Ç.Ü. Sosyal Bilimler Enstitüsü Dergisi, Cilt 23, Sayı 2, 2014, Sayfa 73-86

MOTIVATION, STRATEGY USE AND ACADEMIC ACHIEVEMENT OF UNIVERSITY STUDENTS WITH A VIEW TO DOMAIN, GENDER AND YEAR OF STUDY

Berrin UÇKUN*
Gamze KÜLEKÇİ ALMACIOĞLU**

ABSTRACT
This study examines the correlational and predictive relations between motivational constructs and levels of self-regulatory strategy use in university students representing three subject domains – two social science departments and one natural science department. Gender and year of study were used as categorizations variables. Multivariance analyses were run to examine main effects and interactive relations between gender, year of study and subjects' mean levels of motivations and strategy use. Strong correlational ties among some of the motivational components were common to all three departments, while departmental differences did exist pertaining to the use of cognitive and metacognitive strategies, and resource management. Analyses of the predictive power of motivational components on strategy use levels established intrinsic goal orientation as the single most significant determiner of strategy use, however levels of motivation and strategy use were not predictive of achievement for all departments. Contextual reasons and pedagogical implications of these results are discussed.

Key words: motivation, self-regulated learning, strategy use, domain, gender, achievement.

ÖZET
Bu çalışmada üniversite öğrencilerinin öz-düzenleyici strateji kullanım düzeyleri ile güdülenme yapıları arasındaki ilişki ve belirleyicilik düzeyi incelenmektedir. Denek belirlemede, bilim alanları olarak iki sosyal bilimler ve bir doğa bilimleri dalı bölümleri seçilmiştir. Cinsiyet, sınıf düzeyi ve deneklerin motivasyon ve strateji kullanım ortalama değerleri arasındaki interaktif ilişkileri ve ana etkenleri belirlemek için Multivariance Analysis kullanılmıştır. Üç bölüm öğrencilerinin ortak özelliği olarak belirli motivasyon ögeleri arasında güçlü korelasyon ilişkileri görülmekle beraber zihinsel ve metazihinsel strateji ve kaynak yönetimi kullanımlarına yönelik bölümler arasında farklılıklar gözlenmemiştir. Strateji kullanımının tek başına en güçlü motivasyonal belirleyicisi olarak iç hedef oryantasyonu saptanmıştır, ancak akademik başarı üzerinde motivasyon ve strateji kullanımının belirleyici olmadığı gözlenmiştir. Çalışmanın sonuçlarının bağlamsal nedenleri ve pedagojik çıkarımları tartışılmaktadır.

Anahtar Kelimeler: güdülenme, öz-düzenlemeli öğrenim, strateji kullanımı, alan, cinsiyet, başarı

* Yrd.Doç.Dr., Gaziantep Üniversitesi, Fen Edebiyat Fakültesi, İngiliz Dili ve Edebiyatı, berrin.uckun00@gmail.com
** Arş.Gör., kulekci@gantep.edu.tr

1. Introduction

Recent research on self-regulated learning (SRL) has focused on the relationships between motivational and cognitive components of learning in determining academic achievement (Garcia & Pintrich, 1994; Pintrich, 1994; McWhaw & Abrami, 2001; Zimmerman, 1989). The basic assumption of SRL is that students use various cognitive and metacognitive strategies to control and regulate their learning. However, knowledge of these learning strategies does not necessarily lead to academic achievement unless students develop the motivation to use those strategies (McKeachie et al., 1985). Teachers need to understand this cause-and-effect relationship before they design learning environments that facilitate the use of these strategies.

Most self-regulation theorists define SRL as a multidimensional process involving personal (cognitive and emotional), contextual, and behavioral components (Zimmerman, 1998). Therefore, students' SRL is not an absolute state of functioning, but varies with the academic context, personal efforts of self-regulation, and the outcomes of behavioral performance. Models of SRL aim to integrate various cognitive and motivational components into a comprehensive model of students' classroom academic performance. The model adopted in this empirical work was developed by Pintrich (1989) and his colleagues (Pintrich & Garcia, 1991; Pintrich et al., 1993). Following is a brief discussion of research related to
the components of this model.

