

INVESTIGATING STUDENTS' MOTIVATIONAL TRAITS IN SCIENCE

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## **ABSTRACT**

### **INVESTIGATING STUDENTS' MOTIVATIONAL TRAITS IN SCIENCE**

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The aim of this study was to investigate the elementary school students' motivational traits (achiever, curious, conscientious and social) in science. More specifically present study examined the effects of gender, grade level and location of the school on elementary school students' motivational traits. The data in the main study was collected by Motivational Pattern Questionnaire from randomly selected 8 classes of randomly selected 15 schools in five districts of Ankara. A total of 3685 students (1927 females and 1748 males), about 230 students per school, were participated in the study. The questionnaire was administrated to 6<sup>th</sup> (n=1291), 7<sup>th</sup> (n=1177) and 8<sup>th</sup> (n=1207) graders in spring 2004-2005 semester.

According to the obtained data, scores of the students are assigned to four percentile groups. Each student assigned to the motivational pattern according to the highest percentage. To find the effects of gender, grade level, and location of the school on students motivational traits, one- way MANOVA was used.

Results of the statistical analysis revealed that gender, has a significant effect on students' motivational traits and girls are more achiever, curious, conscientious and sociable than boys. Furthermore, grade level has a significant effect on students' motivational traits and 6<sup>th</sup> graders are more achiever, curious, conscientious and sociable than 7<sup>th</sup> and 8<sup>th</sup> graders. It is also found that scores of the students related to the motivational traits decreases as the grade level increases. This means that 8<sup>th</sup> graders have lowest mean score while 6<sup>th</sup> graders have the highest mean score relate to motivational trait. While students from urban schools are more curious and more sociable than the students from rural schools, no significant difference between the mean scores of the students from urban schools and the students from rural schools with respect to achiever students and conscientious students dimensions was demonstrated.

Keywords: motivational patterns, gender, grade level, school location, science.

## ÖZ

### ÖĞRENCİLERİN FEN DERSLERİNDEKİ GÜDÜSEL ÖZELLİKLERİNİN ARAŞTIRILMASI

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Bu çalışmanın amacı, ilköğretim öğrencilerinin fen derslerindeki güdusel özelliklerini araştırmaktır. Çalışma ayrıca cinsiyetin, sınıf düzeylerinin ve okulların bulunduğu bölgenin öğrencilerin dört güdusel özelliğine, başarılı, meraklı, vicdanlı ve sosyal öğrenci olan etkisini araştırmaktadır.

Veriler güdusel özellikler anketinin Ankara'nın 5 ilçesinden rasgele seçilen 15 okulun rasgele seçilmiş 8 sınıfına uygulanması ile elde edilmiştir. Çalışmaya her okuldan yaklaşık 230 olmak üzere toplam 3685 öğrenci (1927 kız, 1748 erkek) katılmıştır. Anket 2004-2005 öğretim yılı bahar döneminde 6. (n=1291), 7. (n=1177) ve 8. (n=1207) sınıflara uygulanmıştır.

Elde edilen verilere göre öğrencilerin sonuçları dörtlü yüzdeler gruplara ayrılmıştır. Her öğrenci en yüksek yüzdesine göre güdusel özellik grubuna atanmıştır. Sınıf düzeyi, cinsiyet ve okulun bulunduğu çevrenin öğrencilerin güdusel

özellikleri üzerine olan etkisini arařtırmak için tek yönlü çoklu varyans analizi metodu kullanılmıřtır.

Arařtırma sonuçları öđrencilerin cinsiyetinin güdüsel özellikleri üzerinde anlamlı etkisi olduđunu ve kızların erkeklere göre daha başarı odaklı, meraklı, vicdanlı ve sosyal olduđunu göstermiřtir. Ayrıca sınıf düzeyinde öđrencilerin güdüsel özellikleri üzerinde etkili olduđu ve 6. sınıf öđrencilerinin 7. sınıf öđrencilerine ve 7. sınıf öđrencilerinin 8. sınıf öđrencilerine göre daha başarı odaklı, meraklı, vicdanlı ve sosyal olduđu bulunmuřtur. Aynı zamanda öđrencilerin güdüsel özelliklerinin sınıf seviyesi arttıkça azaldığı gözlenmiřtir. Bu sonuç 8. sınıf öđrencilerinin güdüsel özellikler açısından en küçük ortalamaya sahip olurken 6. sınıf öđrencilerin ortalamalarının en fazla olduđunu göstermektedir. Çalışmada okulları kentsel bölgelerde bulunan öđrencilerin güdüsel özelliklerinin meraklı öđrenciler ve sosyal öđrenciler boyutlarında kırsal bölgelerdeki okulların öđrencilerine göre daha fazla olduđu saptanırken, başarı odaklı öđrenciler ve vicdanlı öđrenciler boyutlarında anlamlı bir fark bulunmamıřtır.

Anahtar Kelimeler: güdüsel özellikler, cinsiyet, sınıf düzeyi, okulun bulunduđu çevre, fen.

To my family

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## LIST OF SYMBOLS

### SYMBOLS

MPQ	: Motivational Pattern Questionnaire
T-MPQ	: Turkish version of the Motivational Pattern Questionnaire
DV	: Dependent Variable
IV	: Independent Variable
MANOVA	: Multivariate Analysis of Variance
DF	: Degree of Freedom
N	: Sample Size

## **CHAPTER I**

### **INTRODUCTION**

Science education has a major role for preparing new generation for scientific and technological era. In order to make young people ready for scientific revolutions and real scientist of new generation, science teachers should be aware of the students' needs and expectations. To respond those needs and expectations, teachers should notice the factors that motivate their students and instructors should realize that students' learning and memory closely related to motivation. Students learn what they want to learn and have great difficulty in learning material that does not interest them. Motivated students learn better and apply their scientific knowledge in every aspect of their life. Clearly, student motivation is crucial for learning.

Motivation can be defined as a complex psychological construct that attempts to explain behavior and the effort applied in different activities (Gins & Watters, 2000) and as internal states that arouses, directs and maintains behavior (Levy, 2002). While dealing with motivation, researchers come up with an important question "Whether motivation is an inborn characteristic, or a temporary state of mind." Some people believe that motivation is a trait, or an inborn characteristic, while others consider it as a temporary state of mind. Actually it is combination of both (Hill, 1999).

Intrinsic and extrinsic motivations are two important components of

students' motivation. Motivation that comes from internal factors like needs, curiosity, and enjoyment is called as intrinsic motivation and that comes from external factors like rewards, social pressure and punishment are called as extrinsic motivation (Levy, 2002; Hill, 1999). These factors are the answers of the question why people become motivated. People focused on this question and recommended several reasons for motivation, based on four approaches: behavioral, humanistic, cognitive and socio-cultural approaches. According to Levy (2002) behavioral approach focuses on the external factors like rewards and praises. These external factors determine the way how people behave. Humanists interpret the motivation according to the Abraham Maslow's Hierarchy of Needs. The needs of people determine what motivates them. In cognitive approach, the intrinsic motivational patterns are considered. The external factors are not responded but the interpretations of people about those external factors are considered. The socio-cultural view of motivation emphasizes on groups, which people belong to. People direct their behaviors to maintain their group or social identity. In classroom environment, which engage in cooperative learning the students are motivated according to the expectations of their groups.

If we specify the motivation as students' motivation, we come across four tightly entangled theories in contemporary education psychology. These theories are: self-efficacy theory, attribution theory, self-worth theory, and achievement goal theory. Self-efficacy is a construct refers to a person's beliefs about his/her capability to do a task at a specified level of performance or a person's confidence (Seifert, 2004). According to the Bandura's study (1977), children who believe that they can do the requirements to reach their aim or who are confident with their abilities perform better than others. If the students are not confident with their capabilities avoid performing tasks which are seem to be challenging. Students who see themselves as capable are more likely to do adaptive and mastery behaviors.

An attribution, on the other hand, refers to the perceived causes of an outcome; it is a person's explanation why a particular event turned out as it did. Weiner (1990) defines the attribution in terms of three characteristics: locus of

causality (e.g. effort), stability (e.g. illness) and controllability (e.g. amount of study). How the students perceive causes in terms of these characteristics results in emotions and these emotions have behavioral outcomes. (Seifert, 2004). If a student attributes his or her failure to a stable characteristic then the expectation of that student about future may be hopelessness. On the other hand, if a student attributes his or her failure to an unstable characteristic then the expectation of that student about future may be hopefulness.

Self-worth, however, refers to one's thoughts about their places in the society. A person who has self-worth knows that he or she is loved and respected by others in the society and is valued as a person in the society (Seifert, 2004). Being respected in the society makes the individuals confident with themselves and motivates to do complex works (Wentzel 1993, as cited in Wentzel & Wigfield (1998)).

Besides, achievement goal theory can be explained as students' academic motivation to achieve goals. The logic of goal theory is that students' behaviors are a function of desires to achieve particular goals (Seifert, 2004). If an individual is successful in a particular event or failed in that event this condition is only the result of that individual's effort. Wentzel and Wigfield (1998) found that students with mastery goal orientations are more likely to have positive motivation in school.

According to expectancy-value theory, there are three components characterize students' motivational beliefs (Pintrich & De Groot, 1990). First one of these factors is the expectancy component of motivation, which includes students' beliefs about their ability to perform a task. Second factor is the value component of motivation. This component includes students' goals and beliefs about the importance and the interest of the task. The last factor is the affective component of motivation. This component includes the emotional reactions of the students. This theory is one of the long standing perspectives on motivation. In this theory, individuals' choice, persistence, and the performance can be explained by their beliefs about how well they will do on the activity and the extend to which they

value the activity (Wighfield & Eccles, 2000). Researchers in this perspective attempt to identify key goals influencing students' achievement desires and investigate how these goals can be manipulated and coordinated to develop academic achievement (DeBacker & Nelson, 2000).

As a result of being a broad subject motivation is reduced to simple components in research. Concepts like self esteem, competence beliefs, self efficacy, task values, intrinsic motivation, and extrinsic motivation considered are as motivational variables. For decades the effects of these variables on achievement and the factors that affect these motivational variables are studied. Most of those studies also examined the effects of gender, age, grade level, and other factors like family, school type, and socio economic status on motivational variables.

The motivational patterns, underlying the view of this study were presented by Adar (1969) as achiever students, curious students, conscientious students and social students. Adar identified this terms as achiever students are the ones who need to achieve; curious students are the ones who need to satisfy their curiosity; conscientious students are the students who need to discharge a duty and the social students are the ones who need to affiliate with other people.

The main problem of this study is to investigate the motivational traits of the students in science. This study also examines the effects of gender; grade level and location of the school on these four motivational patterns.

### **1.1. Problems and Hypothesis of the Study:**

#### *Main Problem of the Study:*

What are the main characteristics of the Turkish elementary students' motivational traits in science?

*Sub Problems of the Study:*

Is there a significant difference between boys and girls with respect to the motivational patterns?

Is there a significant difference across grade levels with respect to the motivational patterns?

Is there a significant difference between students in rural and urban areas with respect to the motivational patterns?

*Hypothesis of the Study:*

The problems stated above were tested with the following hypotheses which are stated in null form.

Null Hypothesis 1: There is no statistically significant mean difference between the boys and girls with respect to motivational patterns

Null Hypothesis 2: There is no statistically significant mean difference across grade levels with respect to motivational patterns.

Null Hypothesis 3: There is no statistically significant mean difference between students attending schools in rural and urban area with respect to motivational patterns.

**1.2. Significance of the Study**

The research in the field of science education mainly focused on effectiveness of teaching methods and the cognitive variables on students achievement. Although affective construct are very important for science teaching and learning, less attention has been given affective constructs especially the motivational patterns and their influences on students' performance. This study was conducted to fill this gap in literature.

This study will be a guide for curriculum developers and the teachers who want their students to be successful in their courses. If education system is planned to be student centered then the beliefs and the motivation of the students and the factors that effect their motivation should be considered. Teaching strategies developed according to the students' motivational patterns will provide long time retention of knowledge. A match between the learner characteristics and teaching method will increase the efficiency of both teaching and learning processes. If this matching is not provided then some learning difficulties will arouse among the students. Motivation is one of the major factors that affect the learning process. The teaching procedures should be parallel to the students' aims, goals and the other factors that affect their learning. As the needs of the students changes the curricula about the education also changes. To make the education more effective not only the teachers, but also the curriculum developers should be aware of students' educational goals and their motivational trait.

## **CHAPTER II**

### **LITERATURE REVIEW**

Science education has a major role in the development of critical and informed citizens in the rapidly changing scientific and technological society. To make the new generations aware about scientific developments teachers should be careful while they are teaching science, and consider which factors influence students' learning and which factors causes learning differences. There are several dimensions about the factors affecting the students learning. One of the factors that affect the students' achievement is motivation of the students. In this part, literature related to history of the motivational research under the headings students' motivation, effect of gender on motivation, age and grade level, social factors affecting motivation, and the significance of the study are presented.

#### **2.1. Motivation Research in Education**

Most of the research in the field of motivation have investigated the achievement motivation context and the relationship with other variables like gender, age, social structures of the environment that students come from, and motivation related with some teaching method. In following parts we examine the research under the headings students' motivation, effect of gender, and age, and social variables on motivation.

### *2.1.1. Students Motivation*

Students' motivation was defined by Lumsden (1994, para 3), as "naturally has to do with students' desire to participate in the learning process. But it also concerns the reasons or goals that underlie their involvement or noninvolvement in academic activities." Most of the studies in this area concentrated on motivational characteristics of the students, and relationships between those characteristic, and achievement motivation. Achievement motivation was explained as students' motivation towards performance goals like getting a high score and learning goals improving oneself (Ames & Archers, 1988). Several researchers investigated the relationship between motivation and students' achievement and reported positive correlations between students' achievement and motivation (Uguroglu & Walberg, 1979; Kremer & Walberg, 1981; Napier & Riley, 1985; Brown & Walber, 1993; Pintrich & De Groot, 1990). For example, Uguroglu and Walberg (1979) reviewed 40 studies in psychological and educational literature related to the motivation and learning process. They found there exist a positive correlation between general self concept, mathematics self concept, locus of control, and achievement motivation. Furthermore twenty-seven characteristics were recorded from the studies and the correlations between them calculated in the range 0.7 – 7.1. The average of the correlation coefficients between those characteristics was calculated as .35. They also found that motivational measures account for 11.4 % of the variance in achievement.

Another study held by Kremer and Walberg (1981) who they reviewed about 20 studies related to motivation. They concentrated on three different constructs namely, students motivation, home environment and peer environment. These studies were the ones concerning science learning in grades 6-12, including some measures of students learning in science, and concerning the three constructs as a predictor of the science learning. They concluded that most of studies related to science achievement and students motivation showed a positive correlation between the motivation variables (e.g. self concept, persistence, need achievement and text anxiety) and learning.

Some of the researchers examined the effects of motivation not only on academic concerns but also on social concerns. For example, Wentzell and Wighfield (1998) reviewed the studies related to both social and academic concerns and motivation. They stated that students' overall motivation clearly reflects both social and academic concerns. Then the students' motivation would be more understandable if how both aspects of motivation related to one another and to various aspects of academic performance. They concluded that the students' motivation is crucial for school success and the students who focus on academic activities and display socially appropriate behavior are more likely to succeed in school. They also mentioned that students who believed they control their achievement outcomes (who had greater internal locus of control) tended to do better in school, and they persisted when coming across difficulties.

Apart from review studies, Napier and Riley (1985) conducted a study to investigate affective determinants of science achievement. They used the data collected in the one booklet of 1976-1977 National Assessment of Educational Progress (NAEP) survey of seventeen years old. About 3135 students responded to the items. They calculated correlation coefficient between achievement, usefulness of the class, teacher support, students' choices, lack of anxiety, students' motivation, teacher enthusiasm, science enjoyment and self concept. It was found that achievement in science and motivation had the highest correlation among various determinants and students' motivation accounted for 7% of the variance in cognitive achievement.

In a separate correlational study, Pintrich and De Groot (1990), examined the relationship between motivational orientations, self regulated learning and classroom academic performance. The sample of the study was consist of 173 (100 girls and 73 boys) seventh grade students from eight science and seven English classes. The students responded the Motivational Strategies for Learning Questionnaire (MSLQ). Also students' grades were collected before and after the administration of the questionnaire. Positive correlations between motivational beliefs and using cognitive and self regulated learning strategies that result in deeper

processing and a better understanding of the material is found (self efficacy-cognitive learning strategies ( $r=.33$ ); intrinsic value-cognitive learning strategies ( $r=.63$ ); self efficacy-self regulation ( $r=.44$ ); intrinsic value- self regulation ( $r=.73$ )). Also, they reported that the students, who were more productive in classroom works, had greater self efficacy scores.

