



EXAMINATION OF HIGH SCHOOL STUDENTS' MOTIVATION AND LEARNING STRATEGIES

LİSE ÖĞRENCİLERİNİN MOTİVASYON VE ÖĞRENME STRATEJİLERİNİN DEMOGRAFİK DEĞİŞKENLERE GÖRE İNCELENMESİ

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ABSTRACT: Today's societies strive toward not leaving any children behind in their educational systems. Efficacy of educational inputs and processes is of paramount importance in today's education. Research studies can provide essential input in efforts toward attaining such efficacy. Thus, the purpose of this study was to test if high school students' motivation and learning strategies scores differed significantly according to their gender, grade level, mother's level of education and father's level of education. Participants of the study were 318 volunteering high school students. Motivational and Learning Strategies Questionnaire and the Demographic Information Form were used for data collection. Data analysis was done with ANOVA and MANOVA procedures. Results showed that students' scores on motivation factor differed only according to grade level. Their scores on learning strategies factor differed according to both gender and grade level. Results, limitations of the study and implications for educators and school counselors were discussed.

Keywords: Motivation, learning strategies, high school students, mathematics education.

ÖZET: Bugünün eğitim sistemleri olabildiğince hiçbir çocuğu geride bırakmama çabasındadırlar. Ayrıca, eğitim sistemleri tarihin diğer bütün zamanlarına kıyasla, bugün çok daha etkili olma çabasındadırlar. Eğitim girdi ve süreçlerine ilişkin bilimsel araştırmalar bu çabanın etkili olması yönünde ışık tutacaktır. Öğrencilerin motivasyon ve öğrenme stratejileri en önemli girdilerden bir tanesidir. Bu nedenle, bu araştırmanın amacı, lise öğrencilerinin matematik dersine ilişkin güdülenme ve öğrenme stratejileri puanlarını bir grup değişkene göre incelemek olarak belirlenmiştir. Araştırmaya Ankara ilindeki bir Anadolu Lisesinden 318 gönüllü öğrenci katılmıştır. Veri toplamada Güdülenme ve Öğrenme Stratejileri Ölçeği ile Demografik Bilgi Formu kullanılmıştır. Veri analizi için MANOVA ve ANOVA teknikleri kullanılmıştır. Güdülenme alt ölçeği puanlarının sadece sınıf düzeyine göre farklılaştığı; bu puanların cinsiyete, anne ve baba eğitim düzeyine göre manidar bir farklılık göstermediği bulunmuştur. Öğrenme stratejileri alt ölçeği puanlarının hem cinsiyete hem de sınıf düzeyine göre farklılaştığı; bu puanların anne ve baba eğitim düzeyine göre manidar bir farklılık göstermediği bulunmuştur. Araştırmanın sonuçları, sınırlılıkları, eğitim ve psikolojik danışma ve rehberlik alanları için doğurguları tartışılmıştır.

Anahtar sözcükler: Güdülenme, öğrenme stratejileri, lise öğrencileri, matematik eğitimi.

1. INTRODUCTION

Today's youths are expected to acquire incomparably greater amounts of information and to stay in formal education longer than ever before. They are having to adjust to fast-paced changes more so than any previous times in human history (Geisler-Breinstein & Schmeck, 1996). Furthermore, student bodies in almost all countries around the world have grown in numbers and become more diverse than ever. Such circumstances of contemporary societies pose challenges for today's educators in terms of creating educational environments fostering and maintaining effective learning strategies as well as levels of motivation through long years of formal education. How educators meet these challenges is particularly vital in educational systems aiming at leaving no child behind.

Every contemporary educator knows that without motivation learning would be inconceivable. Motivation has been of great interest to researchers in various disciplines ranging from industrial psychology, education to management. Although motivation is typically viewed as a key factor promoting learning, accumulated research also shows that it is a result of learning (Hodges, 2004). As such, various models of motivation and its relationship with learning have emerged during last few decades. Keller's ARCS model highlights four major components of motivation, namely, attention, relevance, confidence and satisfaction (Keller, 1984, 1987). This model proposes that the educational

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material and environments should (a) provide stimuli that engage the learner and thus attract his or her attention; (b) should have relevance to the learners' goals; (c) should promote positive expectancies of success and self-efficacy; and (d) should provide learners with positive feelings about their learning experiences. Wlodkowski's (1985) Time Continuum Model of Motivation has commonalities with Keller's model but focuses more on the role of motivation at different stages of learning: the beginning of the learning process, during the learning process, and the end of the learning process. The model claims that at the beginning of the learning process, attitudes and needs of the learners; during the process stimulation and affect and at the end of the learning process competence and reinforcement should be targets of motivational strategies utilized by educators. Another model of motivation and learning was developed by Moshinskie (2001). Similar with Wlodkowski's model, Moshinskie's model is built on the same three-stage model of learning. Moshinskie added that at each of these stages active versus passive attitudes persons assume in life. Moshinskie proposes that individuals who have predominantly active attitude toward life (those with intrinsic motivation) and individuals who assume a more passive attitude toward life (those with extrinsic motivation) will have different motivational needs at each of the three stages of learning. Theoretical orientations and research on motivation have emerged from diverse directions. In addition to behaviorist, cognitive and social cognitive approaches to motivation and learning, there have been a variety of models ranging from Maslow's hierarchy of needs to Herzberg's two factor theory, expectancy theory to goal setting theory. Studies with motivation have been extended to distance education, computer-based learning ("e-learning") and to work with a variety of populations. Neuroscientific examination of motivation has explored the roles of mid-brain dopamine neurons and other neural and cognitive processes play in motivation and learning (i.e., Daw and Shohamy, 2008).

