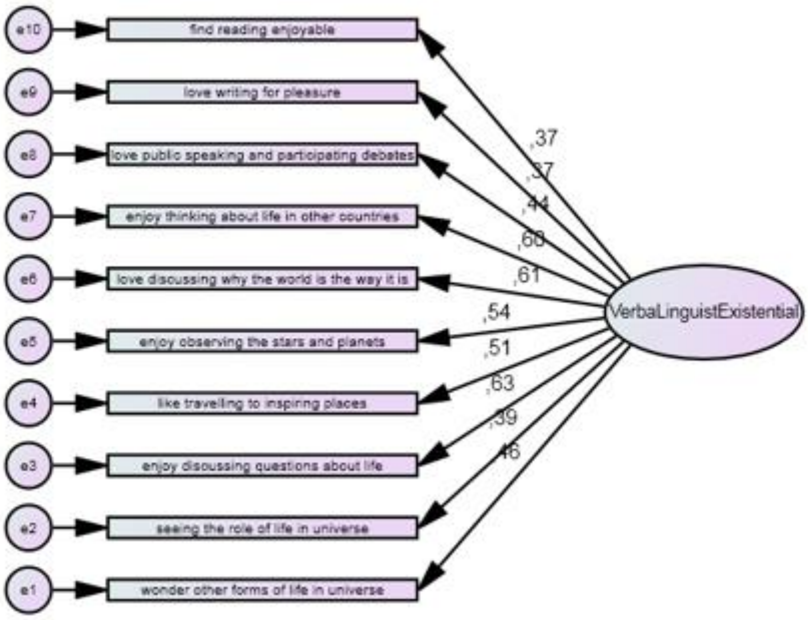

Figure 73. Constrained Model Fit of Verbal/Linguistic and Existential Intelligence

Discriminant validity analysis for intrapersonal and visual/spatial intelligences were presented in the following figures and table. The two models can be seen in Figure 74 and 75, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 54. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity.

Table 54. Chi-square and Model Fit Values for Intrapersonal and Visual/Spatial Intelligence

Intrapersonal and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	34.165	19	.003	.039	68.165	.133	.977
constrained model	233.698	20	.000	.144	265.698	.519	.678

When, the model is forced into a single fit model like in Figure 75, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

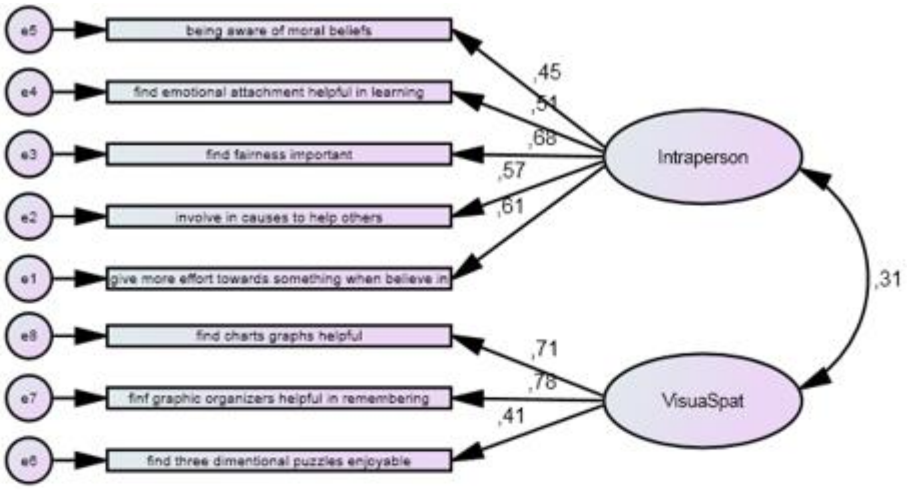

Figure 74. Unconstrained Model Fit of Intrapersonal and Visual/Spatial Intelligence

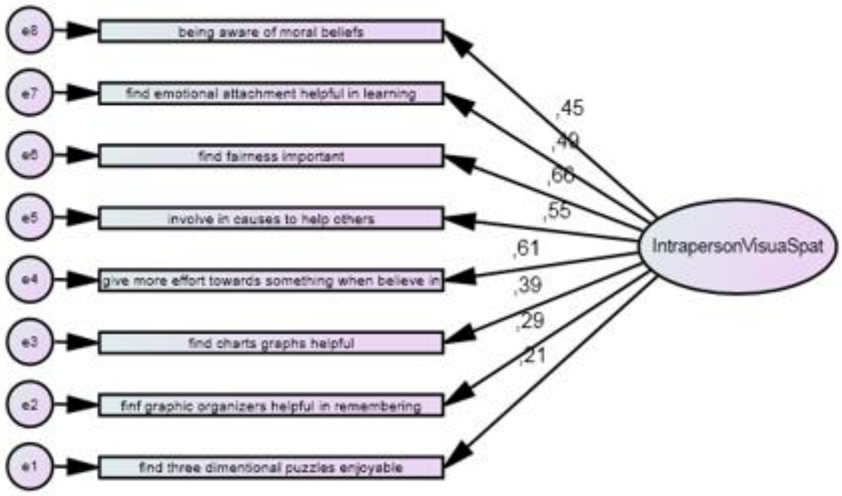

Figure 75. Constrained Model Fit of Intrapersonal and Visual/Spatial Intelligence

Details about discriminant validity analysis for intrapersonal and existential Intelligences were presented in Figures 76-77 and values for the unconstrained and constrained models can be seen in Table 55. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. The related values reveal that the single factor model is significantly deteriorated.

Table 55. Chi-square and Model Fit Values for Intrapersonal and Existential Intelligence

Intrapersonal and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	239.315	53	.000	.083	289.315	.565	.851
constrained model	246.066	54	.000	.103	394.066	.770	.767

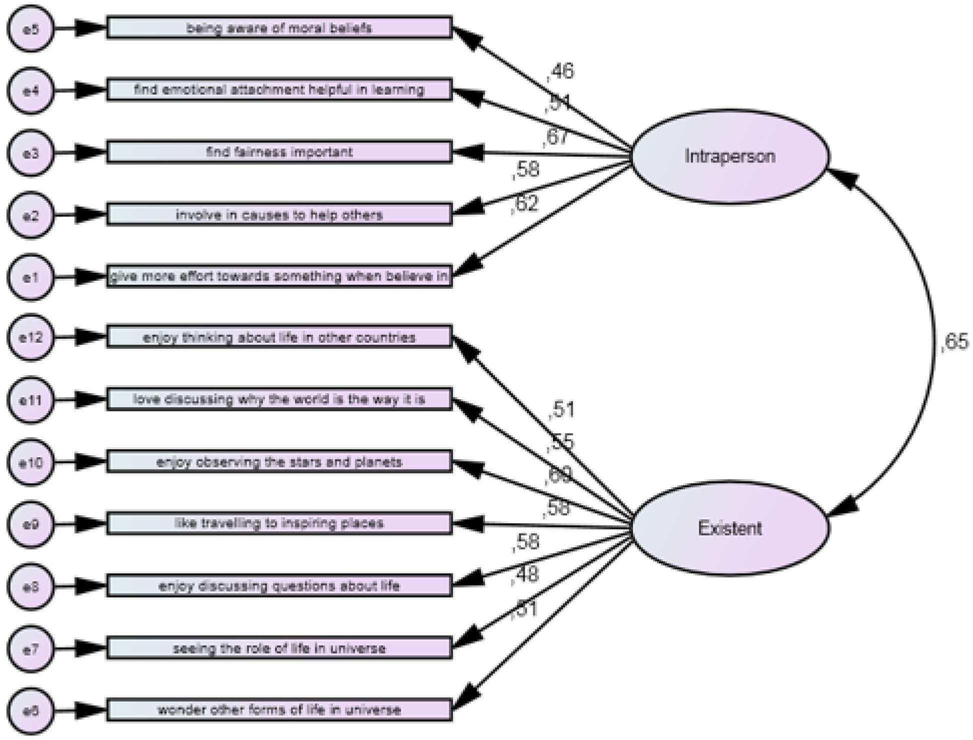

Figure 76. Unconstrained Model Fit of Intrapersonal and Existential Intelligence

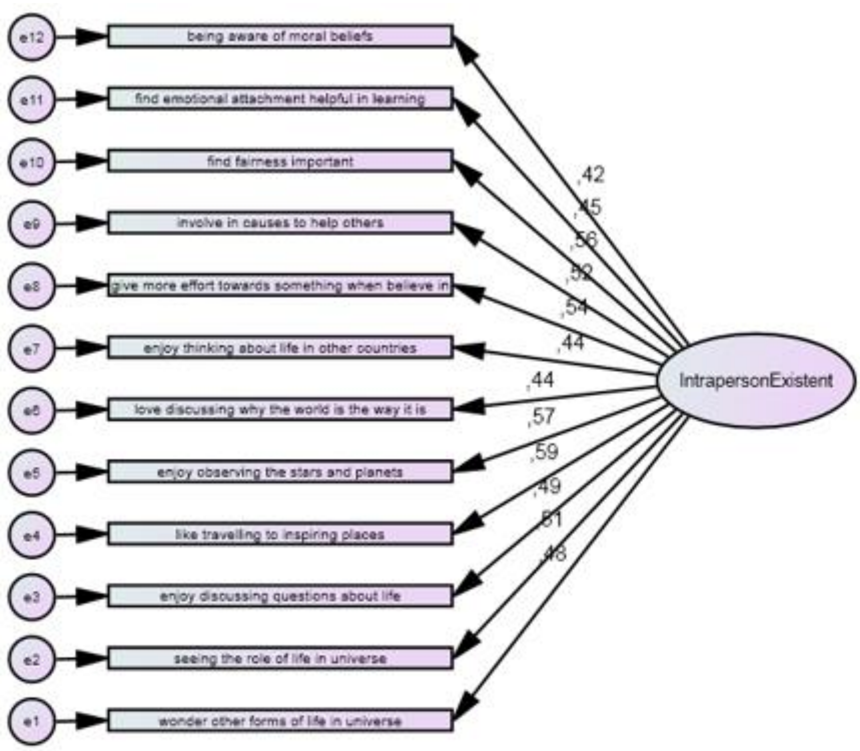

Figure 77. Constrained Model Fit of Intrapersonal and Existential Intelligence

Figure 78 and 79 represents the unconstrained and constrained model for visual/spatial and existential Intelligences for discriminant validity analysis. As can be seen from the values in Table 56, when, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases.

Table 56. Chi-square and Model Fit Values for Visual/Spatial and Existential Intelligence

Visual/Spatial and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	157.967	34	.000	.084	199.967	.391	.875
constrained model	310.076	35	.000	.124	350.076	.684	.722

These values confirm that the single factor model is significantly deteriorated. Therefore, the values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

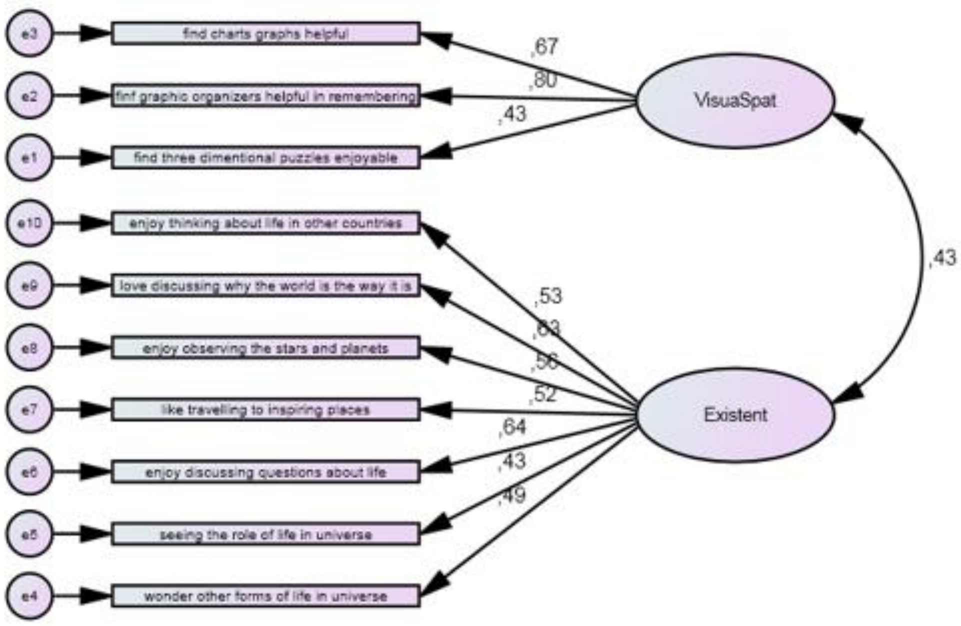

Figure 78. Unconstrained Model Fit of Visual/Spatial and Existential Intelligence

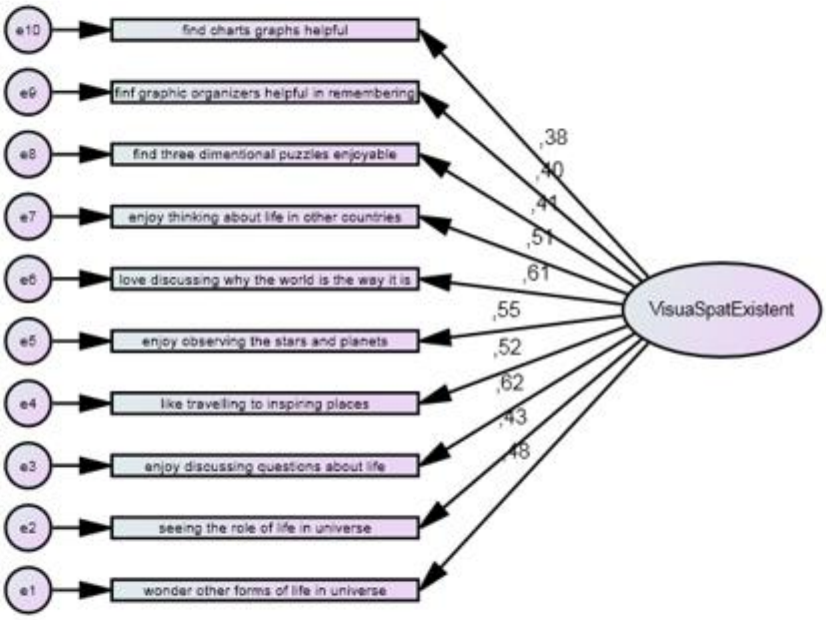

Figure 79. Constrained Model Fit of Visual/Spatial and Existential Intelligence

4.4.2 Discriminant Validity for MISFS

Discriminant validity for naturalistic and musical intelligences were presented below. The unconstrained and constrained models can be seen in Figure 80 and 81, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 57. According to the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 57. Chi-square and Model Fit Values for Naturalistic and Musical Intelligence

Naturalistic-Musical	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	83.833	53	.004	.050	133.833	.574	.939
constrained model	217.679	54	.000	.114	265.679	.1140	.674

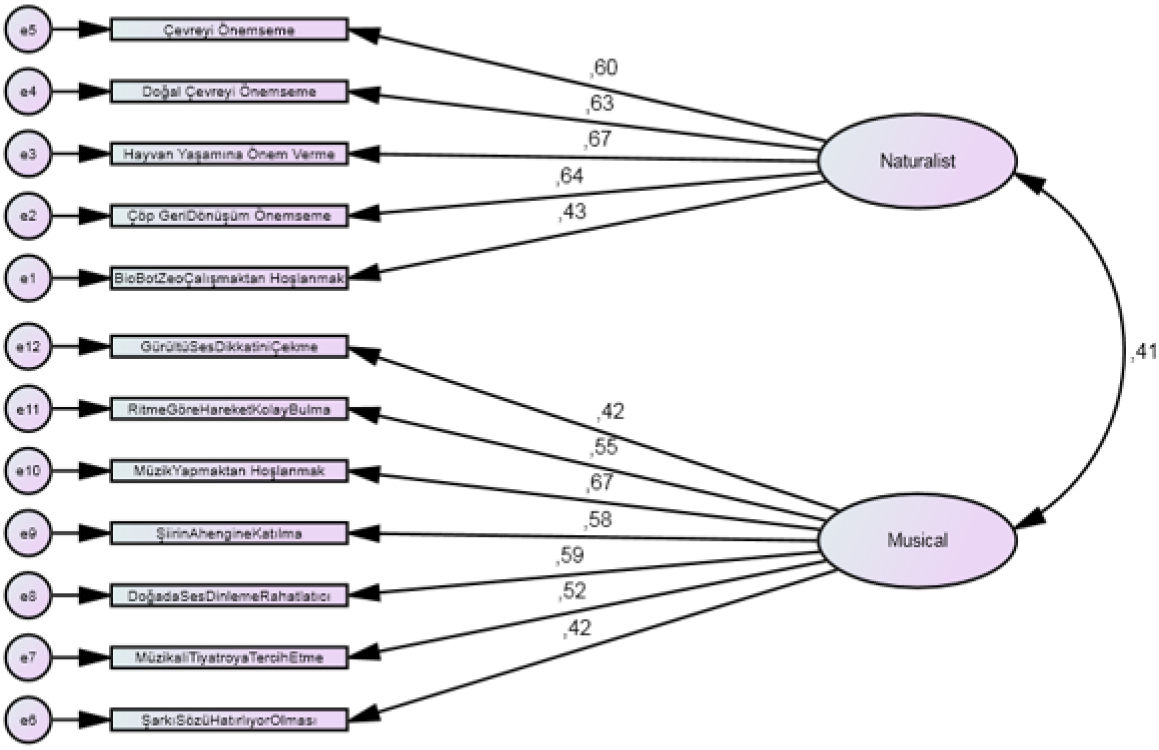

Figure 80. Unconstrained Model Fit of Naturalistic and Musical Intelligence

When, the model is forced into a single fit as in Figure 81, a rise of Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed which shows that the model is significantly deteriorated. Hence, some factor loadings were also distorted below .40 level.

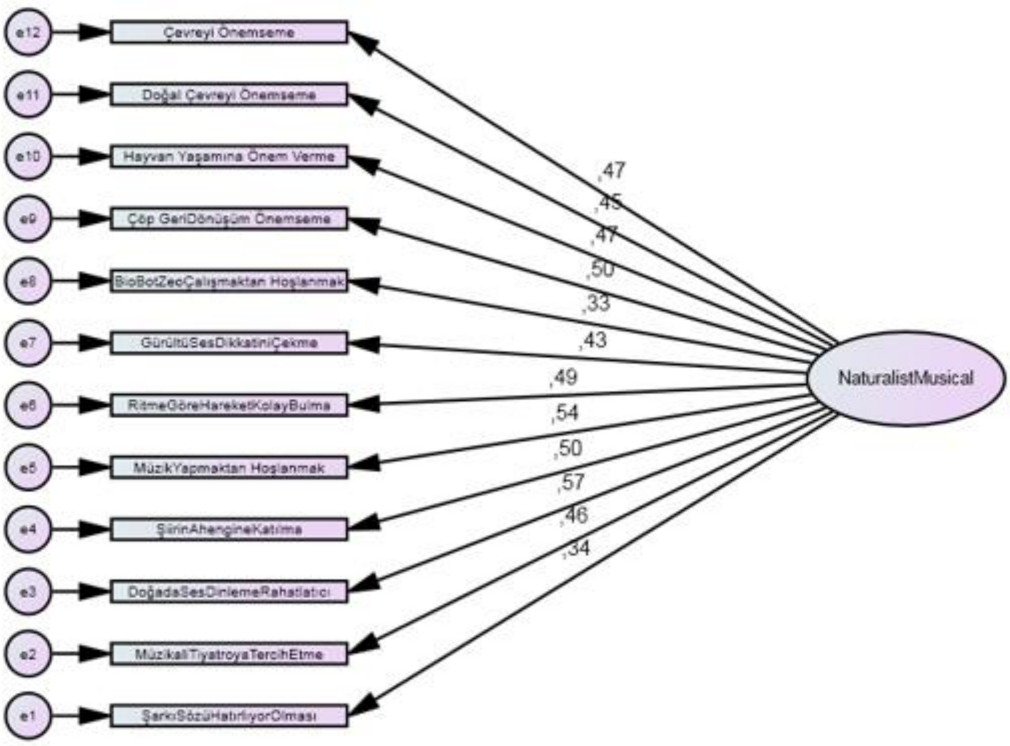

Figure 81. Constrained Model Fit of Naturalistic and Musical Intelligence

Discriminant validity for naturalistic and logical/mathematical intelligences were presented in the following figures and table. The unconstrained and constrained models can be seen in Figure 82 and 83, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 58. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 58. Chi-square and Model Fit Values for Naturalistic and Logical/Mathematical Intelligence

Naturalistic-Log/Mathematical	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	93.391	43	.000	.071	139.391	.598	.912
constrained model	251.982	44	.000	.142	295.982	.1270	.636

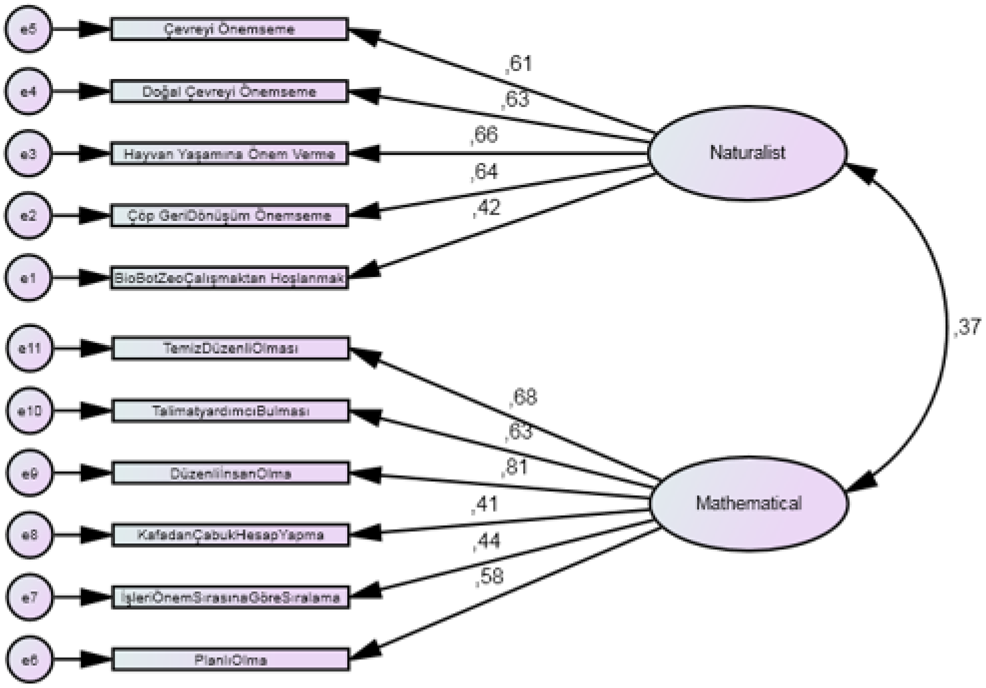

Figure 82. Unconstrained Model Fit of Naturalistic and Logical/Mathematical Intelligence

When, the model is forced into a single fit, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value shows a decrease. Hence, all of the naturalistic intelligence factors were distorted. The related values reveal that the constrained model is significantly deteriorated.

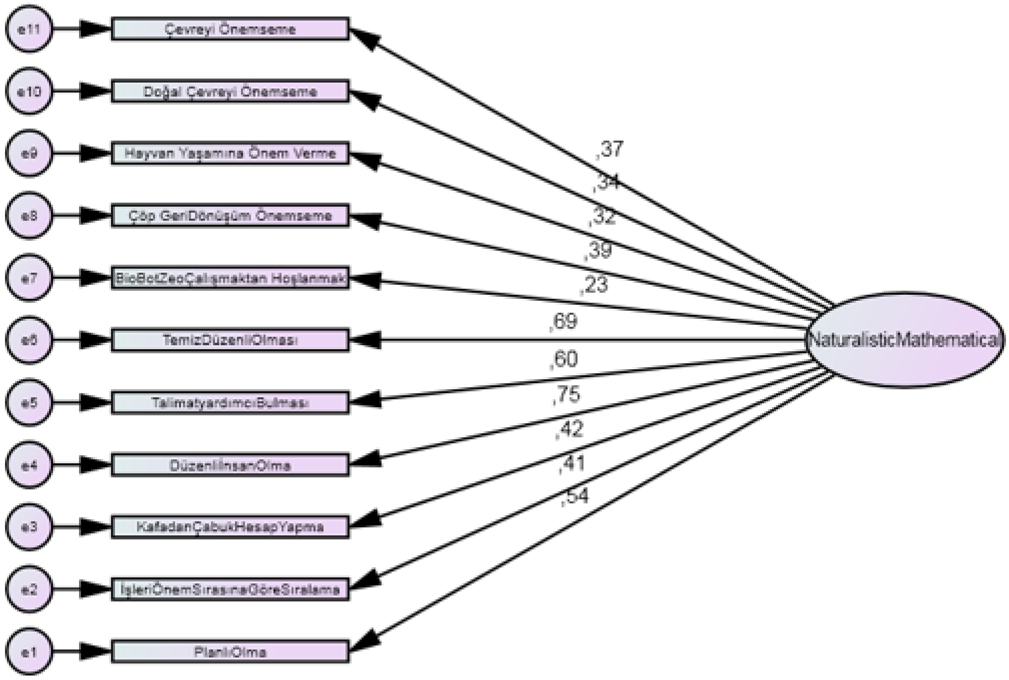

Figure 83. Constrained Model Fit of Naturalistic and Logical/Mathematical Intelligence

Discriminant validity for naturalistic and interpersonal intelligences and the constrained and unconstrained models were presented in the following figures and table. The two models can be seen in Figure 84 and 85, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 59.

Table 59. Chi-square and Model Fit Values for Naturalistic and Interpersonal Intelligence

Naturalistic-Interpersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	78.010	43	.001	.059	124.010	.532	.930
constrained model	220.392	44	.000	.131	264.392	.1135	.648

The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, Chi-square, RMSEA, AIC, and ECVI values increase and

CFI value decreases which reveal that the constrained model is significantly deteriorated.

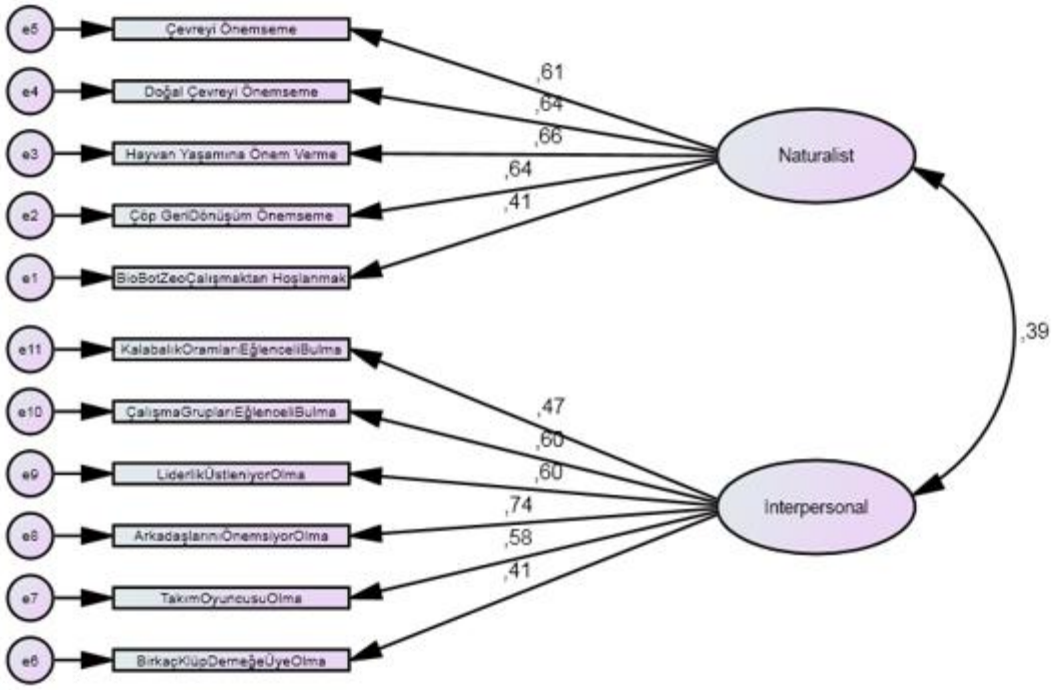

Figure 84. Unconstrained Model Fit of Naturalistic and Interpersonal Intelligence

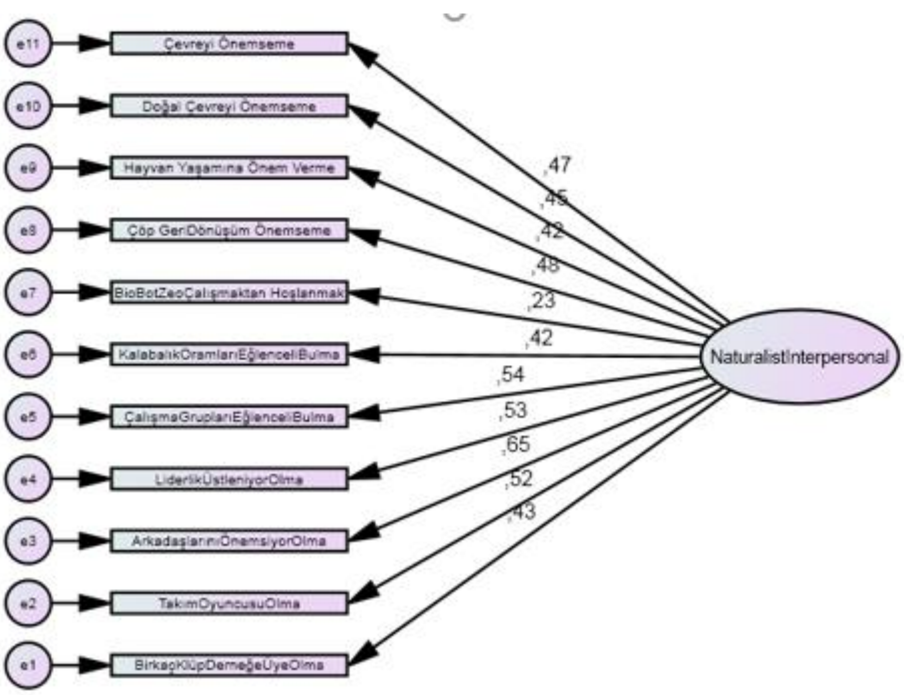

Figure 85. Constrained Model Fit of Naturalistic and Interpersonal Intelligence

Details about discriminant validity analysis for naturalistic and bodily/kinesthetic intelligences were presented in Figures 86-87 and values for the unconstrained and constrained models can be seen in Table 60. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, Chi-square, RMSEA, AIC, and ECVI values increase and CFI value decreases. Also more than half of factor loadings went below the cut-off value of .40, which in turn reveals that the constrained model is significantly deteriorated.