Anderman and Young (1994) investigated individual and classroom level differences in motivation and used strategies through sixth and seventh grades from two middle schools near a Midwestern city. The sample of the study consisted of 678 students (51% sixth grade, and 49% seventh grade; 51% male, and 49% female) and 24 teachers (13 male and 11 female). They used Comprehensive Test of Basic Skills, and three versions of (science specific, general learning, and teachers' version) Patterns of Adaptive Learning Survey (PALS) for data collection. PALS assessed the groups of the students according to the 14 motivational characteristics (self efficacy, learning focus, ability focus, modifiable intelligence, school learning focus, school ability focus, science learning focus, science ability focus, science deep strategies, science surface strategies, science self efficacy, science expectancy, science value and science self concept) and the beliefs of the teachers about teaching, learning and their instructional practices. They grouped the students as special education students, students with academic difficulties and science achiever students. For general learning scale they found that students with academic difficulties has lower self efficacy scores, and they perceive the school as being less learning focused. Special education student were less self efficacious than both other groups. For science scale science achiever students had higher grades, strong beliefs about their ability in science, deep processing strategies, self efficacy, more science value than both students with academic difficulties and special education students.

Another study held by Paulsen and Feldman (1999) was conducted to see the effect of epistemological beliefs of the university students on their motivational beliefs as well as the effect of motivational beliefs on achievement. Students ( $n=246$ ) from an urban public university filled two questionnaires, namely Epistemological Beliefs Questionnaire (EBQ) and Motivational Strategies for

Learning Questionnaire. The researchers examined the correlation between motivational constructs (intrinsic goal orientation, extrinsic goal orientation, task value, control of learning, self efficacy, and test anxiety) and dimensions of epistemological beliefs (simple knowledge, certain knowledge, quick learning, and fixed ability). It was found there existed a significant negative correlation between intrinsic goal orientation and simple knowledge ( $r=-.39$ ), intrinsic goal orientation and fixed ability ( $r=-.28$ ), task value and fixed ability ( $r=-.34$ ), control of learning and simple knowledge ( $r=-.24$ ), control of learning and fixed ability ( $r=-.33$ ), self efficacy and simple knowledge ( $r=-.30$ ), self efficacy and fixed ability ( $r=-.31$ ), and a significant positive correlation between extrinsic goal orientation and simple knowledge ( $r=.28$ ), and test anxiety and simple knowledge ( $r=.26$ ). They concluded that motivational beliefs of the college students had direct effect on their academic performance. Also the epistemological beliefs of the students affected the motivational beliefs of the students. They suggested that teachers should change the students' naive beliefs (knowledge in simple, absolute, certain and learning takes place quickly) with more sophisticated beliefs (knowledge is complex, tentative, evolving and learning takes place gradually over time) to enhance the students' motivation.

In a different study, Rouse and Austin (2002) examined ethnic minority populations and investigated the motivational differences within those groups. They concentrated on the relationship of GPA and gender to motivation, all of which are within ethnic group comparisons. One study was conducted with African-Americans, the second with Hispanic-Americans, and the third with Euro-Americans. Data collection instruments of the study were the Assessment of Academic Self-Concept and Motivation and Assessment of Personal Agency Beliefs. The participants of the study varied with respect to three characteristics namely; gender, ethnic group, and academic achievement level. There were 145 African-American subjects (88 female and 57 male; 78 in the low-achievement group and 67 in the high-achievement group); 78 Hispanic subjects (46 female and 32 male; 50 in the low-achievement group and 28 in the high-achievement Group);

145 European-American subjects (69 female and 76 male; 47 in the low-achievement group and 98 in the high achievement Group). The participants, with a wide range of socioeconomic levels, were sophomores in urban high school that offers a number of extracurricular activities. The high-GPA students had more cognitive motivation and more motivation for other and sport extracurricular activities than the low-GPA students in all ethnic groups. High-GPA students had more motivation in terms of their self-concept. If the result of the groups are considered, in the African-American sample the results were significant in all four areas of self-concept (beliefs about ability, beliefs about environmental support, beliefs about control, and beliefs about value/importance) in the Hispanic and Euro-American samples, statistical significance was only evidenced in three areas: beliefs about ability, beliefs about control, and beliefs about value/importance.

Recently, Özkan (2003) investigated the relationship between the biology achievement of the 10<sup>th</sup> grade Turkish students (N=980) and the three motivational belief components (self efficacy beliefs, intrinsic value beliefs and test anxiety beliefs). According to the results of the study there existed a low positive correlation between students self efficacy beliefs and biology achievement test scores ( $r=.18$ ), students intrinsic values and their test scores on biology achievement test are positively correlated ( $r=.14$ ) and finally there existed a low positive correlation between students test anxiety beliefs and their biology achievement test scores.

More recently, Lepper, Corpus and Iyengar (2005) focused on the relationship between achievement and intrinsic and extrinsic motivation. They investigated intrinsic and extrinsic motivational orientation of 797 third grade to eighth grade students from two districts in San Francisco using a modified version of the Harters' scale of intrinsic versus extrinsic orientation. According to the results of the study there was a strong negative correlation between intrinsic motivation and preference for easy work ( $r=-.47$ ,  $p<.01$ ), no significant correlation between intrinsic motivation and desire to please the teacher ( $r=-.06$ , ns) and a statistically significant but quiet modest correlation between intrinsic motivation and dependence on the teacher ( $r=.08$ ,  $p<.05$ ) They concluded that there existed a positive relationship

between the intrinsic motivation and performance in class and on standardized tests while extrinsic motivation negatively correlated with academic outcomes. Also the researchers looked at the correlation between intrinsic and extrinsic motivation and students grades (GPA). They found that the correlation between intrinsic motivation and GPA was positive at all six grade levels, and the correlation between extrinsic motivation and GPA was negative at five of the six grade levels, with third grade being exception.

The interdependence between motivation and academic achievement was also highlighted by Hancock (2002). He investigated the effects of instruction strategies used by professors and students' conceptual levels on the motivation to learn. Eighty three postsecondary students participated in the study and they were randomly assigned to either direct or nondirect instruction groups. The participants of the study completed the Paragraph Completion Method (PCM) test for assessing conceptual level (CL). Then they participated in 12 lessons, each 2 hours and 50 minutes, over 12 weeks. The lessons for direct and nondirect instruction were designed according to Cicchelli's Instruction Pattern observation Instrument and administered by professors. After lessons a version of Vroom's expectancy theory model was used to measure students' motivation to learn academic course content.

Using this model, the strength of each student's motivation toward learning depended on the strength of that student's expectation that learning was accomplishable and that learning would result in a valued outcome (p.64). The results of the study showed that highly structured teaching methods maximized the motivation of students with low conceptual levels while teaching methods that were low in structure enhanced the motivation of high-conceptual level students (Hancock, 2002).

In an experimental study Brown and Walberg (1993) investigated whether motivation affects the science scores of the students. They held the study with a group of 406 students sample in grades 3, 4, 6, 7, and 8 in randomly 11 schools in USA. They used form 7 of the mathematics concept subtest of the Iowa basic skills

(ITBS) 1978 edition as the instrument of the study. During the study the students randomly assigned as experimental group and control group. Each group of the students were given the test, however the students in experimental group were motivated by telling the scores of the test is extremely important for their and their teachers' success, and their results will be compared with results of other classes and other schools. No information was given to the students in control group. The results of the study showed that test scores of the students in experimental group were higher than the scores of the control group. The researchers concluded that motivation could make a considerable difference in test scores of students.

In another study held by Donald (1999), a relation between motivation and higher order learning was investigated. The measures of students' motivation, both intrinsic motivation and strategies for learning were associated with higher order learning of the students (Donald, 1999). The Study Process Questionnaire developed by Biggs, (1988) and Motivational Strategies for Learning Questionnaire developed by Pintrich, (1987) were used for data collection. In the study, 39 students filled the questionnaires for two times, at the beginning of the and at the end of the semester. Contrary to other studies, it was mentioned that the context and the students' preparation had a greater effect on achievement than did motivation. That is students within the discipline felt that preparation for the course was the best predictor of the success.

To sum up, student motivation is one of the common topics in literature related to the field of motivation. Most of the studies found a positive correlation between the motivation and achievement of the students, which means motivated students do better in their academic work.

### *2.1.2. Gender and Motivation*

Gender has been one of the common variables across the studies related to the motivation. The researchers in this perspective divided into two. Some says that gender do not affect motivation of the students while a number of motivational

studies support the idea of gender differences in academic motivation. Within these research related to gender difference some of the research found that female are more motivated than the male students in social subjects like language and verbal activities (Wighfield & Eccelles, 1992; Lightbody et al 1996; Dai & David, 2001; Skaalvik & Skaalvik, 2004; Mori & Gobel, 2006), while males are more motivated than the females in science and mathematics (Kempa & Diaz, 1990; Lightbody et al 1996; Githua & Mwangi, 2003; Skaalvik & Skaalvik, 2004).

While some studies reported gender effect, some studies showed that there is no gender effect on motivation. Miecee and Jones (1996) conducted a study to explore “gender differences in science achievement are due to differences in rote and meaningful learning modes” hypothesis. The sample of the study was consisted of 108 girls and 105 boys (a total of 213 students) from fifth and sixth grades. The study examined gender differences in three different topics, namely confidence, motivational orientation, and use of meaningful and rote learning strategies in science. The Task Mastery Scale (for assessing motivational goals) and The Active Learning Strategy Scale (for strategy use measures), also they use three items to measure the students’ confidence ratings used for data collection. They reported that if both the science achievements and the gender of the students were considered only low ability girls had less motivation than low ability boys and this difference was due to the stereotypical beliefs about science achievement. On the other hand, no gender difference existed in mastery orientation among average and high ability students. Moreover, girls reported greater use of meaningful strategies than boys (Miecee & Jones, 1996).

Another study related to the stereotypical beliefs about gender and motivation is done by DeBacker and Nelson (2000). They investigated that gender affects the science achievement due to some stereotypical beliefs, set of fixed ideas generally held about a particular thing, wrongly believed to be shared by all other people, related to gender. They reviewed some research and about these stereotypical beliefs and found that these beliefs related to science especially the belief “science is a male dominated concept” persists among students and affects

girls' motivation.

Contrary to former studies, Anderman and Young (1994) reported a few gender differences in science. In their study they found that girls got higher grades than boys and boys were more efficacious than the girls.

However, some studies (Kempa & Diaz, 1990; Trumper, 1995; Dai, 2001; Özkan, 2003; Rozendaal, Minnaert, & Boekaerts, 2003) investigated that gender effects students motivational patterns. For example, Kempa and Diaz (1990a) held a study with 390 second year secondary school students, from five schools the Bajadoz and Madrid regions in Spain. They used and validated Motivational patterns questionnaire (MPQ) and investigated the effect of gender on four motivational traits namely, achievers, curious students, conscientious students and sociable students. They found that for two of the motivational traits major differences existed between males and females. The boys ( $M=2.94$ ) were more achievement oriented than the girls ( $M=2.57$ ;  $p= .001$ ) and girls ( $M=3.81$ ) were more conscientious than boys ( $M=3.65$ ;  $p=.001$ ). Also they found that the girls were more interested in the motivational traits than boys. Similar to this study, Trumper (1995) conducted a study about the motivational traits of students in Israel ( $N=944$ ) using Motivational Pattern Questionnaire (MPQ). According to the results of his study more girls than boys might be categorized as conscientious and girls and boys might be categorized almost equally as sociable.

A study held in a large London comprehensive school reported in two different papers by Lightbody et al (1996) and Siann and Lightbody (1996). A total of 1068 (985 Asian, 83 non-Asian) secondary school students participated in the study and filled a questionnaire about enjoyment of school, enjoyment of subjects and what they attributed academic success to. In the former paper data from all the students were analyzed. The results of this study showed that girls showed greater enjoyment, liking friends, teachers, outings, and lessons more than boys, while boys reported liking sports and school clubs more. Enjoyment of school subjects reflected traditional sex stereotyping: girls are more interested in English, French, German,

history, drama, music and home economics while boys are more interested in science, craft and design technology, physical education and information technology. Contrary to these results there was no gender difference in attributed academic success. In the latter paper the data from Asian students were analyzed. Additionally to the former results it was also reported as girls reported that there was not enough choice of subjects in school; and Asian students rated parents and friends as more important in contributing to academic success.

Another study related to gender was conducted by Dai (2001) in China. He conducted two separate studies related to gender differences in academic self-concept, self-esteem, and academic motivation among high-ability Chinese adolescents. Three different measures; self-concept and self-esteem, academic motivation and math and Chinese achievement, were used in the study. For self-concept and self-esteem measure Self-Description Questionnaire (SDQ) developed by Marsh in 1990, for academic motivation measure an adapted version of Measure of Academic Motivation developed by Vallerand and his colleagues in 1993, and lastly for measures of achievement in math and Chinese scores of Chinese exam and math exam were used. In study 1, he examined gender differences between schools in a key school as compared to a regular school. Participants of the study were 208 Chinese 10th-grade high school students (96 boys and 112 girls), from two schools (key school: 90 and regular school: 118). The questionnaire was administered near the end of the students' first year of high school. According to the results of the study boys at the regular school had higher math self-concept than girls (3.84 for boys and 2.78 for girls, effect size= 1.09), and girls had higher verbal self-concept than boys. On the other hand, for the key school, girls and boys had comparable math self-concept (3.63 for boys and 3.59 for girls, ES = .04), and girls had higher general academic self-concept than boys. In Study 2, he investigated the gender differences between classes with a group of 148 10th-grade students from a regular school. According to the results of the study there was statistically significant gender difference on verbal self-concept favoring girls ( $F [1,140] = 6.06, p < .02$ ) and (3.68 for girls and 3.26 for boys, ES = .43) and on math self-concept favoring boys ( $F$

[1,140] = 14.48,  $p < .001$ ) and (3.77 for boys and 3.11 for girls,  $ES = .74$ ). There were no statistically significant main or interaction effects of gender on general academic self-concept, self-esteem, and motivation.

Gender differences in the relations between motivational aspects (i.e., interest, persistence, test anxiety, and performance anxiety) and information processes in secondary vocational education schools in the Netherlands was investigated by Rozendaal, Minnaert, and Boekaerts (2003). The education system of this kind of school in Netherlands is based on social constructivism and called the Interactive Learning Group System (ILS). In this system the students worked in groups and do experiments collaboratively. 310 students (175 males and 135 females) from 21 classes from different domains were participated in the study. They answered two questionnaires. The first questionnaire was 'SELECTOR UL'98', which measures surface-level processing, deep-level processing, test anxiety, and interest, was developed by Boekaerts, Minnaert, and Witteman, in 2001. The second questionnaire was Motivational Aspects of Learning in Groups (MALIG), developed by Boekaerts in 1996, and it measured performance anxiety and persistence. According to the results of the study Females showed surface-level processing more than boys (67.57% females vs. 32.43% males), while more males placed in deep-level processing subgroup (65.79% males vs. 34.21% females). Also a significant relationship between males and females was found with respect to all motivational and cognitive variables except persistence. They also reported more females had test and performance anxiety, and more interest than males.

In a recent study held in Turkey by Özkan (2003), the relation between the motivational beliefs (self efficacy beliefs, intrinsic value beliefs and test anxiety beliefs) and biology achievement test scores of 10<sup>th</sup> grade students (N=980) were investigated. To obtain data Motivated Strategies for Learning Questionnaire on Biology achievement test were used. The results of the study showed that self-efficacy mean scores of male students (M=24.39) were slightly higher than those of female (M=23.31). However scores related to intrinsic value component (M=44.06 for females and M=40.31 for males) and test anxiety component (M=13.01 for

females and  $M=12.93$  for males) of motivation was reverse of the self-efficacy scores.

Besides science, mathematics self concept and gender relationship also investigated in some research. Githua and Mwangi (2003) investigated the gender differences in mathematics self concept and motivation to learn mathematics in four dimensions of motivation namely, interest in learning mathematics, satisfaction, relevance, perceived probability of success among secondary school students in Kenya. They use Mathematics Self Concept (MSC) and Students' Motivation-to-learn-mathematics (SMOT) scales for collecting data from a sample of 649 students (320 boys, 329 girls). The results of the study showed that there existed a statistically significant gender difference, favoring boys in students mean motivation to learn mathematics two dimensions: perceived probability of success and satisfaction in learning mathematics. They also found that students in single-sex schools were more motivated to learn mathematics than students in co-educational schools, showing that girls in mixed secondary schools had disadvantages.

Another study related to the mathematics self concept and gender was held by Skaalvik and Skaalvik, (2004). They concentrated on the gender differences in mathematics self-concept, performance expectations, intrinsic motivation, and goal orientation of Norwegian students. 907 students (6th grade: 277, 9th grade: 239, 11th grade: 264, first year of senior high school: 127) participated in the study. The modified version of the Self Description Questionnaire developed by Marsh in 1990 was used for data collection. The researchers found that although the math grades of the female students were greater than the grades of male students, male students had significantly higher scores related to self-concept (in all grades), higher performance expectations and intrinsic motivation (interest) for mathematics (in 11th grade and at the first year of senior high school) than the female students with an effect size .50.