In addition to motivational processes, what students actually do in the process of classroom learning is another essential aspect students' learning experience. Motivation and learning strategies are complimentary. Neither of them can promote desired degrees of learning and achievement without the presence of the other. In other words, a highly motivated student who does not possess effective strategies for learning may not fully benefit from classroom learning experiences. Likewise, a student with impressive learning strategies who does not have sufficient degree of motivation may not fully engage in learning experiences. Thus, both motivational processes and learning strategies should be taken into account as essential components of academic performance in the classroom context (Garcia & Pintrich, 1994).

A host of studies have addressed students' ways of thinking, strategies that can help them to process information, plan study activities, monitor their attention and sustain their motivation for learning (Ames & Archer, 1988; Corno & Mandinach, 1983; Pressley, 1986; Pressley & Levin, 1983). This study focuses on general learning strategies, those that can be applied to multiple contexts and that can enhance learning across knowledge domains. Learning strategies of this sort serve to regulate and monitor time, concentration, effort, and comprehension (McKeachie, Pintrich, & Lin, 1985) and are related to what some have called support strategies (Dansereau, 1985; Thomas & Rohwer, 1986), self-instructions and self-monitoring (Corno & Mandinach, 1983; Weinstein & Mayer, 1986) or strategic thinking (Covington, 1985).

Studies on achievement and motivation conducted during the 1970s and 1980s attempted to identify students' goal orientations and their relationships with motivational processes. Some authors argued that goal orientations can be viewed as task involved versus ego involved (Maehr, 1983; Maehr & Nicholls, 1980; Nicholls, 1984). Others conceptualized them as learning oriented versus performance oriented (Dweck, 1988; Dweck & Elliott, 1984) or as mastery focused versus ability focused (Ames, 1984). Integrating these points of views, Ames and Archer (1988) conceptualized goal orientations as mastery and performance goals.

Regulation of cognition and behavior is an essential aspect of student learning and academic performance in the classroom context (Corno & Rohrkemper, 1985). There are many definitions of self-regulated learning. Pintrich and De Groot (1990) identify three components as essential aspects of self-regulated learning in the classroom. One involves students' metacognitive strategies for planning, monitoring, and modifying their cognition (Corno, 1986; Zimmerman & Pons, 1988). Second has to

do with students' management and control of their effort on classroom academic tasks such as persistence on tasks and blocking out (ignoring) distractions and thus maintaining their cognitive engagement in the task. Third aspect of self-regulated learning in the classroom involves the actual cognitive strategies that students use to learn, remember and understand the material.

Studies have shown that individuals with higher levels of self-regulation tend to have higher degrees of achievement than those with lower levels of self-regulation. Persons with high self-regulation are more likely to be motivated to use planning, organizational and self-monitoring strategies (Pintrich & De Groot, 1990). Pintrich, Smith, Garcia and McKeachie (1993) state that motivational, cognitive and metacognitive strategies are essential elements of students' regulation of their cognition. Garcia and Pintrich (1996) view motivational elements as "students' perceptions of the classroom environment as well as their self-related belief such as personal goals, self-efficacy, interest and value beliefs" (p. 319). Cognitive components include students' content knowledge, along with a host of cognitive learning strategies such as rehearsals, elaborations, organization and metacognitive strategies (such as planning, monitoring and regulating learning). Cognitive learning strategies include elaboration and organizational strategies. Elaboration strategies refer to paraphrasing or summarizing the material at hand, creating analogies, generative note taking and connecting ideas personal note taking. The organizational strategies refer to behaviors such as selecting the main idea from the text, outlining the text or material at hand, and using a variety of other techniques for selecting and organizing the ideas in the material to be learned (Garcia & Pintrich, 1994). This view of motivational processes and learning strategies utilizes a social cognitive orientation, which sees the learner "as an active processor of information whose beliefs and cognitions are important mediators of instructional input and task characteristics" (Garcia & Pintrich, 1996, p. 323).

Contemporary research in education and areas of mental health attempts to focus on variables and issues whose examination can foster professional practice. In other words, studies in these areas try to reach at some degree of precision so as to shed light on practical issues. The Motivated Strategies for Learning Questionnaire (MSLQ) emerged from the self-regulated learning line of research (i.e., Harris & Graham, 1999; Schraw, Crippen, & Hartley, 2006; Shunk, 1996) which combines motivational processes and cognitive strategies in situation-specific contexts. This point of view is not as interested in a student's general level of motivation or learning strategies he or she generally utilizes as it is in exploring the student's level of motivation and learning strategies in a given course. The rationale for this stand point is that individuals may utilize different strategies for different learning materials and environments and might have various motivational processes at work for each set of material. Therefore, in this study, students' motivational processes and learning strategies in mathematics was examined.