Table 60. Chi-square and Model Fit Values for Naturalistic and Bodily/Kinesthetic Intelligence

Naturalistic-Bodily/Kinesthetic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	55.409	34	.000	.052	97.409	.418	.941
constrained model	171.355	35	.000	.129	211.355	.907	.627

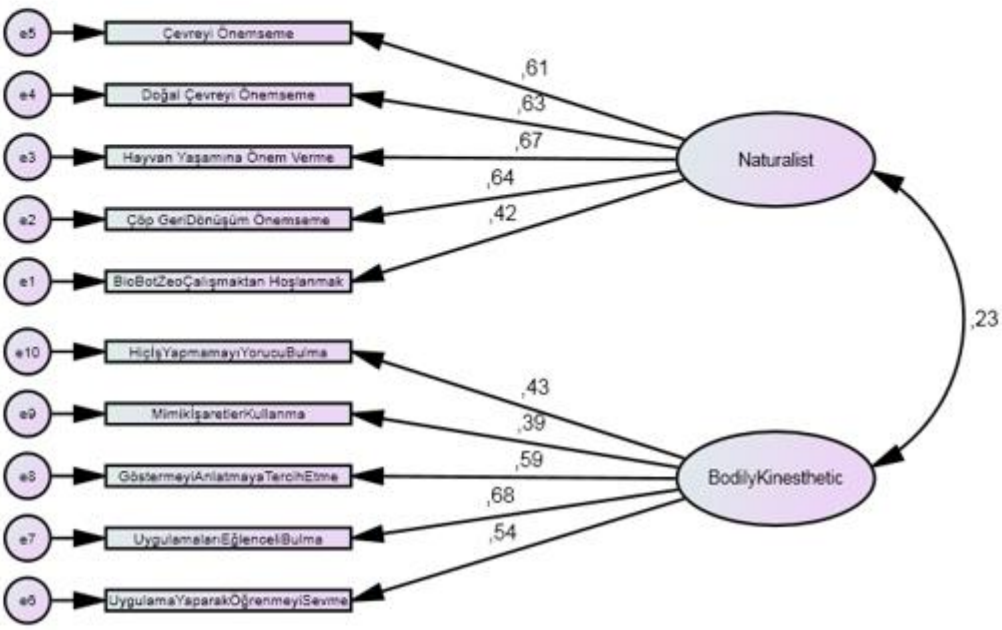

Figure 86. Unconstrained Model Fit of Naturalistic and Bodily/Kinesthetic Intelligence

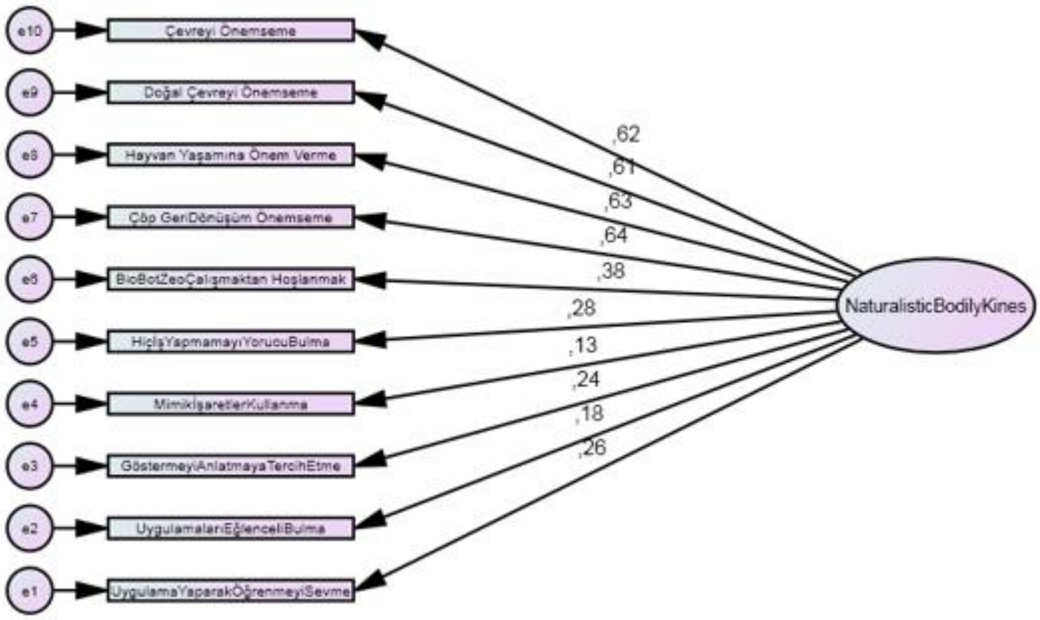

Figure 87. Constrained Model Fit of Naturalistic and Bodily/Kinesthetic Intelligence

Next, discriminant validity for naturalistic and verbal/linguistic intelligences were presented. The two models can be seen in Figure 88 and 89, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 61. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity.

Table 61. Chi-square and Model Fit Values for Naturalistic and Verbal/Linguistic Intelligence

Naturalistic-Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	60.160	26	.000	.075	98.160	.421	.928
constrained model	267.739	27	.000	.196	303.739	.1304	.491

When, the model is forced into a single fit like in Figure 89, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value. Parameter estimates also show negative results which reveal that the constrained model is significantly deteriorated.

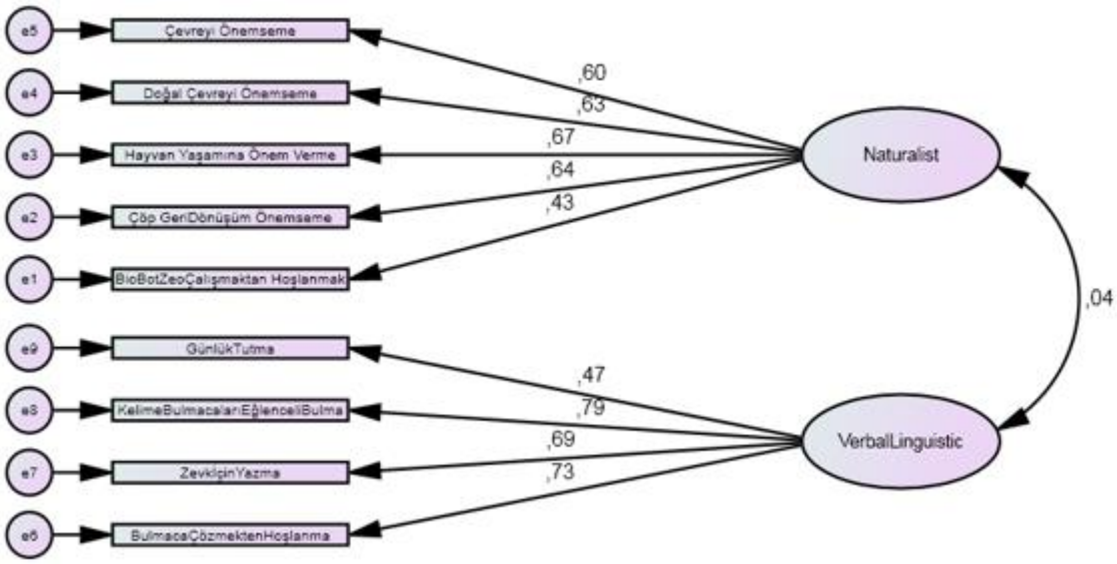

Figure 88. Unconstrained Model Fit of Naturalistic and Verbal/Linguistic Intelligence

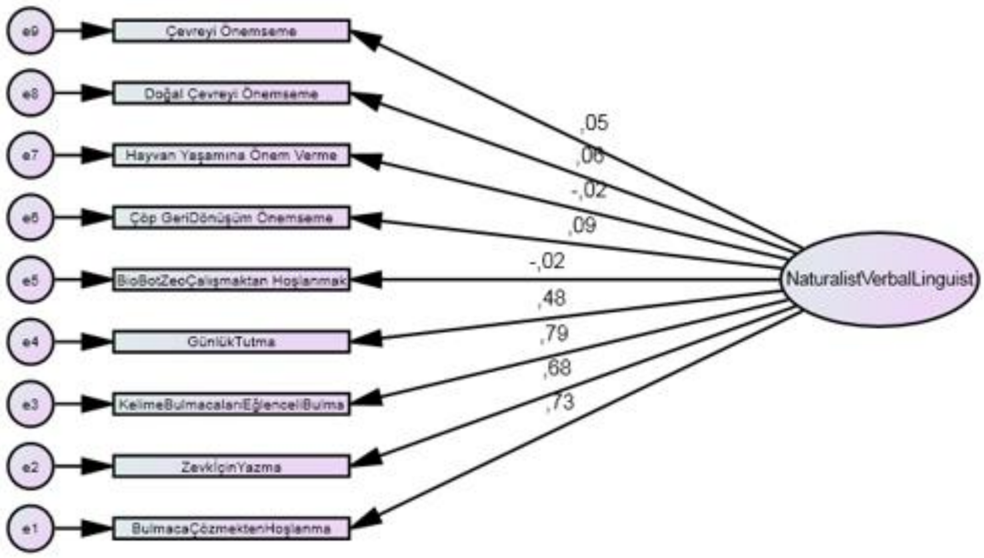

Figure 89. Constrained Model Fit of Naturalistic and Verbal/Linguistic Intelligence

Discriminant validity for naturalistic and intrapersonal intelligences were presented below. The two models can be seen in Figure 90 and 91, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 62. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value reveal that the constrained model is significantly deteriorated.

Table 62. Chi-square and Model Fit Values for Naturalistic and Intrapersonal Intelligence

Naturalistic and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	95.883	53	.000	.059	145.883	.626	.916
constrained model	229.262	54	.000	.118	277.262	.1190	.658

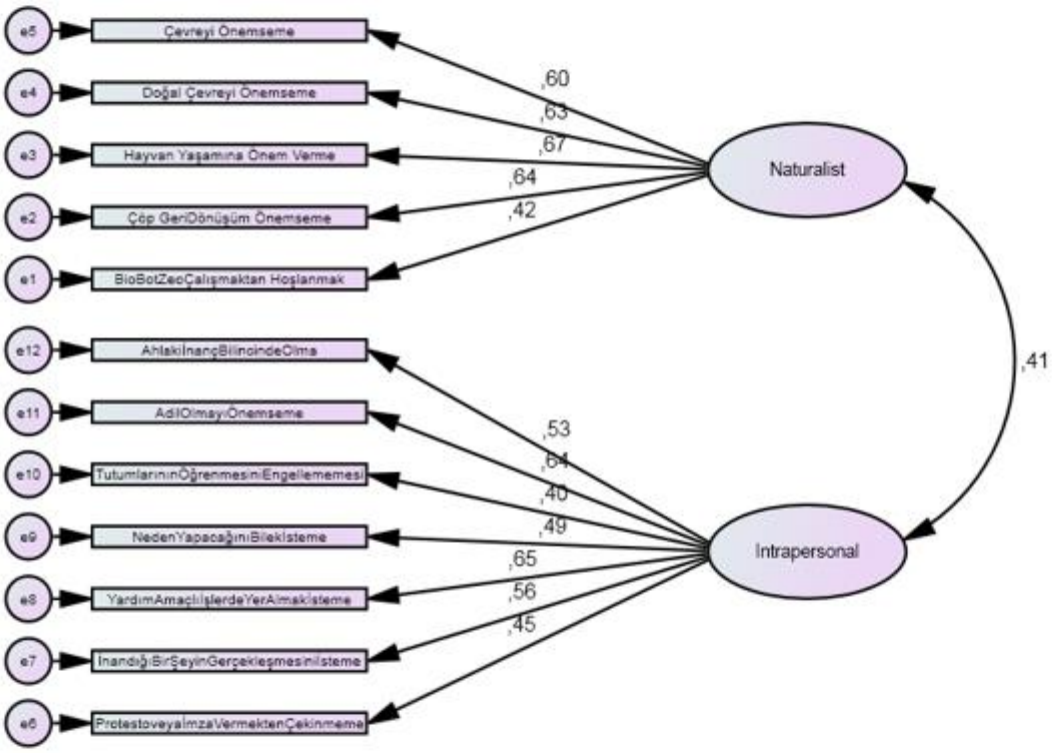

Figure 90. Unconstrained Model Fit of Naturalistic and Intrapersonal Intelligence

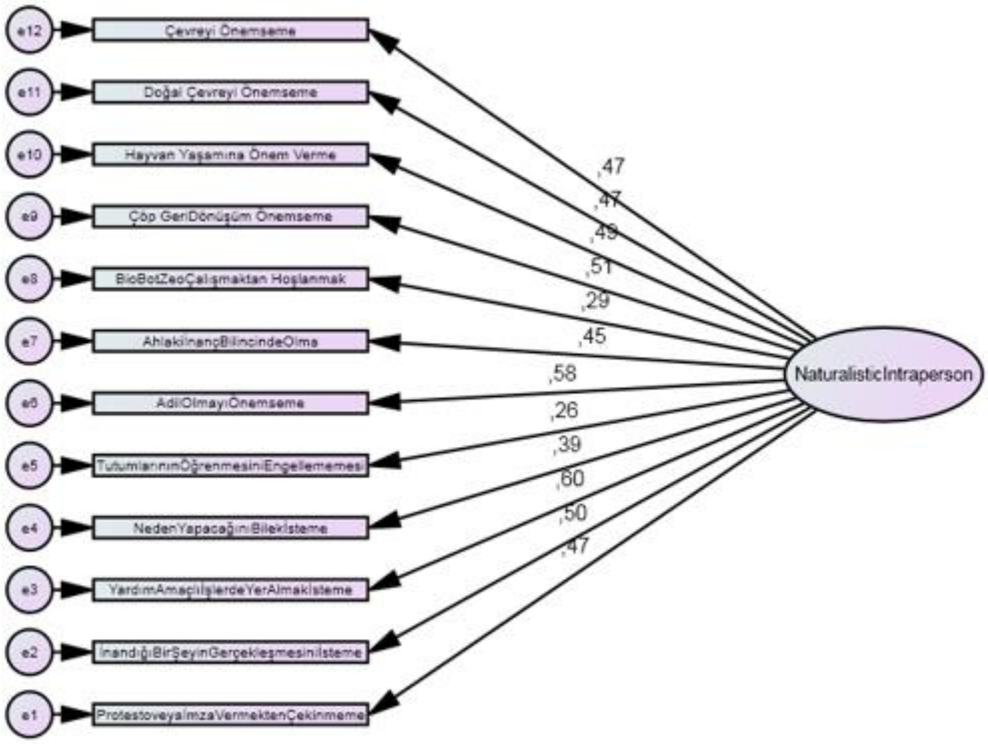

Figure 91. Constrained Model Fit of Naturalistic and Intrapersonal Intelligence

Discriminant validity for naturalistic and visual/spatial Intelligences were presented below. The unconstrained and constrained models can be seen in Figure 92 and 93, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 63. According to the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 63. Chi-square and Model Fit Values for Naturalistic and Visual/Spatial Intelligence

Naturalistic and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	45.466	34	.000	.038	87.466	.375	.966
constrained model	118.046	35	.000	.101	158.046	.678	.751

When, the model is forced into a single fit, some factor loadings went below the cut-off value of .40. Besides, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value reveal that the constrained model is significantly deteriorated.

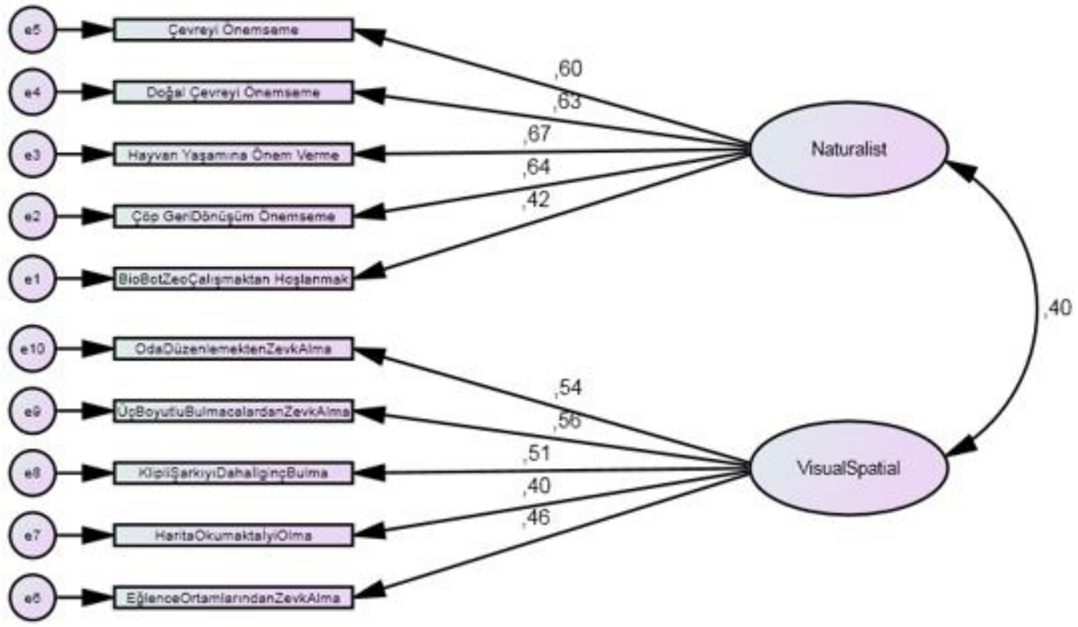

Figure 92. Unconstrained Model Fit of Naturalistic and Visual/Spatial Intelligence

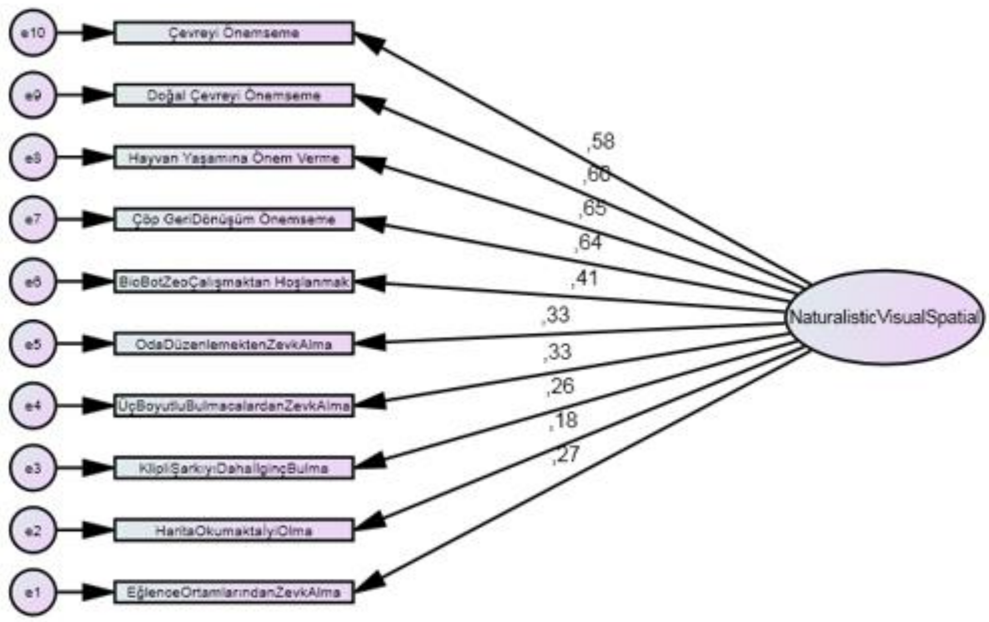

Figure 93. Constrained Model Fit of Naturalistic and Visual/Spatial Intelligence

Details about discriminant validity analysis for naturalistic and existential intelligences were presented in Figures 94-95 and values for the unconstrained and constrained models can be seen in Table 64. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, the related goodness-of-fit values and low factor loadings reveal that the constrained model is significantly deteriorated.

Table 64. Chi-square and Model Fit Values for Naturalistic and Existential Intelligence

Naturalistic and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	89.902	53	.001	.055	139.902	.600	.933
constrained model	251.982	54	.000	.125	299.982	.1287	.642

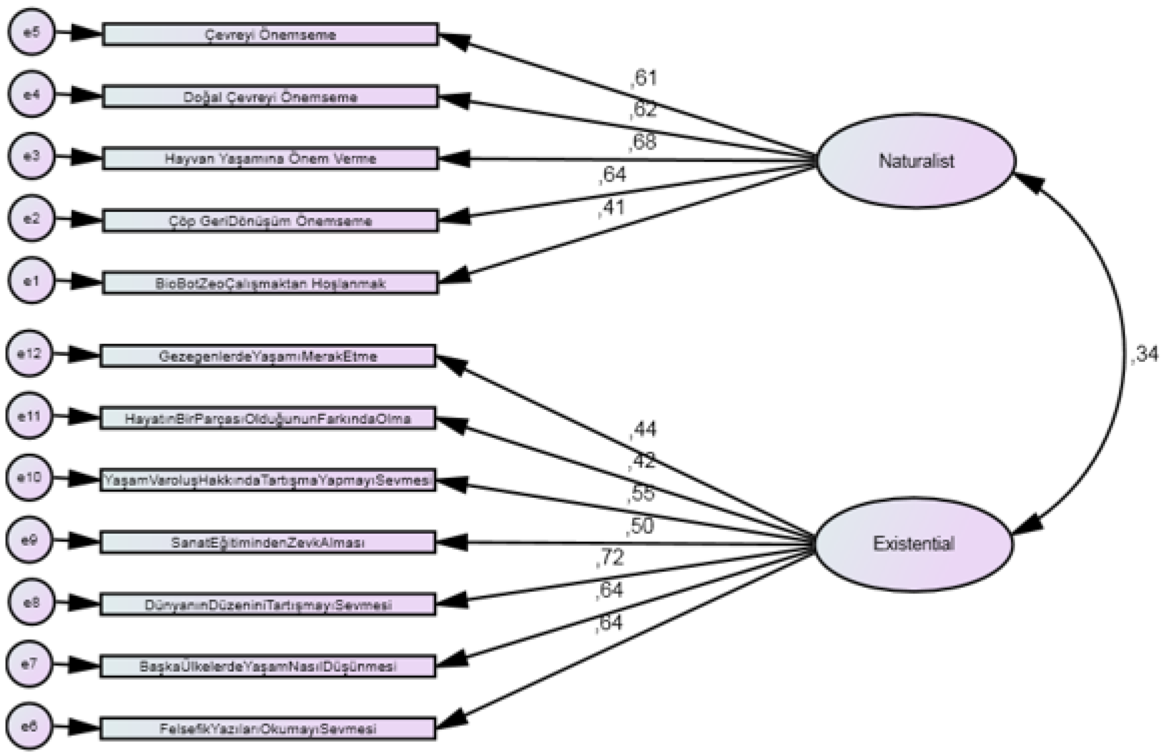

Figure 94. Unconstrained Model Fit of Naturalistic and Existential Intelligence

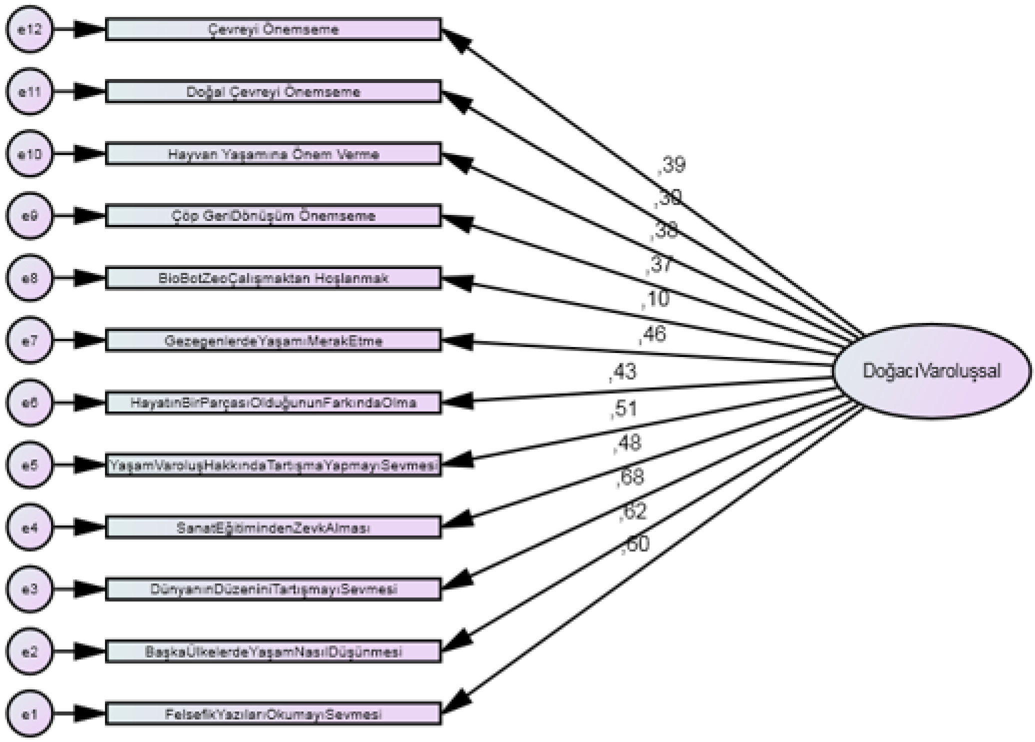

Figure 95. Constrained Model Fit of Naturalistic and Existential Intelligence

Details about discriminant validity analysis for musical and logical/mathematical Intelligences were presented in Figures 96-97 and values for the unconstrained and constrained models can be seen in Table 65.

Table 65. Chi-square and Model Fit Values for Musical and Logical/Mathematical Intelligence

Musical and Logical/Mathematical	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	98.632	64	.004	.048	152.632	.655	.940
constrained model	347.366	65	.000	.137	399.366	.1714	.468

As an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value can be seen for the constrained model, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

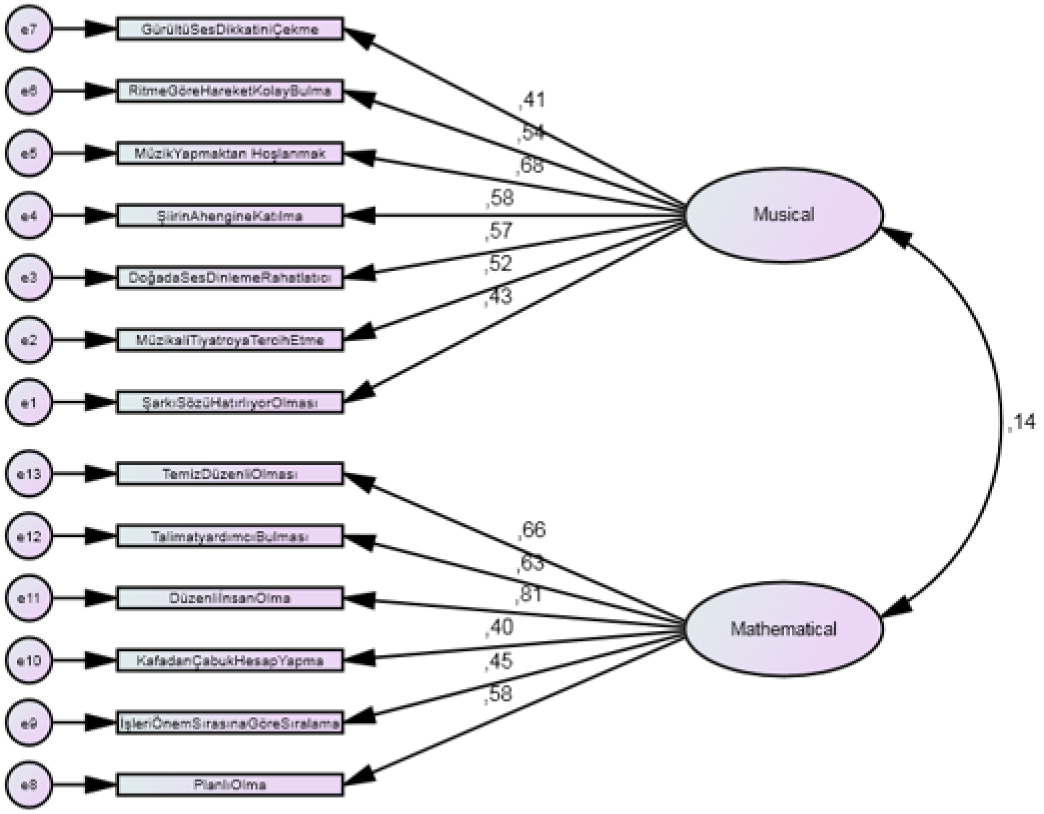

Figure 96. Unconstrained Model Fit of Musical and Logical/Mathematical Intelligence

Figure 97 depicts the factor loadings for each construct. While all values in the unconstraint model shown in Figure 96 are above .40, the values are musch lower for the constrained model. This also proves that when, the model is forced into a single fit, the related fit indices and low factor loading values reveal that the model is significantly deteriorated.

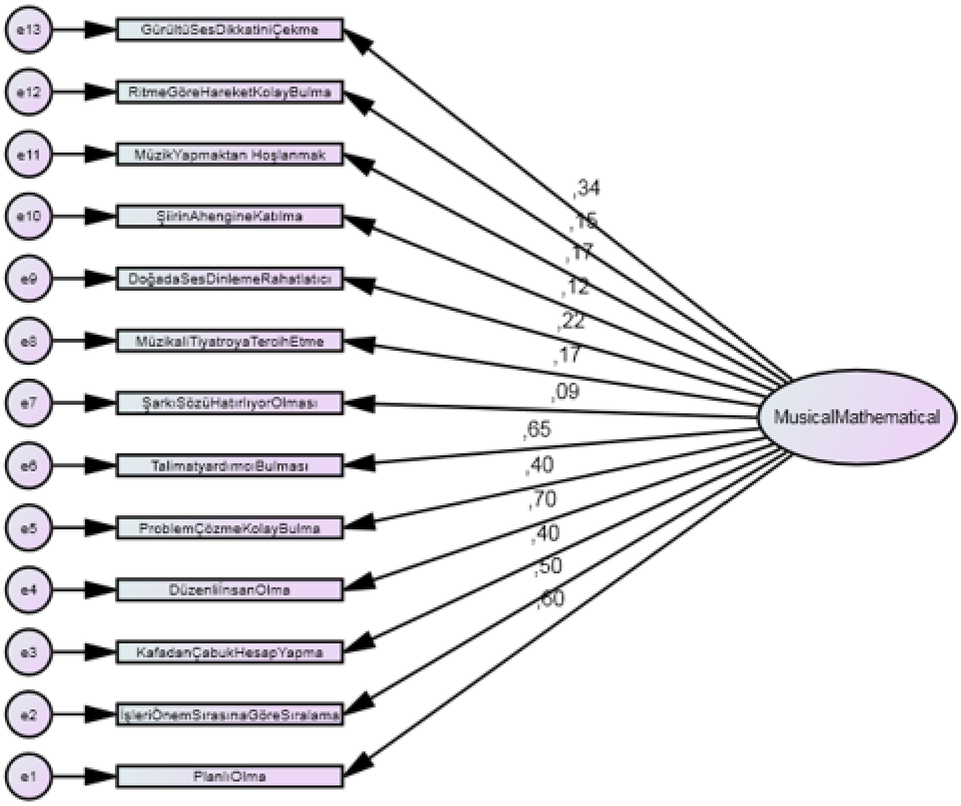

Figure 97. Constrained Model Fit of Musical and Logical/Mathematical Intelligence

Discriminant validity for musical and interpersonal intelligences were presented in the following table and figures. The unconstrained and constrained models can be seen in Figure 98 and 99, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 66.