1.1 Motivation and Cognitive Strategy Use

The cognitive learning strategies used in the processing of information from texts and lectures are identified as rehearsal, elaboration, organization and critical thinking. Metacognitive strategies are those of planning, monitoring, and regulating. Resource management includes strategies that students use to manage and control their environment. The motivational component of the study is based on a general social-cognitive model of motivation involving the three constructs of expectancy (self-efficacy and control of learning beliefs), value (intrinsic goal orientation, extrinsic goal orientation, and task value) and affect (test anxiety).

Self-efficacy in academic contexts refers to students' beliefs concerning their capability to perform given academic tasks at designated levels (Schunk, 1991). Linnenbrink & Pintrich (2003) make strong associations between resource management strategies and self-efficacy. Self-efficacy is believed to lead to more behavioral engagement (that is, to exert more effort, persist longer at tasks, and seek instrumental help) and, subsequently, to more learning and higher achievement (Pajares, Miller & Johnson, 1999) for all age groups (from primary school to university), genders, and ethnic groups (Pintrich & Schunk, 1996). Control beliefs for learning refer to students' beliefs that outcomes are contingent on one's own effort rather than external factors such as the teacher or luck.

Value components focus on the reasons why students engage in an academic task. They assess students' intrinsic goal (i.e. mastery) orientation, extrinsic goal (i.e. performance) orientation, and task value beliefs. Pintrich & Schrauben (1992) define intrinsic orientation as a focus on mastery, learning, challenge, or curiosity and extrinsic

goal orientation as a focus on grades, rewards, or approval from others. Different goals are assumed to elicit different motivational and self-regulatory patterns in classroom learning. Lin, McKeachie, & Kim (2003) propose that college students have multiple goals in learning, and that mastery and performance orientation may be interacting with each other in complex ways and with other variables that determine student success (see Pintrich, 1999). Task value beliefs were found to correlate positively with all three cognitive strategies tapped in Pintrich's (1999) study, as well as the self-regulatory strategies of monitoring and organizing of cognition, and performance.

1.2. Domain, Gender and Year of Study

Lin and his colleagues (2003) drew attention to the importance of contextual and cultural variables that may affect psychological processes such as motivation. Educational context is believed to have an impact on students' SRL behavior (Purdie et al., 1996) because motivational and cognitive processes tend to vary according to the features of the task, the classroom, or the context in which the students are functioning (Zimmerman, 1994; Ames, 1992). Earlier learning experiences can trigger expectancies and beliefs, which might have a profound effect on students' current perceptions and the effort they are prepared to invest.

Research on gender differences report differences in motivational engagement for various subject domains (see Wigfield & Eccles, 1994; Zimmerman & Martinez-Pons, 1990). Hence, there is sufficient reason to examine how these differences might interact with gender, and finally with length of study in a specific context. Based on his survey of SRL, Kaplan (2008) argues that self-regulation is not a unitary construct. There are many types of self-regulated action that are more or less appropriate for different tasks, in different domains, in different socio-cultural contexts, and for different students. Therefore, one should not be expecting one set of cognitive, metacognitive, motivational, and behavioral strategies that constitutes the most desirable mode of engagement in every setting and domain.

Following the work of Wolters & Pintrich (1998), our study is structured to investigate firstly, whether students' level of motivation and cognition varies across three domains with gender and year of study as independent factors; secondly, whether the relations between the motivational and cognitive components, and achievement vary for each domain; thirdly, whether motivational constructs, year of study and gender can predict subjects' level of strategy use; and finally, whether scores on motivation and strategy use measures can predict subjects' academic achievement, as argued by SRL theories.

2. Method

2.1. Participants

Participants for the study were 224 university undergraduate students enrolled in three departments: English literature (EL) students made up 36 % of the sample (females n=58, males n=23); Turkish literature (TL) students 38 % (females n =49, males n=37); and biology (BIO) students 25 % (females n=33, males n=24). First-year students constituted 59 % (n=133) and third-year students 41 % (n = 91) of the

responding sample. Biology students represented the natural science domain while students of literature represented the social science domain. Students were asked to put their student ID numbers on the questionnaires but were assured that their responses would remain confidential and that only the researchers
would have access to the data.