Empirical examination of psychological constructs measured by newly adopted instruments will not only clarify the constructs and thus enrich evidence for the instruments' construct validity but will also make cross-cultural comparisons possible. The MSLQ has recently been adapted to Turkish thus there is need for further studies utilizing this instruments with Turkish samples. Therefore, the purpose of the first part of this study was to test if high school students' motivation and learning strategies scores on the MSLQ differed significantly according to their gender, grade level, mother's level of education and father's level of education. The second part of the study aimed at identifying which factors of motivation and learning strategies differed significantly according to the independent variables. Gender was chosen as an independent variable because of the historical debate over gender differences in mathematical ability and achievement. Grade level was chosen to examine if students' motivational factors and learning strategies differed with age and content of mathematics courses. Lastly, each parent's level of education was used based on the assumption that the guidance and learning environment provided to the students at home might differ according to parental level of education which in turn might impact their motivation and learning strategies.

2. METHOD

2. 1. Participants

A convenient sample of 318 volunteer students from an Anatolian High School in Ankara, Turkey was utilized in this survey study. The sample consisted of 122 females (38%) and 196 males (62%). Students' age ranged between 14 and 17 years with a mean of 15.42 (SD=0.76). Fifty percent of the students were ninth graders, 25% tenth graders and almost 25% were eleventh graders. Majority of students' parents were university graduates (55.1% of mothers and 61% of fathers).

2. 2. Procedures

After school administration's permission was obtained, students present at the school were informed about the nature and purpose of the study and their consent was obtained. Students who volunteered to participate in study were given the surveys during their respective class sessions. The survey consisted of the MSLQ scale and a demographic questionnaire. Completion of the instruments took about 20-30 minutes.

2. 3. Instruments

The Motivated Strategies for Learning Questionnaire (MSLQ): Developed by Pintrich, Smith, Garcia and McKeachie in 1991, the MSLQ is a self-report instrument designed to assess college students' motivational orientation and their use of different learning strategies for a college course. There are two sections to the MSLQ, a motivation section and a learning strategies section. Eighty one items of the MSLQ are scored on a seven-point Likert scale, ranging between 1 (not at all true of me) to 7 (very true of me). The motivation section consists of 31 items that assess students' goals and value beliefs for a course, their beliefs about their skills to succeed in the course, and their anxiety about tests in the course. The learning strategy section includes 50 questions: 31 items regarding students' use of different cognitive and metacognitive strategies and 19 items concerning students' management of different learning resources (Garcia & Pintrich, 1996). The Motivation section has six factors (intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs, self-efficacy for learning and performance and test anxiety) and the learning strategies section has nine factors (rehearsal, elaboration, organization, critical thinking, peer learning, effort management, help seeking, metacognition, time and study environment).

The MSLQ was adapted into Turkish culture by Karadeniz, Büyüköztürk, Akgün, Çakmak and Demirel (2008). In the adaptation study the scale was administrated to 1114 students aged between 12 and 18 years. Results of the confirmatory factor analyses showed that the first subscale, Motivation, had six factors, and the second subscale, Learning Strategies, had nine factors which were parallel to the factor-structure of the original scale. Based on the results of the confirmatory factor analysis; 6 items from motivation subscale and 5 items from learning strategies subscale were removed due to their low factor loadings. The corrected item total correlations ranged 0.58 to 0.15 for motivation subscale, and 0.68 to 0.19 for learning strategies subscale (Karadeniz et al., 2008).

Demographic Information Form: Participants were given a demographic information form inquiring information on age (open ended), gender (female or male), grade level (open ended), mother's level of education (illiterate, elementary school graduate, middle school graduate, high school graduate, university graduate or with a master's degree) and father's level of education (illiterate, elementary school graduate, middle school graduate, high school graduate, university graduate or with a master's degree).

2. 4. Data Analysis

Two-way MANOVA was used to test if high school students' scores on the motivation and learning strategies sections of the MSLQ differed significantly according to their gender, grade level, mother's level of education and father's level of education. Analysis of variance (ANOVA) was conducted on each dependent variable as a follow-up test for MANOVA. In addition, Box's M was

used to test for assumption of homogeneity of variance-covariance and Scheffe's test was used as the follow up procedure. For this study significance level was set at .05.

3. RESULTS

3. 1. First Part of the Study

Two-way MANOVA was used to test if high school students' scores on the motivation and learning strategies sections of the MSLQ differed significantly according to their gender, grade level, mother's level of education and father's level of education. The MSLQ sub-scales were taken as dependent variables. Gender, grade level, mother's level of education and father's level of education were the independent variables.

A two-way MANOVA was conducted to determine if students' scores on the two sub-scales (motivation and learning strategies) differed significantly according to gender and grade level. First, the assumption of homogeneity of variance-covariance was tested with Box's M Test which was not significant and indicated that homogeneity of variance-covariance was fulfilled ($p=.280$). The MANOVA illustrated that main effects of gender [Wilks' $\lambda=.890$, $F(2,311)=19.231$, $p<.001$, $\eta^2=.11$] and grade level [Wilks' $\lambda=.792$, $F(4,622)=19.181$, $p<.001$, $\eta^2=.11$] differences were significant on the MSLQ sub-scales. Interaction of gender and grade level were also significant [Wilks' $\lambda=.931$, $F(4,5622)=5.681$, $p<.001$, $\eta^2=.035$]. Thus, these results indicated that students in mathematics classes had motivation and learning strategies subscale scores varying significantly according to their gender and grade level. However, multivariate effect sizes were very small.