Table 66. Chi-square and Model Fit Values for Musical and Interpersonal Intelligence

Musical and Interpersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	119.048	64	.000	.061	173.048	.743	.902
constrained model	255.150	65	.000	.112	307.150	.1318	.660

According to the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

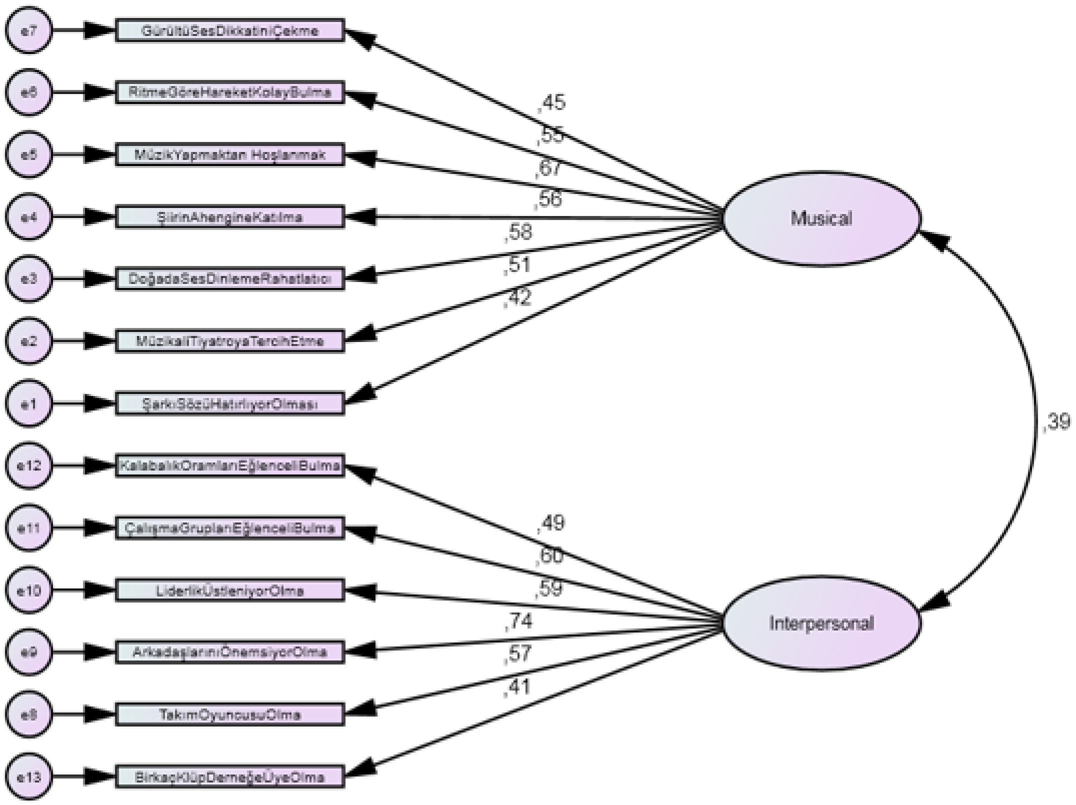

Figure 98. Unconstrained Model Fit of Musical and Interpersonal Intelligence

When, the model is forced into a single fit, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed. Hence some factor loadings went below the .40 limit showing significant evidence for the deterioration of the constrained model.

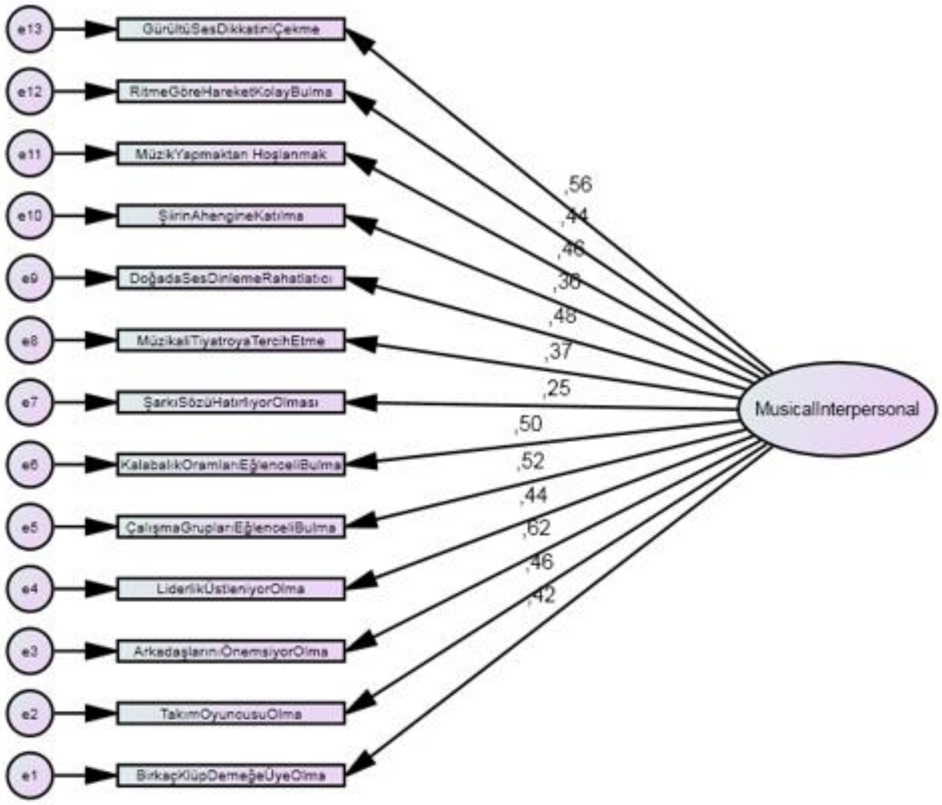

Figure 99. Constrained Model Fit of Musical and Interpersonal Intelligence

As can be seen below, discriminant validity for musical and bodily/kinesthetic intelligences were presented. The unconstrained and constrained models can be seen in Figure 100 and 101, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 67. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is constrained as one factor, the goodness-of-fit values and low factor loadings confirm that the constrained model is significantly deteriorated.

Table 67. Chi-square and Model Fit Values for Musical and Bodily/Kinesthetic Intelligence

Musical and Bodily/Kinesthetic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	75.064	53	.005	.042	125.064	.537	.947
constrained model	168.172	54	.000	.095	216.172	.928	.726

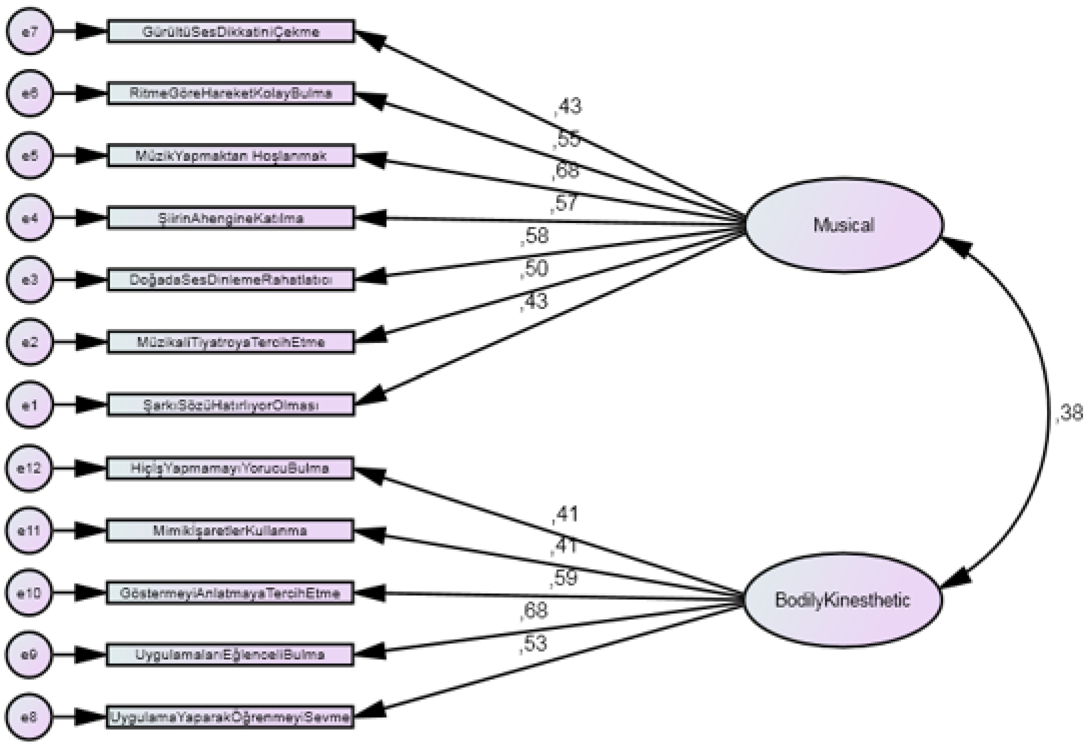

Figure 100. Unconstrained Model Fit of Musical and Bodily/Kinesthetic Intelligence

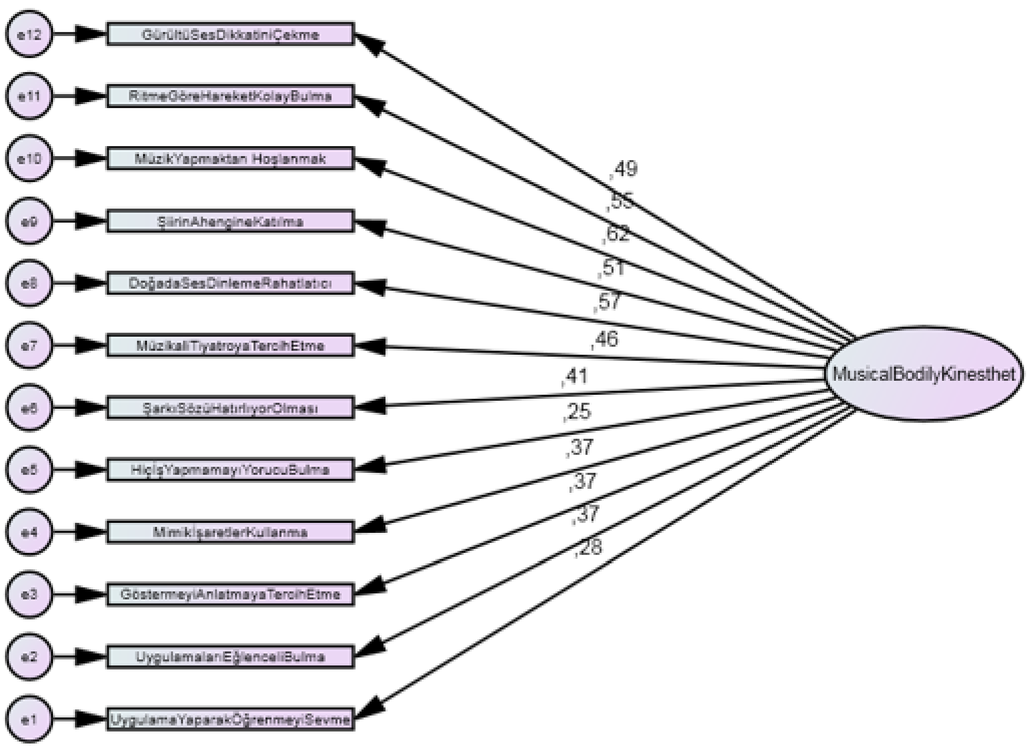

Figure 101. Constrained Model Fit of Musical and Bodily/Kinesthetic Intelligence

Discriminant validity for musical and verbal/linguistic intelligences were presented below. The two models can be seen in Figure 102 and 103, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 68. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit like in Figure 103, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are seen. This reveals that the constrained model is significantly deteriorated.

Table 68. Chi-square and Model Fit Values for Musical and Verbal/Linguistic Intelligence

Musical and Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	107.062	43	.000	.080	153.062	.657	.886
constrained model	254.608	44	.000	.143	298.608	.1282	.626

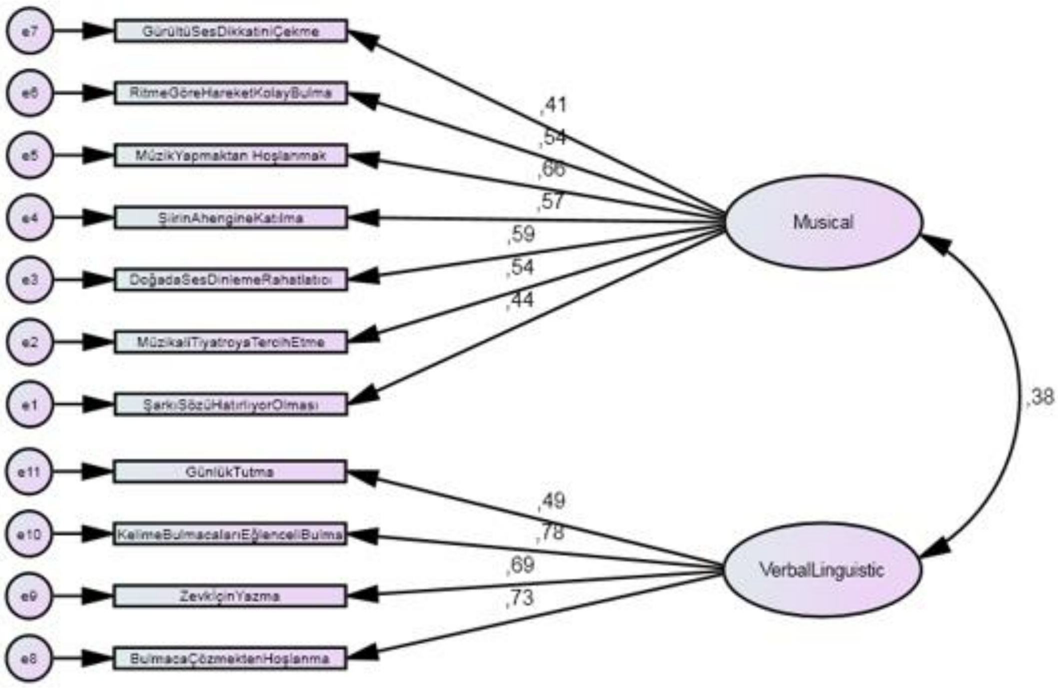

Figure 102. Unconstrained Model Fit of Musical and Verbal/Linguistic Intelligence

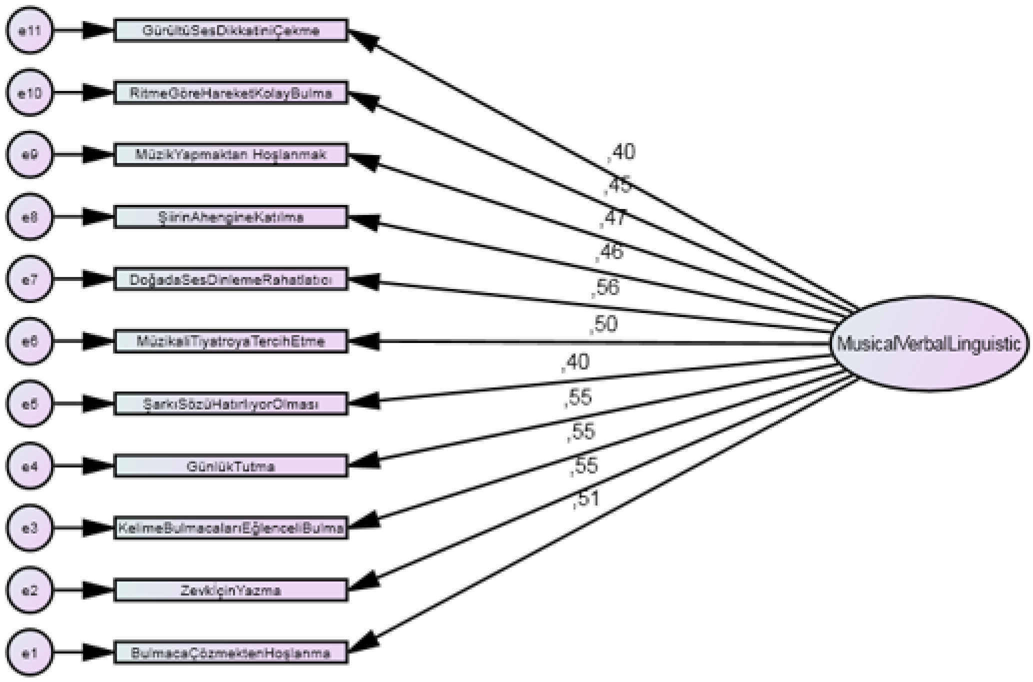

Figure 103. Constrained Model Fit of Musical and Verbal/Linguistic Intelligence

As can be seen in the following figures and table, discriminant validity analysis for musical and intrapersonal intelligences were presented. The unconstrained and constrained models can be seen in Figure 104 and 105, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 69.

Table 69. Chi-square and Model Fit Values for Musical and Intrapersonal Intelligence

Musical and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	138.229	76	.000	.059	196.229	.842	.887
constrained model	331.494	77	.000	.119	387.494	.1663	.540

The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

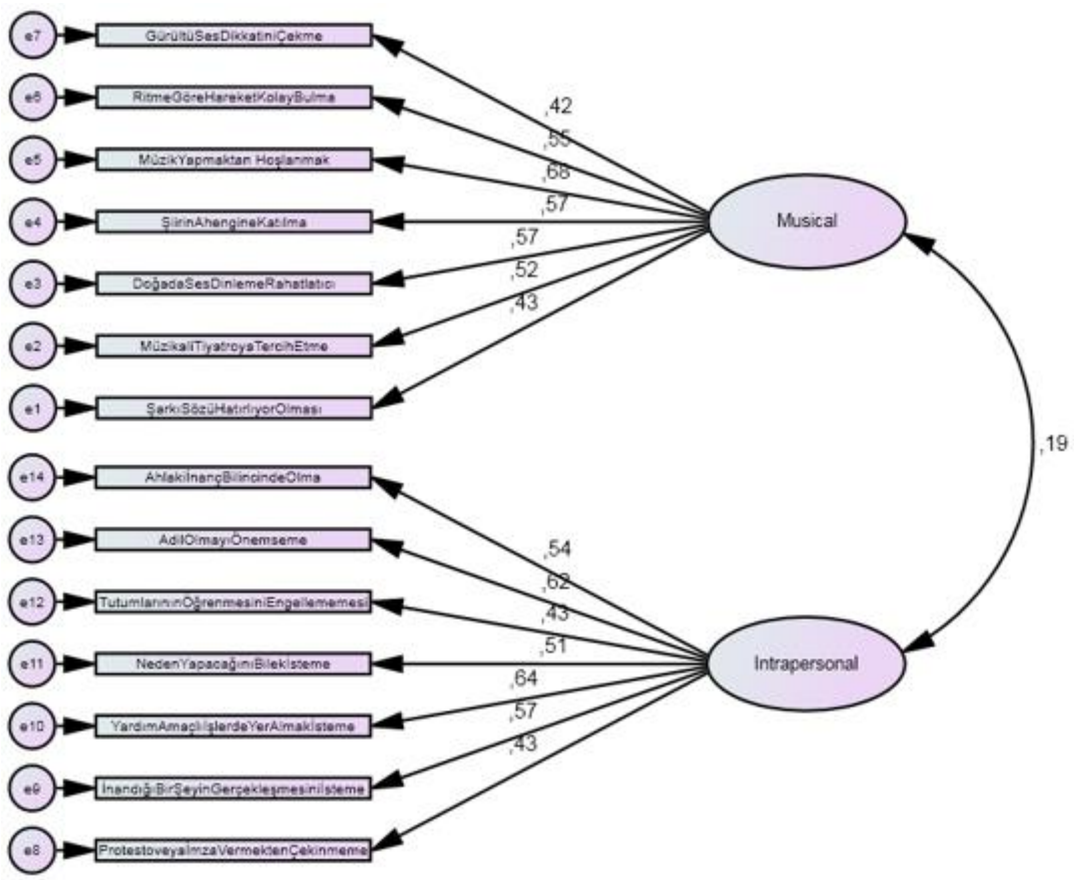

Figure 104. Unconstrained Model Fit of Musical and Intrapersonal Intelligence

When, the model is constrained as one factor, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed. Besides, many parameter estimates are measured below the cut-off point of .40. All these reveal that the constrained model is significantly deteriorated.

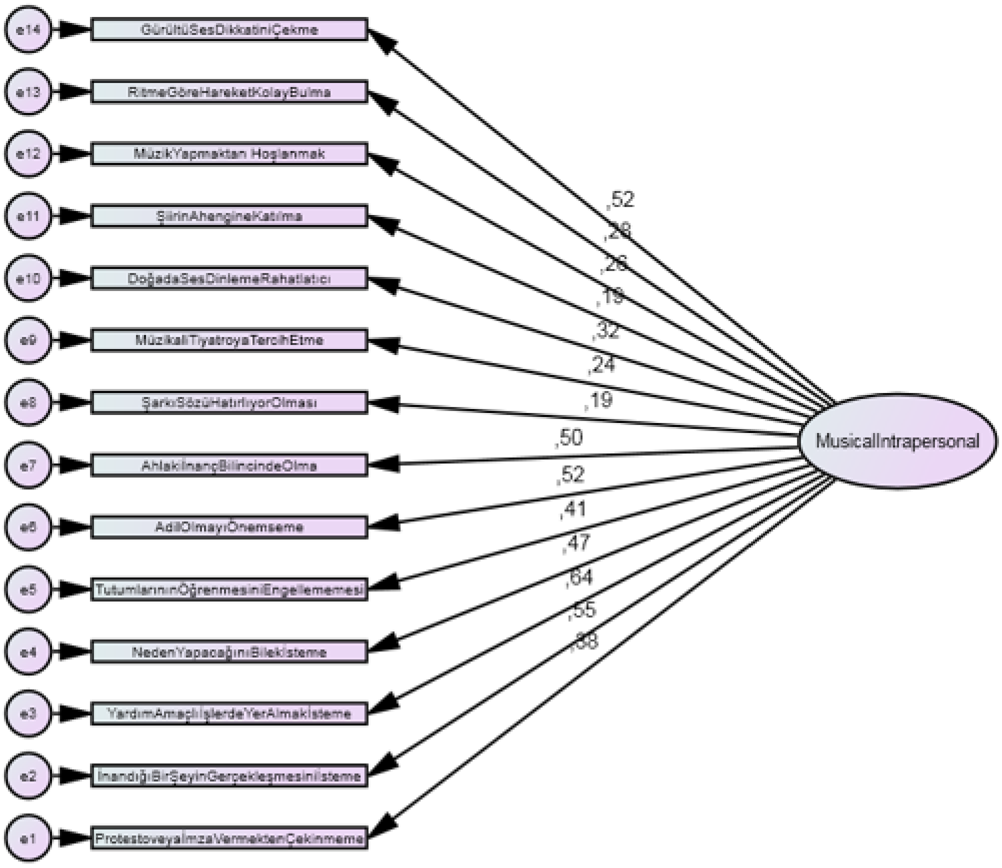

Figure 105. Constrained Model Fit of Musical and Intrapersonal Intelligence

Discriminant validity for musical and visual/spatial intelligences were presented in Figures 106 and 107 and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 70. According to the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value shows a decrease.

Table 70. Chi-square and Model Fit Values for Musical and Visual/Spatial Intelligence

Musical and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	103.494	53	.000	.064	153.494	.659	.883
constrained model	146.023	54	.000	.086	194.023	.833	.787

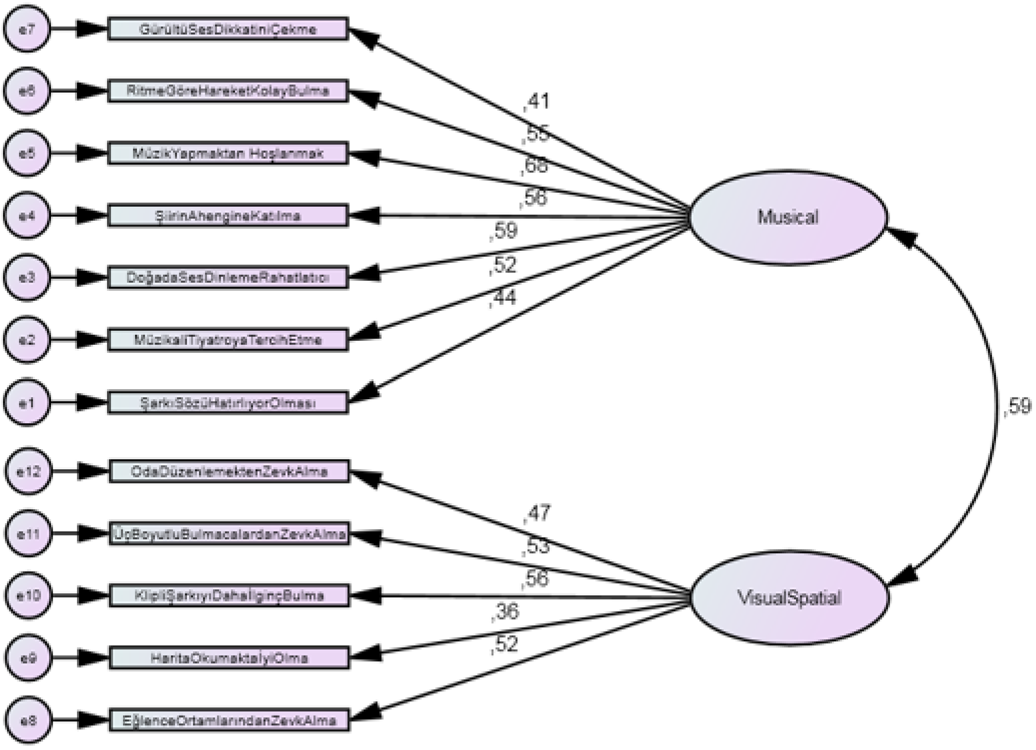

Figure 106. Unconstrained Model Fit of Musical and Visual/Spatial Intelligence

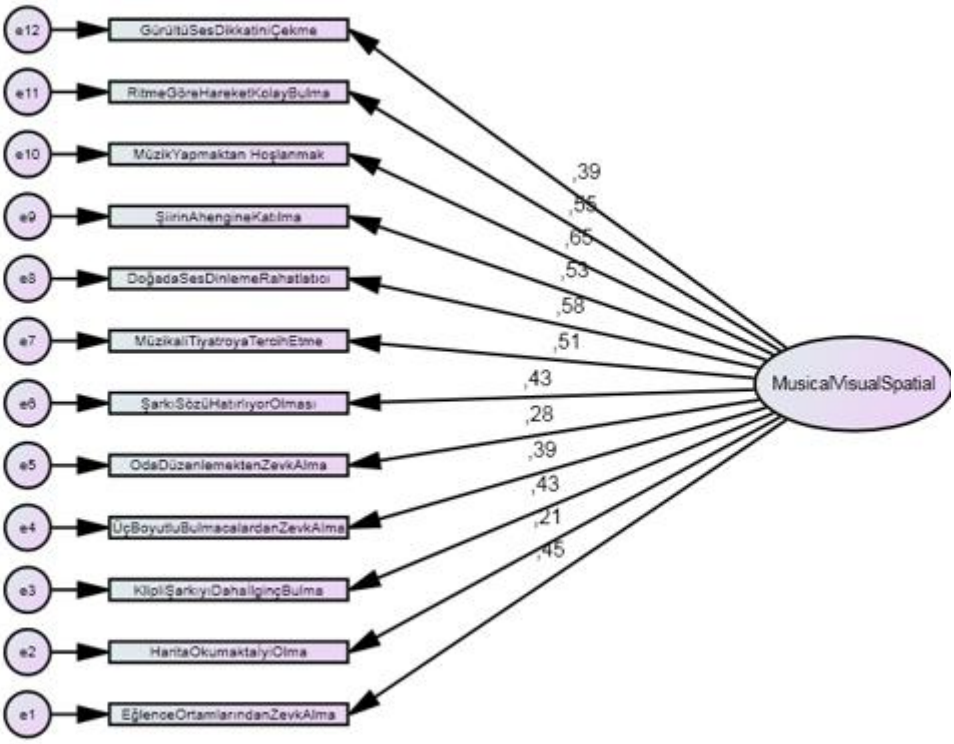

Figure 107. Constrained Model Fit of Musical and Visual/Spatial Intelligence

Details about discriminant validity analysis for musical and existential intelligences were presented below in Figures 108-109 and values for the unconstrained and constrained models can be seen in Table 71. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 71. Chi-square and Model Fit Values for Musical and Existential Intelligence

Musical and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	141.796	76	.000	.061	199.796	.857	.896
constrained model	270.499	77	.000	.104	326.499	.1401	.695

Figure 108. Unconstrained Model Fit of Musical and Existential Intelligence

When, the model is forced into a single fit, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed. The related values reveal that the constrained model is significantly deteriorated. Also with the constrained model, a number of parameter estimates are distorted. All these evidences reveal that the constrained model is significantly deteriorated.

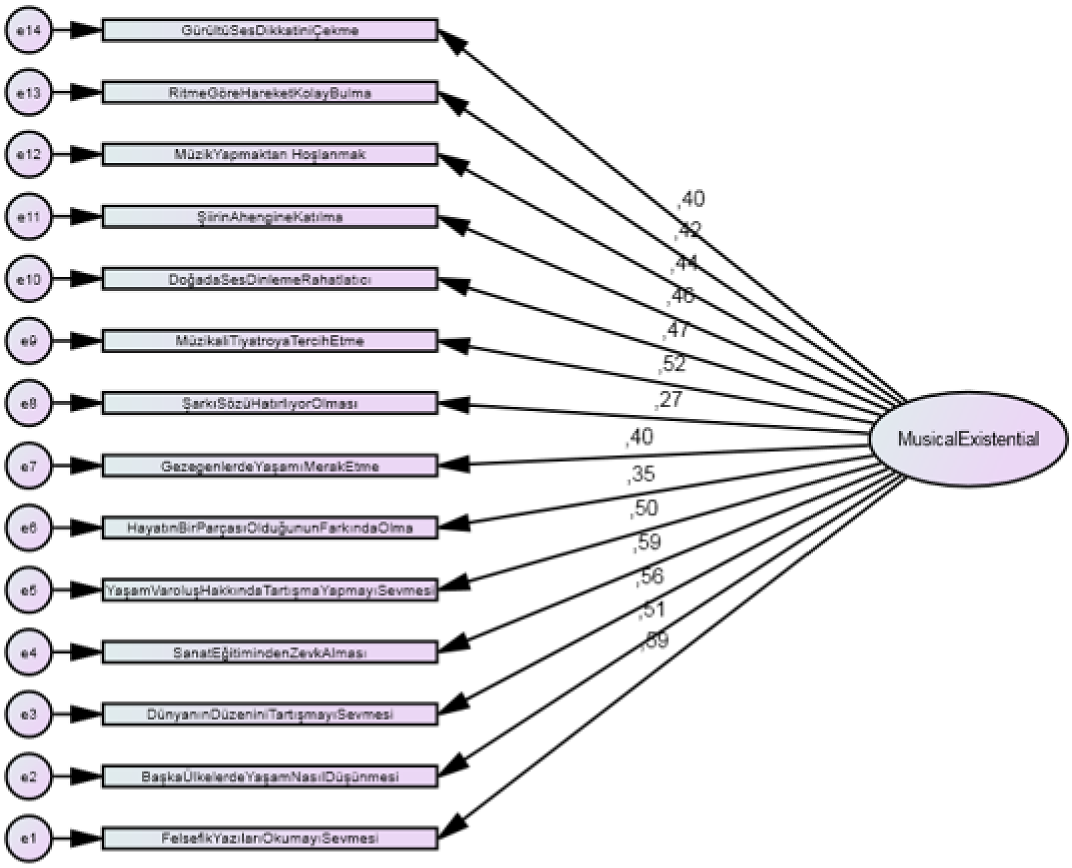

Figure 109. Constrained Model Fit of Musical and Existential Intelligence

Discriminant validity for logical/mathematical and interpersonal intelligences were presented in the next figures and table. The two models can be seen in Figure 110 and 111, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 72. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity.