2.2. Measures and Procedures

Motivation and cognition: This study made use of the Motivated Strategies for Learning Questionnaire (MSLQ), (Pintrich, et al., 1991), a validated self-report instrument designed to measure college students' motivation and SRL in a particular classroom context. Students responded to each item using a seven point Likert scale from (1) "Not at all like me" to (7) "Very much like me" (see Appendix for coefficient alphas for the subscales). The administration of the Turkish translation of the questionnaire (r = .95) and the statistical analyses confirming the scales' 15 factors can be found in Altun & Erden (2006).

Course achievement was indicated by teacher reported grades, which were later converted to z-scores. First-year courses selected for the study were equivalent in terms of credits, introductory content, and length of two terms; these were, General Biology II, Introduction to Folk Literature II, and Introduction to English Literature II. Third year courses were one of the mainstream courses in each program. Students were administered questionnaires in late April during students' regular class hours by the researchers themselves.

3. Results

3.1. Domain, Year of Study and Gender Differences in Mean Levels

In order to test for differential effects on subgroups within our sample, multivariate analyses were run with motivation and strategy use as dependent variables, and gender, domain and year-of-study as dependent variables. Groupings showed no significant differences with the following exceptions.

3.1.1. Motivational Scales

Domain showed a significant difference with TL students scoring higher (M= 6.01) than EL students (M = 5.55) on both task value [F(4,674)= 4.5, p<.05], and test anxiety (M= 4.89 versus M= 3.90, respectively) scales [F(9,316)= 15.6, p<.01]. In terms control of learning beliefs, there was a significant difference between the departments of EL (M = 5.9), TL (M = 5.7) and BIO (M = 5.3).

Most notably, gender showed a significant difference for intrinsic goal orientation [F(10,798)= 7,9, p<.01], extrinsic goal orientation [F(6,896)= 6,6, p<.01], and task value [F(12,331)= 11.9, p<.01]. Females reported higher levels on all three scales (M = 6.01, M = 5.9, and M = 5.9, respectively) than males (M = 5.7, M = 5.6, and M = 5.5, respectively). Interactive values for gender and department were not indicated.

Year of study also had a main effect on subjects' rate of extrinsic goal orientedness [F(21,263)= 18,7, p<.001], self-efficacy [F(9,700)= 8,2, p<.01], control of

learning beliefs [F(12,815)= 10,9, p<.001], and test anxiety [F(4,495)= 8.2, p<.05]. First-year students reported significantly higher levels on these scales (M = 6.1, M = 5.7, M = 5.9, M = 4.6, respectively) than third-year students (M = 5.4, M = 5.3, M = 5.4, M = 4.2, respectively).

3.1.2. Learning Strategy Scales

While domain failed to differentiate for learning strategies, gender showed a significant difference for rehearsal [F(10,665)= 17.6, p<.01], elaboration [F(8,108)= 8.2, p<.01], and organization [F(17,643 = 23.4, p<.01], with females scoring higher on all three cognitive scales (M = 5.4, M = 5.6, M = 5.8, respectively) than males (M = 4.8, M = 5.2, M = 5.0, respectively). Significant differences were found for metacognitive self-regulation [F(9,418) = 7,8, p<.01] in favor of females (M = 5.2 versus M = 4.9). Gender was also significant [F(7,042) = 6.7, p<.01] with time/study environment management (females M = 4.8 versus males M = 4.4), and effort regulation [F(4,541) = 6.2, p<.05], (females M = 5.2 versus males M = 4.8).

Year-of-study was also significant with rehearsal strategy [F(20.714)= 30.3, p<.001], organization [F(8.039)= 11.0, p<.01], metacognitive self-regulation [F(5,709)= 4.9, p<.05], effort regulation [F(4,360= 5.9, p<.05], and peer-learning [F(4,703)= 10.0, p<.05], with first-year students scoring higher on the first four scales (M = 5.5, M = 5.6, M = 5.3, M = 4.2, respectively) than third-year students (M = 4.7, M = 5.2, M = 4.9, M = 4.9, respectively); peer-learning, however, was employed more by third-year students (M = 4.1 versus M = 3.6).