Analysis of variance (ANOVA) was conducted on each dependent variable as a follow-up test for MANOVA. Univariate ANOVAs revealed that students' scores on motivation did not differ significantly according to gender [$F(1,312)=.362$, $p=.548$, $\eta^2=.001$] while their scores on learning strategies did [$F(1,312)=32.184$, $p<.001$, $\eta^2=.094$]. Female students had a mean of 232.11 (SD=37.162) while their male peers had 210.93 (SD=37.668). In other words, female students had significantly higher mean scores on learning strategies than male students in mathematics courses.

ANOVA results showed significant differences in scores on both motivation [$F(2,312)=19.65$, $p<.001$, $\eta^2=.112$] and learning strategies [$F(2,312)=5.622$, $p=.004$, $\eta^2=.044$] according to grade level. Scheffe's post hoc test showed that motivation scores of 9th and 11th graders were significantly different as well as those of 10th and 11th graders ($p<.05$). Ninth, 10th and 11th graders had mean motivation scores of 125.19 (SD=16.535), 125.68 (SD=16.117) and 137.08 (SD=15.793) respectively. Thus, 11th graders had significantly higher motivation scores than students of other two grades.

Scheffe's post hoc test was also conducted for learning strategies scores. The results showed that there were significant differences in mean scores of 9th and 10th graders and 9th and 11th graders ($p<.05$). Ninth, 10th and 11th graders had mean learning strategies scores of 227.70 (SD=35.160), 214.95 (SD=31.444) and 204.40 (SD=49.242) respectively. Thus, 9th graders had significantly higher scores on the learning strategies subscale than 10th and 11th graders.

One-way-MANOVA was used to determine if students' scores on motivation and learning strategies differed significantly according to father's level of education. First, the Box's test was used to ensure homogeneity of variance-covariance. This test was not significant [$p=.163$] and indicated that homogeneity of variance-covariance was fulfilled. The MANOVA results showed that scores on the subscales of MSLQ (motivation and learning strategies) did not differ significantly according to father's level of education [Wilks' $\lambda=.983$, $F(8,624)=.668$, $p=.720$, $\eta^2=.008$].

One-way-MANOVA was used to determine if students' scores on motivation and learning strategies differed significantly according to mother's level of education. First, the Box's test was used to ensure homogeneity of variance-covariance. This test was not significant [$p=.273$] and thus it was indicating that assumption of homogeneity of variance-covariance was fulfilled. The MANOVA results indicated that scores on the subscales of MSLQ did not differ significantly according to mother's level of education [Wilks' $\lambda=.977$, $F(10,622)=.739$, $p=.688$, $\eta^2=.017$].

3. 2. Second Part of the Study

The second part of the study aimed at identifying which factors of motivation and learning strategies which differed significantly according to the independent variables. Thus, analyses of the second part of the study involved a further examination of significant MANOVA and univariate ANOVA results which showed that scores on the motivation subscale differed significantly according to grade level but did not differ significantly with respect to gender and father's and mother's level of education. Thus, part of the purpose of the second part of the study was to detect as to scores of which of the six factors of motivation differed significantly according to grade level. A One-way MANOVA was conducted with grade level being independent variable and scores on the six factors of motivation (intrinsic goal orientation, extrinsic goal orientation, task value, control of learning beliefs, self-efficacy for learning and performance and test anxiety) being dependent variables. MANOVA results showed that students' scores on "self-efficacy for learning and performance" [$F(2,315)=10.176$, $p=.000$, $\eta^2=.061$] and "test anxiety" differed significantly [$F(2,315)=30.420$, $p=.000$, $\eta^2=.162$] according to grade level. Scheffe's post hoc results for grade level and "self-efficacy for learning and performance" subscale indicated that scores of 9th and 11th graders ($p<.05$) and those of 10th and 11th graders ($p<.05$) differed significantly. Ninth grade students' mean on the self-efficacy factor was 26.26 (SD=5.739), 10th graders' was 26.08 (SD=5.625) and 11th graders' was 29.96 (SD=3.455).

Scheffe's post hoc test results for grade level and "test anxiety" subscale indicated that scores of 9th and 11th graders ($p<.05$) and those of 10th and 11th graders ($p<.05$) differed significantly. Students' mean scores on the test anxiety factor were 18.36 (SD=5.786), 19.30 (SD=5.931) and 24.85 (SD=7.069) for 9, 10 and 11th graders respectively. In other words, 11th graders mean scores on both "self-efficacy for learning and performance" and "test anxiety" factors were significantly higher than those of 9th and 10th graders.