Table 72. Chi-square and Model Fit Values for Logical/Mathematical and Interpersonal Intelligence

Logical/Mathematical and Interpersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	97.326	53	.000	.060	147.326	.632	.930
constrained model	204.355	54	.000	.109	252.355	.1083	.762

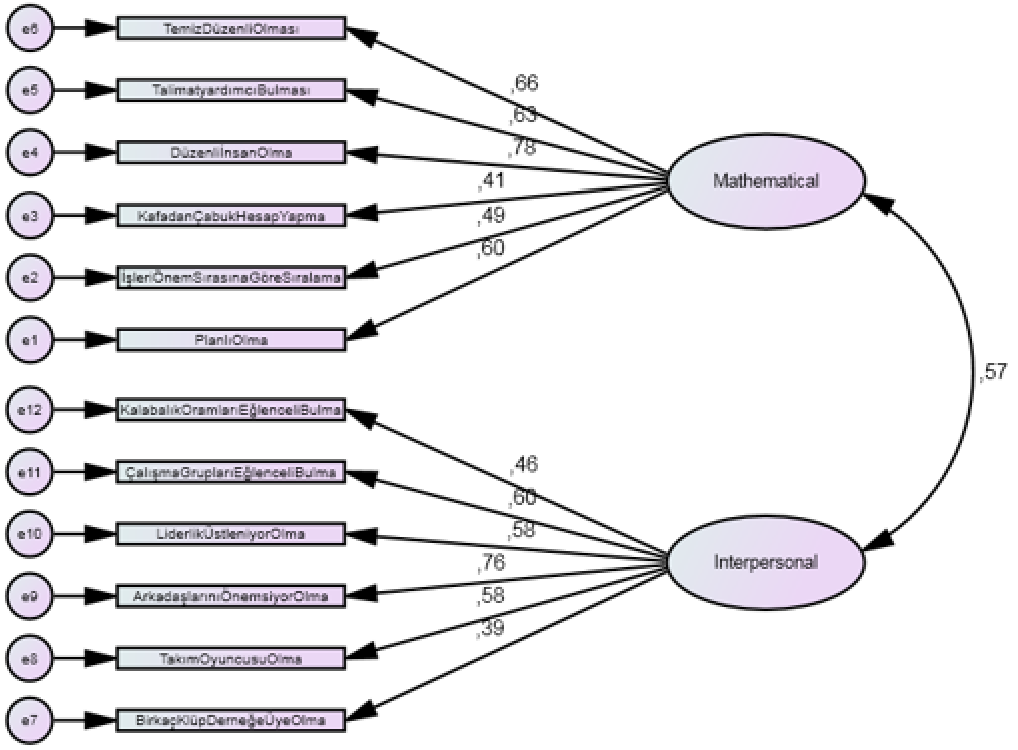

Figure 110. Unconstrained Model Fit of Logical/Mathematical and Interpersonal Intelligence

When, the model is forced into a single fit like in Figure 110, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed which reveal that the single factor model is significantly deteriorated.

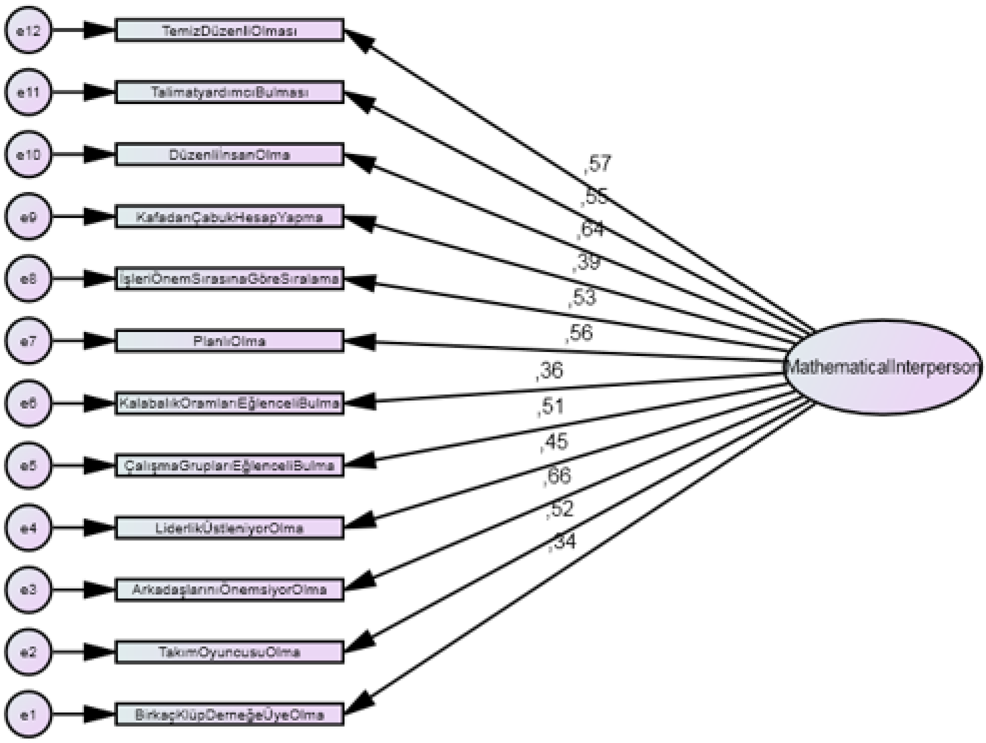

Figure 111. Constrained Model Fit of Logical/Mathematical and Interpersonal Intelligence

Following, discriminant validity for logical/mathematical and bodily/kinesthetic intelligences were presented. The unconstrained and constrained models can be seen in Figure 112 and 113, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 73. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is constrained as one factor, an increase in Chi-square, RMSEA, AIC, and ECVI values and a decrease in the CFI value are observed which confirm that the constrained model is significantly deteriorate.

Table 73. Chi-square and Model Fit Values for Logical/Mathematical and Bodily/Kinesthetic Intelligence

Logical/Mathematical and Bodily/Kinesthetic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	79.757	43	.001	.061	125.757	.540	.929
constrained model	131.297	44	.000	.092	175.297	.752	.832

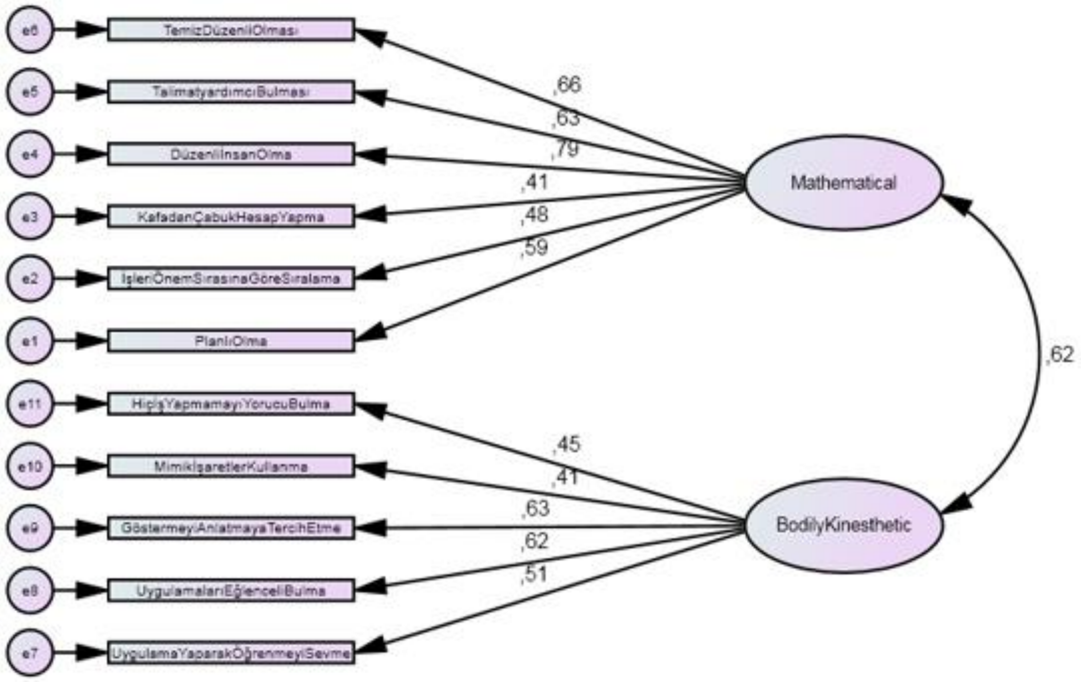

Figure 112. Unconstrained Model Fit of Logical/Mathematical and Bodily/Kinesthetic Intelligence

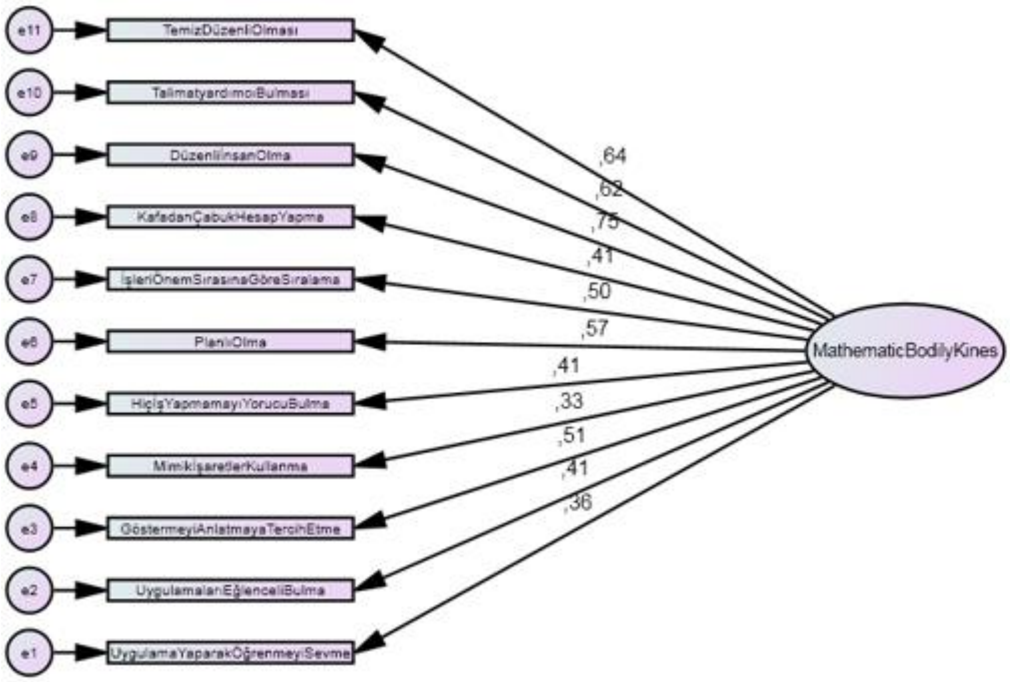

Figure 113. Constrained Model Fit of Logical/Mathematical and Bodily/Kinesthetic Intelligence

Details about discriminant validity analysis for logical/mathematical and verbal/linguistic intelligences were presented in Figures 114-115 and values for the unconstrained and constrained models can be seen in Table 74.

Table 74. Chi-square and Model Fit Values for Logical/Mathematical and Verbal/Linguistic Intelligence

Logical/Mathematical and Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	56.921	34	.005	.054	98.921	.425	.959
constrained model	327.992	35	.000	.190	367.992	.1579	.478

As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, some factor loadings were found to be below the cut-off point of .40. Hence a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. The related values reveal that the single factor model is significantly deteriorated.

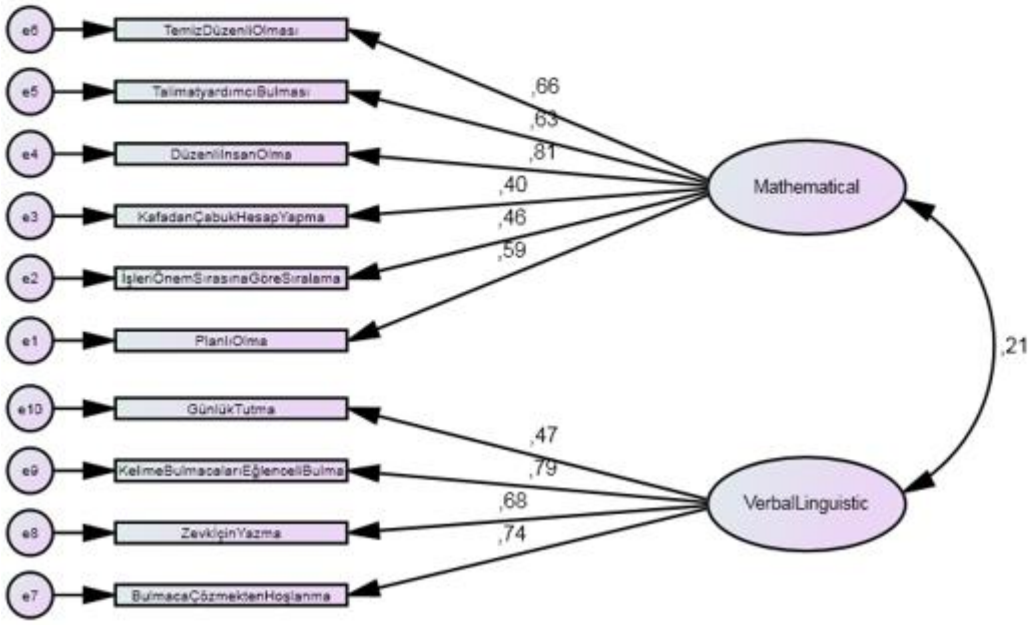

Figure 114. Unconstrained Model Fit of Logical/Mathematical and Verbal/Linguistic Intelligence

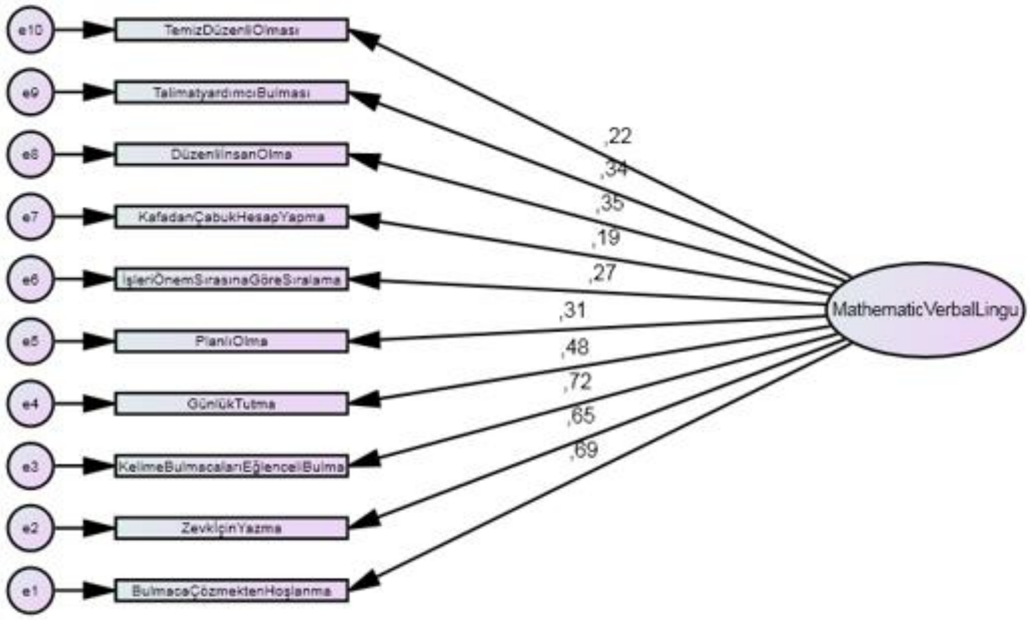

Figure 115. Constrained Model Fit of Logical/Mathematical and Verbal/Linguistic Intelligence

Discriminant validity for logical/mathematical and intrapersonal intelligences were presented in the following table and figures. The constrained and unconstrained models can be seen in Figure 116 and 117, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 75.

Table 75. Chi-square and Model Fit Values for Logical/Mathematical and Intrapersonal Intelligence

Logical/Mathematical and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	128.439	64	.000	.066	182.439	.783	.901
constrained model	234.740	65	.000	.106	286.740	.1231	.739

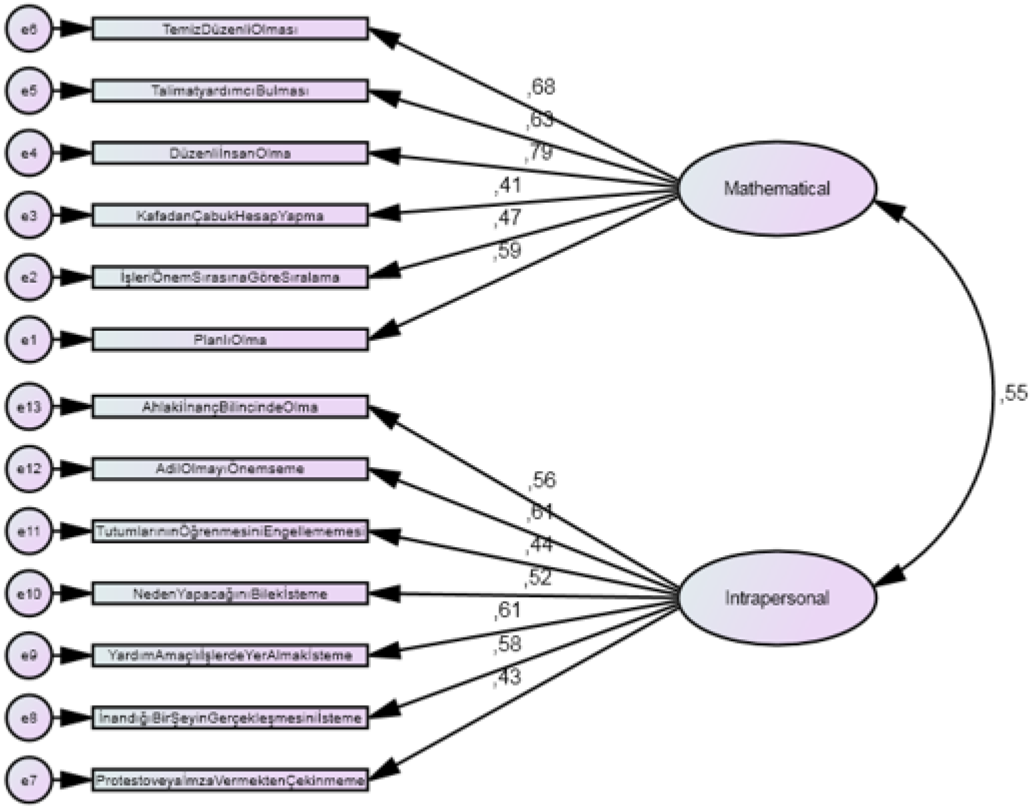

Figure 116. Unconstrained Model Fit of Logical/Mathematical and Intrapersonal Intelligence

When, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases.

The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit like in Figure 117, the related values reveal that the model is significantly deteriorated.

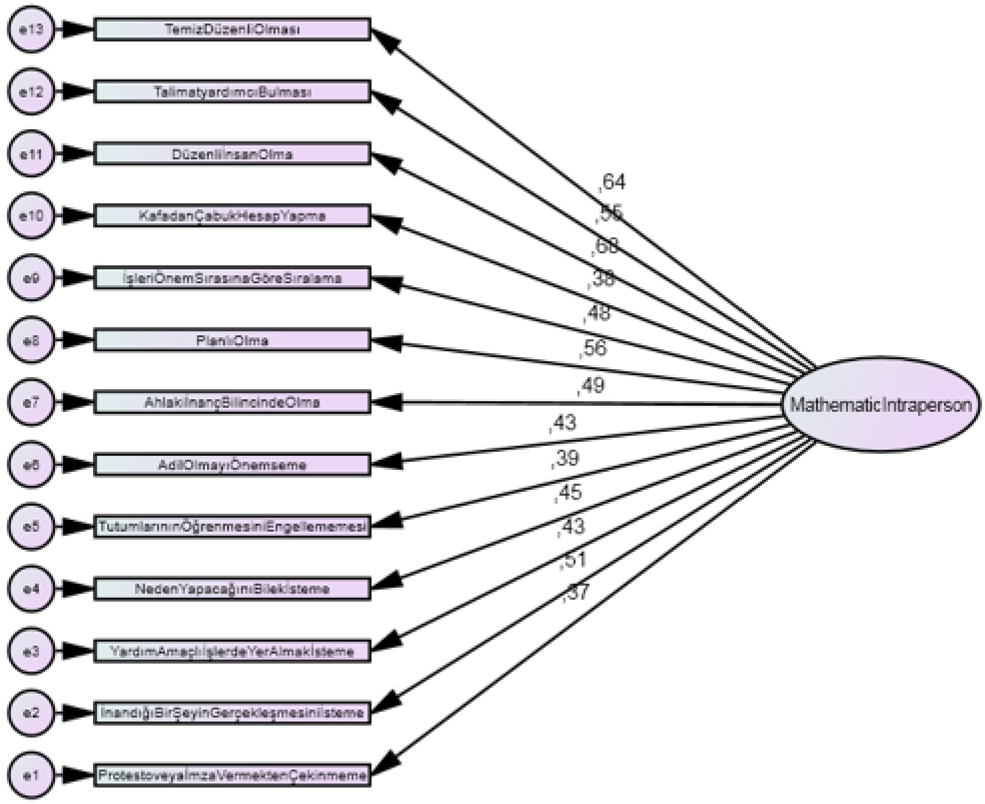

Figure 117. Constrained Model Fit of Logical/Mathematical and Intrapersonal Intelligence

Discriminant validity analysis for logical/mathematical and interpersonal intelligences can be seen in Figure 118 and 119, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 76. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit model like in Figure 119, all of the Visual/Spatial items went below the cut-off point of .40.

Table 76. Chi-square and Model Fit Values for Logical/Mathematical and Visual/Spatial Intelligence

Logical/Mathematical and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	52.223	43	.000	.030	98.223	.422	.978
constrained model	143.758	44	.000	.099	187.758	.806	.757

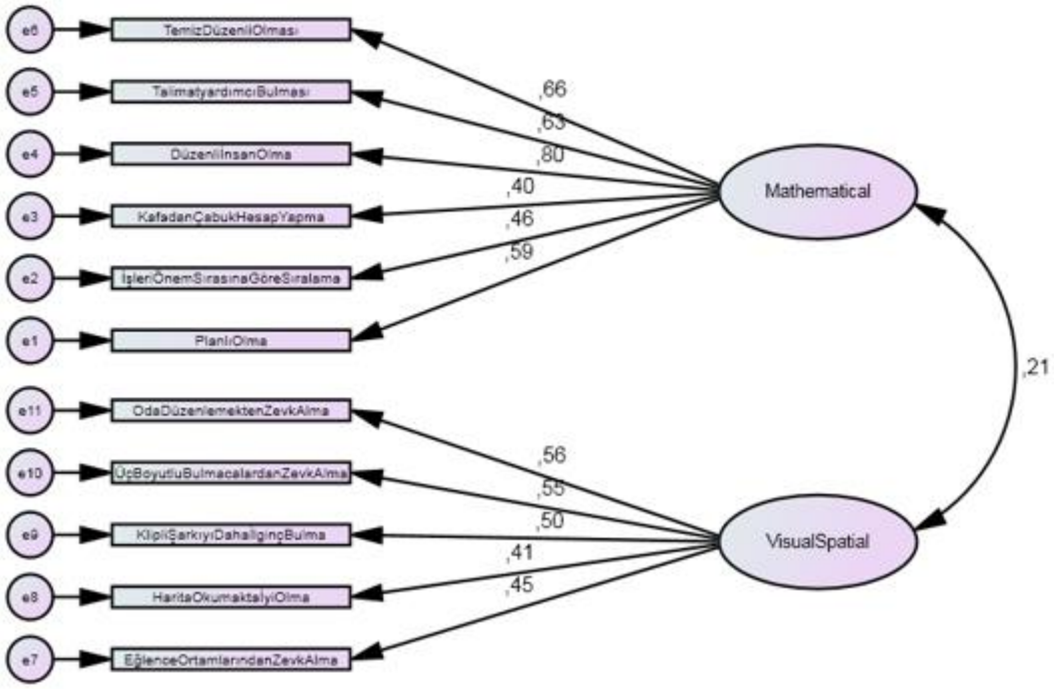

Figure 118. Unconstrained Model Fit of Logical/Mathematical and Visual/Spatial Intelligence

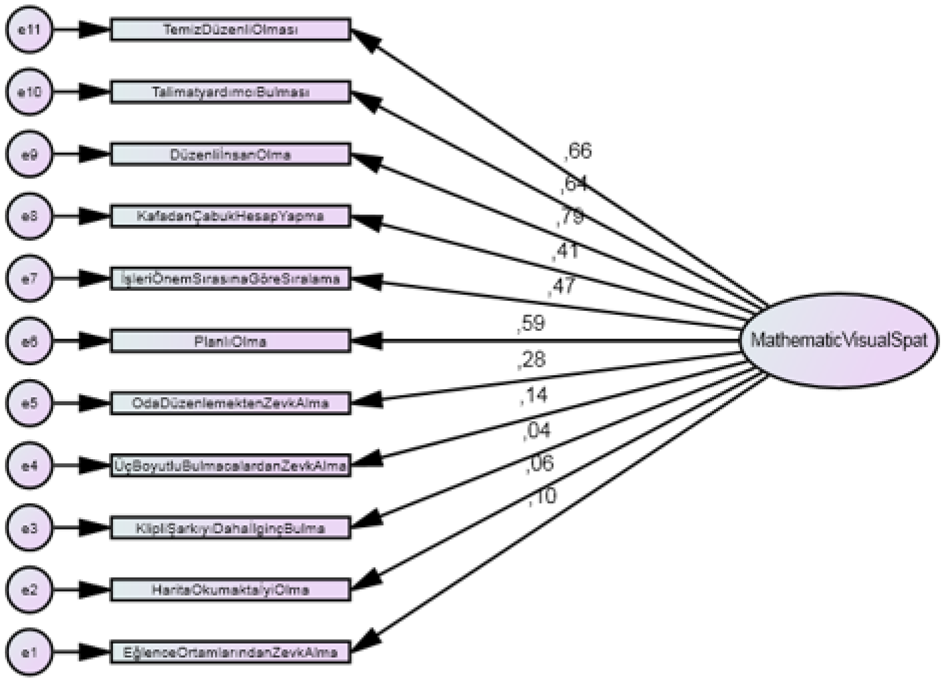

Figure 119. Constrained Model Fit of Logical/Mathematical and Visual/Spatial Intelligence

As can be seen in the following figures and table, discriminant validity analysis for logical/mathematical and existential intelligences were presented. The unconstrained and constrained models can be seen in Figure 120 and 121, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 77.

Table 77. Chi-square and Model Fit Values for Logical/Mathematical and Existential Intelligence

Logical/Mathematical and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	91.741	64	.000	.043	145.741	.625	.955
constrained model	381.113	65	.000	.144	433.113	.1859	.491

Figure 120. Unconstrained Model Fit of Logical/Mathematical and Existential Intelligence

The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is constrained as one factor, logical/mathematical items were measured to be below the cut-off value of .40. Hence, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated.

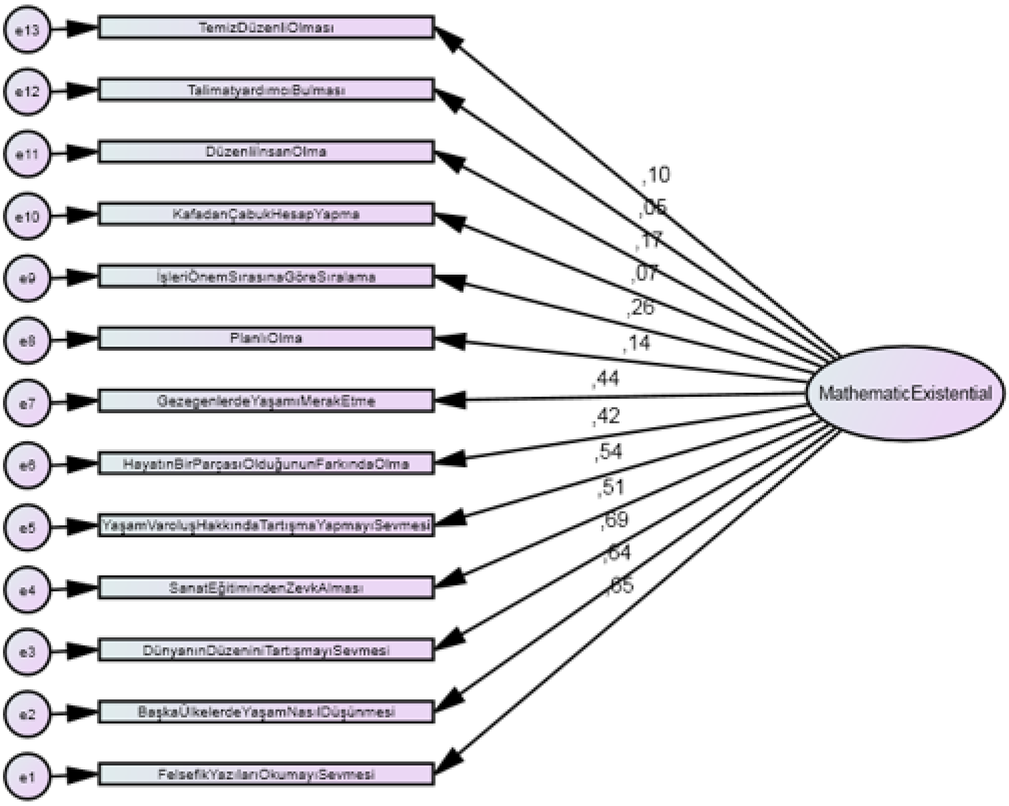

Figure 121. Constrained Model Fit of Logical/Mathematical and Existential Intelligence

Discriminant validity analysis for interpersonal and bodily/kinesthetic intelligences were presented below. The two models can be seen in Figure 122 and 123, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 78.

Table 78. Chi-square and Model Fit Values for Interpersonal and Bodily/Kinesthetic Intelligence

Interpersonal and Bodily/Kinesthetic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	62.351	43	.000	.044	108.351	.465	.959
constrained model	82.033	27	.000	.061	126.033	.541	.919

The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity.