In a different study it was found that girls showed lower levels of extrinsic motivation, took more responsibility for their failures and use information processing strategies extensively and getting better mark in language arts. However

no gender difference were found in academic self concept, in intrinsic motivation in success related attributions and performance attained in mathematics (Rusillo & Arias, 2004).

Martin (2004) investigated the gender effect on self-belief, learning focus, value of schooling, persistence, planning and study management (the boosters) and anxiety, low control, failure avoidance and self-sabotage (the gluzzers) by using The Students Motivation Scale. The study was held in Australia and 2927 students (57% male and 43% female) participated. It was found that there were differences between motivation of girls and boys. There existed a statistically significant multivariate effect  $F(10, 2788) = 26.14, p < 0.001$  showed that girls' learning focus, planning, study management, persistence and anxiety were statistically higher than boys. However boys' self-sabotage and self-handicapping are statistically significant than girls. It was concluded that although girls had higher levels of motivation than boys on a number of dimensions, the two groups' fundamental motivation orientations did not appear to be markedly qualitatively different (Martin, 2004).

If we specify Rouse and Austin's (2002) study to the gender differences among ethnic groups the results of the study revealed that in African-American sample, high-ability females had the most adaptive motivational pattern in beliefs about ability, beliefs about control, and beliefs about value/importance, than the males and the low ability females. The low-ability African-American females had the least adaptive motivational characteristics. In the European-American sample, males were more motivated by homework, understanding class material, and obtaining information to help them in the future than females in the cognitive and personal information domains. Furthermore author suggested that "European-American females were the least motivated by these areas of any group. A closer examination of the means showed that, in the ethnic minority population, females were more motivated in these areas than the males" (p.312).

To summarize most of the studies about gender and motivation found that gender had a significant effect on motivation. Although some studies grounded the

argument about this effect on difference between males and females, some others linked these results to the stereotypical thoughts about girls and science.

### *2.1.3. Grade Level and Motivation*

Age or grade levels of the students also considered as a variable effecting the motivation (Wighfield & Eccles, 1994; Trumper, 1995; Lepper, Corpus & Iyengar, 2005; Yeung & McInerney, 2005; Otis, Grouzet & Pelletier, 2005). The studies in this part can be examined in two perspectives, because some of the researchers investigate the grade level effect during a school period, while others investigate the effect of transition period (from elementary to high, or from juniors to seniors high school) on motivational characteristics.

To begin with the effect of the grade, Uguroglu and Walberg (1979) reviewed 40 sample studies related to the general and academic motivation factors or mathematics self concept, locus of control and achievement motivation. They found that grade level was the only significant students' characteristics affecting achievement motivation, and correlation coefficient increased as the grade level increased. The closer linkage between motivation and achievement among older students may be attributable to their wider and longer experiences in comparing their ability and performance to age peers (p.384).

In a separate study, Wighfield and Eccles (1994) investigated the difference between the students' competence beliefs, achievement values and general self esteem during elementary school by using a modified version of the questionnaire developed by Eccles et al in 1993 that asses the interest, interest and usefulness values (related to math, music, reading and sports) of the students. The study held in elementary grades was a longitudinal study and the students (approximately N=615) completed the questionnaire once a year for three years (3<sup>rd</sup>, 4<sup>th</sup> and 6<sup>th</sup> grade. The results of the study showed that students self esteem and perceived interest did not change during the period of time although the competence, importance and usefulness beliefs decreased for all the domains (mats, music, reading and sports).

Also it was found that children rated reading and math as useful and important although they were more interested in sports.

Different from the previous studies, Trumper (1995) investigated the motivational traits of girls and boys with respect to grade level by Motivational Patterns Questionnaire. The study held in Israel with a sample of 944 students from grades 8<sup>th</sup> to 11<sup>th</sup> (average age: 15). He demonstrated that distribution of boys and girls differed in some traits according to the grade level of the students. In 8<sup>th</sup> grade ( $p=.017$ ) and 9<sup>th</sup> grade ( $p=.026$ ) more boys than girls may be categorized as achievers, and in 8<sup>th</sup> grade ( $p=.037$ ) and 11<sup>th</sup> grade ( $p=.015$ ) more girls than boys may be categorized as conscientious. More boys than girls may be categorized as curious ( $p=.001$ ) in 9<sup>th</sup> grade. However there is no significant difference between boys and girls motivational traits in 10<sup>th</sup> graders. In 11<sup>th</sup> grade, more girls than boys may be categorized as conscientious.

Recently two studies held by Lepper, Corpus and Iyengar (2005) and Yeung and McInerney (2005) also investigated the effect of grade level on motivational characteristics of the students. In the former one it was found that intrinsic motivation decreased across the grade levels third grade ( $M=4.07$ ,  $SD=.67$ ) through eighth grade ( $M=3.42$ ,  $SD=.75$ ),  $F(5, 791)=19.27$ ,  $p<.001$  while extrinsic motivation changed very little  $F(5, 791) = 5.05$ ,  $p<.001$ . Although, there existed a significant effect of grade level on extrinsic motivation it was not in a linear trend. There existed a mean score difference between third and fourth grades and a little change thereafter. The latter study conducted in Hong Kong with a sample size 199 through grades 7<sup>th</sup>, 9<sup>th</sup>, and 11<sup>th</sup>. In the study an adopted version of Inventory of School Motivation was used. According to the results of the study grade 7 students displayed significantly higher scores than students from 9<sup>th</sup> grades and 11<sup>th</sup> grades in the motivation orientation and there was no statistically significant difference between 9<sup>th</sup> grade students and 11<sup>th</sup> grade students. As conclusion, motivation of the students changed as they got older.

If the literature related to the motivational changes during the transition

period between schools investigated, two different results were emerged. Some of the researchers found that the motivational characteristics of the students decrease during transition while some of them said motivational characteristics of the students' increased.

Concerning the studies that claim motivation of the students decrease, Wighfield and Eccles (1994) examined the difference between the students' competence beliefs, achievement values and general self esteem during the transition from junior high school to senior high school. In the study during transition period, the students completed the questionnaire (a modified version of the questionnaire developed by Eccles et al, 1993) that assesses the interest, interest and usefulness values (related to math, music, reading and sports) of the students for four times in the fall and spring of the sixth grade and fall and spring of the seventh grade. They found that children's self esteem decreased significantly across the transition. Also they found that students' competence beliefs become more negative during the transition period.

A recent study was held in Ottawa, Canada by Otis, Grouzet and Pelletier (2005), with a sample of 646 students. They used a French version of the Academic Motivation Scale (AMS) developed by Vallerand and his colleagues in 1989. The students filled the questionnaire when they were in 8<sup>th</sup>, 9<sup>th</sup> and 10<sup>th</sup> grade students. According to the results of the study the researchers revealed that students' intrinsic and all the forms of extrinsic motivation (external regulation, introjected regulation and identified regulation) changed during the transition period from junior to senior high school. There existed a gradual decrease in intrinsic (M=3.72 to M=3.15) and extrinsic (M=4.21 to M=3.98 for external regulation, M=3.52 to M=2.82 for introjected regulation and M=4.42 to M=4.02 for identified regulation) motivation of the students from 8<sup>th</sup> to the 10<sup>th</sup> grade.

A similar result was found by Guerrero (2005). She investigated the students' motivation for academic activities and changes in intrinsic and extrinsic motivation during middle school transition. About 68 students participated in the study. They

answers two 5-likert type scales namely intrinsic motivation scale and extrinsic motivation twice: once in elementary school and once in middle school. The results of the study showed that students' curiosity and interest in mastery and challenge regarding their academic activities decreased in middle school. Also it was found that the extrinsic motivation of the students decreased, in other words they became less dependent on their teacher and had less desire to please their teacher.

Contrary to the results of the previous studies, in Trumper (1997) study, a positive effect of transition on motivational characteristics was found. The study was held in Israel with a sample of 1116 students (320 eighth graders, 322 ninth graders, 224 tenth graders and 249 eleventh graders). According to the results of the study, it was found that the achievement motivations of students toward learning science increased from junior high school to senior high school. Also there was a less significant increase in students' curiosity and conscientiousness as grade level increased.

As a conclusion, most the studies related to the effect of grade level or age on motivation reveal that generally motivational characteristics of the students decreases as grade level increases or they get older.

#### *2.1.4. Cultural Differences and Motivation*

Another factor that affects the motivational patterns is cultural differences (Brown & Walberg, 1993; Trumper, 1997; Wentzell & Wighfield, 1998; Rouse & Austin, 2002; Anderson, Hattie & Hamilton, 2005). Studies related to this part mostly concentrated on effect of school, classroom environment, ethnic root, socio-economic status, and interpersonal relation ships.

Brown and Walberg (1993) examined the motivational characteristics of the students from generally lower middle working classes mostly Hispanic and African-American Chicago. They found a significant effect on school ( $F=3.35$ ,  $p<05$ ) in their study. In other words they found that students motivation differed vary from school to school.

Another study which investigated the effect of the social environment was held by Trumper (1997) in Israel. He investigated the motivational differences among kibbutz, where people earn money from farms and cooperative work was very important, and urban high school students. The results of the study showed that kibbutz students were more sociable than the city students and the city students are better achievers than the Kibbutz students. In this study it was also found that sociability was the primary motivational trait for both boys and girls and through out all the grades in junior and senior high school. City students were more conscientious than kibbutz students and city girls were more conscientious than city boys. Kibbutz girls were lower achievers (for in 8<sup>th</sup> and 9<sup>th</sup> grades) and less curious (for all grades) than boys.

In social motivation Wentzell and Wighfield (1998) reviewed the social motivational processes that affect the academic motivation and academic performance. They concluded that social and academic goals were related and integrated to each other. Instructional characteristics classroom climate, and interpersonal relationship would promote the academic success and school adjustment as they contribute to the development of the social motivational processes and to their expression in classroom.

MacKinnon (1999) examined the most important factors to motivate the students to engage in a problem based classroom. He concluded that the community in which the students interact with was one of the most important factors. Teacher-student, and student-student relationship and the expectations of them motivated the students to learn.

Besides these studies, Anderson, Hattie and Hamilton (2005) focused on the effect of the school type on students' motivational characteristics. They investigated the relationship between generalized locus of control and academic achievement in three different types of school in New Zealand. These schools were examined according to three dimensions; structure, cooperativeness, and competitiveness. School 1 was an urban school and it was considered as neutral and not extreme any

of these dimensions. School 2 was an urban school, and it was judged as low on structure and competition and high on cooperation. School 3 was a smaller school than previous ones and it was judged as high on structure and competition, and low on cooperation. The socio-economic status of the students in school 3 was higher than those in school 1 and school 2. The sample of the study consisted of 215 students, 121 female and 94 male. For data collection the researchers used two different scales. The first scale was an English version of FKK (Fragebogen zu Kompetenz- und Kontrollüberzeugungen; Krampen, 1991), an adapted version of Levenson IPC scale to for locus of control measure. This scale consist of four primary measuring, self concept of own ability, internality, social externality, and fatalistic externality. The other scale was Classroom Environment Scale (CES), used for measures of motivation. Furthermore School Certificate English (a specific norm referenced, examination based measure in New Zealand) resulted from the previous year obtained and use as measure of academic achievement. According to the results of the study there were no statistically significant differences between groups related to locus of control. School 1 and 2 had higher motivational measures and higher levels of task completion than school 3.

The researchers also pointed out the ethnicity of the students, which could be thought as another subject that could be considered as the sociable factors that affected the students' motivation. Rouse and Austin (2002) investigated the motivational differences in ethnic minority populations (European-Americans, Hispanics and African-Americans). The results of the study revealed that in the low- and high-ability Hispanic adolescents were more socially motivated than analogous European-Americans. However, the high-GPA Hispanic students were not as motivated as the high-GPA African-American adolescents, but the low-GPA Hispanic adolescents were more motivated than the low-GPA African-Americans. Furthermore, European-American females had even less motivation in these areas than the African-American females, while Hispanic females had more motivation. It demonstrated that, although there were some similarities, motivation did not look exactly the same in each ethnic group.

To sum up, motivation of the students is effected by not only personal characteristics like gender, age, but also the environmental characteristics like type of the school, location of the school, relationships within the school.

## **CHAPTER III**

### **METHOD**

This chapter includes the information about the design, sample, variables, instruments and the procedure for data collection, data analysis and assumptions and limitations will be explained.

#### **3.1. Population and Sample**

The target population of the study is all the elementary school students in Central Anatolia Region of Turkey. However reaching to a huge population is impossible. As a result, describing an accessible population is more convenient. The accessible population of the study is the 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> graders of elementary schools in Ankara. The data was collected from randomly selected 8 classes of randomly selected 15 schools in districts of Ankara. A total of 3685 students, about 230 students per school, were participated in the study.

To obtain the sample, cluster random sampling and convenience sampling was used. The districts in Ankara were selected by convenience sampling method and the schools, which were thought as clusters in those were selected randomly from each districts. Table 3.1 shows the distribution of students with respect to gender, grade level and location of the school.

Grouping of the school as rural and urban is done according to the basic characteristics of the areas where the schools are located. Schools located in mean

surroundings of Ankara where immigrant families with middle and low income live in, are grouped as rural area schools. On the other hand the schools located in central regions of Ankara where there is a settled population with middle and high income live in, are grouped as urban schools.

Table .3.1. Distribution of students with respect to gender, grade level and location of the school

Location	Grade level	Gender		Total
		Female	Male	
Rural	6	265	265	530
	7	243	212	455
	8	235	248	483
	Total	743	725	1468
Urban	6	412	349	761
	7	384	338	722
	8	388	336	724
	Total	1184	1023	2207
Total		1927	1748	3675

Distributions of students' gender, grade level and location of the school and distribution of students' science grades and age are also presented in figure 3.1

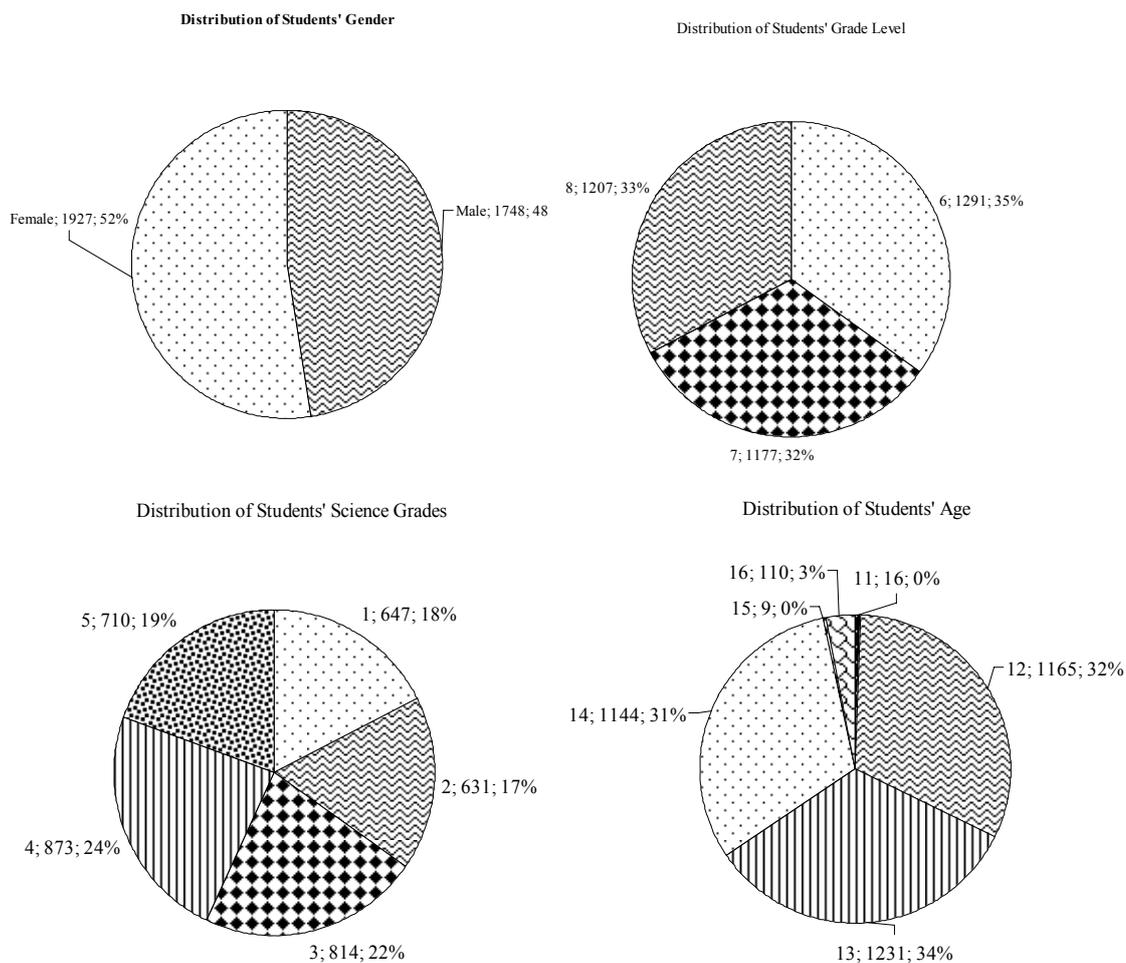


Figure.3.1. Distribution of students' gender, grade level, location of the school science grades and age

Figure 3.1. shows that science grades of the participants of the study distributed equally and ranges from 1 to 5. Furthermore ages of most of the students ranges from 12 to 14.