3.2. Correlational and Predictive Relations among Variables

The second research question of the study aimed to investigate the relations among the motivational, cognitive and course performance variables within each department. Table 1 presents the zero-order correlations. The pattern of relations within each department show strong similarities; for example, correlations between intrinsic goal orientation and task value yielded the highest coefficients as r = 0.70. r = 0.68 and r = 70, p's < .01. Test anxiety mostly correlated negatively and/or non-significantly with all the motivational beliefs, but significantly with extrinsic goal orientation (r's between 0.35 and 0.40). Metacognitive self-regulation correlated consistently with intrinsic goal orientation, task value and self-efficacy (r's between 0.36 and 0.59), and with all the cognitive strategies. The deep-level processing strategies of critical thinking and elaboration correlated most highly with each other for all three subject areas (r's between 0.53 and 0.69).

Variable	Intr	Extr	Tskv	Contr	Slfef	Tanx	Reh	Elab	Org	Crit	Mcg	Tstdy	Efft	Prlrn	Hlp seek
English Lit. [1]															
Ext	0.30														
Tskv	0.70	0.19													
Contr	0.33	0.29	0.29												
Slfef	0.52	0.32	0.65	0.33											
Tanx	0.16	0.40	-0.09	0.06	-0.14										
Reh	0.29	0.54	0.17	0.26	0.30	0.31									
Elab	0.48	0.17	0.40	0.09	0.40	0.11	0.32								
Org	0.58	0.42	0.40	0.20	0.43	0.27	0.72	0.48							
Crit	0.30	0.12	0.26	-0.00	0.24	0.15	0.15	0.68	0.25						
Mcg	0.48	0.20	0.43	0.02	0.38	0.08	0.65	0.56	0.55	0.49					
Tstdy	0.40	0.2	0.37	0.08	0.38	-0.08	0.32	0.35	0.39	0.15	0.50				
Efft	0.54	0.29	0.38	0.11	0.43	0.14	0.38	0.41	0.45	0.19	0.42	0.59			
Prlen	0.20	0.08	0.30	-0.06	0.27	0.03	0.17	0.31	0.28	0.34	0.21	0.11	0.08		
Hsk	0.26	-0.07	0.16	0.09	0.03	0.18	0.16	0.28	0.25	0.10	0.21	0.12	0.18	0.41	
Course Grade	0.31	0.19	0.14	0.06	0.16	0.17	0.10	0.16	0.24	0.05	0.07	0.39	0.45	-0.01	0.16
Turkish Lit. [2]															
Ext	0.22														
Tskv	0.68	0.31													
Contr	0.40	0.13	0.21												
Slfef	0.29	0.27	0.52	0.25											
Tanx	0.04	0.35	-0.07	-0.02	-0.25										
Reh	0.42	0.35	0.34	0.28	0.31	0.19									
Elab	0.59	0.21	0.56	0.15	0.39	0.04	0.61								
Org	0.35	0.10	0.40	0.17	0.36	0.10	0.59	0.61							
Crit	0.48	0.17	0.49	0.05	0.31	-0.15	0.30	0.53	0.44						
Mcg	0.59	0.25	0.48	0.32	0.36	0.06	0.62	0.78	0.56	0.58					
Tstdy	0.29	0.28	0.31	0.20	0.33	-0.16	0.33	0.33	0.21	0.21	0.49				
Efft	0.20	0.17	0.09	0.23	0.33	-0.21	0.36	0.32	0.33	0.13	0.46	0.49			
Prlen	0.35	0.10	0.26	-0.04	0.10	0.04	0.19	0.35	0.26	0.32	0.28	0.16	0.06		
Hsk	0.25	0.10	0.22	-0.11	0.17	-0.08	0.19	0.31	0.19	0.38	0.30	0.34	0.09	0.52	
Course Grade	0.24	0.06	0.27	-0.12	0.04	-0.17	0.14	0.28	0.10	0.13	0.14	0.24	0.14	0.13	0.15
Biology [3]															
Ext	0.25														
Tskv	0.70	0.26													
Contr	0.28	0.00	0.19												
Slfef	0.43	0.12	0.55	0.28											
Tanx	-0.19	0.35	-0.13	0.03	-0.32										
Reh	0.33	0.25	0.19	0.10	0.22	-0.18									
Elab	0.49	0.20	0.60	0.20	0.50	-0.16	0.36								