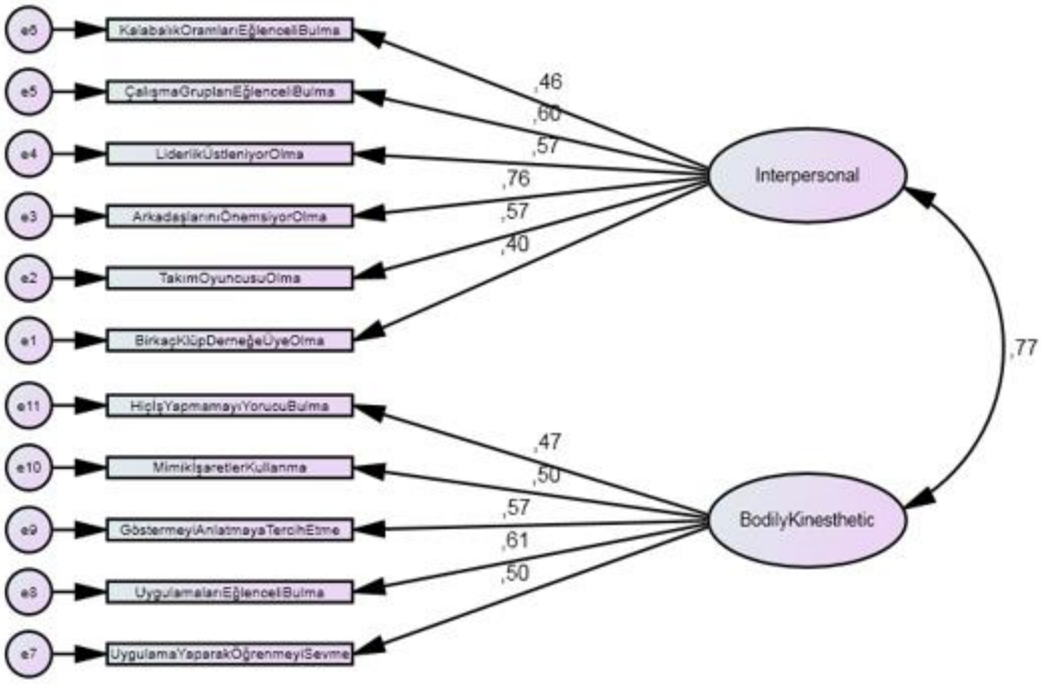

Figure 122. Unconstrained Model Fit of Interpersonal and Bodily/Kinesthetic Intelligence

When, the model is forced into a single fit model like in Figure 123, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

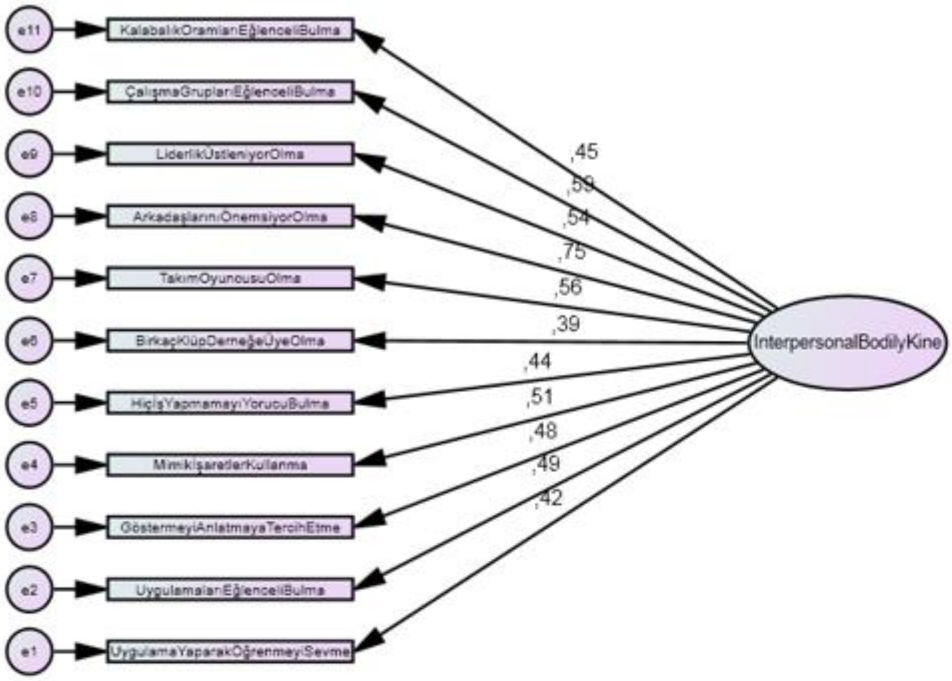

Figure 123. Constrained Model Fit of Interpersonal and Bodily/Kinesthetic Intelligence

Details about discriminant validity analysis for interpersonal and verbal/linguistic intelligences were presented below in Figures 124-125 and values for the unconstrained and constrained models can be seen in Table 79. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. The related values reveal that the single factor model is significantly deteriorated.

Table 79. Chi-square and Model Fit Values for Interpersonal and Verbal/Linguistic Intelligence

Interpersonal and Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	78.023	34	.000	.075	120.023	.515	.918
constrained model	239.374	35	.000	.158	279.374	.1199	.619

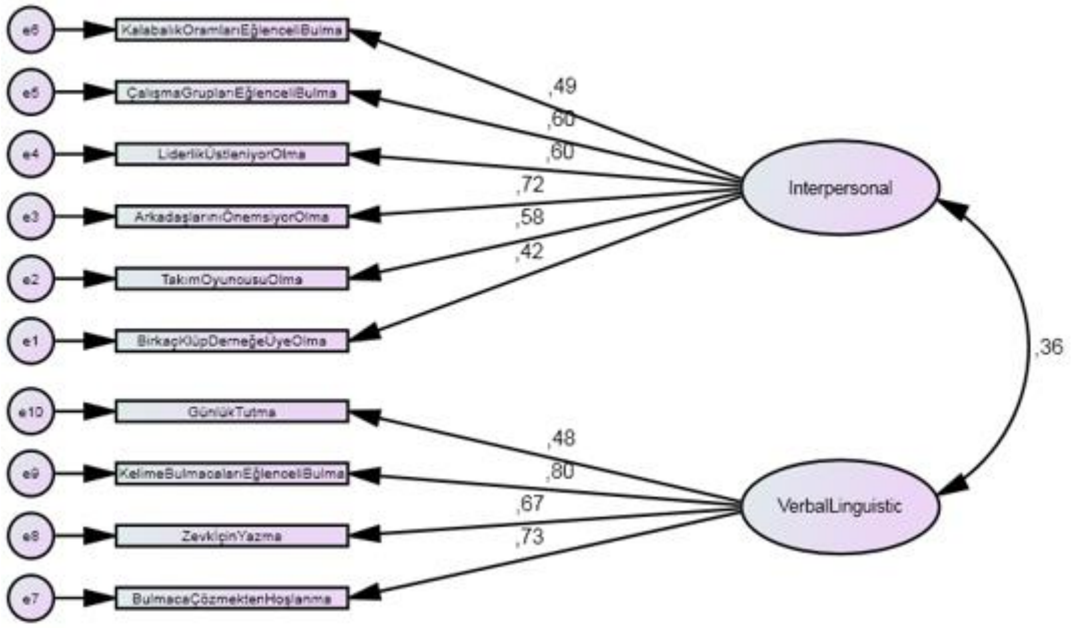

Figure 124. Unconstrained Model Fit of Interpersonal and Verbal/Linguistic Intelligence

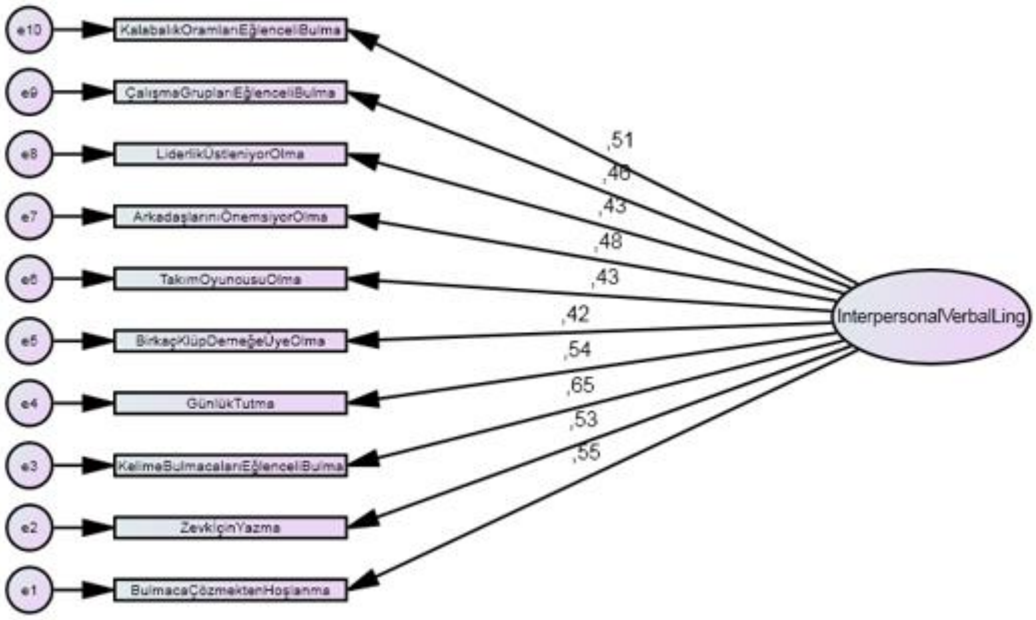

Figure 125. Constrained Model Fit of Interpersonal and Verbal/Linguistic Intelligence

Figure 126 and 127 represents the unconstrained and constrained model for interpersonal and intrapersonal intelligences for discriminant validity analysis. As can be seen from the values in Table 80, when, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases.

These values confirm that the single factor model is significantly deteriorated. Therefore, the values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 80. Chi-square and Model Fit Values for Interpersonal and Intrapersonal Intelligence

Interpersonal and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	104.835	64	.001	.052	158.835	.682	.929
constrained model	184.906	65	.000	.089	236.906	.1017	.792

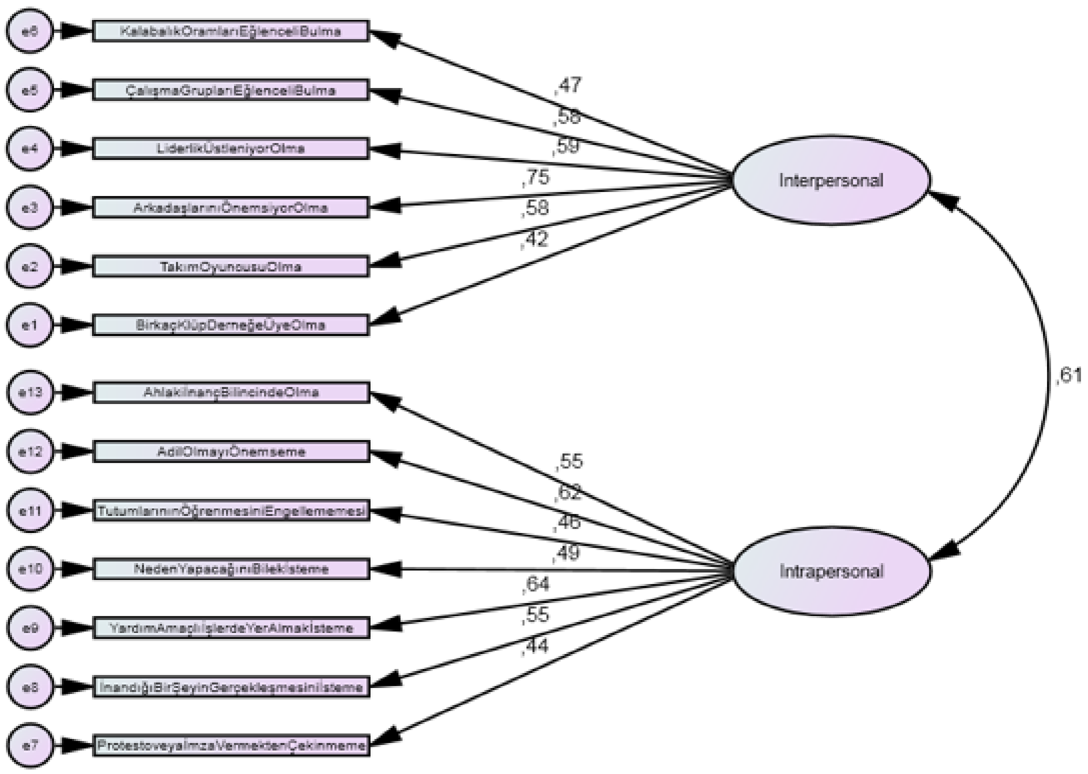

Figure 126. Unconstrained Model Fit of Interpersonal and Intrapersonal Intelligence

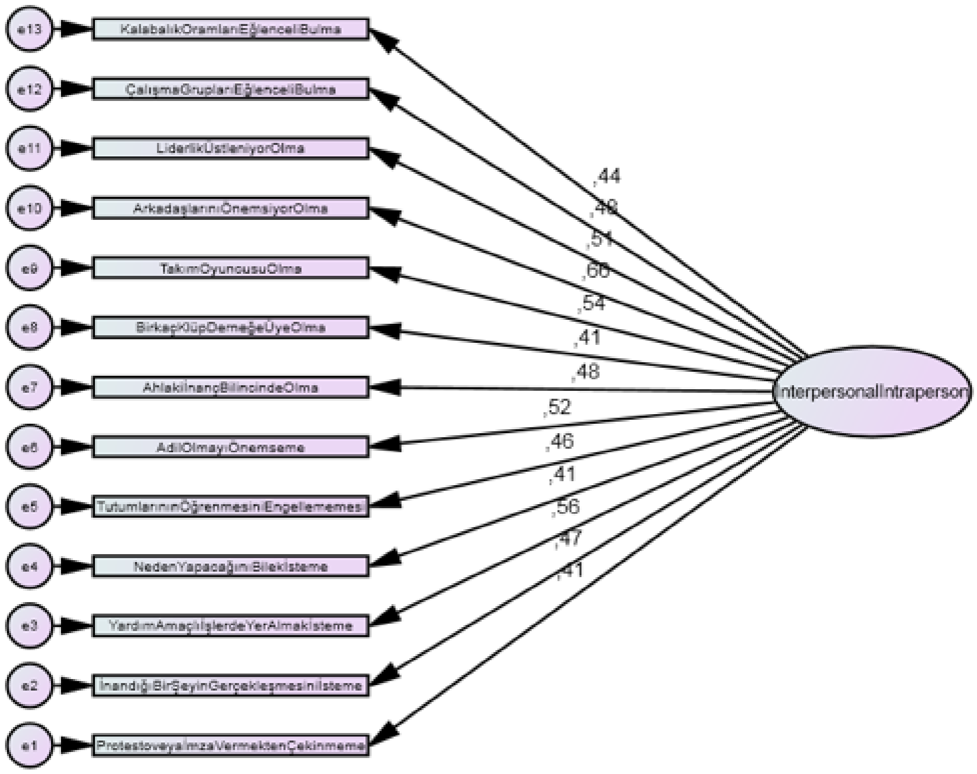

Figure 127. Constrained Model Fit of Interpersonal and Intrapersonal Intelligence

Discriminant validity analysis for interpersonal and visual/spatial intelligences were presented in Figure 128 and 129, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 81.

Table 81. Chi-square and Model Fit Values for Interpersonal and Visual/Spatial Intelligence

Interpersonal and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	54.610	43	.000	.034	100.610	.432	.968
constrained model	134.350	44	.000	.094	178.350	.765	.751

The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is constrained, parameter estimates for Visual/Spatial Intelligence were measured below the limit. Also, Chi-square, RMSEA, AIC, and

ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated.

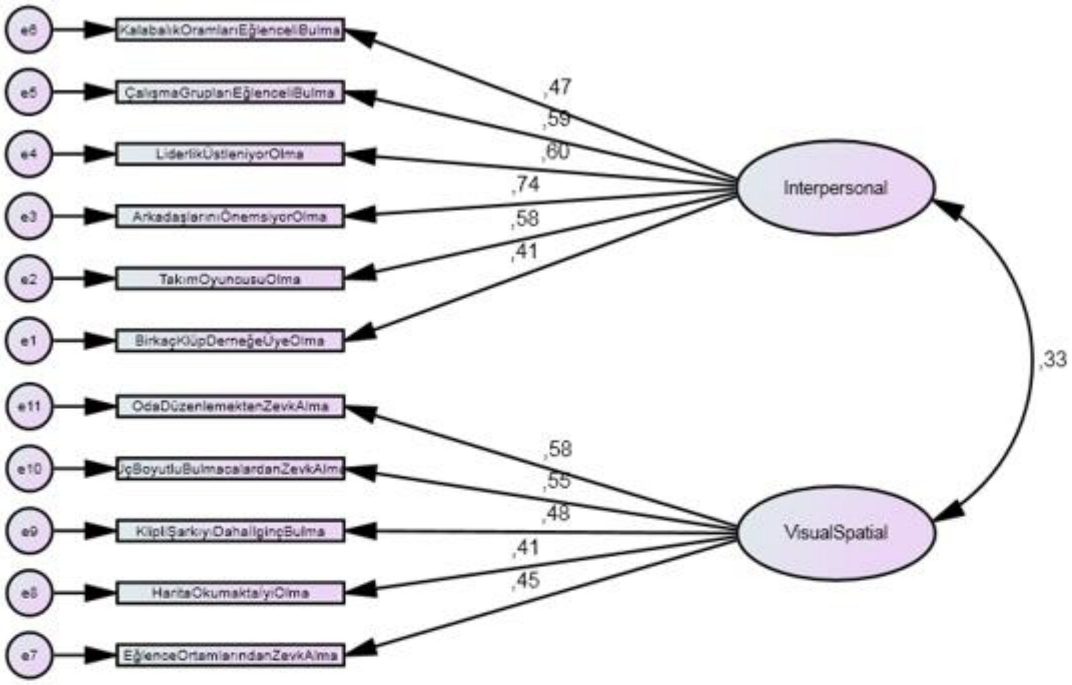

Figure 128.Unconstrained Model Fit of Interpersonal and Visual/Spatial Intelligence

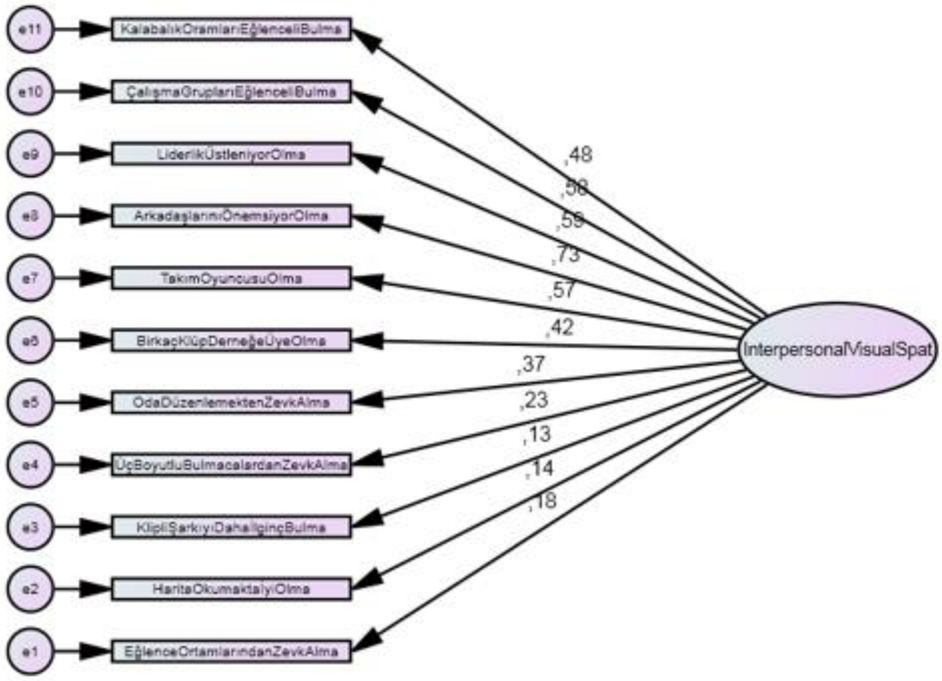

Figure 129.Constrained Model Fit of Interpersonal and Visual/Spatial Intelligence

Discriminant validity analysis for interpersonal and existential intelligences were presented below. The two models can be seen in Figure 130 and 131, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 82. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit model like in Figure 131, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

Table 82. Chi-square and Model Fit Values for Interpersonal and Existential Intelligence

Interpersonal and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	107.429	64	.001	.054	161.429	.693	.929
constrained model	245.854	65	.000	.109	297.854	.1278	.704

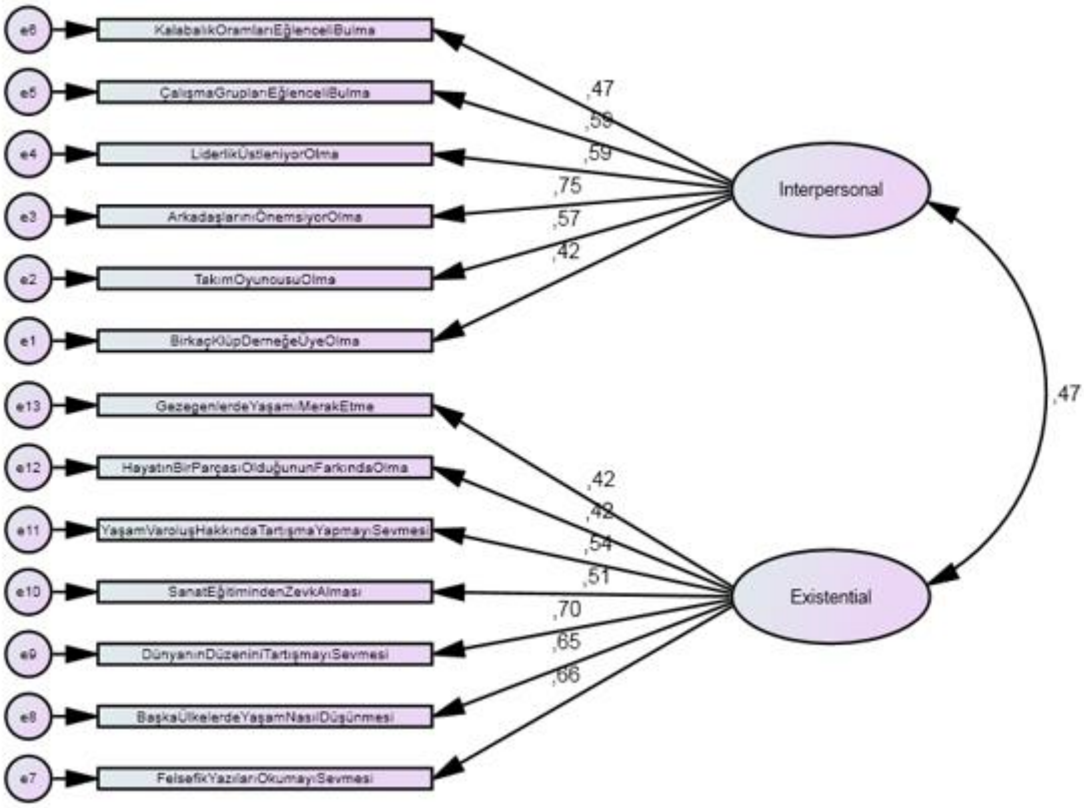

Figure 130. Unconstrained Model Fit of Interpersonal and Existential Intelligence

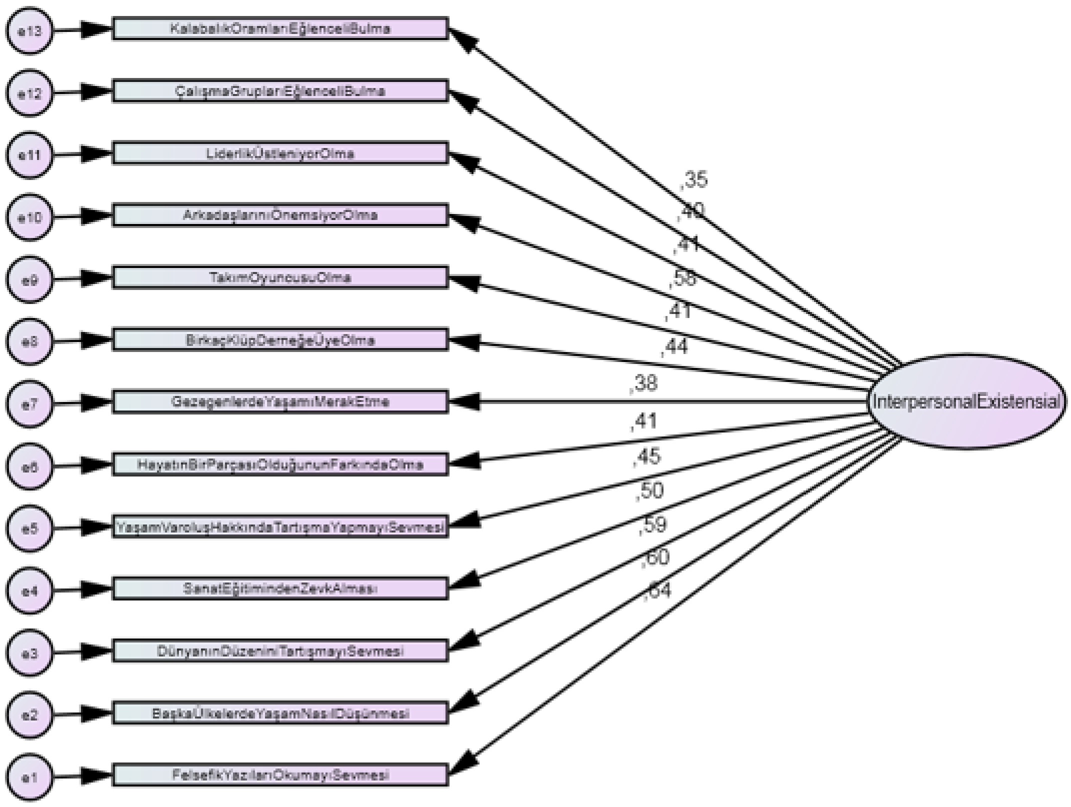

Figure 131. Constrained Model Fit of Interpersonal and Existential Intelligence

Details about discriminant validity analysis for bodily/kinesthetic and verbal/linguistic intelligences were presented in Figures 132-133 and values for the unconstrained and constrained models can be seen in Table 83. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 83. Chi-square and Model Fit Values for Bodily/Kinesthetic and Verbal/Linguistic Intelligence

Bodily/Kinesthetic and Verbal/Linguistic	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	47.386	26	.005	.059	85.386	.366	.947
constrained model	150.432	27	.000	.140	186.432	.800	.694

When, the model is forced into a single fit, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. Besides, the parameter estimates for bodily/kinesthetic went below the limit. Thus, the results reveal that the single factor model is significantly deteriorated.