### 3.2. Instrument

In the study, the motivational traits of the students are measured by a Turkish version of Motivational Patterns Questionnaire (T-MPQ). At the beginning of this inventory personal information, like gender, age, grade level of the students are asked.

#### 3.2.1. Motivational Patterns Questionnaire (MPQ)

The questionnaire is originally developed and validated by Kempa and Diaz (1990). It contains 60 self rating items representing personal responses of the students related to four motivational traits. There are fifteen questions related to the each motivational trait. Descriptions of each dimension of Motivational Patterns Questionnaire and related items in the questionnaire are given in Table 3.2.

Table 3.2. Descriptions of dimensions of Motivational Patterns Questionnaire and corresponding items.

Dimension	Dimension Description	Related Items
Achievers	who need to achieve	4, 8, 12, 15, 19, 26, 29, 32, 36, 40, 43, 46, 49, 54, 59
Curious	who needs to satisfy one's curiosity	1, 3, 6, 7, 10, 14, 20, 25, 30, 33, 38, 42, 44, 47, 52,
Conscientious	who needs to discharge a duty	2, 9, 13, 18, 22, 23, 28, 31, 35, 37, 41, 50, 53, 56, 58
Sociable	who need to affiliate with other people	5, 11, 16, 17, 21, 24, 27, 34, 39, 45, 48, 51, 55, 57, 60

The questionnaire has a five-point Likert scale and the responses on the questionnaire range from “very true to me” to “absolutely inapplicable to me”. Some examples of the different items corresponding to the patterns are as follow:

#### Achiever students

- I do not mind how hard I have to work, as long as I get good marks for my work.
- When home work is returned to me, I am more interested in the mark I have got than in the errors I may have made.

#### Curious students

- I like learning about the latest discoveries and inventions.
- I am not satisfied with the knowledge I have now and am keen on learning new things.

#### Conscientious students

- I do not mind working hard in science lessons as long as I learn
- Low marks in an exam made me ashamed.

#### Social students

- I am proud when the classmates like to work with me in small groups.
- When taking exams, if a classmate ask me something I try to help him/her.

The Cronbach  $\alpha$  coefficient of the original test is in the range .75 to .73. The reliabilities related to the four motivational patterns are measured as achiever student scale .81, curious student scale .79, conscientious student scale is .79 and sociable student scale is .68. (Kempa & Diaz, 1990.)

At the beginning of the study the Motivational Traits Questionnaire is requested from professor Kempa who is one of the developers of the questionnaire (see appendix A). The questionnaire was translated and adapted into Turkish by the researchers. The validity of the translated and adapted version of the questionnaire was established through review by three experts in the field of science education. All were asked if the items in each dimension were relevant to the goal of the questionnaire. Revisions were made based on their comments and suggestion. The revised Turkish version of the questionnaire was pilot tested. Then, the reliabilities of each dimension were calculated. Reliability analysis of the Turkish version of the achiever students dimension produced an alpha coefficient of 0.51, curious students dimension produced an alpha coefficient of 0.63, conscientious students dimension produced an alpha coefficient of 0.70 and finally sociable students dimension produced an alpha coefficient of 0.66.

### 3.3. Variables of the Study

There are seven variables in the study and these variables are categorized as dependent and independent variable (Table 3.3). There are four dependent variables (DVs) and three independent variables (IVs).

Table 3.3. Identification of the variables

Type of the variable	Name of the variable	Type of the value	Type of the scale
DV	Achievers	Continuous	interval
DV	Curious	Continuous	Interval
DV	Conscientious	Continuous	Interval
DV	Sociable	Continuous	Interval
IV	Gender	Discrete	Nominal
IV	Grade level	Discrete	Nominal
IV	Location of the school	Discrete	Nominal

### *3.3.1. Dependent variable of the Study*

The dependent variables of the study are students' motivational traits grouped by Adar as achievers, curious, conscientious, and sociable students. These variables are measured by a 60-item questionnaire. The dependent variables of the study are continuous variables measured on interval scale. Possible responses for each variable ranges from 15 to 75.

### *3.3.2. Independent variable of the Study*

The independent variables of the study are gender, grade level, and location of the school. Gender, grade level and location of the school are considered as discrete variables and measured on nominal scale. Students' gender was coded as one for female and two for male. Grade levels are coded as one for 6<sup>th</sup> grade, two for 7<sup>th</sup> grade and three for 8<sup>th</sup> grade. Locations of the schools are coded as one for schools at rural areas and two for the schools at urban areas.

## **3.4. Research Design and Procedure**

At the beginning of the study, a detailed literature review was conducted. The keywords; 'motivation', 'students' motivation', 'motivation and achievement', 'motivation and gender', 'motivation and age', 'motivation and grade level', 'self efficacy and students' achievement', 'self efficacy and science education', 'locus of control and students' achievement', 'locus of control and science achievement', 'students' attitudes and science achievement' were determined.

After defining the keyword list, International Dissertation Abstracts, Educational Resources Information Center (ERIC), Social Science Citation Index (SSCI), Science Direct and Internet (Google) were searched. The documents were obtained from TUBİTAK Ulakbim, Bilkent library. The obtained studies were read and critically analyzed. Results of the various studies were compared and contrasted.

After pilot study, the final copy of the questionnaire was administered to the 3675 students in five districts of Ankara. Researcher visited the schools after getting permission from the Ministry of Education. Then, in each class, students were told about the purpose of the questionnaire, and the procedure for completing it. After this short explanation, students were asked to complete the survey of questions on their own. They were instructed to think about each question and answer it as it applies to them. It took about 40 minutes for the students to complete the questionnaire

### **3.5. Analysis of Data**

As descriptive statistics mean, median, mode, percentages, standard deviation, skewness, kurtosis and histograms of the variables are presented. For data analysis statistical analysis including tabulation and graphs of descriptive statistics and percentages of the students for each motivational dimension are used.

Also scores of the students are assigned to four percentile groups. Each student assigned to the motivational pattern according to the highest percentage. Finally, one- way MANOVA was used, to find whether there exists a relationship between the variables.

### **3.6. Assumptions of the Study**

The researcher made the following assumptions for this study:

1. The administration of the questionnaire was under standard conditions.
2. The sample in pilot study has similar characteristics with the sample of the study.
3. All the students responded the questionnaire sincerely and correctly.

### **3.7. Limitations of the Study**

1. The sample of the study is limited to the 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> graders from elementary stages.
2. Learner characteristics (e.g., learning disabilities, health problems, socio economic status, and other family related characteristics) were not considered.
3. Entry behaviors (e.g., anxiety, hyperactivity) of the students were not considered.
4. The data collection period is near to the date of high school examination that may affect the responses of the 7th grade and 8th grade students.

## CHAPTER IV

### RESULTS

This chapter that includes the results of the data analysis is divided into three sections. First section includes the descriptive statistic related to the data. Second section deals with the inferential statistics in which the null hypotheses are tested. The third section summarizes the findings of the study.

#### **4.1. Descriptive Statistics Concerning Motivational Patterns Questionnaire**

Descriptive statistics related to four dimensions (Achiever Students, Curious Students, Conscientious Students, and Social students) of the Motivational Patterns Questionnaire with respect to gender, grade level, and location of the schools are presented in Table 4.1 through Table 4.4.

##### *4.1.1 Descriptive Statistics Concerning Achiever Dimension*

Table 4.1 shows the information related to achiever students. According to the table, although the mean scores of the females and males are close to each other, the scores favor the female students. As well as the grade level is considered, it can be said that mean scores of the students decreases as the grade level of the students' increases. The mean scores of the 6<sup>th</sup> grade students are greater than the mean scores of 7<sup>th</sup> graders which is also higher than 8<sup>th</sup> grade students. Descriptive statistics related to the achiever student dimension of T-MPQ indicates that students from urban schools have more desire for achievement than those from rural schools. The

data related to the achiever student dimension shows a normal distribution (Figure 4.1).

Table 4.1. Basic descriptive statistics related to achiever students

		N	M	S.D.	Range	Max.	Min.	Skewness	Kurtosis
Gender	Female	1927	55.05	6.71	46	75	29	-.406	.224
	Male	1748	54.14	7.21	46	74	28	-.374	.139
Grade	6 <sup>th</sup>	1291	55.42	6.57	43	72	29	-.449	.310
	7 <sup>th</sup>	1177	55.03	6.80	45	74	29	-.401	.178
	8 <sup>th</sup>	1207	53.34	7.36	47	75	28	-.289	.093
Location	Rural	1468	54.40	7.27	47	75	28	-.467	.374
	Urban	2207	54.76	6.76	46	74	28	-.337	.007
Total		3675	54.12	6.97	47	75	28	-.401	.197

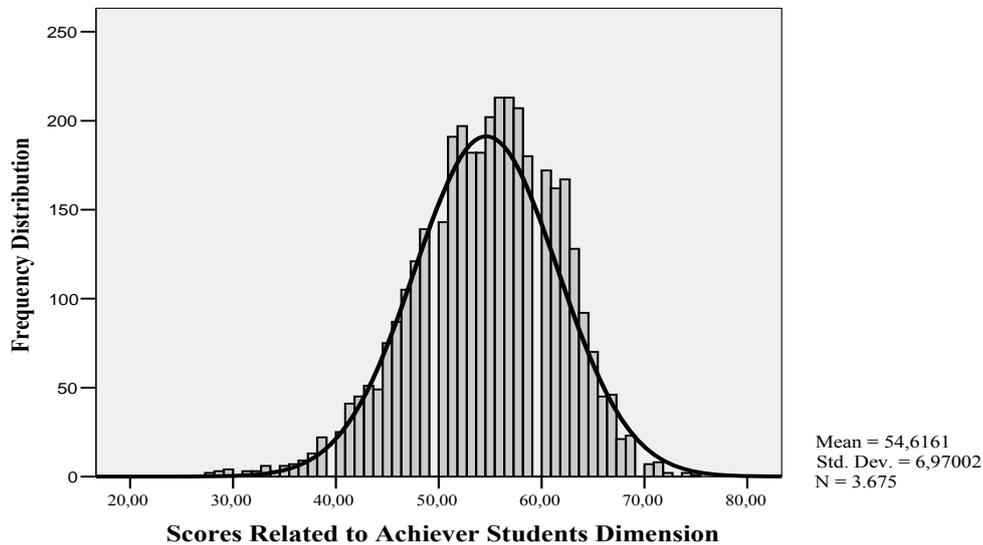


Figure.4.1. Histogram with normal curve related to achiever students dimension of T-MPQ

#### 4. 1. 2 Descriptive Statistics Concerning Curious Dimension

Descriptive statistics related to the curious students' dimension of the Motivational Patterns Questionnaire with respect to gender, grade level, and location of the school is presented in table 4.2. According to the table the mean scores of the female students related to the curious students dimension are greater than the mean scores of male students. The table indicates that similar to the achiever students dimension 6<sup>th</sup> graders are more curious than 7<sup>th</sup> graders and 7<sup>th</sup> graders are more curious than 8<sup>th</sup> graders. Curiosity of the students decreases as the grade level increases. Also the mean scores of the students from urban schools were higher than the mean scores of the students from rural school, which means students from urban schools are more curious about learning science than the students from rural schools. The histogram in figure 4.2 shows that the data related to the curious students dimension shows a normal distribution.

Table 4.2. Basic descriptive statistics related to curious students

		N	Mean	S.D.	Range	Max.	Min.	Skewness	Kurtosis
Gender	Female	1927	57.12	7.80	51	75	24	-.474	.199
	Male	1748	56.03	8.14	53	75	22	-.470	.506
Grade	6 <sup>th</sup>	1291	57.55	7.69	48	75	27	-.422	.104
	7 <sup>th</sup>	1177	56.73	7.60	50	75	25	-.498	.463
	8 <sup>th</sup>	1207	55.45	8.50	53	75	22	-.449	.358
Location	Rural	1468	56.17	8.14	53	75	22	-.472	.418
	Urban	2207	56.87	7.87	53	75	22	-.477	.320
Total		3675	56.60	7.98	53	75	22	-.478	.366

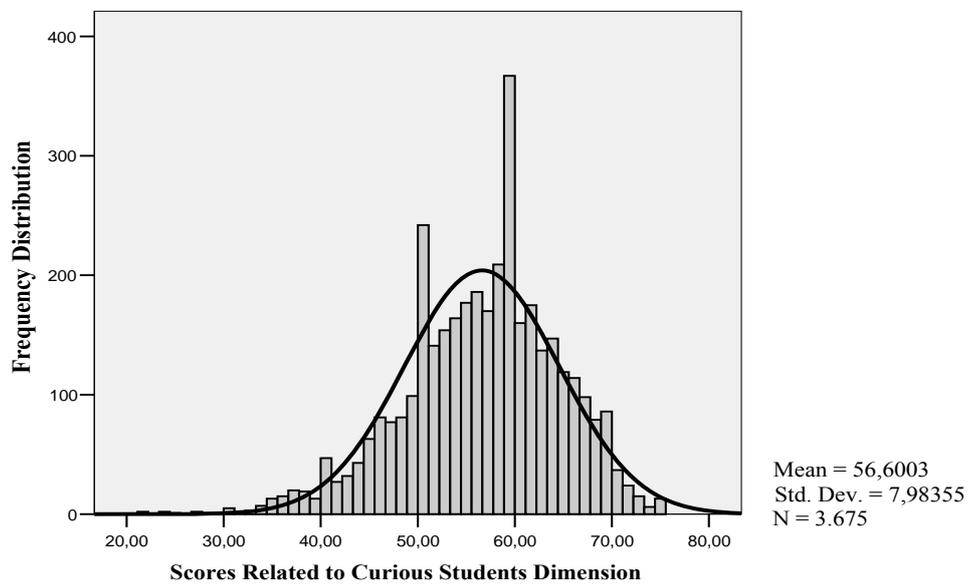


Figure.4.2. Histogram with normal curve related to curious students dimension of T-MPQ

#### 4. 1. 3 Descriptive Statistics Concerning Conscientious Dimension

Descriptive statistics related to the conscientious students' dimension of the Motivational Patterns Questionnaire were categorized according to gender, grade level, and location of the school, and presented in table 4.3. According to the table the mean scores of the female students and male students are close to each other however the scores favor the female students than the male students. Table also shows that the mean scores of the students decreases, as the grade level increases. This means that 6<sup>th</sup> graders are more conscientious than the 7<sup>th</sup> graders who are more conscientious than 8<sup>th</sup> graders. Therefore, 6<sup>th</sup> graders appeared to have more desire to attend carefully to the learning activities and to fulfill the demands posed by their teachers. Regarding location of schools, students attending urban schools seem to be more conscientious than the students attending rural schools. Moreover, figure 4.3 is an evidence for the normal distribution of the scores related to the conscientious students dimension.