Table 1: Descriptive Statistics of Self-Efficacy and Test-Anxiety Scales by Grade Level

Grade	N	Self-Efficacy		Test Anxiety	
		Mean	Std. Deviation	Mean	Std. Deviation
9	160	26.26	5.739	18.36	5.786
10	80	26.08	5.625	19.30	5.931
11	78	29.96	3.455	24.85	7.069

In the first part of the study, MANOVA and univariate ANOVA results which showed that scores on the learning strategies subscale differed significantly according to gender and grade level but did not differ significantly with respect to father's and mother's level of education. Thus, part of the purpose of the second part of the study was to identify as to scores of which of the nine factors of learning strategies (rehearsal, elaboration, organization, critical thinking, peer learning, effort management, help seeking, metacognition, time and study environment) differed significantly according to gender and grade level. One-way MANOVA results showed that factors of; "rehearsal" [$F(1,316)=17.594$, $p=.000$, $\eta^2=.053$], "organization" [$F(1,316)=16.153$, $p=.000$, $\eta^2=.049$], "elaboration" [$F(1,316)=11.810$, $p=.001$, $\eta^2=.036$], "metacognition" [$F(1,316)=39.374$, $p=.000$, $\eta^2=.111$], "help seeking" [$F(1,316)=11.388$, $p=.001$, $\eta^2=.035$], "effort management" [$F(1,316)=15.250$, $p=.000$, $\eta^2=.046$] and "time and study environment" [$F(1,316)=27.447$, $p=.000$, $\eta^2=.080$] differed significantly according to gender ($p<.05$). Female students had higher scores on these factors than their male peers.

Table 2: Descriptive Statistics of Learning Strategies Subscale According to Gender

	Gender	Mean	Std. Deviation	N
Rehearsals	M	17.74	4.812	196
	F	19.40	4.859	122
Organization	M	17.99	5.148	196
	F	19.95	4.800	122
Elaboration	M	28.87	6.515	196
	F	30.51	6.632	122
Metacognition	M	53.59	10.060	196
	F	59.09	10.206	122
Help-seeking	M	14.82	3.337	196
	F	15.96	3.280	122
Effort Management	M	18.05	4.172	196
	F	19.46	3.737	122
Time & Study Env.	M	29.34	5.491	196
	F	31.63	5.669	122

One-way MANOVA results showed that factors of; “rehearsal” [$F(2,315)=9.293, p=.000, \eta^2=.056$], “organization” [$F(2,315)=7.775, p=.001, \eta^2=.047$], “elaboration” [$F(2,315)=5.458, p=.005, \eta^2=.033$], “critical thinking” [$F(2,315)=5.75, p=.004, \eta^2=.035$] “metacognition” [$F(2,315)=7.916, p=.000, \eta^2=.048$] and “peer learning” [$F(2,315)=7.091, p=.001, \eta^2=.043$] differed significantly according to grade level ($p<.05$). Sheffe’s post hoc test was run to identify the sources of differences. Scheffe’s test showed that on all the factors mean scores of 9th and 10th graders and those of 9th and 11th graders differed significantly ($p<.05$). Ninth graders had higher mean scores on “rehearsal”, “organization”, “elaboration”, “critical thinking”, “metacognition” and “peer learning” factors.

Table 3: Descriptive Statistics of Learning Strategies Subscale According to Grade Level

	Grade	Mean	Std. Deviation	N
Rehearsal	9	18.81	4.920	160
	10	18.46	4.349	80
	11	15.64	5.597	78
Organization	9	19.30	4.951	160
	10	18.55	4.441	80
	11	16.16	6.998	78
Elaboration	9	30.51	6.189	160
	10	28.21	6.296	80
	11	27.40	8.822	78
Critical Thinking	9	24.59	5.599	160
	10	22.45	5.079	80
	11	22.36	5.693	78
Metacognition	9	57.42	10.040	160
	10	53.93	9.351	80
	11	51.36	14.032	78
Peer Learning	9	11.56	3.445	160
	10	10.75	3.168	80
	11	9.56	4.134	78

4. DISCUSSION

Motivation scores differed only according to grade level but not with gender, mother's or father's level of education. Furthermore, only "self-efficacy for learning and performance" and "test anxiety" scores differed and 11th graders had higher scores on these two factors of motivation than others. These findings are consistent with those by Kılıç-Çakmak, Akgün, Karadeniz, Büyüköztürk and Demirel (2008) who also worked with a high school sample. They also found that 11th graders had higher scores on the "self-efficacy for learning and performance" and "test anxiety" factors than 9th and 10th graders. This might be considered as indicating a change (improvement) in self-efficacy for learning and performance" and an increase in "test anxiety" with grade. Higher scores in 11th grade could also be associated with the approaching Student Selection Examination which is used for entry to universities in Turkey. In other words, as students progress through high school they might be building up self-efficacy regarding their learning and performance. At the same time, getting closer to high school graduation thus to the above mentioned examination might bring up worries about their performance in exams. One could also find this finding puzzling because higher scores on self-efficacy would be thought to correspond to lower levels of test anxiety. Self-efficacy has to do with individual's beliefs about his or her ability to control or overcome a given challenge while test anxiety refers to elevated levels of fear and anxiety that accompany concerns about failure or lack of competence on an exam or evaluative situation. Indeed, in his work with a Native American high school sample, Golightly (2007) found that students with higher levels of self-efficacy had lower levels of test anxiety. Findings of previous research typically point to gender differences particularly in self-efficacy and test anxiety. While males tend to overestimate their abilities more than females do in various domains (Pajares & Valiante, 1999), females are found to have higher levels of test anxiety (Pintrich, 1989). Working with a Turkish high school sample, Altun (2005) also found similar gender differences. However, results of the current study did not find gender differences on these two factors of motivation. Although one could attribute this to relatively homogenous academic standings of male and female students in Anatolian high schools, further work is needed to enrich the existing empirical insight on this population.