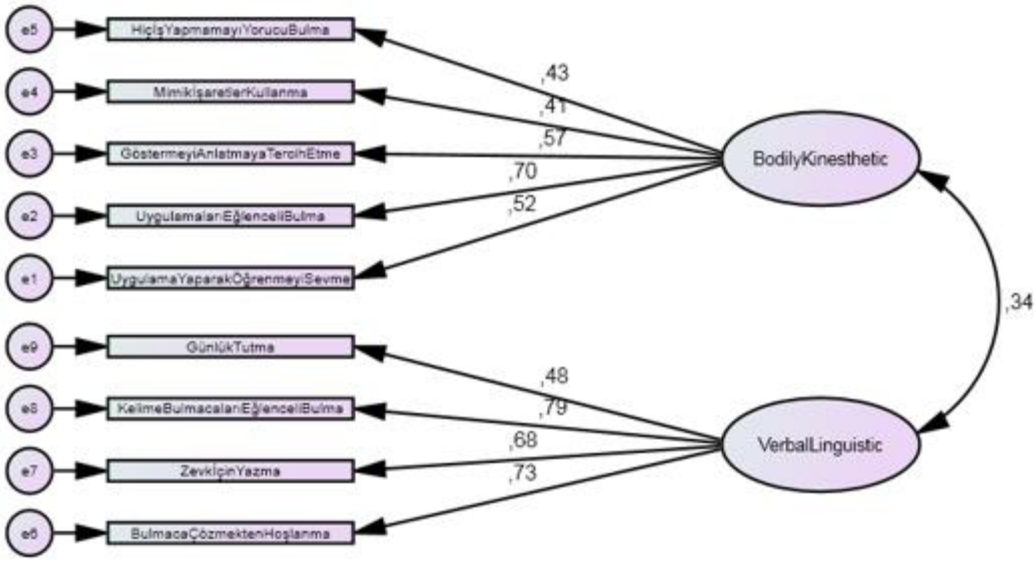

Figure 132. Unconstrained Model Fit of Bodily/Kinesthetic and Verbal/Linguistic Intelligence

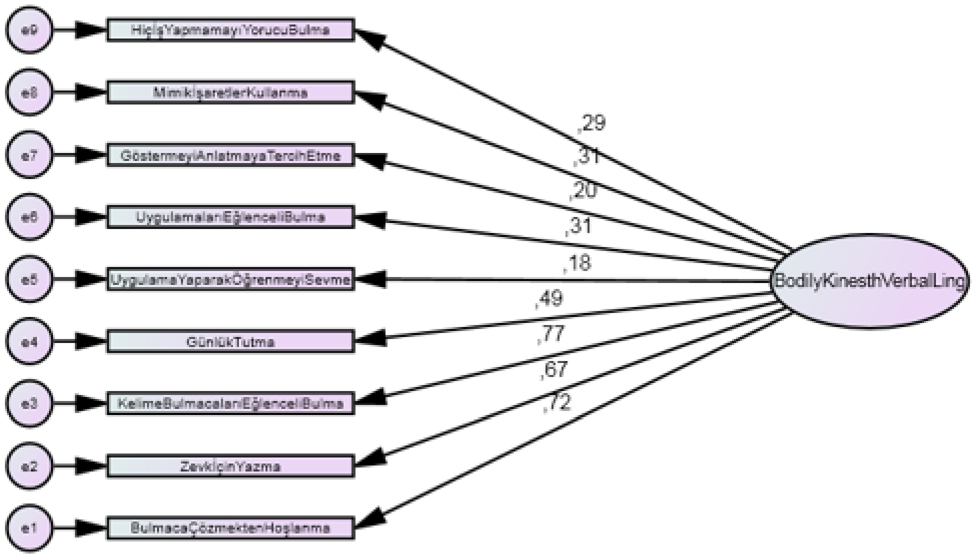

Figure 133. Constrained Model Fit of Bodily/Kinesthetic and Verbal/Linguistic Intelligence

Figure 134 and 135 below represents the unconstrained and constrained model for bodily/kinesthetic and intrapersonal intelligences for discriminant validity analysis. As can be seen from the values in Table 84, when, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated. Therefore, the values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 84. Chi-square and Model Fit Values for Bodily/Kinesthetic and Intrapersonal Intelligence

Bodily/Kinesthetic and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	109.738	53	.000	.068	159.738	.686	.884
constrained model	138.831	54	.000	.082	186.831	.802	.827

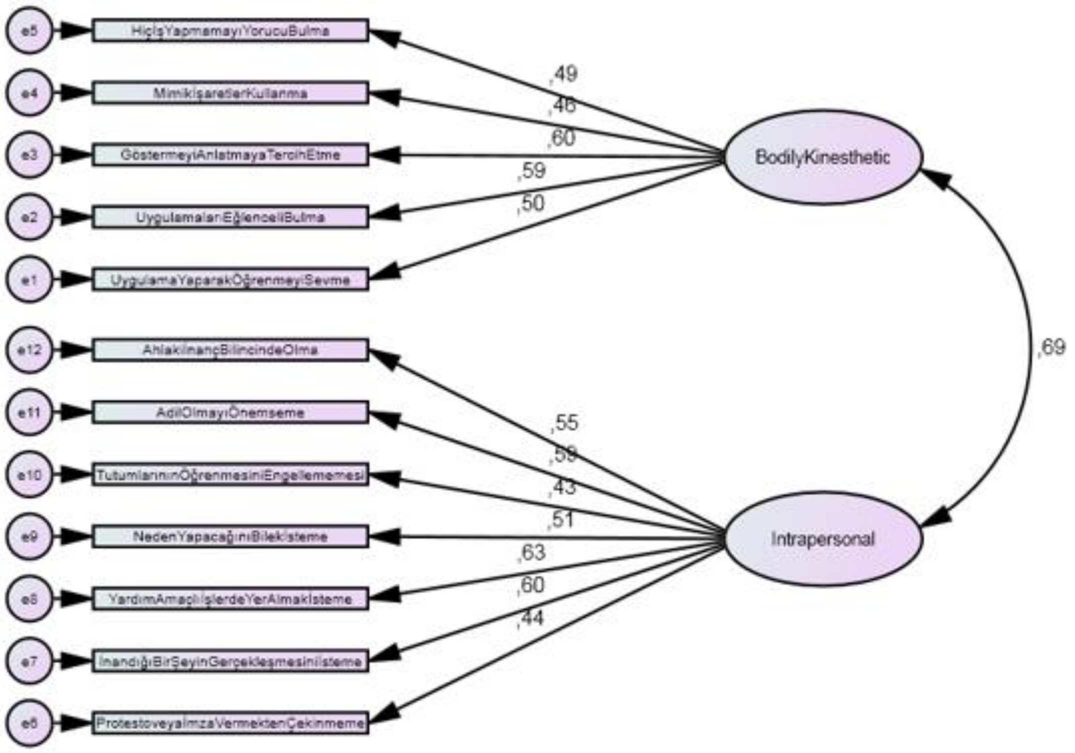

Figure 134. Unconstrained Model Fit of Bodily/Kinesthetic and Intrapersonal Intelligence

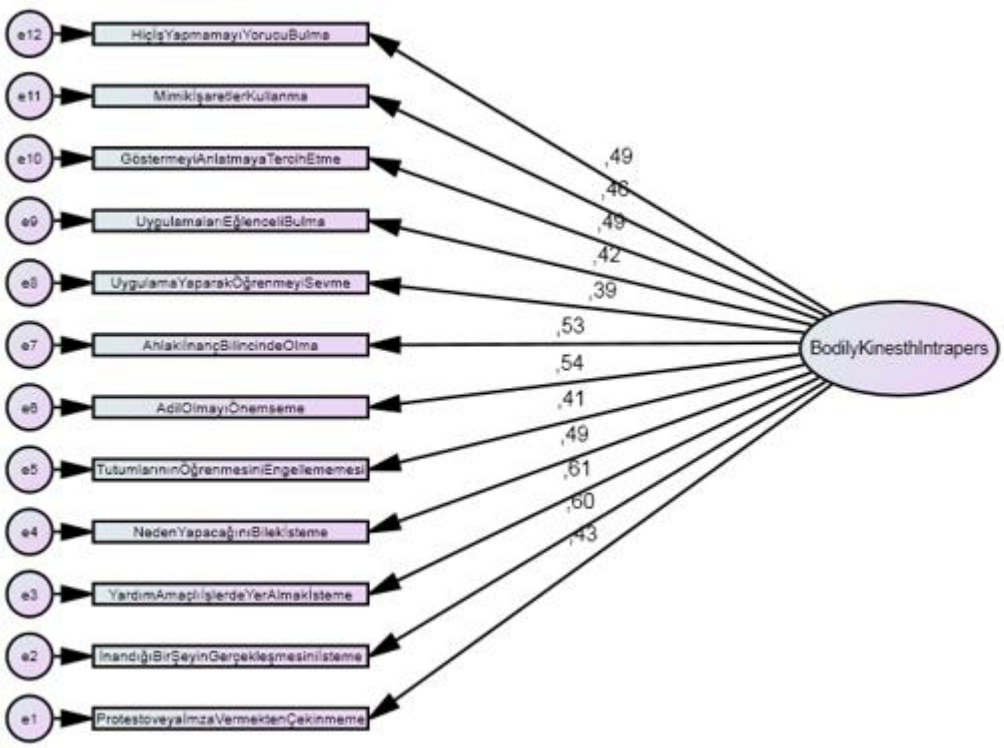

Figure 135. Constrained Model Fit of Bodily/Kinesthetic and Intrapersonal Intelligence

As can be seen below, discriminant validity analysis for bodily/kinesthetic and visual/spatial intelligences were presented. The unconstrained and constrained models can be seen in Figure 136 and 137, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 85. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 85. Chi-square and Model Fit Values for Bodily/Kinesthetic and Visual/Spatial Intelligence

Bodily/Kinesthetic and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	36.079	34	.000	.016	78.079	.334	.992
constrained model	95.862	35	.000	.086	135.862	.583	.758

When, the model is constrained as one factor, some parameter estimates went below the cut-off value. Besides, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated.

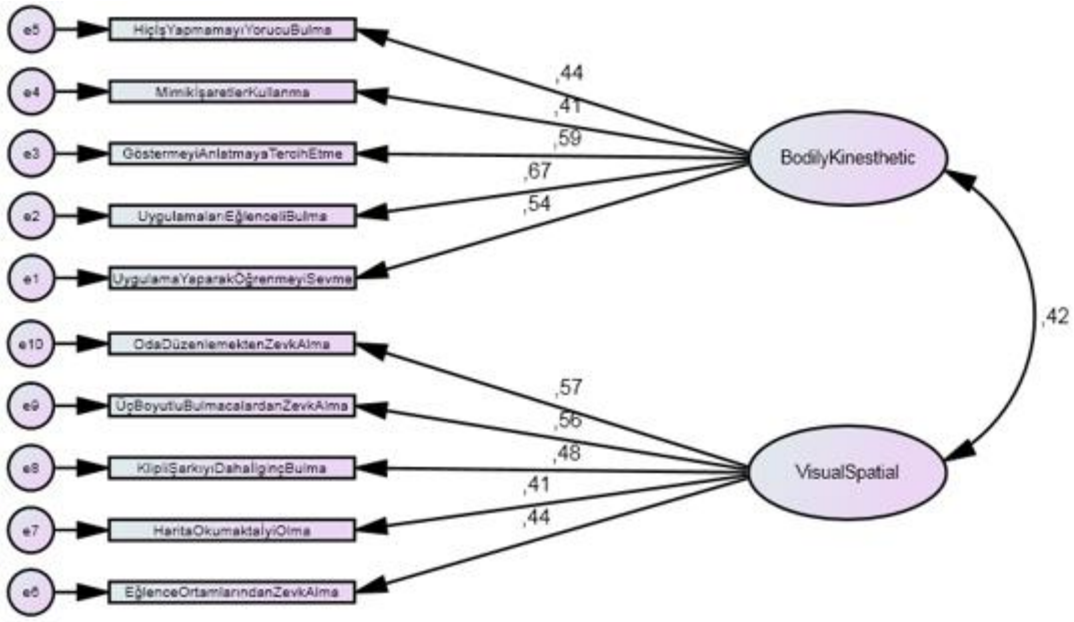

Figure 136. Unconstrained Model Fit of Bodily/Kinesthetic and Visual/Spatial Intelligence

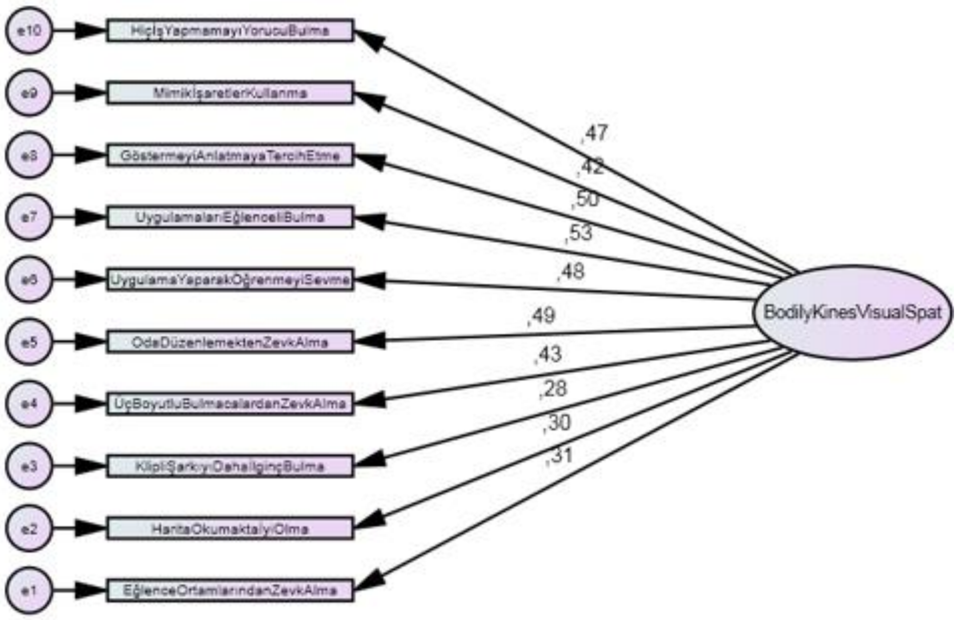

Figure 137. Constrained Model Fit of Bodily/Kinesthetic and Visual/Spatial Intelligence

Discriminant validity analysis for bodily/kinesthetic and existential intelligences were presented below. The two models can be seen in Figure 138 and 139, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 86. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit model like in Figure 139, factor loadings went below the cut-off value, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

Table 86. Chi-square and Model Fit Values for Bodily/Kinesthetic and Existential Intelligence

Bodily/Kinesthetic and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	89.907	53	.001	.055	139.907	.600	.923
constrained model	187.026	54	.000	.103	235.026	.1009	.724

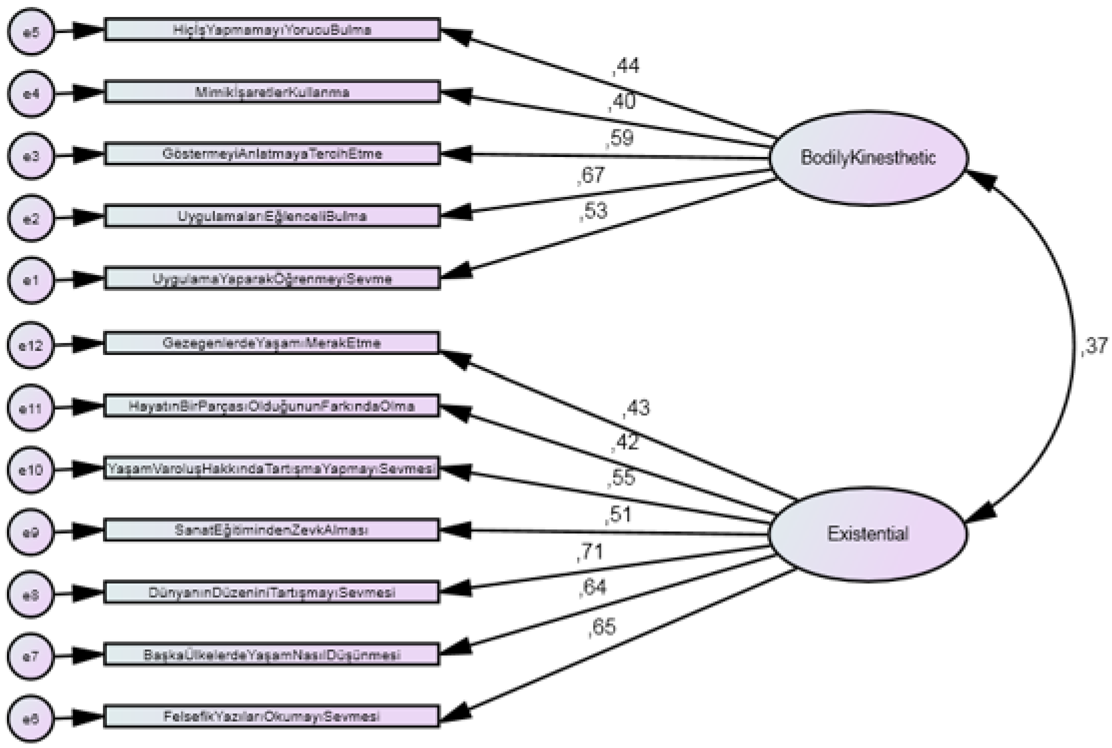

Figure 138. Unconstrained Model Fit of Bodily/Kinesthetic and Existential Intelligence

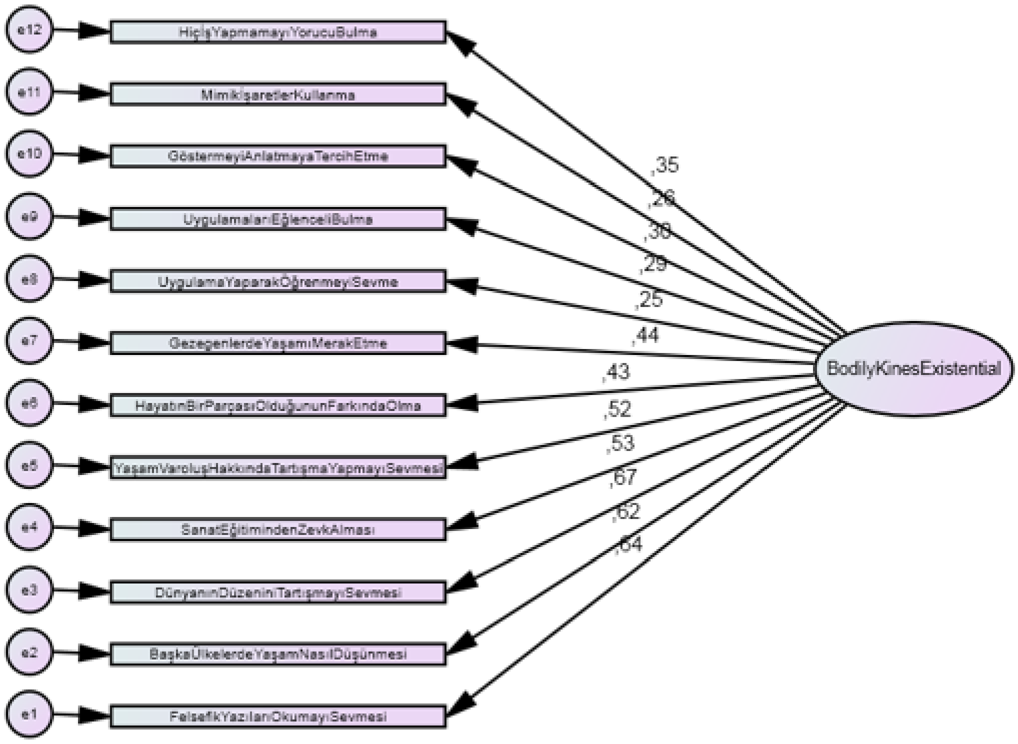

Figure 139. Constrained Model Fit of Bodily/Kinesthetic and Existential Intelligence

Details about discriminant validity analysis for verbal/linguistic and intrapersonal intelligences were presented in Figures 140-141 and values for the unconstrained and constrained models can be seen in Table 87. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. Also, the parameter estimates were distorted. The related values reveal that the single factor model is significantly deteriorated.

Table 87. Chi-square and Model Fit Values for Verbal/Linguistic and Intrapersonal Intelligence

Verbal/Linguistic and Intrapersonal	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	69.791	43	.005	.052	115.791	.497	.947
constrained model	297.656	44	.000	.157	341.656	.1466	.497

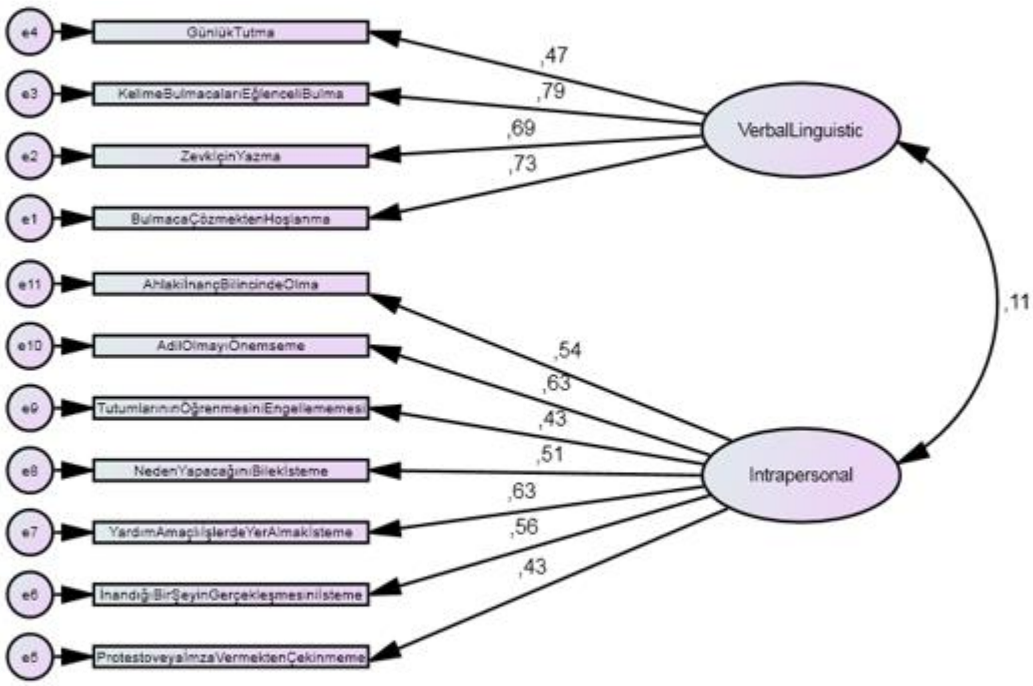

Figure 140. Unconstrained Model Fit of Verbal/Linguistic and Intrapersonal Intelligence

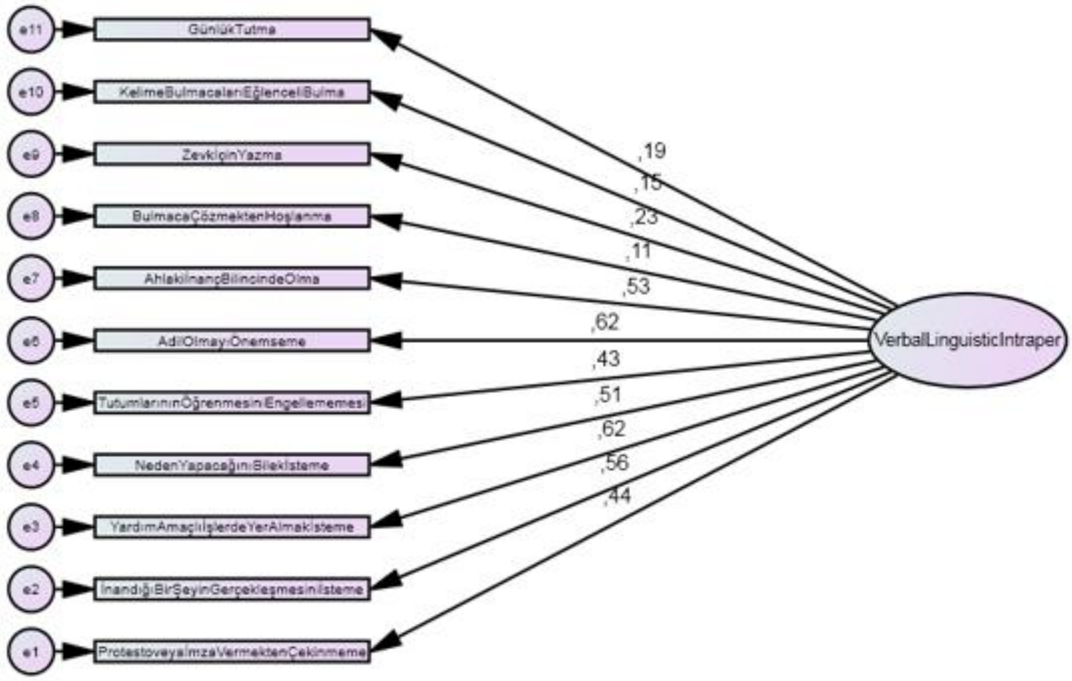

Figure 141. Constrained Model Fit of Verbal/Linguistic and Intrapersonal Intelligence

Figure 142 and 143 represents the unconstrained and constrained model for verbal/linguistic and visual spatial intelligences for discriminant validity analysis. As can be seen from the values in Table 88, when, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. Hence some factor loadings were distorted.

Table 88. Chi-square and Model Fit Values for Verbal/Linguistic and Visual Spatial Intelligence

Verbal/Linguistic and Visual Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	43.777	26	.000	.054	81.777	.351	.953
constrained model	108.900	27	.000	.114	144.900	.622	.783

These values confirm that the single factor model is significantly deteriorated. Therefore, the values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

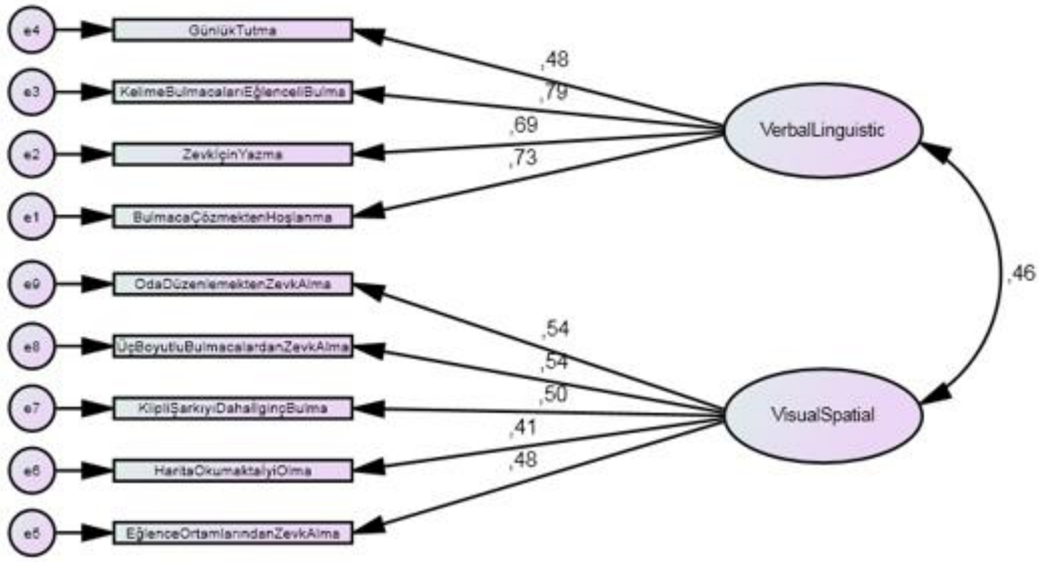

Figure 142. Unconstrained Model Fit of Verbal/Linguistic and Visual Spatial Intelligence

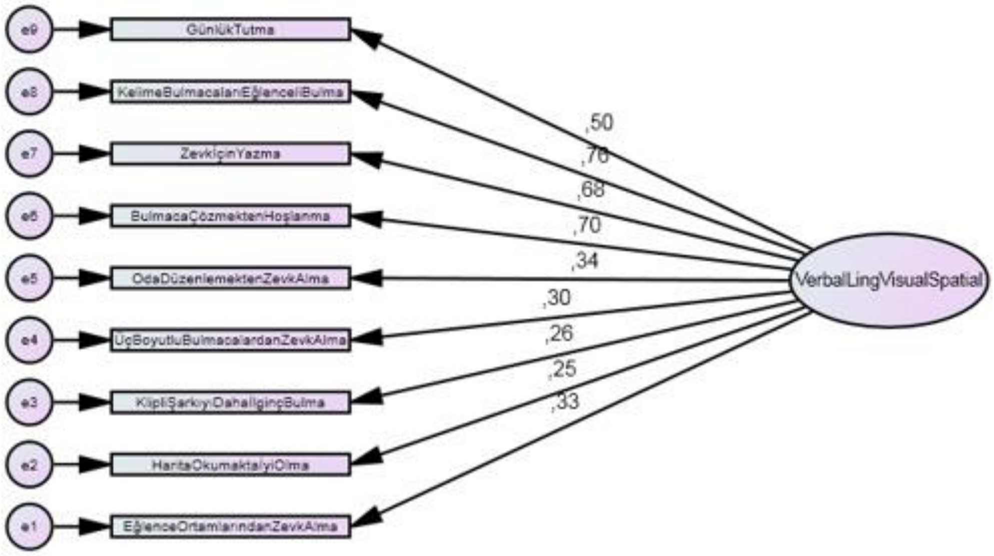

Figure 143. Constrained Model Fit of Verbal/Linguistic and Visual Spatial Intelligence

As can be seen from Table 89 and Figures 144-145, discriminant validity analysis for verbal/linguistic and existential intelligences were presented. The unconstrained and constrained models can be seen in Figure 143 and 144, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 89. The values of chi-square and the goodness-of-fit measures posits that the unconstrained model provides a better fit and proves the evidence for discriminant validity. When, the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. These values confirm that the single factor model is significantly deteriorated.

Table 89. Chi-square and Model Fit Values for Verbal/Linguistic and Existential Intelligence

Verbal/Linguistic and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	108.519	43	.000	.081	154.519	.663	.893
constrained model	291.193	44	.000	.155	335.193	.1439	.595

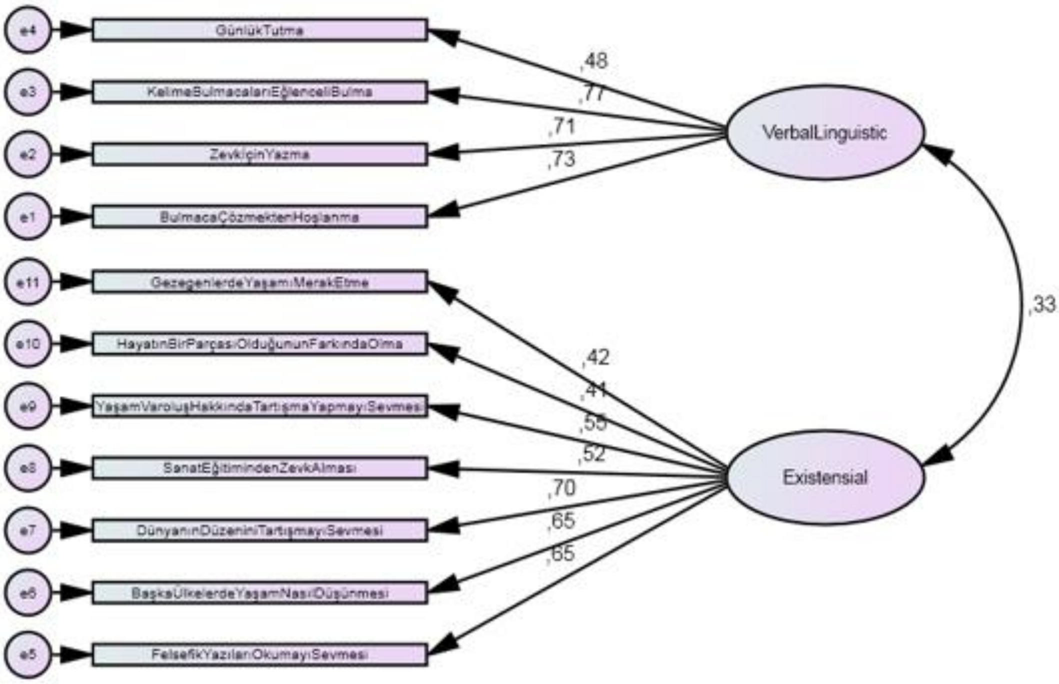

Figure 144. Unconstrained Model Fit of Verbal/Linguistic and Existential Intelligence

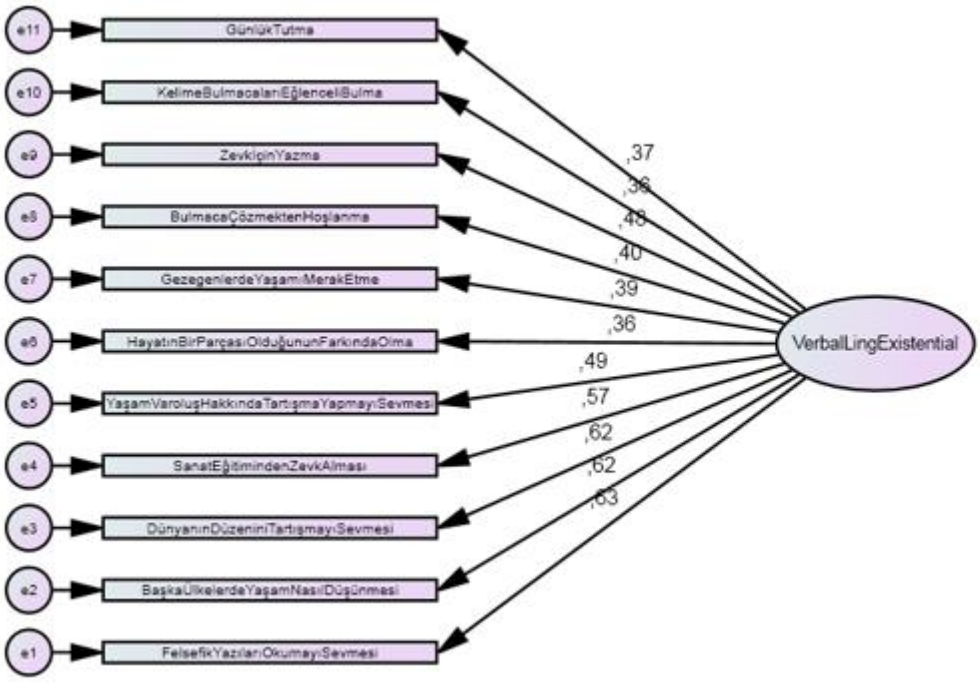

Figure 145. Constrained Model Fit of Verbal/Linguistic and Existential Intelligence

Discriminant validity analysis for intrapersonal and visual/spatial Intelligences were presented in Figure 146 and 147, and the values of Chi-square, RMSEA, AIC, ECVI and CFI are presented in Table 90. The values of chi-square and the goodness-of-fit measures of the unconstrained model gives a better fit and proves the evidence for discriminant validity. When, the model is forced into a single fit model like in Figure 147, some factor loading went below the cut-off value, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases revealing that the single factor model is significantly deteriorated.