Table 4.3. Basic descriptive statistics related to conscientious students

		N	Mean	S.D.	Range	Max.	Min.	Skewness	Kurtosis
Gender	Female	1927	55.14	6.97	48	73	25	-.541	.413
	Male	1748	53.38	7.62	51	74	23	-.421	.267
Grade	6 <sup>th</sup>	1291	56.09	7.00	47	74	27	-.543	.342
	7 <sup>th</sup>	1177	54.99	6.88	42	73	31	-.443	.068
	8 <sup>th</sup>	1207	51.70	7.39	48	71	23	-.500	.543
Location	Rural	1468	54.08	7.57	51	74	23	-.595	.661
	Urban	2207	54.45	7.17	46	73	27	-.417	.053
Total		3675	54.30	7.34	51	74	23	-.499	.347

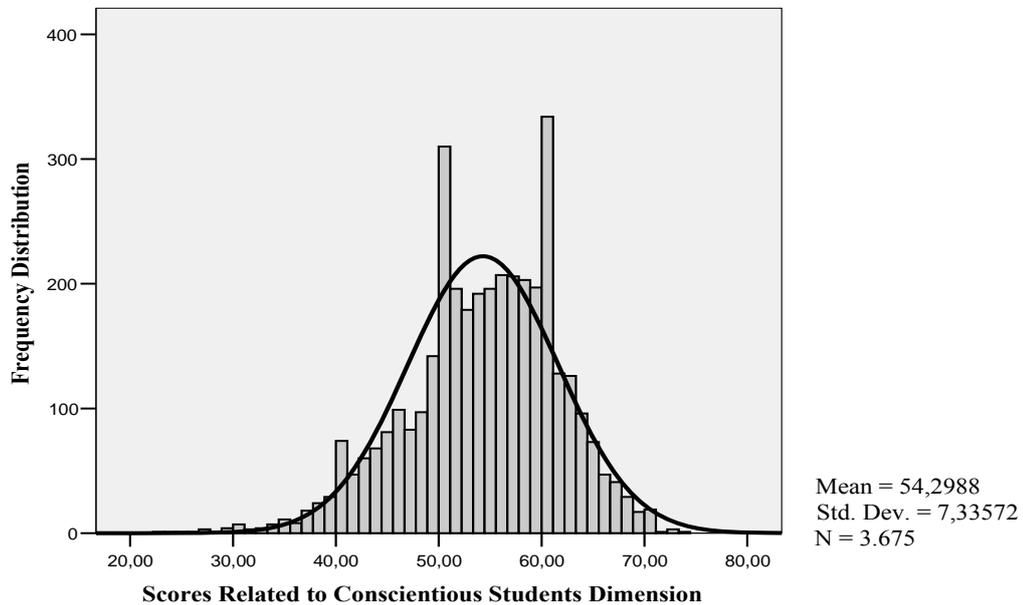


Figure.4.3. Histogram with normal curve related to conscientious students dimension of T-MPQ

#### 4. 1. 4. Descriptive Statistics Concerning Social Dimension

Descriptive statistics related to the sociable students' dimension of the Motivational Patterns Questionnaire were categorized according to gender, grade level, and location of the schools, and presented in table 4.4. According to the table the mean scores, we can say that female students are more sociable than the male students. As well as grade levels are concerned, it can be said that the social students dimension of the motivational patterns questionnaire decreases as the grade level increases. Table reveals that 6<sup>th</sup> graders have greater mean scores than that of the 7<sup>th</sup> graders and 7<sup>th</sup> graders have greater mean scores than 8<sup>th</sup> graders. Moreover, data show that the schools in urban areas have more sociable students than the schools in rural areas. In other words, students in urban areas tend to have more desire for cooperation in learning. The data related to the social students dimension shows a normal distribution as indicated in figure. 4.4.

Table 4.4. Basic descriptive statistics related to sociable students

		N	Mean	S.D.	Range	Max.	Min.	Skewness	Kurtosis
Gender	Female	1927	54.44	5.57	36	71	35	-.376	.241
	Male	1748	52.75	6.12	43	71	28	-.374	.400
Grade	6 <sup>th</sup>	1291	53.93	5.65	40	70	30	-.414	.262
	7 <sup>th</sup>	1177	53.85	5.90	38	70	32	-.358	.334
	8 <sup>th</sup>	1207	53.10	6.13	43	71	28	-.411	.441
Location	Rural	1468	53.26	5.98	43	71	28	-.365	.227
	Urban	2207	53.88	5.83	41	71	30	-.429	.492
Total		3675	53.63	5.90	43	71	28	-.405	.375

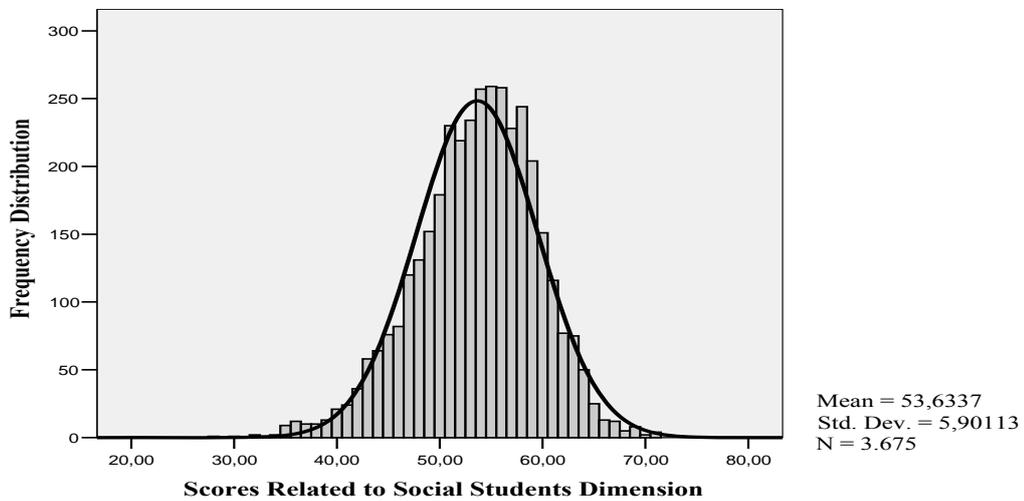


Figure.4.4. Histogram with normal curve related to sociable dimension of T-MPQ

Generally, results of descriptive statistics show that females, 6<sup>th</sup> graders and students attending schools have greater mean scores with respect to four dimensions

of motivational patterns questionnaire than males, 7<sup>th</sup> and 8<sup>th</sup> graders and students from rural schools respectively.

Furthermore, histograms with normal curves related to students mean scores on four motivational dimensions are given in Figure 4.1 through Figure 4.4. These figures are also evidence for the normal distribution of the scores.

Beside descriptive statistics, students were assigned to four percentile groups according to T-MPQ scores (Table 4.5-4.7). Each student assigned to the motivational pattern according to the highest percentage. These results show that some students are assigned to two or more motivational patterns and approximately half of the students could not assigned to a motivational pattern.

Table 4.5 shows that the percentages of the female students at the top quartile of each motivational dimension are greater than the percentages of male students. Moreover, more males placed in the bottom quartile than the females. This results show that the number of the female students assigned to the motivational traits is greater than the number of the male students.

Table 4.5. Distribution of students in four percentile groups on each of the motivational traits, in percentages, according to gender

Motivational pattern	Gender	Bottom	Near to bottom	Near to top	Top
Achievers	Female	23.8	25.8	28.5	21.8
	Male	28.8	26.1	24.9	20.3
Curious	Female	25.9	22.8	26.3	25.0
	Male	30.8	23.6	23.1	22.5
Conscientious	Female	23.1	24.9	24.0	28.0
	Male	32.3	26.2	20.0	21.5
Social	Female	22.3	24.5	29.8	23.4
	Male	32.9	26.7	23.7	16.7

As shown in table in Table 4.6, the percentages of the 6<sup>th</sup> graders are greater than the percentages of 7<sup>th</sup> and 8<sup>th</sup> graders for achievers, curious students and conscientious students dimensions of T-MPQ. However the percentage of the 7<sup>th</sup> graders is greater than the percentages of 6<sup>th</sup> and 8<sup>th</sup> graders. Also the table reveals that the percentages of 8<sup>th</sup> graders at the bottom quartile are greater than the percentages of other grades. This means that the numbers of the 8<sup>th</sup> grade students who are assigned to any of the motivational traits are less than the 6<sup>th</sup> grade students.

Table 4.6. Distribution of students in four percentile groups on each of the motivational traits, in percentages, according to grade level

Motivational pattern	Grade level	bottom	Near to bottom	Near to top	Top
Achievers	6	21.5	26.3	28.4	23.9
	7	24.0	25.7	28.0	22.3
	8	33.3	25.9	23.9	16.9
Curious	6	24.0	22.3	26.3	27.3
	7	26.8	24.9	25.9	22.4
	8	34.2	22.4	22.0	21.4
Conscientious	6	20.6	20.8	23.8	34.8
	7	23.2	25.9	24.4	26.5
	8	39.0	30.1	18.1	12.8
Social	6	25.2	25.8	27.8	21.2
	7	26.5	25.7	26.3	21.4
	8	30.4	25.2	26.5	17.9

According to the Table 4.7 percentages of the students from urban schools at the top quartile are greater than the percentages of the students from rural school for all the motivational dimensions. Moreover the percentages of the students from rural

schools are higher than the percentages of the students from urban school at the bottom quartile.

Table 4.7. Distribution of students in four percentile groups on each of the motivational traits, in percentages, according to location of the school

Motivational pattern	Location of school	Bottom	Near to bottom	Near to top	Top
Achievers	Rural	26.5	26.8	26.2	20.4
	Urban	26.0	25.4	27.2	21.5
Curious	Rural	30.0	24.5	22.8	22.8
	Urban	27.1	22.3	26.1	24.5
Conscientious	Rural	28.3	25.8	21.7	24.3
	Urban	27.0	25.3	22.4	25.3
Social	Rural	29.6	25.5	26.6	18.3
	Urban	25.8	25.6	27.1	21.5

Table 4.8 shows that only 53.1% of the students had scores at the top quarter of at least one motivational trait. 27.5 % of the students were assigned in one motivational trait, 16.0% of the students associated with the two particular motivational traits, 7.8 % of the students were placed in three motivational traits and 1.7 % of the students were placed in four motivational traits. In addition approximately half of the students did not placed in the top quartile of the four motivational traits and they couldn't be placed in at least one of the motivational traits.

Table 4. 8. Distribution of students according to the motivational trait

Description of the Motivational Trait	Frequency	Percentage
Four major motivational traits	63	1.7
Three motivational Traits	287	7.8
Achievers + Curious + Conscientious	104	2.8
Achievers + Curious + Social	54	1.5
Achievers + Conscientious + Social	39	1.1
Curious + Conscientious + Social	90	2.4
Two motivational Traits	590	16.0
Achievers + Curious	63	1.7
Achievers + Conscientious	108	2.9
Achievers + Social	81	2.2
Curious + Conscientious	177	4.8
Curious + Social	104	2.8
Conscientious + Social	57	1.6
One motivational Traits	1013	27.5
Achievers	262	7.1
Curious	220	6.0
Conscientious	277	7.5
Social	254	6.9
No Trait	1722	46.9

#### 4.2. Inferential Statistics

Multivariate analysis of variance (MANOVA) was performed to investigate the effect of gender, grade level and the location of the school on four motivational patterns. The dependent variables were the scores on the each dimension of the motivational patters questionnaire-achiever students, curious students, conscientious students and sociable students. The independent variables were gender, grade level and the location of the school.

#### *4.2.1. Assumptions of Multivariate Analysis of Variance*

##### *4.2.1.1. Sample Size*

As the cases in the cells are greater than the number of the dependent variables the sample size of the study is enough to precede MANOVA analysis.

##### *4.2.1.2. Normality and Outliers*

For normality assumption, univariate and multivariate normalities were checked.

To check univariate normality histograms and skewness and kurtosis values were examined. Histograms for all the groups appear to be normally distributed. Also skewness and kurtosis values were all in acceptable range being between -1 and +1.

To check multivariate normalities mahalanobis distance is calculated and compared with the critical value given in the chi square table for four dependent variables (Pallant, 2001). The critical chi-square value was found to be 18.47 and the maximum mahalanobis distance of the sample was 35.149. This shows that there were outlying cases and they were (id 3, 9, 29, 35, 1115, 1184, 1677, 2168, 2274, 3663) removed from the data.

##### *4.2.1.3. Linearity*

To test the linearity of the scores the scatter plots are generated for each pairs of the dependent variables (Appendix B, Appendix C, and Appendix D). The scatter plots indicate that in general there is no serious violation of linearity assumption for many pairs of dependent variables across different groups.

#### 4.2.1.4. Multicollinearity and Singularity

As shown in the Table 4.9, correlation coefficients between dependent variables vary from 0.232 to 0.573. These values show that there is a linear and positive correlation between the dependent variables. Although correlation between the variables is significant the values show that the relation is a weak relation.

Table 4.9. Correlation coefficients between dependent variables

	Achievers	Curious	Conscientious	Social
Achievers	-	0.373**	0.361**	0.282**
Curious		-	0.573**	0.353**
Conscientious			-	0.232**
Social				-

\*\* Correlation is significant at the 0.01 level (2-tailed).

#### 4.2.1.5. Homogeneity of variance-Covariance Matrices

For each one of the independent variables a separate MANOVA was conducted and homogeneity of variance –covariance matrices was tested. Results of the Box Test of Equality of Covariance Matrices for each MANOVA conducted revealed that there is a violation of homogeneity of variance covariance matrices for all the independent variables ( $p = 0.000$  for gender and grade level and  $p = 0.003$  for location of the school). Fortunately, a violation of this assumption has minimal impact if the groups are of approximately of equal size i.e., if the largest group size divided by the smallest group size is less than 1.5 (Hair, Anderson, Tatham, & Black, 1998). In the present study, maximum ratio was found to be 1.5.

Concerning homogeneity of variance assumption, Levene's Test of Equality of Error variances was checked for each MANOVA conducted. For gender variable, Levene's Test of Equality of Error variances has a sig. value .006 for achiever students dimension, .116 for curious students dimension, .000 for conscientious

students dimension and .002 for social students dimension. These results violates the equality of variances for achiever, conscientious and sociable students dimension, and do not violate the assumption for curious students dimension.

For the grade level variable, Levene's Test of Equality of Error variances has a sig. value .000 for achiever students dimension, .000 for curious students dimension, .182 for conscientious students dimension and .047 for social students dimension. These results violates the equality of variances for achiever, curious and sociable students dimension, and do not violate the assumption for conscientious students dimension.

For the variable related to the location of the school, Levene's Test of Equality of Error variances has a sig. value .034 for achiever students dimension, .260 for curious students dimension, .137 for conscientious students dimension and .208 for social students dimension. These results violates the equality of variances for first dependent variable, and do not violate the assumption for other three variables.

Since analysis of variance is reasonably robust to violation of the homogeneity of variance assumption, if the ratio of largest group size to smallest group size is less than 1.5, in the present study, violation of the assumption for some dimensions does not lead to serious problems.

#### *4.2.2. Multivariate Analysis of Variance*

##### *4.2.2.1 Effect of Gender on Motivational Patters*

Problem 1: Is there a significant difference between boys and girls with respect to the motivational patterns?

Null Hypothesis 1: There is no statistically significant difference between boys and girls with respect to students' motivational patters.

To determine the effect of the gender on students' motivational patterns MANOVA was conducted. According to the results the null hypothesis was rejected ( $F(4, 3673) = 27.918, p = .000$ ; Wilks'  $\Lambda = .970$ ; partial  $\eta^2 = .030$ ). Thus, it was found that there was a statistically significant difference between males and females with respect to the combined dependent variables. When the results for the dependent variables were considered separately, gender has a significant effect on all the dependent variables at Bonferroni adjusted alpha level of 0.0125. the F values and significance are found as  $F(1,3673) = 15.565, p = .000$ , for achiever students dimension;  $F(1,3673) = 17.341, p = .000$ , for curious students dimension;  $F(1,3673) = 53.588, p = .000$ , for conscientious students dimension;  $F(1,3673) = 76.499, p = .000$ , for social students dimension of the Motivational Patterns Questionnaire.

Overall mean ratings and Mean scores of the students are given in figure 4.5 and table 4.10 and 4.11 respectively. Means scores of males and females showed that females have slightly higher means on achiever students dimension, curious students dimension, conscientious students dimension, sociable students dimension than that of males.

Mean Ratings of the Students on Four Motivational Patterns by Gender

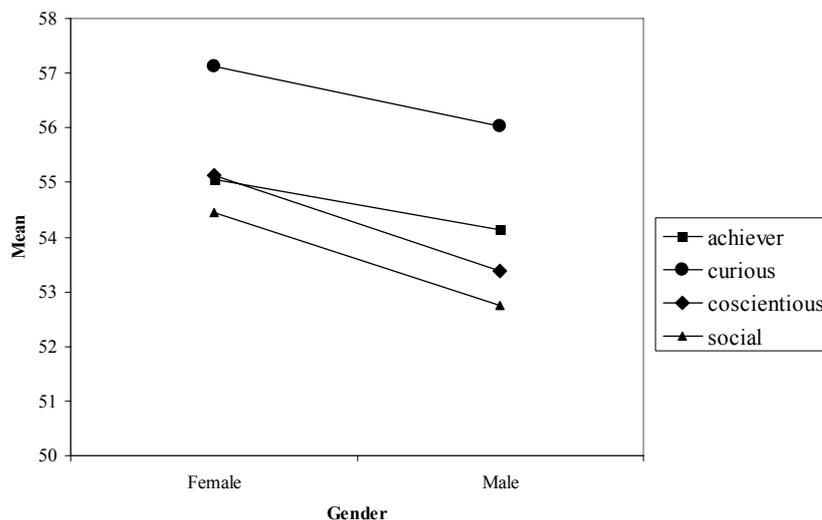


Figure.4.5 Overall mean ratings of the students on four motivational patterns by gender

Table 4.10. Means and standard deviations of the students by gender and motivational patterns

Motivational pattern	Females		Males	
	Mean	S.D.	Mean	S.D.
Achievers	55.05	6.71	54.14	7.21
Curious	57.12	7.80	56.06	8.14
Conscientious	55.14	6.97	53.38	7.61
Social	55.44	5.57	52.75	6.12

Table 4.11. Tests of between subject factors

Motivational pattern	df	Error df	F	p	Partial eta squared	Observed power
Achiever	1	3673	15.565	.000	.004	.976
Curious	1	3673	17.341	.000	.005	.986
Conscientious	1	3673	53.588	.000	.014	1.000
Social	1	3673	76.499	.000	.021	1.000

#### 4.2.2.2 Effect of Grade Level on Motivational Patterns

Problem 2: Is there a significant difference across grade levels with respect to the motivational patterns?