Scores on learning strategies differed significantly by gender and grade level but did not by mother's and father's levels of education. More specifically, of the nine factors of learning strategies, scores on "rehearsal", "organization", "elaboration", "metacognition", "help seeking", "effort management" and "time and study environment" differed significantly by gender. More specifically, female students scored higher on these factors than males. Working with a Finish sample of high schoolers from various cultural and ethnic backgrounds Kivinen (2003) found similar results. His findings showed that female students utilized more cognitive and metacognitive learning strategies than males. The highest difference was on the elaboration factor of the learning strategies subtest of the MLSQ. Likewise, girls were more successful in both language and math courses. Although the current study did not detect a significant difference on the "critical thinking" factor, Kivinen (2003) found that this was the only factor on which males attained higher scores than females. In their work with a Spanish high school sample Rusillo and Arias (2004) also found that female students made greater use of learning strategies such as information processing and self-evaluation strategies than males. There have also been studies which found more gender similarities than differences (i.e., Pintrich & De Groot, 1990). Hence, further work with diverse sets of Turkish populations is needed to make firm conclusion on the relationship between gender and motivation and learning strategies.

Students' scores on factors of "rehearsal", "organization", "elaboration", "critical thinking", "metacognition" and "peer learning" differed significantly according to grade level. Ninth graders scored higher on these factors than 10th and 11th graders. Furthermore, students' scores on these factors decreased with grade level. Studies exploring students' motivation and learning strategies by grade have found mixed results. For example, in their work with Romanian elementary, middle and high school students, Mih and Mih (2001) found that students' scores on factors of MLSQ did not show any particular patterns of variation depending upon their grades. Ninth graders higher scores on these factors might be due to their new entry in the highly competitive environment of the Anatolian high school which receives its students through highly selective national examinations. Furthermore, this

result could in part be due to the content of mathematics courses in 9, 10 and 11th grades. In Turkish high schools 9th grade math involves more topics of algebra and relatively easier subjects than the proceeding grades.

While viewing results of this study some limitations of the study need to be kept in mind. For instance, the sample was made of students from one type of school. In other words, working with a sample of an Anatolian high school might be criticized in that students in such schools are of relatively homogeneous academic characteristics. Another limitation of the study has to do with exclusion of students' achievement. Incorporating students' grades in mathematics courses into the study could provide a richer picture of these students' learning outcomes. Moreover, the study relied on self-report which might also pose some limitations to its findings.

Based on the findings of this study some recommendations for future research, educators and school counselors can be made. Studies could work with multiple courses of the same participants to test if their motivational factors and learning strategies vary across courses. Therefore, similar work should include multiple courses of the same participants to gain insight in similarities and differences according to the subject area. Furthermore, researchers might consider incorporating qualitative methodologies in order to gain in depth insight on students' motivational processes and learning strategies.

Based on empirical evidence from work with college students (i.e., Stefanou & Salisbury-Glennon, 2002) it appears that a learning communities approach to education particularly with students who spend 24 hours of their times in their respective schools, such as Anatolian high schools, might be highly beneficial in enhancing both motivation and learning strategies. Moreover, in order to foster academic achievement, school counselors can examine students' motivation and learning strategies in order to tailor educational guidance activities in accordance with the specific needs of their student bodies. Furthermore, unlike the traditional approach of viewing students' motivational processes and learning strategies globally, focusing on students' motivation and learning strategies from the self-regulated learning paradigm requires counselors and educators to identify their experiences in each course. By focusing on students' experiences in each specific course, such an approach will foster a more individualized service delivery for counselors and teachers alike. Indeed, this approach to educational guidance services is also in line with a developmental approach to school counseling services.

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Genişletilmiş Özet

Yirmi Birinci Yüzyılda çocuk ve gençleri daha uzun süre okula devam etmekte, daha büyük miktarlarda bilgiler edinmek durumunda ve geçmiş zamanların aksine toplumun her kesiminden çocuklar okullarda öğrenim görmektedir. Bu eğitsel ortamda, eğitim girdi ve süreçlerinin etkili ve etkin olmaları önceki zamanlardan daha önemli hale gelmiştir. Eğitsel girdi ve süreçlerin etkin kılmada bilimsel araştırmalar önemli rol oynarlar. Bu nedenle, bu araştırma, önemli bir eğitim girdisi olan öğrenci değişkenlerinden motivasyon ve öğrenme stratejilerini ele almakla eğitim süreç ve girdilerine ilişkin var olan bilgi birikine katkıda bulunmayı amaçlamıştır. MSLQ öz-düzenleyici (self-regulated) öğrenme geleneğine (örn., Harris ve Graham, 1999; Schraw, Crippen, ve Hartley, 2006; Shunk, 1996) dayanan bir ölçme aracıdır. Bu öğrenme anlayışı bireylerin genel akademik güdülenme düzeylerine veya genel öğrenme stratejilerine odaklanmaktansa, özgül konu (ders) veya durumlardaki güdülenme ve öğrenme stratejilerini inceler. Nitekim, bu bakış açısına göre kişilerin güdülenme ve öğrenme stratejileri herbir konu veya içerik için farklı olacaktır. Ayrıca, MSLQ Türkçeye yeni uyarlanmış bir ölçme aracıdır ve bu kültürde çeşitli değişkenlerle ilişkilerinin incelendiği araştırmalara ihtiyaç vardır. Bu nedenle bu araştırmanın amacı, lise öğrencilerinin matematik dersine ilişkin güdülenme ve öğrenme stratejilerini cinsiyet, sınıf düzeyi, anne ve baba eğitim düzeyi değişkenlerine göre farklılık gösterip göstermediğini incelemek olarak ortaya konmuştur.