Table 90. Chi-square and Model Fit Values for Intrapersonal and Visual/Spatial Intelligence

Intrapersonal and Visual/Spatial	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	72.986	53	.000	.040	122.986	.528	.947
constrained model	152.148	54	.000	.088	200.148	.859	.737

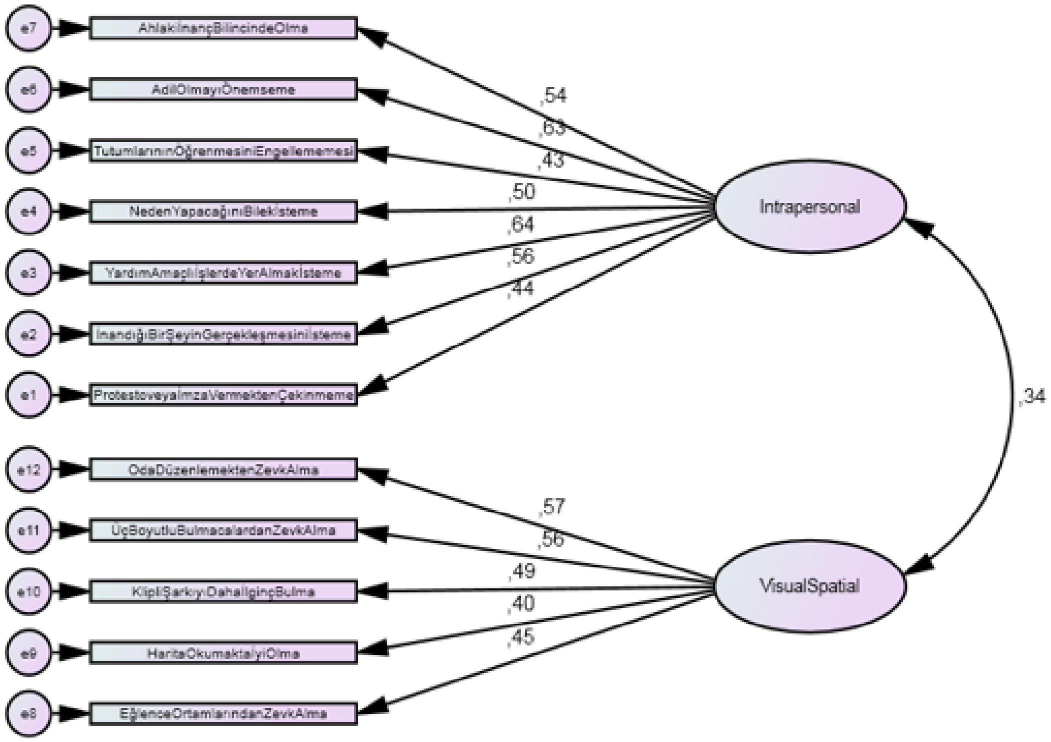

Figure 146. Unconstrained Model Fit of Intrapersonal and Visual/Spatial Intelligence

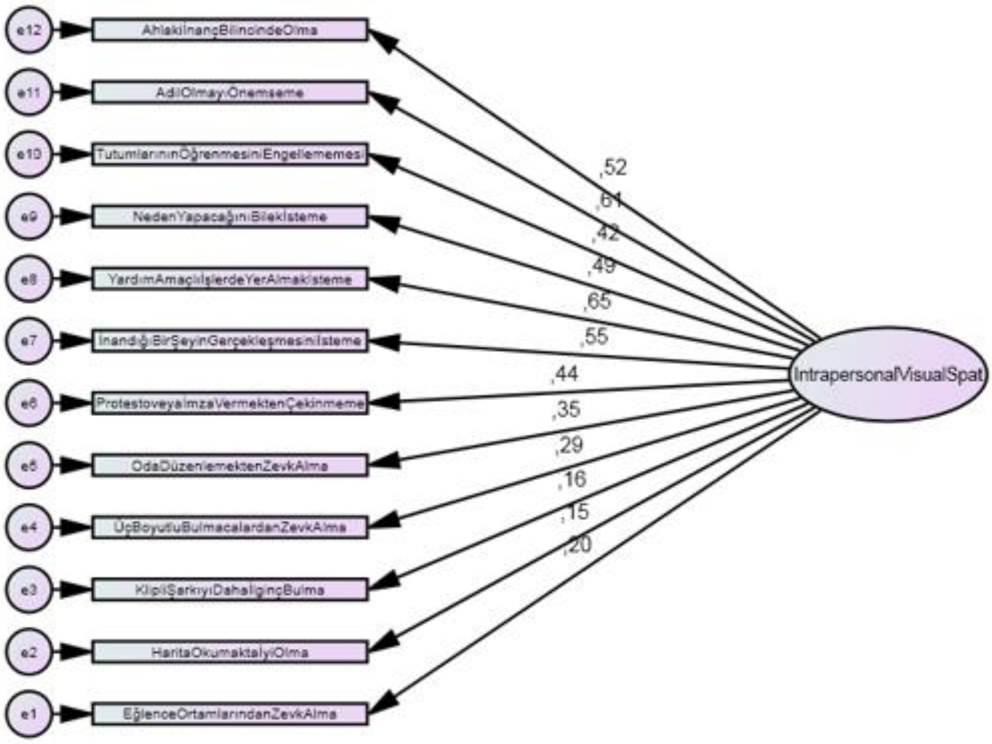

Figure 147. Constrained Model Fit of Intrapersonal and Visual/Spatial Intelligence

Details about discriminant validity analysis for intrapersonal and existential intelligences were presented in Figures 147-148 and values for the unconstrained and constrained models can be seen in Table 91. As can be seen from the values of chi-square and the goodness-of-fit measures, the unconstrained model provides a better fit and proves the evidence for discriminant validity.

Table 91. Chi-square and Model Fit Values for Intrapersonal and Existential Intelligence

Intrapersonal and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	102.099	76	.005	.038	160.099	.687	.955
constrained model	257.583	77	.000	.100	313.583	.1346	.692

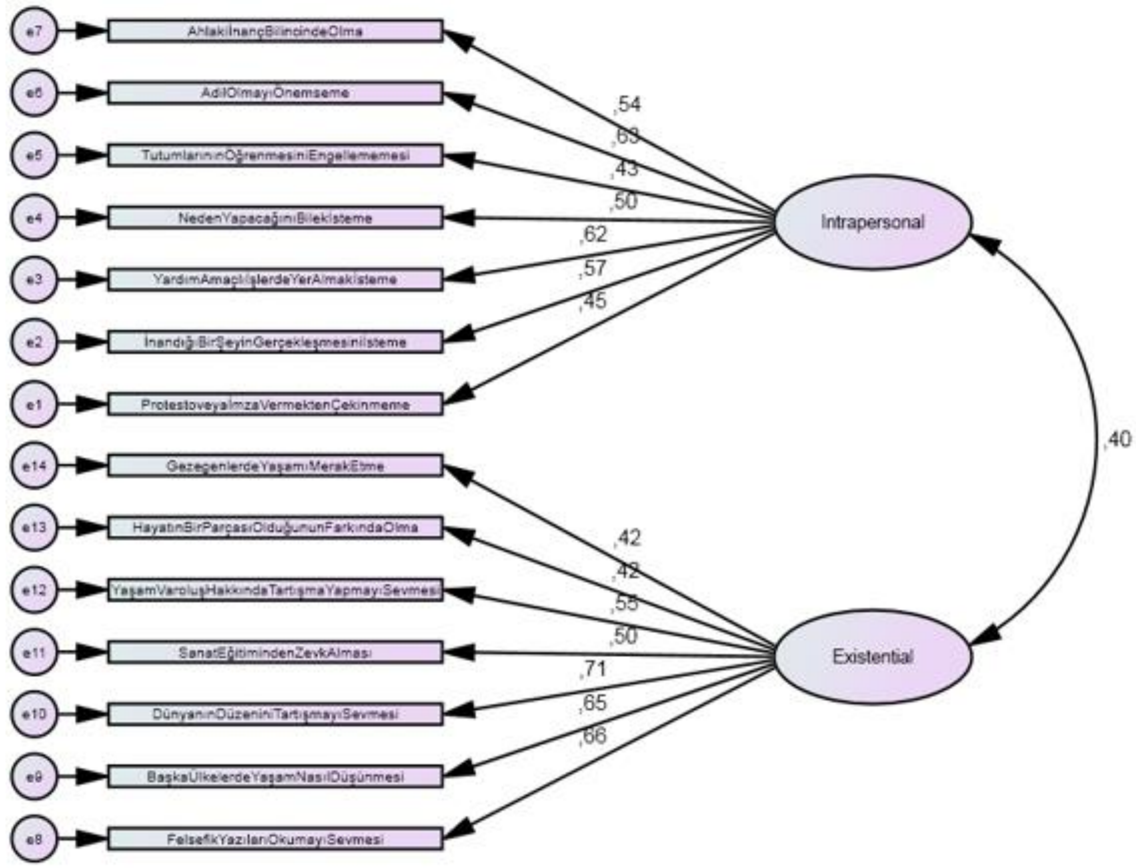

Figure 148. Unconstrained Model Fit of Intrapersonal and Existential Intelligence

When, the model is forced into a single fit, a decrease in the CFI value and an increase in Chi-square, RMSEA, AIC, and ECVI values are observed. Also, most of the parameter estimates affected in a negative way when the mocel is constrained.

As can be seen from Figure 149, the parameter estimates for intrapersonal intelligence went below the required level of .40 proving that the unconstrained model shown in Figure 148 is better. The related values reveal that the single factor model is significantly deteriorated.

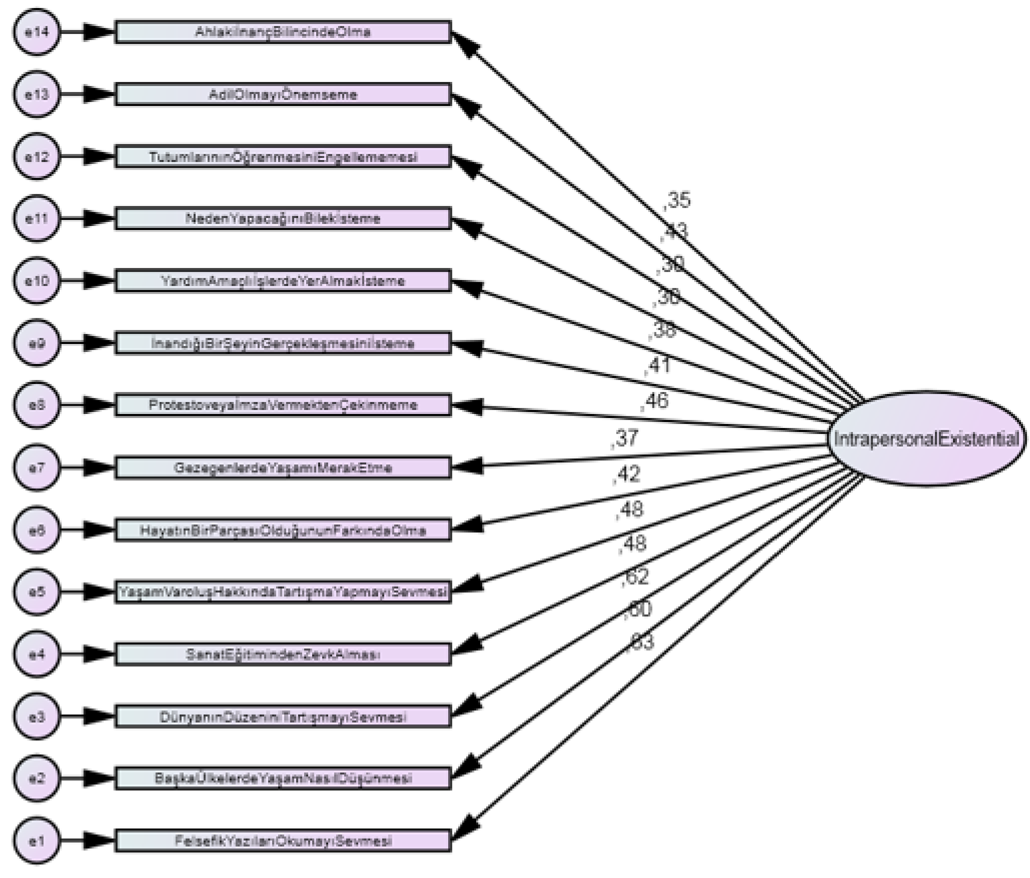

Figure 149. Constrained Model Fit of Intrapersonal and Existential Intelligence

Figure 150 and 151 below represents the unconstrained and constrained model for visual/spatial and existential intelligences for discriminant validity analysis. As can be seen from the values in Table 92, when the model is constrained as one factor, Chi-square, RMSEA, AIC, and ECVI values show an increase and CFI value decreases. The single factor model is significantly deteriorated.

Table 92. Chi-square and Model Fit Values for Visual/Spatial and Existential Intelligence

Visual/Spatial and Existential	Chi-square	df	P-value	RMSEA	AIC	ECVI	CFI
unconstrained model	84.608	53	.004	.051	134.608	.578	.932
constrained model	127.696	54	.000	.077	175.696	.754	.842

The values of chi-square and the goodness-of-fit measures show that the unconstrained model provides a better fit and proves the evidence for discriminant validity.

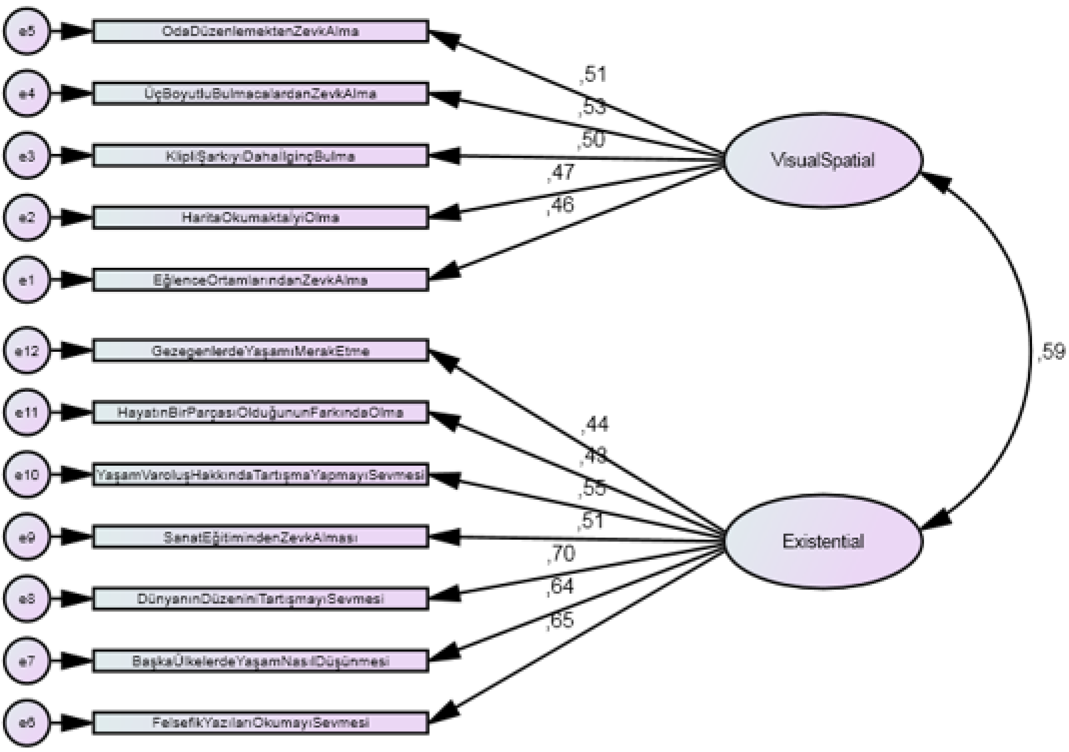

Figure 150. Unconstrained Model Fit of Visual/Spatial and Existential Intelligence

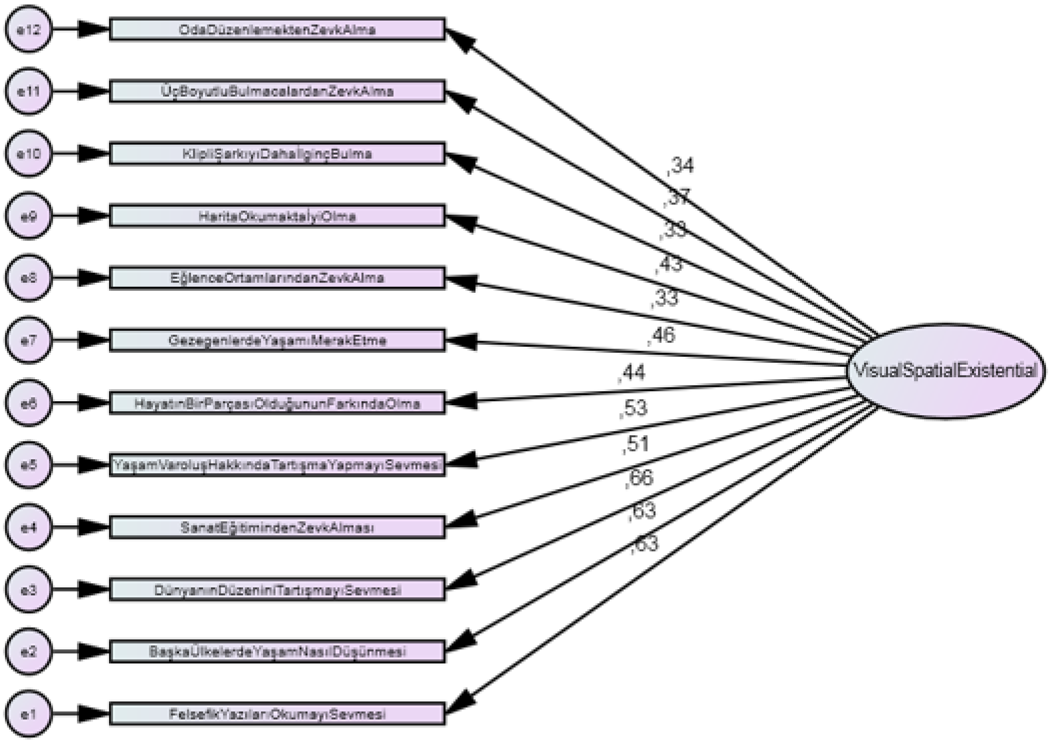

Figure 151. Constrained Model Fit of Visual/Spatial and Existential Intelligence

4.5 Findings and Discussion

This section presents the analysis of the data collected via the use of Multiple Intelligence Inventory which was administered to student participants, and Multiple Intelligence Scale for Fields of Study which was administered to instructor participants. The results and interpretations will be presented in order of the research questions mentioned in Chapter 1.

4.5.1 Analysis Results for the First Research Question.

The aim of the first research question "Which intelligence areas should students be superior in order to be successful in the Faculty of Education and in the Faculty of Engineering?" is to investigate the required Multiple Intelligence areas for the students studying at the Faculty of Education and at the Faculty of Engineering.

In order to collect data, Multiple Intelligence Scale for Fields of Study was administered to instructors teaching at Faculties of Education and Faculties of Engineering in TRNC and Turkey. Regarding the analysis of the data, first the arithmetic mean calculation of the respondents' data were computed for each of the Multiple Intelligence areas. As the participants responded each item on the MISFS on a 5 point Likert scale ranging from 5 to 1 where (5) absolutely necessary, (4) necessary, (3) not sure, (2) unnecessary, and (1) absolutely unnecessary, an intelligence with a computed mean over 3 would mean that particular intelligence area is necessary for students in order to be successful at any Faculty of Education or at any Faculty of Engineering.

4.5.1.1 Which intelligence areas should students be superior in order to be successful in the Faculty of Education?

For the analysis of the data, the mean calculation for each intelligence area for each of the respondents was done. Next, the mean for each of the intelligence areas was calculated for all of the respondents from Faculty of Education. Analysis was done to obtain descriptive statistics for the data. For each of the Multiple Intelligence areas Mean, Mode, Median, and Standard Deviations were calculated. Descriptive statistics as a result of the frequency analysis of the calculated means can be seen in Table 93.

Table 93. Faculty of Education Descriptive Statistics for Each Intelligence Area (N=300)

Faculty of Education	Mean	Mode	Median	Std. Deviation
Verbal/Linguistic	3.60	3.50	3.50	.515
Logical/Mathematical	3.42	3.00	3.33	.562
Bodily/Kinesthetic	3.39	3.40	3.40	.597
Interpersonal	3.30	3.00	3.16	.466
Intrapersonal	2.99	3.00	3.14	.691
Naturalistic	2.97	2.80	3.00	.855
Existential	2.87	3.00	3.00	.746
Musical	2.78	2.86	2.85	.770
Visual/Spatial	2.72	3.00	2.80	.675

As can be seen from Table 93, the mean of the verbal/linguistic intelligence is 3.60, logical/mathematical intelligence is 3.42, bodily/kinesthetic intelligence is 3.39, interpersonal intelligence 3.30 and intrapersonal intelligence is 3.18. Considering the results, it can be said that students who have their verbal/linguistic, logical/mathematic, bodily/kinesthetic, and interpersonal intelligence areas developed, can be succuessful at the Faculty of Education acccording to the instructor participants' views.

Because the rest of the intelligence areas which are intrapersonal (Mean 2.99), naturalistic (Mean 2.97), existential (Mean 2.87), musical (Mean 2.78), and visual/spatial (Mean 2.72) intelligences means were below 3.00, they can be considered as not so much important for the students studying at the departments of Faculty of Education.

4.5.1.2 Which intelligence areas should students be superior in order to be successful in the Faculty of Engineering?

The aim of the second part of research question one "Which intelligence areas should students be superior in order to be successful in The Faculty of Engineering?" is to investigate the required multiple intelligence areas for the students studying at the Faculties of Engineering. As for the first part of the research question, Multiple Intelligence Scale for Fields of Study was administered to instructors teaching at Faculties of Engineering in TRNC and Turkey. Regarding the analysis of the data, first, the arithmetic mean calculation of the respondents data were computed for each of the Multiple Intelligence area. As the participants responded each item on the MISFS on a 5 point Likert scale ranging from 5 to 1 where (5) absolutely necessary, (4) necessary, (3) not sure, (2) unnecessary, and (1) absolutely unnecessary, an intelligence with a computed mean over 3 would mean that particular intelligence area is vital for students in order to be successful at any Faculty of Engineering.

For the analysis of the data, the mean for each intelligence area for each of the respondents was calculated. Next, the mean for each of the intelligence areas was calculated for all of the respondents from Faculty of Engineering. Analysis was done to obtain descriptive statistics for the data. For each of the Multiple Intelligence areas Mean, Mode, Median and Standard Deviations were calculated. Descriptive statistics as a result of the frequency analysis of the calculated means can be seen in Table 94.

Table 94. Faculty of Engineering Descriptive Statistics for Each Intelligence Area (N=259)

Faculty of Education	Mean	Mode	Median	Std. Deviation
Logical/Mathematical	3.69	3.17	3.50	.555
Interpersonal	3.20	3.00	3.00	.553
Bodily/Kinesthetic	3.19	3.00	3.00	.583
Naturalistic	3.12	3.00	3.00	.723
Intrapersonal	2.99	3.86	3.00	.401
Existential	2.79	3.00	2.85	.669
Visual/Spatial	2.67	2.60	2.60	.546
Verbal/Linguistic	2.49	3.00	2.50	.593
Musical	2.37	2.00	3.00	.657

As can be seen from the Table 94, the mean of the logical/mathematical intelligence is 3.69, interpersonal intelligence is 3.20, bodily/kinesthetic intelligence is 3.19, and naturalistic intelligence is 3.12. Considering the results, it can be said that students who have their logical/mathematic, bodily/kinesthetic, interpersonal and naturalistic intelligence areas developed, can be succuessful at the Faculty of Engineering acccording to the instructor participants view.

As the rest of the intelligence areas which are intrapersonal (Mean 2.99), existential (Mean 2.79), visual/spatial (Mean 2.67), verbal/linguistic (Mean 2.49), and musical (Mean 2.37), intelligence means were calculated below 3.00, they were considered as not so much important for the students studying at the departments of Faculty of Education by the instructor participants.

4.5.2 Analysis Results of the Second Research Question

The aim of the second research question "How is the difference between the instructors expectations about each intelligence of students in the Faculty of Education and in the Faculty of Engineering?" is to investigate the mean difference for instructor expectations regarding the required Multiple Intelligence areas of the students studying in their faculties. To this aim, independent samples *t*-test analysis was used.

According to Ho (2006, p. 41), "… independent samples *t*-test is used for testing the differences between the means of two independent groups". As there are nine intelligence areas, testing the mean difference is repeated for each intelligence type and analysis for each mean difference for both faculties are presented in Table 95 and Table 96.

Table 95. Descriptive statistics for intelligence types proposed by faculty members for Faculty of Education and Faculty of Engineering

Intelligence Types/Faculty	N	Mean	Std. Deviation	Std. Error Mean
Naturalistic/Education	300	2.9733	.85580	.04941
Naturalistic/Engineering	259	3.1228	.72362	.04496
Musical/Education	300	2.7810	.77036	.04448
Musical/Engineering	259	2.3723	.65742	.04085
Logical-Mathematical/Education	300	3.4283	.56297	.03250
Logical-Mathematical/Engineering	259	3.2085	.55303	.03436
Bodily-Kinesthetic/Education	300	3.3907	.59780	.03451
Bodily-Kinesthetic/Engineering	259	3.1954	.58374	.03627
Visual-Spatial/Education	300	2.7220	.67516	.03451
Visual-Spatial/Engineering	259	2.4942	.59387	.03627
Existential/Education	300	2.8738	.74606	.04307
Existential/Engineering	259	2.6757	.54686	.03398
Verbal-Linguistic/Education	300	3.6033	.51579	.02978
Verbal-Linguistic/Engineering	259	2.7932	.66994	.04163
Interpersonal/Education	300	3.3050	.46668	.02694
Interpersonal/Engineering	259	3.6918	.55560	.03452
Intrapersonal/Education	300	3.1852	.69174	.03994
Intrapersonal/Engineering	259	2.9917	.40132	.02494

As can be seen in Table 96, for the naturalistic intelligence, the results of the Levene's test $F(557) = 4.815$, $p = .29$, indicate that the variances of the two populations are assumed to be approximately equal. Thus, the standard t test results are used. The results from the analysis $t(557) = -2.21$, $p = .280$ indicates that there is no significant difference between the Faculty of Education and Faculty of Engineering instructors expectations regarding their students' required level of naturalistic intelligence.

Table 96. Independent samples t-test results for Intelligence Types

	Levene's Test for Equality of Variances		*t*-test for equality of Means				Effect Size *d*
Type of Intelligence	**F**	**Sig**	**t**	**df**	**Sig.(2-tailed)**	**Mean Dif.**	
Naturalistic	4.815	0.29	-2.210	557	0.280	-.1495	0.188
Musical	3.066	.800	6.689	557	0.000	.40864	0.569
Logical Mathematical	.220	.639	4.642	557	0.000	.21984	0.395
Bodily/Kinesthetic	1.467	.226	3.894	557	0.000	.19530	0.331
Visual/Spatial	1.312	.253	4.204	557	0.000	.22779	0.357
Existential	14.86	.000	3.611	543	0.000	.19813	0.370
Verbal/Linguistic	20.06	.000	15.829	480	0.000	.81017	1.345
Interpersonal	15.49	.000	8.832	506	0.000	-.38676	0.751
Intrapersonal	30.93	.000	4.110	491	0.000	.19351	0.349

The results of the Levene's test F(557) = 3.066, p = .80 for musical intelligence indicate that the variances of the two populations are assumed to be approximately equal. Thus, the standard t test results are used. The results from the analysis t(557) = 6,689, p = .0001 indicates that there is significant difference between the Faculty of Education and Faculty of Engineering instructors opinions regarding their students' required level of musical intelligence. In other words, although the mean value for musical intelligence is 2.7810 which is still below 3.00, instructors of Faculty of Education prefer their students to have their musical intelligence more developed when compared to instructors of Faculty of Engineering.

The results of the Levene's test f (557) = .220, p = .639 for logical/mathematical intelligence indicate that the variances of the two populations are assumed to be approximately equal. Thus the standard t test results are used. The results from the analysis t(557) = 4,642, p = .0001 indicates that there is significant difference between the Faculty of Education and Faculty of Engineering instructors opinions regarding their students' required level of logical/mathematical intelligence.

For the bodily/kinesthetic intelligence, results of the Levene's test f (557) = 1.467, p = .226 indicate that the variances of the two populations are assumed to be approximately equal. Thus the standard t test results are used. The results from the analysis t(557) = 3.894, p = .0001 indicates that there is significant difference between the Faculty of Education and Faculty of Engineering instructors oppinions regarding their students' required level of bodily/kinesthetic intelligence.

For the visual/spatial intelligence, the results of the Levene's test f (557) = 1.312, p = .253, indicate that the variances of the two populations are assumed to be approximately equal. Thus the standard t test results are used. The results from the analysis t(557) = 4204, p = .0001 indicates that there is significant difference between the Faculty of Education and Faculty of Engineering instructors oppinions regarding their students' required level of visual/spatial Intelligence.

The results of the Levene's test f (557) = 14.858, p = .0001 for the existential intelligence indicate that the variances of the two populations are not assumed to be equal. Thus the equal variance not assumed t test results are used. The results from the analysis t(543) = 3.611, p = .0001 indicates that there is significant difference between the Faculty of Education and Faculty of Engineering instructors oppinions regarding their students' required level of existential Intelligence.

As can be seen in Table 96, the results of the Levene's test f (557) = 20.06, p = .0001 for the verbal/linguistic intelligence indicate that the variances of the two populations are not assumed to be equal. Thus the equal variance not assumed t test results are used. The results from the analysis t(480) = 15.829, p = .0001 indicates that there is significant difference between the Faculty of Education and Faculty of Engineering instructors oppinions regarding their students' required level of verbal/linguistic intelligence. It can be seen from the group statistics that the mean of verbal/linguistic intelligence is 3.60 for the Faculty of Education whereas the mean is 2.79 for the Faculty of Engineering. The means and the results of the *t*-test reveal that instructors from Faculty of Education find verbal/linguistic Intelligence as very necessary in order for the students to be successful in the Faculty of Education. On the other hand, instructors of Faculty of Engineering do not see verbal/linguistic intelligence as an important intelligence area for their students.

For the interpersonal intelligence, the results of the Levene's test f (557) = 15.490, p = .0001, indicate that the variances of the two populations are not assumed to be equal. Thus the equal variance not assumed t test results are used. The results from the analysis t(506) = 8.832, p = .0001 indicates that there is significant difference between the Faculty of Education and Faculty of Engineering instructors oppinions regarding their students' required level of interpersonal intelligence. According to the results, although both faculty members suggested interpersonal intelligence as an important intelligence area for their students success, it can be said that interpersonal intelligence is seen as more necessary for the students studying at the Faculty of Engineering.

For the intrapersonal intelligence, the results of the Levene's test f (557) = 30.933, p = .0001, indicate that the variances of the two populations are not assumed to be equal. Thus the equal variance not assumed t test results are used. The results from the analysis t(491) = 4.110, p = .0001 indicates that there is significant difference between the Faculty of Education and Faculty of Engineering instructors oppinions regarding their students' required level of intrapersonal intelligence.

4.5.3 Analysis Results of the Third Research Question

The aim of the third research question "What are the Multiple Intelligence profiles of the students studying at The Faculty of Education and at The Faculty of Engineering?" is to investigate the required Multiple Intelligence profiles of the students studying at the Faculty of Education and at the Faculty of Engineering.