Null Hypothesis 2: There is no statistically significant difference across grade levels with respect to students' motivational patterns.

Results of the MANOVA conducted to test the second null hypothesis showed that there was a statistically significant difference between 6<sup>th</sup>, 7<sup>th</sup> and 8<sup>th</sup> graders with respect to the combined dependent variables.  $F(8, 7338) = 34.227$ ,  $p = .000$ ; Wilks' Lambda = .926; partial eta squared = .037. When considered separately, grade level has a significant effect on all the dependent variables at alpha level 0.0125. Post-hoc comparisons indicated that the mean scores of 8<sup>th</sup> graders was significantly different than 6<sup>th</sup> graders and 7<sup>th</sup> graders for the achiever student and the sociable students. sixth graders did not differ significantly from 7<sup>th</sup> graders for all the dimensions. The F values and significance of the scores are found as  $F(2,3672) = 31.341$ ,  $p = .000$ , for achiever students dimension;  $F(2,3672) = 22.244$ ,  $p = .000$ , for curious students dimension,  $F(2,3672) = 127.767$ ,  $p = .000$ , for conscientious students dimension, and  $F(2,3672) = 7.412$ ,  $p = .000$ , for social students dimension of the Motivational Patterns Questionnaire.

Also results indicated that the mean scores across the grade level were different from each other for curious students and conscientious students dimensions of T-MPQ.

Figure 4.6 and tables 4.12 and 4.13 indicated that mean scores of 6th graders is slightly higher than the mean scores of 7th and 8th graders for achiever, curious, conscientious and sociable students dimensions.

**Mean Ratings of the Students on Four Motivational Patterns by Grade Level**

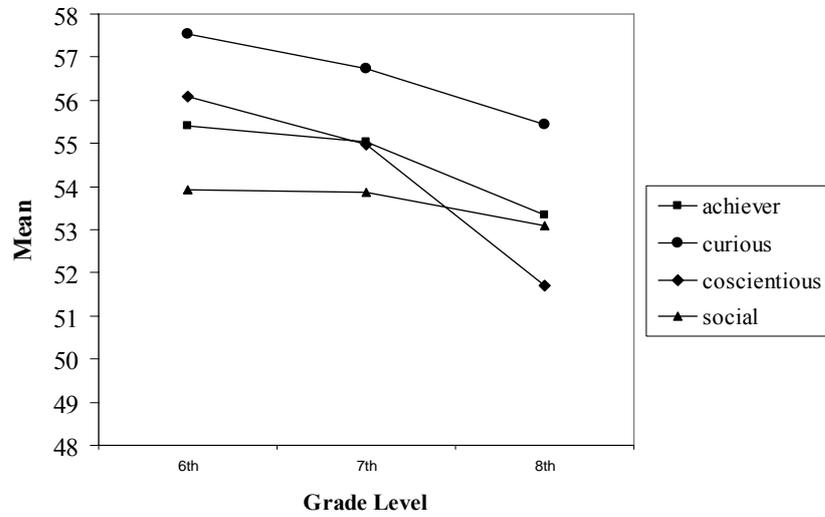


Figure.4.6. Overall mean ratings of the students on four motivational patterns by grade level

Table 4.12. Means and standard deviations of the students by grade level

Motivational Pattern	6 <sup>th</sup> grade		7 <sup>th</sup> grade		8 <sup>th</sup> grade	
	Mean	S.D.	Mean	S.D.	Mean	S.D.
Achiever	55.42	6.57	55.04	6.80	53.34	7.36
Curious	57.56	7.69	56.73	7.60	55.45	8.50
Conscientious	56.09	7.00	54.99	6.88	51.70	7.39
Social	53.93	5.65	53.85	5.90	53.10	6.13

Table 4.13. Tests of between subject factors

Motivational pattern	df	Error	F	P	Partial eta squared	Observed power
Achiever	2	3672	31.341	.000	.017	1.000
Curious	2	3672	22.244	.000	.013	1.000
Conscientious	2	3672	127.767	.000	.067	1.000
Social	2	3672	7.412	.001	.004	.941

#### 4.2.2.3 Effect of Location of the School on Motivational Patterns

Problem 3: Is there a significant difference between students in rural and urban areas with respect to the motivational patterns?

Null Hypothesis 3: There is no statistically significant difference between students attending the schools in the rural areas and urban areas with respect to students' motivational patterns.

MANOVA results showed that there was a statistically significant difference between students attending the schools in rural areas and urban areas with respect to the combined dependent variables.  $F(4, 3680) = 3.400, p = .009$ ; Wilks' Lambda = .996; partial eta squared = .004. When separately considered location of the school has a significant effect on curious students dimension ( $F(1, 3673) = 7.125, p = .008$ ) and sociable students dimension ( $F(1, 3673) = 9.710, p = .002$ ) of the motivational patterns questionnaire.

Figure 4.7 and mean scores in table 4.14 and 4.15 show that students attending schools in urban regions had slightly higher mean scores on achiever, curious conscientious, and social students dimension than the mean scores of the students of schools from rural regions. However, mean differences between students of rural and urban areas were not found to be statistically significant for the achiever

students dimension ( $F(1, 3673) = 2.383, p=.123$ ) and conscientious students dimension ( $F(1, 3673) = 2.263, p=.133$ ).

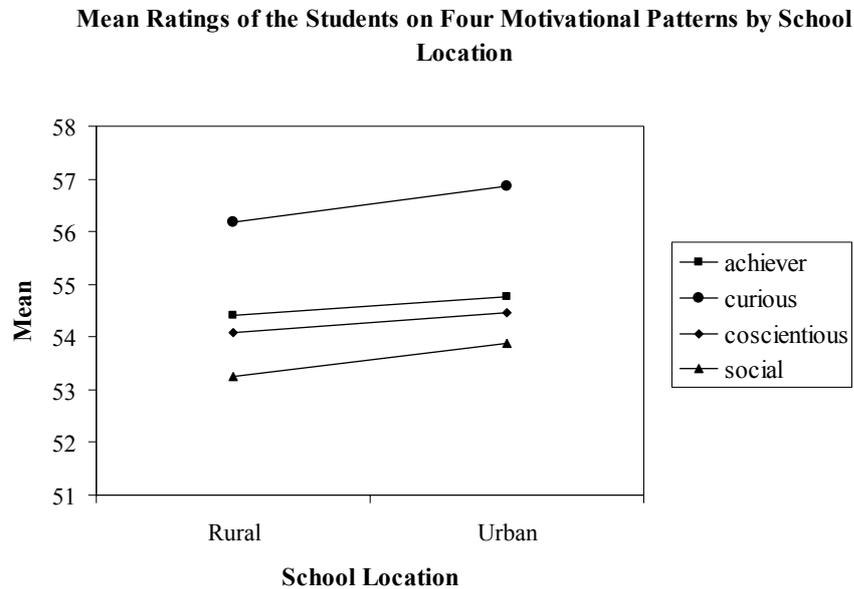


Figure.4.7. Overall mean ratings of the students on four motivational patterns by location of the school

Table 4.14. Means and standard deviations of the students by location of the school

Motivational pattern	Rural		Urban	
	Mean	S.D.	Mean	S.D.
Achievers	54.40	7.27	54.76	6.76
Curious	56.17	8.14	56.89	7.87
Conscientious	54.08	7.57	54.45	7.17
Social	53.26	5.98	53.88	5.83

Table 4.15. Tests of between subject factors

Motivational pattern	df	Error	F	P	Partial eta squared	Observed power
Achiever	1	3673	2.383	.123	.001	.339
Curious	1	3673	7.125	.008	.002	.761
Conscientious	1	3673	2.263	.133	.001	.324
Social	1	3673	9.710	.002	.003	.876

### 4.3 Findings of the Study

The results of the study are summarized according to the dependent variables of the study.

#### Achiever student dimension

- Females have more desire for achievement than males.
- 6<sup>th</sup> graders have more desire for achievement than 7<sup>th</sup> and 8th graders.
- Mean scores of the related to the achiever students dimension decreases when the grade level increases.
- There is no significant difference between the mean scores of the students from urban schools and the students from rural schools.

#### Curious student dimension

- Females are more curious than males.
- 6<sup>th</sup> graders are more curious than 7<sup>th</sup> and 8th graders.
- Mean scores of the related to the curious students dimension decreases when the grade level increases.

- Students from urban schools are more curious than the students from rural schools.

#### Conscientious student dimension

- Females are more conscientious than males.
- 6<sup>th</sup> graders are more conscientious than 7<sup>th</sup> and 8th graders.
- Mean scores of the related to the conscientious students dimension decreases when the grade level increases.
- There is no significant difference between the mean scores of the students from urban schools and the students from rural schools.

#### Sociable student dimension

- Females are more sociable than males.
- 6<sup>th</sup> graders are more sociable than 7<sup>th</sup> and 8th graders.
- Mean scores of the related to the sociable students dimension decreases when the grade level increases.
- Students from urban schools are more sociable than the students from rural schools.

These results can be shown in Figure 4.8 -4.10.

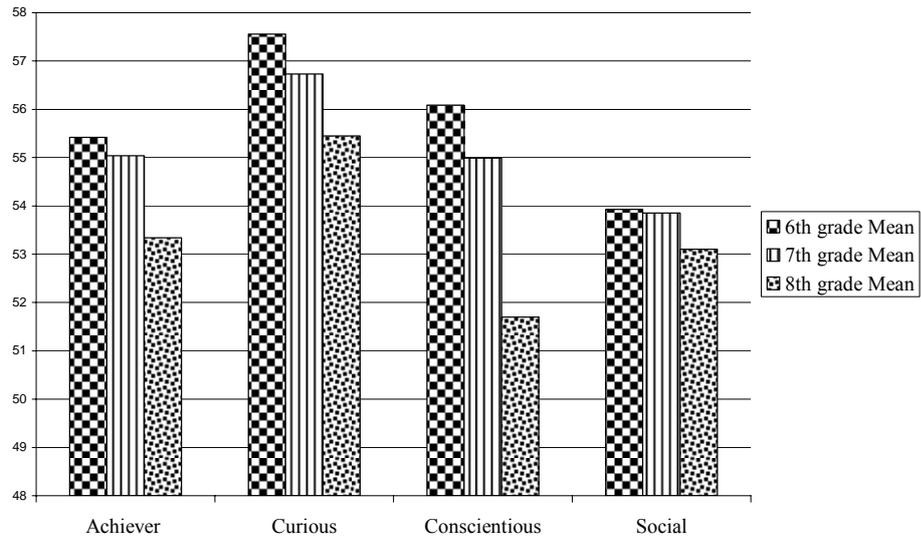


Figure.4.8. Mean scores of 6<sup>th</sup>, 7<sup>th</sup>, and 8<sup>th</sup> grade students with respect to four motivational traits.

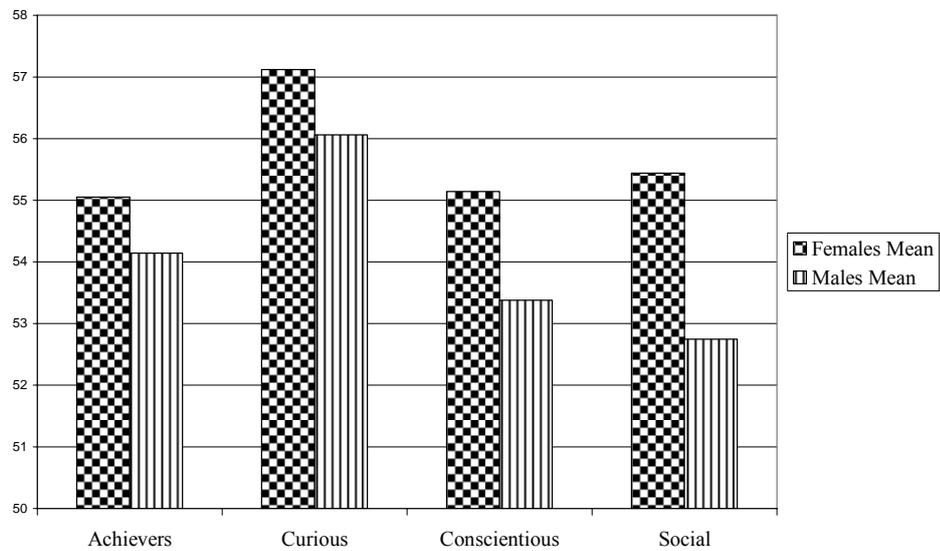


Figure.4.9. Mean scores of females and males with respect to four motivational traits.

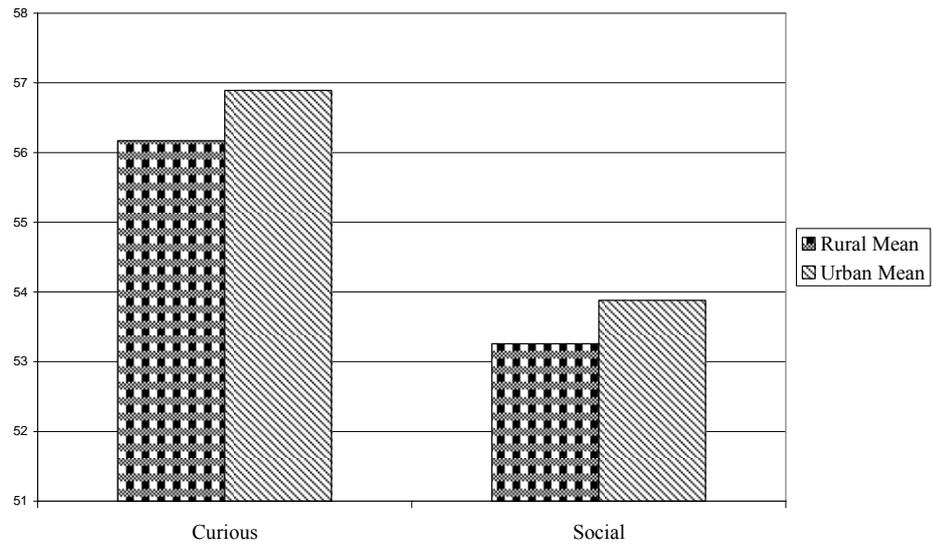


Figure.4.10. Mean scores of students from rural and urban schools with respect to two motivational traits

## **CHAPTER V**

### **DISCUSSION**

This chapter includes the summary of the study, conclusions and the discussions of the results, implications of the study and recommendations for further studies.

#### **5.1 Summary of the Study**

To investigate the effects of gender, grade level and the location of the school on motivational traits of the students, Turkish version of the Motivational Patterns Questionnaire is administered to a total of 3675 students (1291 sixth grade, 1177 seventh grade and 1207 eighth grade) from randomly selected 13 schools.

#### **5.2 Conclusion and Discussion of the Results**

The results of the present study reveal that students' motivational traits in science are highly affected by the gender, grade level and the location of schools.

Regarding gender difference, in motivational traits, the current study shows that gender has a significant effect on all the motivational traits (achievers, curious, conscientious and social students) in favor of females.

Similarly, a significant effect of grade level on students' motivational traits was found. The results of the study show that the 6<sup>th</sup> graders are more achiever,

more curious, more conscientious and more sociable than 7<sup>th</sup> and 8<sup>th</sup> graders. However, there is no significant difference between 7<sup>th</sup> and 8<sup>th</sup> graders.

Likewise, location of the schools has a significant effect on the curious and the social students. Students attending urban elementary schools are more curious and more sociable than the students of schools in rural areas. However, no statistically significant difference is found for achiever students dimension and conscientious students dimension.

When the results of this study were compared to the other studies related to the field of motivation, current study supports results of some previous studies while it does not support some others.

If the effect of gender is considered, the results of this study are consistent with the results of the study held by Kempa and Diaz in 1991, by using Motivational Patterns Questionnaire, and found that the mean scores of girls ( $M=3.81$ ) related to conscientious students dimension were greater than the mean scores of the boys ( $M=3.65$ ). Moreover, there existed a statistically significant mean difference ( $p=.001$ ) between girls and boys related to conscientious students dimension in favor of girls. Also Trumper (1995) reported that girls were more conscientious than boys ( $p=0.037$ ) in grade 8 compared to grades 9<sup>th</sup>, 10<sup>th</sup> and 11<sup>th</sup>. The results of current study are similar to these results, which show that girls' mean scores are greater than the boys not only in conscientious dimension but also in other dimensions of motivational patterns questionnaire. Like our study, Özkan (2003) found that girls have greater scores on some motivational characteristics. For example girls had greater scores than boys related to intrinsic value component ( $M=44.06$  for females and  $M=40.31$  for males) and test anxiety component ( $M=13.01$  for females and  $M=12.93$  for males) of MSLQ. In the current study, it was found that girls have greater motivational patterns in each dimension (see Table 4.10 and Table 4.11). This finding is inconsistent with studies that reported that boys have greater means scores related to the motivational characteristics than girls. Kempa and Diaz (1991) found that the boys ( $M=2.94$ ) were more achievement oriented than the girls

( $M=2.57$ ;  $p= .001$ ).