Bu araştırmaya Ankara ilindeki bir Anadolu Lisesinden 122'si kız (%38) ve 196'sı erkek (%62) olmak üzere toplam 318 gönüllü öğrenci katılmıştır. Öğrencilerin yaşları 14 ile 17 arasında değişmektedir; yaş ortalamaları ise 15.2 olarak saptanmıştır. Katılımcılar 10., 11. ve 12. sınıf öğrencileri olup, çoğunun ebeveynleri (%55) üniversite mezunlardır. Katılımcılara ölçekler verilmeden önce okul idaresinden ve öğretmenlerinden izin alınmıştır. Öğrenciler ölçekleri matematik derslerinde yanıtlamışlardır. Ölçekleri yanıtlama süresi 20-30 dakikadır.

Veri toplamada Güdülenme ve Öğrenme Stratejileri Ölçeği (GÖSÖ; Karadeniz ve ark., 2008) ile araştırmacılar tarafından hazırlanan Kişisel Bilgi Formu kullanılmıştır. Orijinal Güdülenme ve Öğrenme Stratejileri Ölçeği Pintrich ve arkadaşları tarafından 1991 yılında geliştirilmiştir. Ölçeğin 7'li Likert tipinde 81 maddesi vardır. Bu maddelerden 31'i güdülenme, 50'si öğrenme stratejileri alt ölçeğini oluşturmaktadır. Güdülenme alt ölçeğinde; "içsel hedef düzenleme", "dışsal hedef düzenleme", "görev değeri", "öğrenme ve performansla ilgili öz-yeterlik algısı", "öğrenmeye ilişkin kontrol inancı" ve "sınav kaygısı" faktörleri yer almaktadır. Öğrenme stratejileri alt ölçeğinde ise "yineleme", "ayrıntılılandırma", "düzenleme" (örgütlenme), "eleştirel düşünme", "metabilizasyon" (üst biliş), "zaman ve çalışma ortamı yönetimi", "çaba yönetimi", "akran işbirliği yönetimi" ve "yardım isteme" faktörleri yer almaktadır. Ölçeğin Türkçeye uyarlanması Karadeniz ve arkadaşları (2008) tarafından yapılmıştır. Bu araştırmacılar 12 ile 18 yaş arası 1114 öğrenciye ölçeğin Türkçe formunu uygulamış ve doğrulayıcı faktör analizinden sonra güdülenme boyutundan 6, öğrenme stratejilerinden de 5 maddeyi düşük faktör yüklerinden dolayı çıkarmışlardır. Ölçeğin düzeltilmiş madde-toplam korelasyonlarını güdülenme boyutu için 0.58 ile 0.15, öğrenme stratejileri boyutu içinse 0.68 ile 0.19 olarak bulmuşlardır. Bu çalışmada, katılımcılara verilen kişisel bilgi formunda yaşları (açık uçlu), cinsiyetleri (kız, erkek), sınıf düzeyleri (açık uçlu), annenin ve babanın eğitim düzeyi (okuma yazma bilmiyor, ilköğretim mezunu, ortaokul mezunu, lise mezunu, üniversite mezunu, yüksek lisans mezunu) sorulmuştur.

Araştırma iki aşamadan oluşmuştur. Birinci aşamada, veri analizi için MANOVA kullanılmıştır. Bu aşamada, öğrencilerin Güdülenme ve Öğrenme Stratejileri alt ölçeklerinden aldıkları puanların cinsiyet, sınıf düzeyi ve anne-baba eğitim düzeylerine göre manidar düzeyde farklılık gösterip göstermediği sınıanmıştır. İki-yönlü MANOVA sonuçlarına göre öğrencilerin güdülenme ve öğrenme stratejileri puanlarının cinsiyet ve sınıf düzeyine göre manidar farklılıklar gösterdiği bulunmuştur. Bu

farklılaşmanın hangi alt testten kaynaklandığını ortaya çıkarmak için ANOVA yapıldığında, cinsiyete göre öğrencilerin güdülenme puanlarının manidar farklılık göstermediği, buna karşın öğrenme stratejileri puanlarının manidar farklılık gösterdiği gözlenmiştir. Kız öğrencilerin öğrenme stratejileri puan ortalamaları erkeklerinkinden manidar derecede yüksek bulunmuştur.