In order to collect data, Multiple Intelligence Inventory was administered to students studying at the Faculty of Engineering and Faculty of Education at Eastern Mediterranean University. The participants responded each item on the MII on a 5 point Likert scale ranging from 5 to 1 where (5) refers to totally agree, (4) refers to agree, (3) refers to undecided, (2) refers to disagree, and (1) refers to totally disagree.

For the analysis of the data, firstly the arithmetic mean calculation of the respondents data were computed for each of the Multiple Intelligence area. Next, the mean computation for each of the intelligence area was calculated for all of the respondents from both faculties separately. For each of the Multiple Intelligence areas Mean, Mode, Median and Standard Deviations were calculated.

4.5.3.1 What are the Multiple Intelligence profiles of the students studying at the Faculty of Education?

For the analysis of the data, the mean calculation for each intelligence area for each respondents was done. Next the mean for each of the intelligence area was calculated for all the respondents from the Faculty of Education. Analysis was done to obtain descriptive statistics for the data. For each of the Multiple Intelligence areas Mean, Mode, Median, and Standard Deviations were calculated. Descriptive statistics as a result of the frequency analysis of the calculated means can be seen in Table 97.

Table 97. Faculty of Education Descriptive Statistics for Each Intelligence Area (N=513)

Faculty of Education	Mean	Mode	Median	Std. Deviation
Intrapersonal	4.52	5.00	4.60	.486
Bodily/Kinesthetic	4.35	4.75	4.50	.559
Naturalistic	4.17	4.60	4.20	.616
Logical/Mathematical	4.16	5.00	4.25	.720
Existential	3.96	4.00	4.00	.666
Musical	3.88	4.00	4.00	.787
Visual/Spatial	3.68	3.67	3.67	.811
Interpersonal	3.05	3.00	3.00	.785
Verbal/Linguistic	2.99	3.67	3.00	.930

As can be seen from the Table 97, the mean of the intrapersonal intelligence is 4.52, bodily/kinesthetic intelligence is 4.35, naturalistic intelligence is 4.17, logical/mathematical intelligence is 4.16, existential intelligence is 3.96, musical intelligence is 3.88, visual/spatial is 3.68, interpersonal intelligence is 3.05, and verbal/linguistic intelligence is 2.99. Considering the results, it can be seen that intrapersonal, bodily/kinesthetic, naturalistic and logical/mathematic intelligences of students who are studying at the Faculty of Education are the most developed areas. existential, musical, visual/spatial, and interpersonal intelligences of the education faculty students are moderately developed. Verbal/linguistic intelligence area is not so developed.

4.5.3.2 What are the Multiple Intelligence profiles of the students studying at the Faculty of Engineering?

For the analysis of the data, the mean calculation for each intelligence area for each respondents was done. Next the mean for each of the intelligence area was calculated for all the respondents from the Faculty of Engineering. Analysis was done to obtain descriptive statistics for the data. For each of the Multiple Intelligence areas Mean, Mode, Median, and Standard Deviations were calculated. Descriptive statistics as a result of the frequency analysis of the calculated means can be seen in Table 98.

Table 98. Faculty of Engineering Descriptive Statistics for Each Intelligence Area (N=396)

Faculty of Engineering	Mean	Mode	Median	Std. Deviation
Intrapersonal	4.16	3.80	4.20	.537
Logical/Mathematical	4.03	4.00	4.00	.588
Bodily/Kinesthetic	3.97	4.00	4.00	.543
Existential	3.95	3.86	3.86	.571
Naturalistic	3.93	4.40	4.00	.581
Musical	3.72	3.75	3.75	.661
Visual/Spatial	3.67	3.00	3.67	.659
Interpersonal	3.17	3.00	3.00	.633
Verbal/Linguistic	3.14	2.33	3.00	.889

As can be seen from the Table 98, the mean of the intrapersonal intelligence is 4.16, logical/mathematical intelligence is 4.03, bodily/kinesthetic intelligence is 3.97, existential intelligence is 3.95, naturalistic intelligence is 3.93, musical intelligence is 3.72, visual/spatial is 3.67, interpersonal intelligence is 3.17, and verbal/linguistic Intelligence is 3.14. Considering the results, it can be seen that intrapersonal and logical/mathematic intelligence of students who are studying at the Faculty of Engineering are the most developed intelligence areas. Bodily/kinesthetic, existential, naturalistic, musical, and visual/spatial intelligences of the engineering students are moderately developed. Interpersonal and verbal/linguistic intelligence areas areas are not so developed.

Chapter 5

SUMMARY AND CONCLUSION

This chapter presents the conclusion remarks for the study. First, the implications of the results of the study will be discussed. Later, limitations of the study and some suggesstions for future research will be made.

5.1 Discussion of the First Research Question

a) Which intelligence areas should students be superior in order to be successful in the faculty of Education?

As mentioned in Chapter 4 at the analysis part, for the students studying at the education faculties, the instructors mentioned verbal/linguistic as the most necessary intelligence type. Logical/mathematical, bodily/kinesthetic, and interpersonal intelligences were also seen as other necessary intelligence types that the students need to have in order to be successful at the faculty of education.

Considering the career opportunities of the graduates of Faculty of Education, as most of them will be serving as teachers, it is not surprising to have the linguistic/verbal intelligence with the highest mean avarage 3.60. According to the results of the study, students should have their linguistic/verbal intelligence developed both for their success in their areas of study and also for future career. It should be kept in mind that, Gardner views linguistic/verbal intelligence as the capacity to use the language to achieve goals. McKenzie (2005) and Saban (2005) stated that those who have their linguistic/verbal intelligence developed are good at reading, writing, telling, asking, reporting, discussing, clarifying, lecturing, announcing, narrating, and so forth. which are all vital for both teacher candidates and current teachers. Demirel and friends, (2006) stated that linguistic/verbal intelligence is associated with being a teacher. Therefore, it can be said that teacher participants' expectations from the students having linguistic/verbal intelligence are related with what the researchers had stated before.

Also, it is remarkable to see logical/mathematical intelligence as the second most necessary kind of intelligence with a mean average of 3.42 for the teacher candidate students. This may be because instructor participants value logic and reasoning and also for years logical/mathematical intelligence has been valued in instruction alongside with linguistic/verbal intelligence. Therefore, instructor participants probably thought that in order to be successful in their area of study their students should have logical/mathematical intelligence developed.

The third most preferred multiple intelligence area for the students studying at the faculty of education is bodily/kinesthetic intelligence, which according to Armstrong (2000) and Gardner (1999) involves the ability to use the body or parts of the body to express emotion, ideas, and feelings, to play a game, to solve problems, and to create a new product or transform things. This may be because prospective teachers should also use their bodily/kinesthetic intelligence when conveying their message to their students. Thus, time to time, teachers should imitate, play, perform, dance, jump, and exercise when necessary to convey their message to the students.

The forth most preferred multiple intelligence area for the teacher candidate students is interpersonal intelligence. Some of the observable actions for this kind of intelligence are: interacting, sharing, empathizing, caring, socializing, gathering with others, communicating (Fogarty & Stoehr, 2008) and it is not surprising that being a teacher is a profession that is associated with these skills and abilities (Armstrong, 2003; Demirel, et al., 2005). When interpersonal intelligence is developed, a person can understand the motivations, desires, and intentions of other people and to work effectively with others which is a must for a teacher. Therefore, it is obvious why instructor participants marked this type of intelligence as something important for the students studying in their faculties and having this kind of intelligence developed will surly help the students in their classes and careers because teaching requires to be social.

The rest of the intelligence areas which are intrapersonal, naturalistic, existential, musical, and visual/spatial intelligences were considered as not so much important for the students studying at the departments of Faculty of Education. These findings show parallelism with the findings of relevant literature on multiple intelligences which proposes that almost none of these intelligence areas are related with teaching profession except that musical intelligence can be related with being a music teacher.

b) Which intelligence areas should students be superior in order to be successful in the faculty of Engineering?

According to the statistical analysis for the second part of the first research question, logical/mathematical intelligence was considered as the most necessary intelligence type for success for the student studying at the engineering faculties. Interpersonal, bodily/kinesthetic, and naturalistic intelligences were the other important intelligence types for engineering students.

Considering the career opportunities of the graduates of faculty of engineering, as most of them will be serving as engineers, it is not surprising to have the logical/mathematical intelligence. According to the results of the study, students should have their logical/mathematical intelligence developed both for their success in their areas of study and also for future career. It should be mentioned that logical/mathematical intelligence is seen as the capacity of analyzing problems logically and solving them with mathematical operations. It is the intelligence of logic and reasoning and the observable actions for this kind of intelligence involves: organizing, solving, theorizing, ranking, experimenting, predicting, proving, measuring, analyzing, verifying, calculating, questioning, simplifying, and so forth. (Armstrong, 2003; Fogarty & Stoehr, 2008; McKenzie, 2005). Therefore, it is not surprising to have logical/mathematical intelligence as the most preferred intelligence area that should be owned by someone studying at the faculty of engineering. Hence, it is not surprising to see the profession engineering among the professions associated with logical/mathematical intelligence (Demirel, et al., 2006).

According to the analysis of the data, the second most preferred multiple intelligence area for the teacher candidate students is interpersonal intelligence. Among the observable actions for this kind of intelligence are: interacting, sharing, empathizing, caring, socializing, gathering with others, communicating (Fogarty and Stoehr, 2008) and it is not surprising that being an engineer is a profession that is associated with this kind of intelligence (Armstrong, 2003; Demirel, et al., 2006). When interpersonal intelligence is developed, a person can understand the motivations, desires, and intentions of other people and to work effectively with others which is very important for an engineer. Therefore, it is obvious why instructor participants marked this type of intelligence as something important for the students studying in their faculties and having this kind of intelligence developed will surly help the students in their careers because working in the field of engineering requires to be social. Hence, what students will experience in their careers should be practiced during their academic studies. Therefore, this can be the reason why instructors of engineering marked interpersonal intelligence as an important intelligence area for the students studying in their departments.

Like for the students studying at the faculty of education, for the students of engineering, the third most required intelligence area was found to be bodily/kinesthetic intelligence. As Armstrong (2000) and Gardner (1999) state that this intelligence area involves the ability to use the body or parts of the body to express emotion, ideas, and feelings, to solve problems, and to create a new product or transform things, the instructors from Engineering Faculty might regarded these abilities as necessary for their students. This may be because instructor participants thought that prospective engineers would find those abilities useful when conveying their message to the listeners. Also, because engineers will be working in construction areas, those abilities that Armstrong and Gardner mentioned might be considered as important for the students in their future careers.

The fourth intelligence area which is considered as important for the students studying at the departments in Faculties of Engineering is naturalistic intelligence. Naturalistic intelligence involves the expertise in the identification/classification of the wildlife and the ability to recognize non-living forms in nature and urban environment (Armstrong, 2000; Gardner, 1999). A person who has a naturalistic intelligence would demonstrate actions like, watching, observing, classifying, categorizing, hiking, climbing, and so forth. (Fogarty & Stoehr, 2008; McKenzie, 2005). naturalistic intelligence was seen as important for engineering students because instructor participants thought that prospective engineers would find those abilities useful both for their success in class and may be for success in their career. It should also be stated that Demirel et al., (2006) associated naturalistic intelligence with being an engineer.

The rest of the intelligence areas which are intrapersonal, existential, visual/spatial, verbal/linguistic, and musical intelligence were considered as not so much important for the students studying at the departments of Faculty of Education by the instructor participants. These findings show parallelism with the findings of relevant literature on multiple intelligences which proposes that almost none of these intelligence areas are related with engineering profession.

5.2 Discussion of the Second Research Question

The second research question "How is the difference between the instructors' expectations about the profiles of students in the faculty of education and faculty of engineering?" aimed to investigate if there was any significant difference regarding the instructors' expectations for the necessary intelligence areas of students studying in their faculties. Although the means of education and engineering instructors' view for naturalistic intelligence were different, according to the independent samples t-test analysis, this difference was not significant. For the rest of the intelligence areas, there were significant difference between the expectations of the instructors from education faculty and instructors from the engineering faculty. This may be due to the difference between education and engineering areas. In fact, this difference was hypothesized at the beginning of the study. So according to the independent samples t-test analysis, students need to have different intelligence areas developed to be successful in engineering and education faculties.

5.3 Discussion of the Third Research Question

a) What are the multiple intelligence profiles of the students studying at the Faculty of Education?

The results indicate that intrapersonal, bodily/kinesthetic, naturalistic and logical/mathematic are the most developed intelligence areas of students who are studying at the Faculty of Education. Existential, musical, visual/spatial, and interpersonal intelligences of the education faculty students are moderately developed. Verbal/linguistic intelligence area is not so developed. Except for the verbal/linguistic intelligence, students developed intelligence areas for bodily/kinesthetic and logical/mathematical intelligences matches with what the instructors were expecting from their students to have as developed intelligence areas.

b) What are the multiple intelligence profiles of the students studying at the Faculty of Engineering?

According to the statistical analysis, intrapersonal and logical/mathematic intelligence of students who are studying at the Faculty of Engineering are the most developed intelligence areas. Bodily/kinesthetic, existential, naturalistic, musical, and visual/spatial intelligences of the engineering students are moderately developed. Interpersonal and verbal/linguistic intelligence areas are not so developed. Students developed intelligence areas for logical/mathematical intelligence matches with what the instructors were expecting from their students to have as developed intelligence areas. Also, other intelligence areas that the instructors see as vital for their students are what the students have as developed intelligence areas. Only interpersonal intelligence of students does not match with what the instructors expected.

5.4 Implications

Gardner defined intelligence as the ability/abilities that help/s a person to solve a problem that is valued in one or more cultures and it has direct applications to career counseling at all age levels (Armstrong, 2006; Gardner, 1999). He also stated that schools should help students reach vocational goals that are compatible with their particular spectrum of intelligences (Gardner, 2011). This could be made possible by identifying children’s dominant intelligence areas at an early age and then their educational opportunities and options could be drawn according to this knowledge.

Shearer (2009) suggested to do research on how universities institutions can develop intrapersonal understanding, thereby enabling students to select a major course of study that leads naturally into a career that is well-matched to students’ unique strengths. The results of such studies would have practical as well as longitudinal implications for the transition from college to higher education. Shearer and Luzzo (2009) also invited researchers, counsellors, and teachers to do studies on the usefulness of the MI theory to design a framework for career counseling and educational planning. Erkoç and Bayrak (2008) also suggest researchers to conduct studies at university level to reveal the necessary intelligence domains for different areas of studies for career counselling.

After all, Gardner and Moran (2006) stated about the MI theory that there is interaction among intelligences when people’s minds work and the intelligences can be grouped together for various purposes. Hence, it can be concluded that for different areas of studies, the necessary intelligence types can be grouped so that university student candidates can be guided to choose the most suitable area/s of studies before starting their freshman studies.

Considering all these recommendations, this current study aimed to develop two instruments. The first one is the Multiple Intelligence Instrument (MII) for students so that they can self-check their dominant intelligence areas. The second instrument is the Multiple Intelligence Scale (MISFS). The instrument can be administered to instructors of a faculty to define the relevant intelligence areas necessary for their students to be successful in that particular faculty. After developing the MISFS, it was administered to instructors of Engineering and Education Faculties so as to find out the required Multiple Intelligence areas for the students to be successful in their faculties.

The analysis of the data revealed that students who have their verbal/linguistic, logical/mathematic, bodily/kinesthetic, interpersonal and intrapersonal intelligence areas developed, can be successful at the Faculty of Education. On the other hand, the data revealed that students with logical/mathematic, bodily/kinesthetic, interpersonal and naturalistic intelligence areas developed, can be successful at the Faculty of Engineering.

These findings are compatible with the suggestions of some researchers who associated some intelligence areas with some professions (Armstrong, 2000; Demirel, et al., 2006; Gardner, 1999; Fogarty & Stoehr, 2008; McKenzie, 2005).

Finally, it can be concluded that the Multiple Intelligence Instrument is a valid and reliable tool for the adult students and can be used as a self-check tool to find out their multiple intelligence profiles. Alternatively, teachers and counsellor teachers can use it for their adult students to find out their multiple intelligence profiles.

The results of the Multiple Intelligence Scale for Fields of Study for faculties of education and engineering will also help career counsellors guide their students for better career choices by providing them with a list of intelligences required for the faculties of engineering and education.

5.5 Limitations and Suggestions for Future Research

This current study possesses a number of limitations that should be considered. Regarding the effort on finding the necessary Multiple Intelligence areas for the Faculty of Education and Engineering the sample (N=559) was selected from Turkey and TRNC. Although, the sample size is sufficient, it would be better to reach a larger sample size. This was due to the limited time the researcher had to complete the study. Hence most of the instructors' e-mail addresses were not available on their institutions web-pages. Also it would be cost and time consuming to reach many participants face to face. Therefore, because there are many higher institutions in different parts of Turkey, it would be feasible for a group of researchers to repeat the same study easily with a larger sample size. The results could then be compared with the results of the present research.

The second limitation comes from the nature of the research. This current research is purely quantitative. These quantitative findings might also be supported by some qualitative data. Using a mixed method approach, the study could be repeated so that outcomes from both qualitative and quantitative data would be analyzed assuring the triangulation of the study.

Obtaining data from instructors only from Turkey and TRNC can be considered as another limitation. Data also from the instructors teaching at Faculties of Education and Engineering in different countries could be collected. Then, generalization of the findings to a larger scale would be eliminated.

Another limitation may be the way the MISFS is administered. As the survey was conducted online through an online survey tool (SurveyMonkey), the researcher was not available to answer possible questions of the participants. Although a number of participants gave some very positive feedback about the study and showed their interest of learning the results of the study by sending e-mails, still there might be some participants who would like to make their comments about the scale or items on the scale face to face but of course this was not possible.

Finally, for future research it could be suggested to apply the MISFS to instructors teaching at different Faculties, not only Faculties of Education and Engineering. Collecting data from different faculties and analyzing them would make it possible to see the big picture of the necessary intelligence areas for different faculties. The results would help students in deciding which faculty to study and also counsellors would have the chance to guide their students into the right paths considering the required Multiple Intelligences areas for different fields of study.

With this study, a significant contribution has been made to the body of knowledge on the topic of Multiple Intelligences and also contribution has been made to career guidance issue at schools and it will hopefully stimulate and encourage other researchers to investigate more on incorporating Multiple Intelligences to career counselling issue.

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APPENDICES

Appendix A: Multiple Intelligence Inventory

Bölüm I

Kişisel Bilgiler

a) **Fakülteniz/Bölümünüz:** ....

b) **Öğrenci Numaranız:** ....

<u>Lütfen aşağıdaki soruları cevap kağıdına işaretleyiniz</u>

1. **Cinsiyetiniz:** (a) Kadın (b) Erkek

2. **Yaşınız**: (a) 17-18 (b) 19-20 (c) 21-22 (d) 23-24 (e) 25 ve üzeri

3. **Okumakta olduğunuz döneminiz:**
   (a) 1-2 (b) 3-4 (c) 5-6 (d) 7-8 (e) 9 ve üstü

4. **Uyruğunuz:** (a) KKTC (b) TC (c) Diğer (Lütfen belirtiniz) ....

BÖLÜM II

Çoklu Zeka Ölçeği

Aşağıda listelenen maddelere katılma derecenizi kendinizde bulunan özellikleri düşünerek ve verilen dereceleme ölçeğini kullanarak (a)'dan (e)'ye kadar olan seçeneklerden yalnızca birini seçerek optik cevap kağıdına işaretleyiniz.

Seçenekler:

(a) Kesinlikle Katılıyorum;
(b) Katılıyorum;
(c) Kararsızım;
(d) Katılmıyorum;
(e) Kesinlikle Katılmıyorum.

Maddeler	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyoru
1. Doğal çevre ile ilgili konuları önemsiyorum.	a	b	c	d	e
2. Bahçe işlerinden hoşlanıyorum.	a	b	c	d	e
3. Doğal çevreyi korumayı önemsiyorum.	a	b	c	d	e
4. Hayvan yaşamına önem veriyorum.	a	b	c	d	e
5. Çöplerin geri dönüşümüne önem veriyorum.	a	b	c	d	e
6. Ritme göre hareket etmek bana kolay geliyor.	a	b	c	d	e
7. Müzik yapmaktan hoşlanıyorum.	a	b	c	d	e
8. Müzikaller, bana tiyatro oyunlarından daha çekici gelir.	a	b	c	d	e
9. Şarkı sözleri hatırlamak bana kolay gelir.	a	b	c	d	e
10. Temiz ve düzenli olmakla bilinirim.	a	b	c	d	e
11. Düzenli olmayan insanlardan rahatsızlık duyarım.	a	b	c	d	e
12. Yapacağım her hangi bir iş için ihtiyaç duyacağım her şeyi hazırlamadan o işe başlamam.	a	b	c	d	e
13. Planlı olmam iyidir.	a	b	c	d	e
14. Çalışma grupları benim için çok verimlidir.	a	b	c	d	e
15. Arkadaş çevremde genellikle liderliği ben üstlenirim.	a	b	c	d	e
16. Ben bir ‘takım oyuncusuyum’.	a	b	c	d	e
17. Tek başıma çalışmaktan **hoşlanmıyorum.**	a	b	c	d	e
18. Birkaç kulübe veya derneğe üyeyim.	a	b	c	d	e
19. Konuşurken mimik ve işaretler kullanırım.	a	b	c	d	e
20. Bir şeyin nasıl yapıldığını ğöstermek onu anlatmaktan daha iyidir.	a	b	c	d	e
21. Uygulamalı aktiviteler eğlencelidir.	a	b	c	d	e
22. Uygulama yaparak öğrenirim.	a	b	c	d	e
23. Her çeşit materiyali okumaktan zevk alırım.	a	b	c	d	e
24. Zevk için yazı yazarım.	a	b	c	d	e
25. Tartışma toplantılarına katılmak ve kalabalık karşısında konuşmak hoşuma gider.	a	b	c	d	e
26. Ahlaki inançlarımın tamamen bilincindeyim.	a	b	c	d	e
27. Bir konuyla duygusal bağım varsa onu daha iyi öğrenirim.	a	b	c	d	e
28. Adil olmak benim için önemlidir.	a	b	c	d	e
29. Başkalarına yardım amaçlı yapılan işlerde yer almayı severim.	a	b	c	d	e
30. İnandığım birşeyin gerçekleşmesi için daha fazla gayret ederim.	a	b	c	d	e
31. Grafikler ve tablolar bilgileri yorumlamama yardımcı olur.	a	b	c	d	e
32. Grafik düzenleyiciler kullanmam daha iyi hatırlamama yardımcı olur.	a	b	c	d	e
33. Üç boyutlu bulmacalardan zevk alırım.	a	b	c	d	e
34. Diğer gezegenlerde yaşam varmı diye merak ederim.	a	b	c	d	e
35. Hayatın sadece bir parçası olduğumun farkındayım.	a	b	c	d	e
36. Yaşam/varoluş hakkında tartışma yapmayı seviyorum.	a	b	c	d	e
37. İlham verici yerleri ziyaret etmeyi seviyorum.	.a	b	c	d	e
38. Yıldız ve gezegenleri izlemekten zevk alıyorum.	a	b	c	d	e
39. Dünyanın düzenini tartışmayı severim.	a	b	c	d	e
40. Yaşam hakkında düşünmeyi severim.	a	b	c	d	e

Appendix B: Multiple Intelligence Scale for Fields of Study

Çoklu Zeka ve Meslekler

Değerli Hocam,

Doğu Akdeniz Üniversitesi Eğitim Bilimleri Bölümü'nde Doç. Dr. Hüseyin YARATAN danışmanlığında doktora yapmaktayım. Doktora tez çalışmamın bir parçası olan bu araştırma ile çoklu zeka ve meslekler arasındaki ilişkiyi ortaya çıkarmayı amaçlamaktayız ve araştırmanın bir sonuca ulaşabilmesi için sizlerin değerli görüşlerinize gereksinim duymaktayız.

Görüşleriniz sadece araştırma için kullanılacaktır ve vereceğiniz bilgiler kesinlikle gizli tutulacaktır. Ankete göstereceğiniz ilgi ve vereceğiniz samimi cevaplardan dolayı size teşekkür ederiz.

Çalışma ile ilgili sorularınız varsa bana ve/veya tez danışmanıma ulaşabilirsiniz.

Yardımınız ve işbirliğiniz için şimdiden teşekkür ederiz.

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Uluslararası Kıbrıs Üniversitesi
huseyin.yaratan@ciu.edu.tr

1

Çoklu Zeka ve Meslekler

Bölüm I

Kişisel Bilgiler

1. Anabilim Dalınız

2. Uzmanlık Alanınız

3. Eğitim Vermekte Olduğunuz Bölümünüz ve Fakülteniz

4. Cinsiyetiniz

- ◯ Kadın
- ◯ Erkek

5. Yaşınız

- ◯ 21-30
- ◯ 31-40
- ◯ 41-50
- ◯ 51-60
- ◯ 61 ve üzeri

6. Meslek kıdeminiz (Yıl Olarak)

- ◯ 1-5
- ◯ 6-10
- ◯ 11-15
- ◯ 16-20
- ◯ 21 ve üzeri

7. Uyruğunuz

- TC
- KKTC
- Diğer

8. Ünvanınız

- Dr.
- Yrd. Doç. Dr.
- Doç. Dr.
- Prof. Dr.

Çoklu Zeka ve Meslekler

Bölüm II

Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için aşağıdaki özelliklerin gereklilik derecesi nedir? (Lütfen kendi özellikleriniz değil, öğrencilerinizde bulunması gereken özellikleri düşünerek seçeneklerden yalnızca birini işaretleyiniz).

Çoklu Zeka ve Meslekler

Doğacı Zeka

Bu bölümde Doğacı Zeka ile ilgili maddeler yer almaktadır.

9. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için doğal çevre ile ilgili konuları önemsiyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

10. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için doğal çevreyi korumayı önemsiyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

11. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için hayvan yaşamına önem veriyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

12. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için çöplerin geri dönüşümüne önem veriyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

13. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için biyoloji, botanik ve zooloji çalışmaktan zevk alıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

6

Çoklu Zeka ve Meslekler

Müziksel-Ritmik Zeka

Bu bölümde Müziksel-Ritmik Zeka ile ilgili maddeler yer almaktadır.

14. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için gürültü ve seslerin dikkatini çekiyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

15. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için ritme göre hareket etmeyi kolay buluyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

16. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için müzik yapmaktan hoşlanıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

7

17. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için şiirin ahengine kapılıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

18. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için doğadaki sesleri dinlemeyi rahatlatıcı buluyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

19. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için müzikalleri, tiyatro oyunlarına tercih ediyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

20. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için şarkı sözleri hatırlamakta zorluk çekmiyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

Çoklu Zeka ve Meslekler

Mantıksal-Matematiksel Zeka

Bu bölümde Mantıksal-Matematiksel Zeka ile ilgili maddeler yer almaktadır.

21. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için temiz ve düzenli olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

22. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için adım adım verilen talimatları yardımcı buluyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

23. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için düzenli bir insan olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

9

24. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için kafasında çabuk hesap yapabiliyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

25. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için yapacağı işlerle ilgili her şeyi önem sırasına göre sıralıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

26. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için planlı olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

10

Çoklu Zeka ve Meslekler

Sosyal Zeka

Bu bölümde Sosyal Zeka ile ilgili maddeler yer almaktadır.

27. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için kalabalık ortamları eğlenceli buluyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

28. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için çalışma gruplarını verimli buluyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

29. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için arkadaş çevresinde genellikle liderlik üstleniyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

30. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için arkadaşlarını önemsiyor olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

31. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için kendisini "takım oyuncusu" olarak görüyor olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

32. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için birkaç kulübe veya derneğe üye olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

Çoklu Zeka ve Meslekler

Bedensel-Kinestetik Zeka

Bu bölümde Bedensel-Kinestetik Zeka ile ilgili maddeler yer almaktadır.

33. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için çok iş yapmayı değil hiçbir iş yapmamayı yorucu buluyor olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

34. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için konuşurken mimik ve işaretler kullanıyor olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

35. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için bir şeyin nasıl yapıldığını göstermeyi onu anlatmaya tercih ediyor olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

36. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için uygulamalı aktiviteleri eğlenceli buluyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

37. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için uygulama yaparak öğrenmeyi tercih ediyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

Çoklu Zeka ve Meslekler

Sözel-Dil Zekası

Bu bölümde Sözel-Dil Zekası ile ilgili maddeler yer almaktadır.

38. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için günlük tutuyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

39. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için kelime bulmacalarını eğlenceli buluyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

40. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için zevk için yazıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

15

41. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için bulmaca çözmekten hoşlanıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

16

Çoklu Zeka ve Meslekler

İçsel Zeka

Bu bölümde İçsel Zeka ile ilgili maddeler yer almaktadır.

42. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için ahlaki inançlarının tamamen bilincinde olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

43. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için adil olmayı önemli buluyor olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

44. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için tutumlarının, öğrenmesini etkilemiyor olması

- ◯ Çok gerekli
- ◯ Gerekli
- ◯ Kararsızım
- ◯ Gereksiz
- ◯ Çok gereksiz

17

45. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için bir şeyi yapmadan önce neden yapacağını bilmeye istekli olması

◯ Çok gerekli

◯ Gerekli

◯ Kararsızım

◯ Gereksiz

◯ Çok gereksiz

46. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için başkalarına yardım amaçlı yapılan işlerde yer almayı seviyor olması

◯ Çok gerekli

◯ Gerekli

◯ Kararsızım

◯ Gereksiz

◯ Çok gereksiz

47. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için inandığı birşeyin gerçekleşmesi için daha fazla gayret ediyor olması

◯ Çok gerekli

◯ Gerekli

◯ Kararsızım

◯ Gereksiz

◯ Çok gereksiz

48. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için bir yanlışı düzeltmek için protesto etmekten ya da imza vermekten kaçınmıyor olması

◯ Çok gerekli

◯ Gerekli

◯ Kararsızım

◯ Gereksiz

◯ Çok gereksiz

Çoklu Zeka ve Meslekler

Görsel-Uzaysal Zeka

Bu bölümde Görsel-Uzaysay Zeka ile ilgili maddeler yer almaktadır.

49. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için oda düzenlemekten zevk alıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

50. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için üç boyutlu bulmacalardan zevk alıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

51. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için kliple sunulan şarkıyı daha ilginç buluyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

19

52. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için harita okumakta iyi olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

53. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için eğlence amaçlı medya ortamlarından hoşlanıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

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Çoklu Zeka ve Meslekler

Varoluşsal Zeka

Bu bölümde Varoluşsal Zeka ile ilgili maddeler yer almaktadır.

54. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için 'diğer gezegenlerde yaşam varmı?' diye merak ediyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

55. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için hayatın sadece bir parçası olduğunun farkında olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

56. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için yaşam/varoluş hakkında tartışma yapmayı seviyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

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57. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için sanat eğitiminden zevk alıyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

58. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için dünyanın düzenini tartışmayı seviyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

59. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için başka ülkelerdeki yaşam hakkında düşünmeyi seviyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

60. Sizin alanınızda eğitim görmekte olan öğrencilerinizin bölümünüzde başarılı olması için felsefi yazılar okumayı seviyor olması

- Çok gerekli
- Gerekli
- Kararsızım
- Gereksiz
- Çok gereksiz

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