Rusillo and Arias (2004) claimed that girls show lower levels of motivational factors especially extrinsic motivation, take more responsibility for their failures and use information processing strategies extensively and getting better mark in language arts. However, no gender difference were found in academic self concept, in intrinsic motivation in success related attributions and performance attained in mathematics. Contrary to this study, present study found that girls are more achiever, more curious, more conscientious and more sociable than boys.

Grade level emerged as another factor affecting motivational patterns of the students. In our study, the mean scores of 6th grader were greater than both 7th graders and 8th graders for all the dimensions of motivational traits. It was also seen that the scores related to the motivational patterns are decreases as the grade level increases (see Table 4.12, Table 4.13). These results revealed that the motivation of the elementary students decreases as they become older. This may be explained by the pressure exerted by this examination on 8<sup>th</sup> graders especially when and they are close-by the High School Entrance Examination. This situation may cause a decrease in their intrinsic and extrinsic motivation. In a recent study, Otis et al (2005) found a gradual decrease in intrinsic and extrinsic motivation of the students as the grade level increases, which is a similar result to the current study. They also found that students' intrinsic and extrinsic motivation changed during the transition period from junior to senior high school. They linked this result to an increased student' interests on nonacademic activities like social activities and sports than academic activities. Also Lepper, Corpus and Iyengar (2005) found that intrinsic motivation decreased from third grade through eighth grade. According to the results of this study the youngest students had a higher level of intrinsic motivation, while the oldest students had a lower level of intrinsic motivation. Also they reported that the extrinsic motivation changed very little. They linked the results of the study to constant imposition of the extrinsic constraints; increased school control and reduced choices of the students, increased decontextulized and to the shift from optimistic reasoning to the pessimistic reasoning or from task focused vision to the

performance focused vision. Uguroglu and Walberg (1979) found that grade level is the only significant students' characteristics affecting achievement motivation, however contrary to our results they found that positive correlation coefficient between the motivation and grade level increased as the grade level increased. According to Trumper (1995), distribution of boys and girls differed in some traits according to the grade level of the students. In 8th and 9th grade, more boys than girls might be categorized as achievers, and in 8th and 11th grade more girls than boys might be categorized as conscientious. More boys than girls might be categorized as curious in 9th grade. However there was no significant difference between boys and girls motivational traits in 10th graders. In 11th grade more girls than boys might be categorized as conscientious. Another study held by Trumper (1997) reported a less significant increase in students' curiosity and conscientiousness as grade level increases. Also he found that the achievement motivation of students toward learning science increased from junior high school to senior high school. These decreases might due to the effect of transition and adolescence. The study of Wighfield and Eccles (1994) supported this thought. They found that children's self esteem did not changed during elementary school but decreased significantly during junior high school transition. Also they found that students' competence beliefs became more negative during the transition period. They also linked these decreases to the adolescence and the stereotypical beliefs about girls.

The results of these studies showed that generally motivational traits of the students' decrease as the grade level or age of the students increases. However, in other countries the researchers found a decrease in some aspects of motivation, while in this case the decrease was observed in every dimension of the motivational traits. These results may be attributed to the educational system in Turkey. In Turkey, after 8<sup>th</sup> grade, students enter an examination called "High School Entrance Examination". All the students are motivated to get the highest mark and enter an Anatolian High School and Science Lycee rather than to attain a public high school. Sixth graders are quite far from the pressure of this examination and they

concentrate on learning. On the other hand, 7<sup>th</sup> and 8<sup>th</sup> graders focus on passing the high school entrance examination. Unfortunately, because of the type of this examination, the students focus on to choose the correct answer in a multiple choice question and apply rote memorization, more than meaningful learning. This situation is, unfortunately, also reinforced both by teachers and families. Science grades of the students are also not considered for this examination. As a result, students even achiever ones, may not concern about the lesson and the grades they get. Beside examination, the teaching methods employed by the most of the teachers are far from to stimulate student motivation and interest toward science. They have little opportunities to engage in inquiry and to work in small groups, manipulate materials, or discuss their opinions with peers. Extensive use of such strategies may probably lead to a reduction in curious and social students' motivation in science.

According to the results of the present study, location of the school was one of the determinants of motivational patterns. In this study, it was found that students attending urban elementary schools had greater mean scores in four motivational patterns than the students of rural school. The mean difference related to the curious students and sociable students dimensions were significant. This result can be the effect of the learning environment of the schools. Because the schools in urban areas have several cultural activities, the students have the opportunity to interact with their friends and teachers to discuss, share and exchange their ideas and engage inquiry activities. This may increase the social characteristics of the students. Also most of the students have internet opportunity that increases their curiosity, so their investigative skills develop. Contrary to our results, Trumper (1997) found that Kibbutz students are more sociable that the city students and the city students are better achievers than the kibbutz students. The principle reason for this finding is explained by the cooperative work in the Kibbutz farms.

Another finding of the study was that some of the students displayed mixed motivational traits. In other words, some of the students couldn't be assigned to one specific motivational trait, but assigned in combination of two or more traits (see Table 4.8). Classifying students according to one characteristic, in this case, one

trait was impossible. One can be in two or more groups according to the motivational traits, in other words a student can be both curious and sociable. Distribution of the students in motivational traits in this study is quite similar to the distribution of the students in Kempa and Diaz (1991) and Trumper's (1995) studies. Kempa and Diaz (1991) reported that 43% of the students had scores at the top quarter of at least one motivational trait, 34% of the students placed in only one motivational trait, 7% of the students showed two motivational traits and 2 % of the students showed three motivational traits. Besides, Trumper (1995) found that 77% of the students had scores at the top quarter of at least one motivational trait, 48% of the students placed in only one motivational trait and 29% of the students show two motivational traits and 15 % of the students showed three motivational traits. In current study the percentage of the students placed in one or more motivational traits was 46.9%. 27.5%, of the students were placed in two motivational traits and 16.0% of the students placed in two motivational traits and 7.8% of the students were placed in three motivational traits. While there is no data related to the students assigned into four motivational traits in Kempa and Diaz study while in Trumper's study 8% of the students were assigned into four motivational traits. In current study 1.7% of the students had the highest score at four motivational traits.

To sum up, motivation is one of the major factors that affect the achievements of the students. Furthermore it is highly affected by the gender of the students, age or grade level of the students and location of the school. This study suggests that gender has a significant effect on students' motivation in favor of females. It is also found that as the grade level increases the motivational characteristics of the students' decreases. Another finding of the study is that the students from rural schools are less motivated than the students from urban school, especially in curious and social students dimensions of Motivational Patterns Questionnaire.

The present study will be a guide for teachers and educator by showing the importance of motivation in science and the effects of gender, grade level and the school location on motivation. They may develop teaching methods for differently

motivated students. Moreover, they may construct to increase all the motivational dimensions of the students, since the motivational traits of the students are related to their learning preferences. We hope this study will contribute to studies in the literature related to the affective dimension of teaching and learning.

### **5.3 Internal Validity of the Study**

Socioeconomic status, interest and attitude are some of the subject characteristic that may affect the internal validity of the study. The effect of interest is minimized by voluntary participation of the students.

Confidence was not a possible threat to the study since names of the students was not requested.

Finally, the effect of location and instrumentation is minimized by administering the questionnaire to all the subjects in similar conditions, mostly by the researcher.

### **5.4 External Validity of the Study**

As the selection of the groups was done randomly there is no limitation to generalize the findings of the study to the accessible population.

Also all the administration procedure took in a regular class hour. These factors minimize the external threats to the study. Therefore it is considered as the external validity of the study is provided.

### **5.5 Implications**

1. Teachers should be aware of the importance of motivation on students' achievement and the motivational differences among students. They should use different and structured teaching methods to motivate students.

2. To increase the motivation of male students, teachers should do activities like field work and projects to arouse the interest of male students.
3. To stop the decrease in motivation through grades, teachers should be careful about their attitudes towards courses and High School Entrance Examination.
4. To increase their motivation students from rural school must be involved in class activities.
5. To increase students' achievement, teachers and families should increase their motivations by considering their characteristics.

## **5.6 Recommendations for Further Research**

For further research

1. The effect of learning styles on motivational traits can be examined.
2. A longitudinal study can be performed to see the changes in motivational patterns of the students.
3. This study can be repeated by including the high school students (9th, 10th and 11th graders) to see the changes in motivational patterns of the students during transition between elementary school and high school.

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## APPENDICES

### APPENDIX A

#### TURKISH VERSION OF THE MOTIVATIONAL PATTERNS QUESTIONNAIRE

Sevgili Öğrenciler,

Bu anket sizin Fen Bilgisi derslerinde motivasyonunuzu etkileyen faktörleri ölçmek amacı ile hazırlanmıştır. Bu sorulara vereceğiniz yanıtlar, araştırma amacıyla kullanılacak, ve gizli tutulacaktır. Vereceğiniz cevaplar, motivasyonu etkileyen faktörler hakkındaki araştırmaların geliştirilmesine önemli katkılarda bulunacaktır. Sizlerin görüşleri bizler için çok önemlidir.

Yardımlarınız için teşekkür ederim.

Yüksek Lisans Öğrencisi

Fatma YAVUZ

#### 1. Bölüm: Kişisel Bilgiler

1. Okulunuz: \_\_\_\_\_

2. Sınıfınız: 6 7 8

3. Cinsiyetiniz:  Kız  Erkek

4. Doğum yılınız: 1989 1990 1991 1992 1993 1994 1995

5. Son dönem karne notunuz: 1 2 3 4 5

- 6.okulunuzun bulunduğu ilçe:
- Çankaya
  - Yenimahalle
  - Keçiören
  - Mamak
  - Etimesgut

## 2. Bölüm:

Aşağıda fen bilgisi öğretimine yönelik düşünceler göreceksiniz. Belirtilen ifadelere ne derecede katıldığınızı yada katılmadığınızı ilgili seçeneği işaretleyerek belirtiniz.

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
1. Fen dersine çalışırken bir kelimeyi anlamazsam sözlüğe bakarım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Eğer tahtada fen ile ilgili yeni bir sorusu görürsem ve nasıl çözüleceğini bilmiyorsa <b><u>endişelenirim.</u></b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
3. En son icat ve buluşlar hakkında bilgi edinmeyi severim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
4. İyi notlar aldığım sürece, ne kadar çalıştığım benim için önemli <b><u>değildir.</u></b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
5. Bence arkadaş sahibi olmak, sınıf birincisi olmaktan daha önemlidir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Sınıf arkadaşlarımla fikirlerini öğrenmek için küçük bir grup içerisinde çalışmayı severim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
7. Yeni öğretmenlerin dersimize girmesinden hoşlanırım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
8. Sınıfın en iyi öğrencilerinden biri olmak için çabalarım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
9. Bence fen deneylerinin sonuçlarını yorumlamak <b><u>zordur.</u></b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
10. Fen laboratuvarlarında sonucun ne olduğunu görmek için farklı maddeleri karıştırmayı severim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
11. Sınıf arkadaşlarımla küçük gruplarda benimle çalışmak istemelerinden gurur duyarım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
12. Fen dersinden kötü not alırsam arkadaşlarımla bunu öğrenmesini <b><u>istemem.</u></b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
13. Fen ödevimi zamanında vermezsem kendimi kötü hissederim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
14. Okuldaki en önemli hedeflerimden biri yeni şeyler öğrenmektir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
15. Yüksek not için diğerleriyle rekabet etmenin eğlenceli olduğunu düşünüyorum.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
16. Sınıf arkadaşlarımla benim hakkımda ne düşündüklerine önem veririm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
17. Eğer grup arkadaşlarımla seçebilseydim, kendi arkadaşlarımla seçerdim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
18. Ödevleri acele ile yapmak yerine, elimden gelenin en iyisini yapmak için kendime zaman tanımayı tercih ederim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
19. Aldığım iyi nottan dolayı öğretmenin beni sınıf önünde tebrik etmesi hoşuma gider.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
20. Okulda öğretilmeyen birçok bilimsel konu ile ilgilenirim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
21. Sınıf arkadaşlarıma bana kızgın olması, beni herhangi bir soruyu hatalı çözmemden daha çok üzer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
22. Bir parti davetini bu hafta içindeki sınavıma çalışmak için reddedebilirim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
23. Öğrendiğim sürece, fen bilgisi dersine ne kadar çalıştığım benim için önemli <b>değildir.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
24. İyi arkadaşlara sahip olmak okuldaki en önemli şeylerden biridir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
25. Öğretmenimin anlattığı bir konuda şüphelerim varsa o konuyla ilgili birçok kitaptan araştırma yaparım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
26. Sınıf içi tartışmalarda üstün olmaya çalışırım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
27. Sınav olurken, arkadaşım bana bir şey sorarsa ona yardım etmeye çalışırım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
28. Sınavlardan aldığım düşük notlar beni <b>utandırır.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
29. Sınav sırasında benim için en önemli şey, sınavdaki en yüksek notu almaktır.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
30. Fen öğretmenimi bilimsel konularda bilgi verirken dinlediğimde aklımdan birçok soru geçer.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

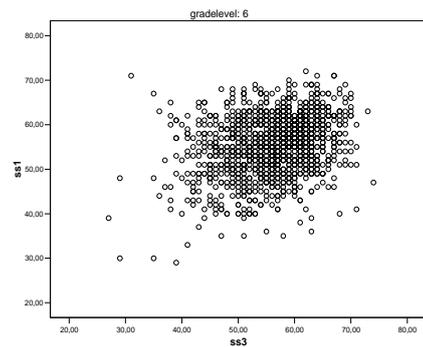
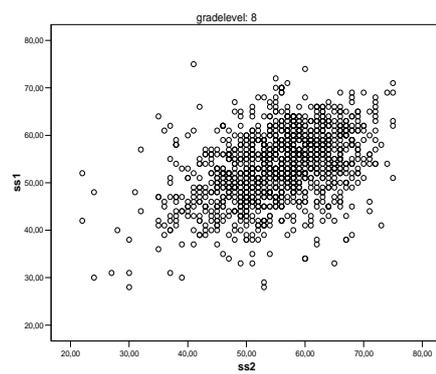
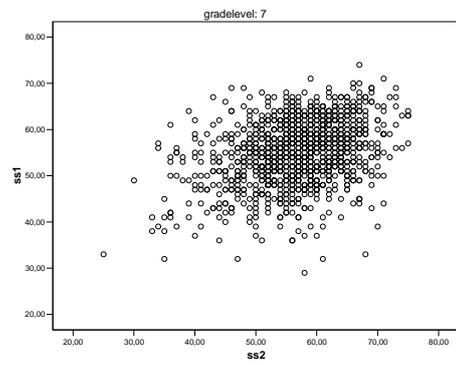
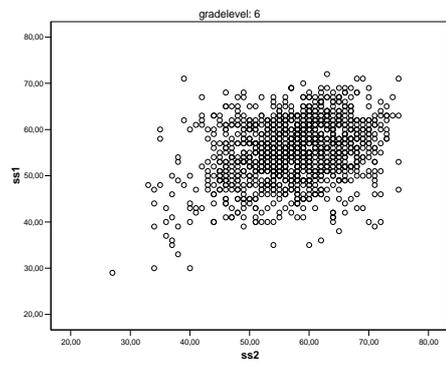
	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
31. Fen sorularını çözerken gösterdiğim çabayı öğretmenin takdir etmesini isterim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
32. Fen dersinde soru çözerken o soruyu bitiren ilk kişi olmayı isterim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
33. Fen dersinde işlediğimiz her yeni konu bende merak uyandırır.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
34. Benim yaptığım ödevleri veya soruları arkadaşlarımdan kopya etmesine <b>aldırmam.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
35. Herhangi bir noktayı kaçırmamak için öğretmenimin anlattıklarını büyük bir dikkatle dinlerim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
36. Arkadaşlarımdan notlarımla gurur duymasının isterim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
37. Öğretmenin ödevlerimi her gün kontrol etmesini isterim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
38. Fen soruları çözerken alabileceğim notlardan çok o sorunun çözümü veya cevabıyla ilgilenirim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
39. Arkadaşlarıma benden istedikleri bütün kitapları ve derste tuttuğum notları ödünç veririm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
40. Eğer grup çalışmasında arkadaşlarımdan seçeceksem en başarılı olanları seçerim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
41. Yaptığım işle öğretmenimi memnun etmek için çok çalışırım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
42. Belirli fen konularında, gerek görülen okumaların dışında konu ile ilgili diğer kitapları da okumayı severim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