Sınıf düzeyini bağımsız değişken olarak alan ANOVA sonuçlarına göre ise öğrencilerin hem güdülenme hem de öğrenme stratejileri puanlarının manidar olarak farklılık gösterdiği gözlenmiştir. Scheffe testine göre dokuzuncu sınıf öğrencilerinin öğrenme stratejileri puanları ortalaması 10. ve 11. sınıf öğrencilerin puanları ortalamasından manidar derece yüksek bulunmuştur.

Tek-yönlü MANOVA ile öğrencilerin Güdülenme ve Öğrenme Stratejileri alt ölçeklerinden aldıkları puanların ortalamasının babanın eğitim düzeyine göre farklılaşp-farklılaşmadığı incelenmiştir. Ne güdülenme ne de öğrenme stratejileri boyutlarında alınan puanlar babanın eğitim düzeyine göre manidar farklılık göstermiştir. Benzer şekilde annenin eğitim düzeyine göre de güdülenme ve öğrenme stratejileri alt ölçek puan ortalamalarının manidar şekilde farklılaşmadığı bulunmuştur.

Araştırmanın ikinci aşaması, birinci aşamanın devamı ve tamamlayıcısı niteliindedir. Bu aşamanın temel amacı, bağımlı değişkenler (Güdülenme ve Öğrenme Stratejileri alt ölçek puanları) üzerinde ortaya çıkan farklılaşmanın bu iki bağımlı değişkeni oluşturan faktörlerin hangilerinden kaynaklandığını belirlemektir. Bu amaçla, ilk aşamada MANOVA ve ANOVA sonuçlarına dayalı olarak farklılaşmanın ortaya çıktığı değişkenler ele alınmıştır. Güdülenme alt ölçeği puanlarının sadece sınıf düzeyine göre farklılaştığı bulunmuştur. İkinci çalışma kapsamında ise, Güdülenme alt ölçeğini oluşturan faktörlerin hangilerinde sınıf düzeyine göre farklılaşmanın ortaya çıktığı incelenmiştir. MANOVA sonuçları, “öz yeterlik algısı” ve “sınav kaygısı” puanlarının sınıf düzeyine göre farklılaştığını göstermektedir. Scheffe testi sonuçlarına göre ise, 11. sınıf öğrencilerinin “öz yeterlik algısı” ve “sınav kaygısı” alt ölçek puan ortalamaların diğer sınıf düzeyindeki öğrencilerden manidar düzeyde daha yüksek olduğu bulunmuştur. Bu bulgular, “öz yeterlik algısı” ve “sınav kaygısı” puanlarının statik olmadığını, sınıf düzeyi arttıkça farklılaştığını gösterir niteliktedir. Ancak, “öz yeterlik algısı” üzerindeki farklılaşmanın sınıf düzeyi arttıkça artmadığı, bir biçimde dalgalanma gösterdiği görülmüştür. Buna karşın, “sınav kaygısı” faktörü için benzer durum söz konusu değildir. “Sınav kaygısı” puanlarının sınıf düzeyine göre değişimi incelendiğinde ortalamaların sınıf düzeyi yükseldikçe arttığı bulunmuştur. Sınıf düzeyi arttıkça neden sınav kaygısının da artıyor olabileceği, Türkiye’de üniversiteye giriş sınavlarının öğrenciler için hayati bir önem taşıması ve akademik ortalamalarının belli bir katsayı ile üniversiteye giriş puanlarını etkilemesi ile açıklanabilir. Yine de bu durumun nedenlerini açığa çıkaracak ileri araştırmaların yapılması gerekir.

Araştırmanın birinci aşamasında, Öğrenme Stratejileri alt ölçeği puanlarının cinsiyete ve sınıf düzeyine göre farklılaştığı; bu puanların anne ve baba eğitim düzeyine göre manidar bir farklılık göstermediği bulunmuştur. Bu sonuçlarından yola çıkarak, benzer şekilde ikinci aşama kapsamında, Öğrenme Stratejileri alt ölçeğini oluşturan faktörlerin hangilerinde cinsiyet ve sınıf düzeyine göre farklılaşmanın ortaya çıktığı incelenmiştir. MANOVA sonuçları, kızların belirlenen alt ölçekler üzerindeki ortalama puanlarının erkeklerden daha yüksek olduğunu ortaya koymuştur. Scheffe testi sonuçları ise 9. sınıf öğrencilerinin öğrenme stratejileri ölçeğindeki “yineleme”, “düzenleme”, “ayrıntılılandırma”, “eleştirel düşünme”, “metabiliz” (üst-biliş) ve “akran işbirliği” alt ölçek puan ortalamalarının diğerlerinden daha yüksek olduğunu gösterir niteliktedir. Bu bulguya ek olarak, sınıf düzeyi yükseldikçe bu faktörler üzerinden alınan ortalama puanların düştüğü saptanmıştır. Bu bulgu çarpıcıdır. Nitekim öğrenciler olgunlaştıkça ve kendi öğrenme biçimlerine ilişkin yeni içgörüler edindikçe öğrenme stratejilerinin kullanımının da gelişmesi beklenir. Bu durumun nedenlerini ortaya çıkaracak nitel ve nicel araştırmaların yapılmasına gereksinim vardır.