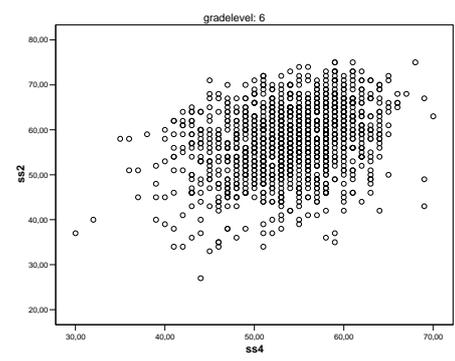
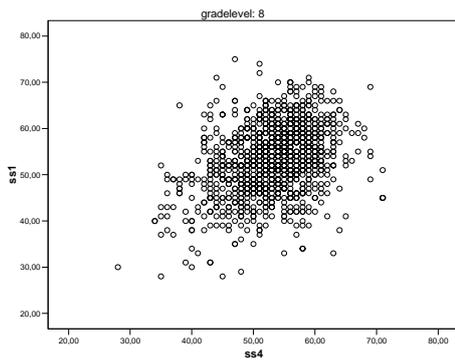
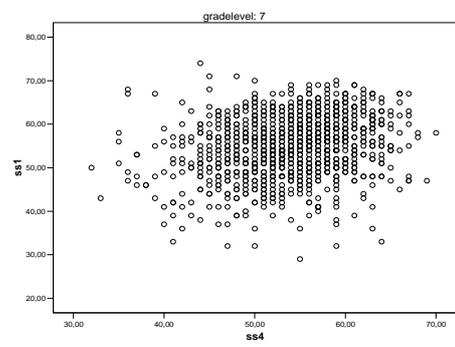
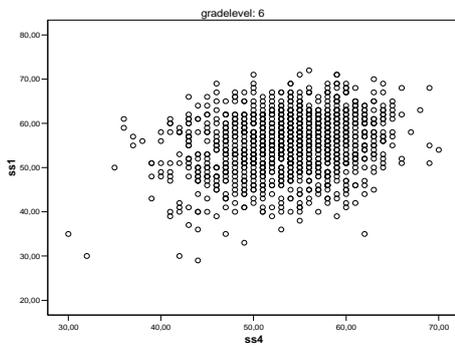
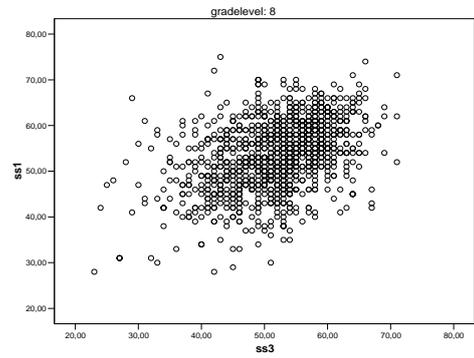
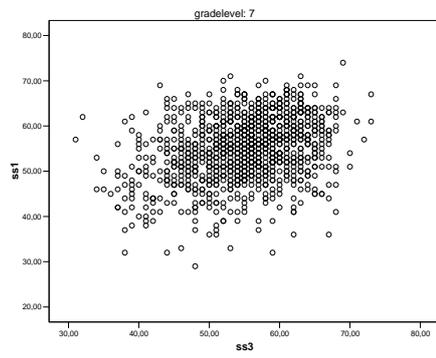
	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
43. Notlarımın sınıf arkadaşlarımla karşılaştırılmasından <b>hoşlanmam.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
44. Öğrenciler tarafından fen konularında yapılan sınıf içi tartışmalar, ders kitaplarından yeni ve farklı şeyler öğrenmemi sağlar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
45. Sorunun çözümünü bilmesine rağmen, diğerleriyle paylaşmayan arkadaşlarımı <b>anlamıyorum.</b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
46. Küçük bir grupta çalışırken, gurubumun sınıftaki en iyi çalışmayı yapması beni mutlu eder.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
47. Sahip olduğum bilgimin yeterli olmadığını düşündüğüm için yeni şeyler öğrenmeye meraklıyım.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
48. Öğretmenlerimin yerine arkadaşlarım tarafından değerlendirilmeyi tercih ederim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
49. Ödevim geri verildiğinde yaptığım yanlışlardan çok, aldığım notla ilgilenirim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
50. Sınıf içinde genellikle sessiz dururum ve yapmakta olduğum işe devam ederim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
51. Küçük gruplar halinde çalışmak sınıftaki öğrencilerin birbirleriyle iletişim kurmasına olanak sağlar.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
52. Bilimsel kanunları öğretmenin açıkladığından daha farklı yollarla açıklamaya çalışmak çok eğlencelidir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

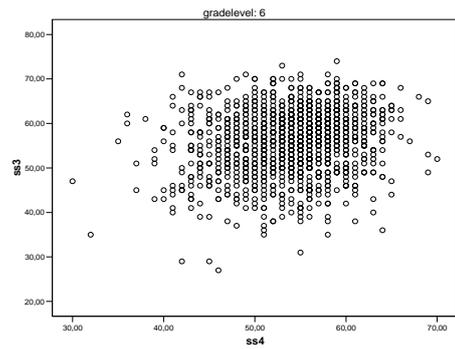
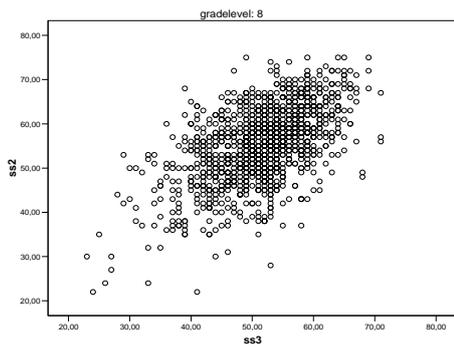
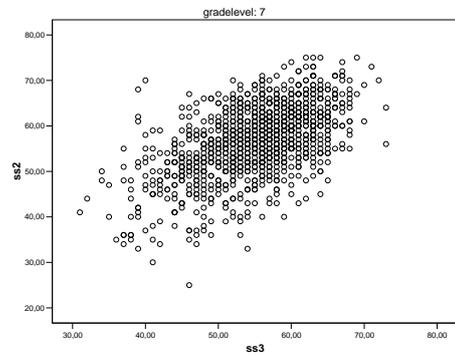
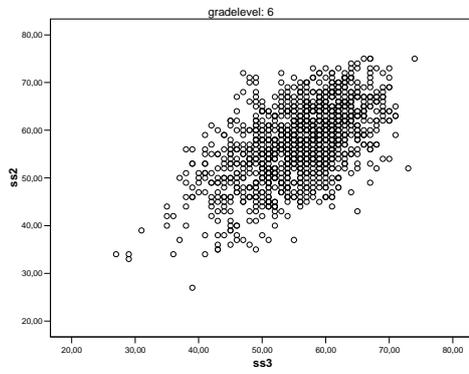
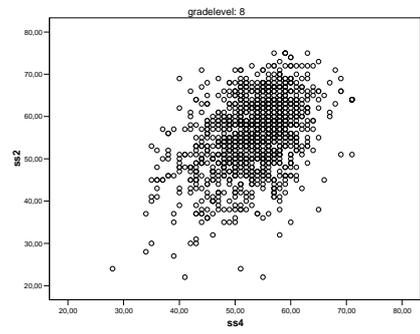
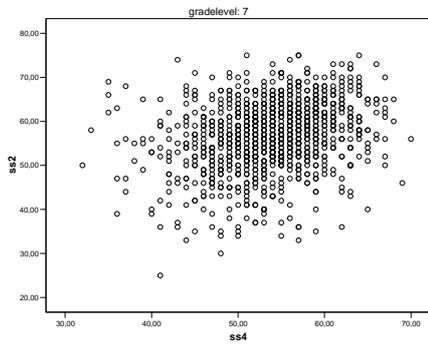
	Kesinlikle Katılıyorum	Katılıyorum	Kararsızım	Katılmıyorum	Kesinlikle Katılmıyorum
53. Öğretmen, öğrencilerinin dersini kesmelerini istememekte haklıdır.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
54. Sınıf tartışmalarında düşüncelerimin diğerlerinin düşüncesinden üstün tutulmasını isterim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
55. Eğer düşük not alırsam cesaretim kırılır, fakat hemen kendime gelecek sefer daha iyi olacağımı söylerim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
56. Elimden gelenin en iyisini yapmak için fen ödevlerime özen gösteririm.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
57. Sınıf arkadaşlarım benimle çalışmaktan hoşlanmasalar bile, ben onlarla grup çalışması yapmayı isterim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
58. Ev ödevi yaparak daha çok öğrendiğimden eminim.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
59. Tahtada soru çözmeye gönüllü olmak için sorunun tam çözümünden emin olmam gerekir.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
60. Küçük bir grup içinde çalışırken grup arkadaşlarımla sınıfın en iyileri olmalarına <b><u>aldırmanm.</u></b>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

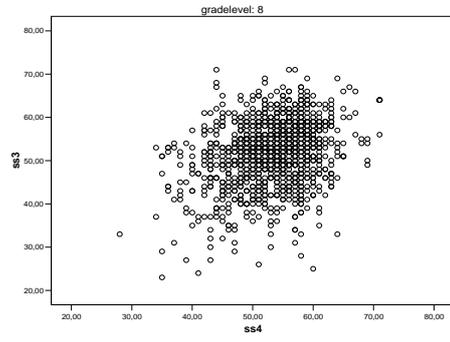
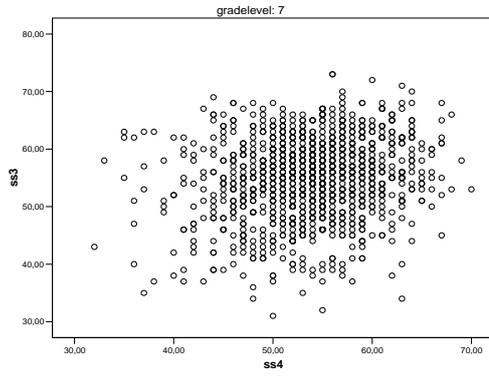
## APPENDIX B

### SCATTER PLOTS FOR EACH PAIR OF THE DEPENDENT VARIABLE WITH RESPECT TO GRADE LEVEL



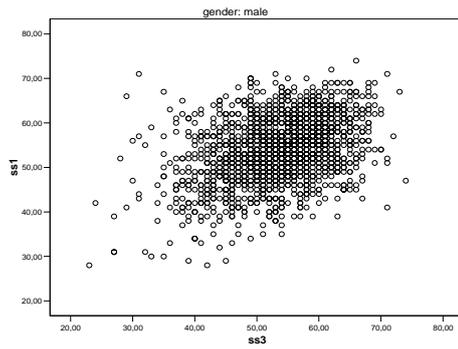
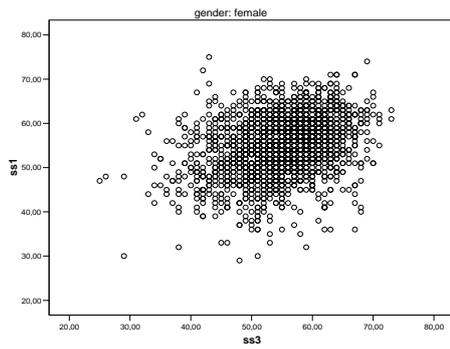
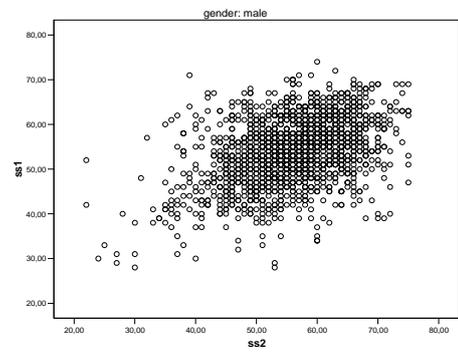
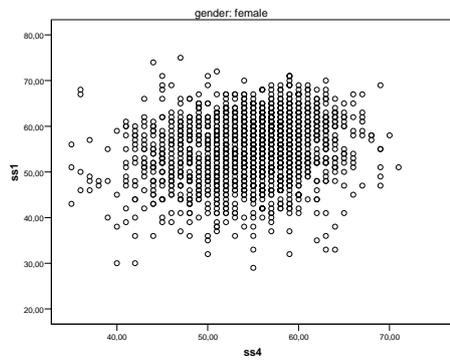


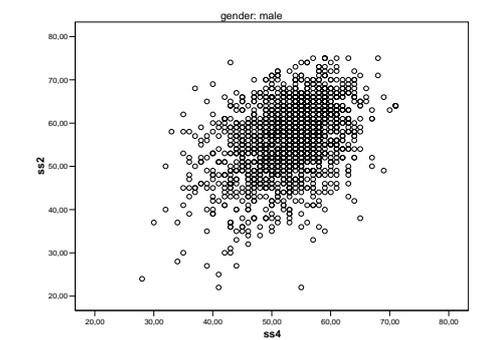
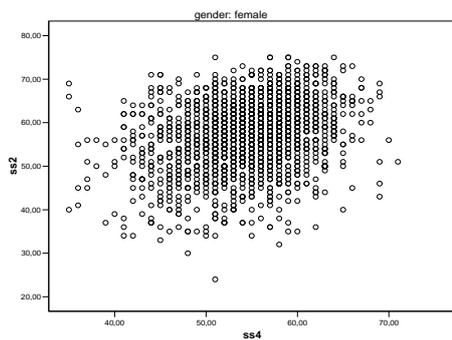
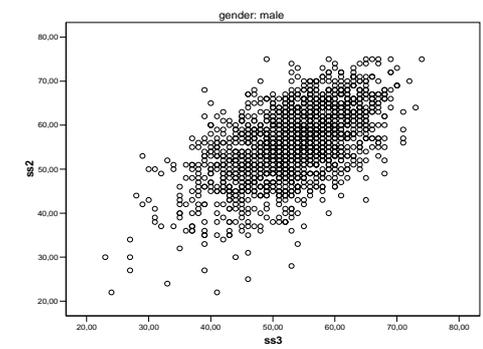
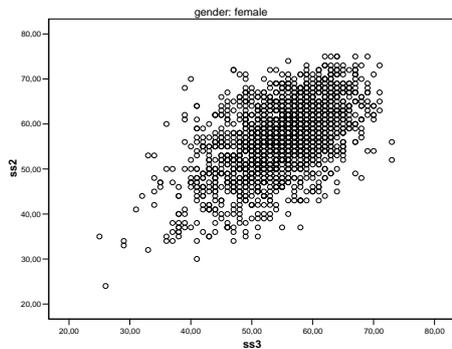
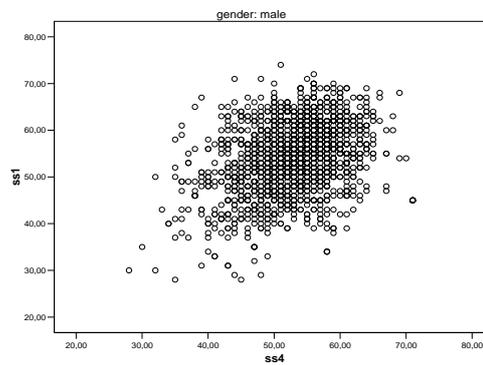
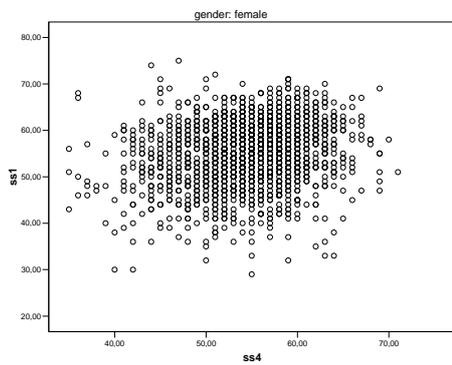


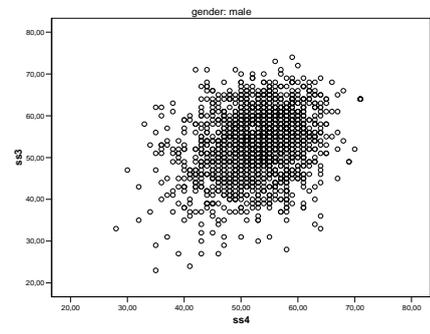
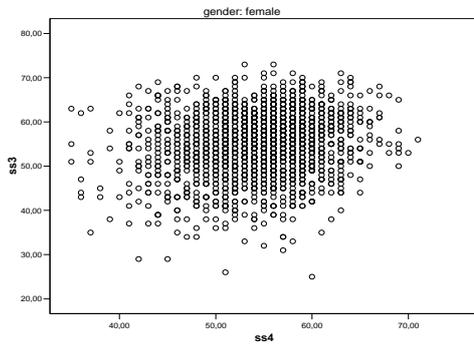


## APPENDIX C

### SCATTER PLOTS FOR EACH PAIR OF THE DEPENDENT VARIABLE WITH RESPECT TO GENDER







## APPENDIX D

### SCATTER PLOTS FOR EACH PAIR OF THE DEPENDENT VARIABLE WITH RESPECT TO LOCATION OF THE SCHOOL