Org	0.45	0.09	0.33	0.11	0.24	-0.32	0.63	0.55							
Crit	0.58	0.33	0.49	0.08	0.41	0.07	0.24	0.69	0.40						
Mcg	0.51	0.26	0.50	0.19	0.53	-0.24	0.43	0.62	0.58	0.56					
Tstdy	0.27	0.20	0.33	0.02	0.31	-0.28	0.38	0.38	0.40	0.34	0.62				
Efft	0.20	0.08	0.15	-0.04	0.28	0.32	0.39	0.30	0.41	0.15	0.46	0.41			
Prlen	0.32	-0.04	0.20	0.24	0.16	-0.19	0.34	0.24	0.40	0.29	0.41	0.30	0.01		
Hsk	0.22	0.30	0.14	0.11	-0.1	0.04	0.32	0.12	0.12	-0.01	0.11	0.22	-0.10	0.20	
CourseGr	0.21	-0.15	0.27	-0.03	0.32	-0.36	-0.05	0.15	0.11	0.14	0.07	0.11	0.18	0.01	-0.35

Note.1 English Literature: *N= 79. r*'s ≥ 24. p<.05; 2. Turkish Literature: N= 84. r's ≥
Table.1 Zero Order Correlations Among the Motivational, Strategy Use and Performance Variables for Three Departments (n = 224)

21. p<.05; 3; 3. Biology: N= 79. r's ≥ 27. p<.05
Ext: external goal orientation; Tskv: task value; Contr: control of learning beliefs; Slfef: self-efficacy; Tanx: test anxiety; Reh: rehearsal; Elab: elaboration; Org: organization; Crit: critical thinking; Mcg: metacognitive self-regulation; Tstdy: time and study environment management; Efft: effort regulation; Prlen: peer-learning; Hsk: help-seeking.

Two strongly correlating subsets were formed under resource management scale: time and study environment management and effort regulation (*r's* = 0.41 to 0.59) versus peer-learning and help-seeking. (*r*'s = 0.41 to 0.52), in line with Wolter and Pintrich's (1998) findings. These scales were collapsed and named *intrapersonal* and *interpersonal* resource management, respectively.

Criterion Variable	English Literature			Turkish Literature			Biology		
Predictive Variables	*B*	*SE B*	b	*B*	*SE B*	b	*B*	*SE B*	b
Cognitive strategy use									
Intrinsic goal orientation	1,12	0,47	0,32*	1,86	0,61	0,40**	1,80	0,75	,40*
Extrinsic goal orientation	0,55	0,39	0,16	0,02	0,44	0,01	0,55	0,45	0,16
Task value	-0,04	0,42	-0,01	0,45	0,60	0,11	0,22	0,78	0,05
Control of learning beliefs	-0,47	0,47	-0,07	-0,02	0,36	-0,01	-0,06	0,49	-0,14
Self-efficacy	1,08	0,54	0,26*	0,99	0,43	0,26*	0,76	0,57	0,21
Test anxiety	0,51	0,29	0,19	0,33	0,29	0,12	-0,24	0,37	-0,09
Year of study	-0,25	0,25	-0,11	0,08	0,42	0,02	0,08	0,40	0,02
Gender	-0,67	0,73	-0,09	-1,06	0,74	-0,13	-0,50	0,90	-0,07
R^2			0,43***			0,45**			,43***
Metacognitive strategy use									
Intrinsic goal orientation	0,32	0,15	0,30*	0,46	0,14	0,42**	0,34	0,17	0,32
Extrinsicgoal orientation	-0,08	0,12	-0,08	0.07	0,1	0,08	0,17	0,10	0,21
Task value	0,13	0,13	0,16	0,04	0,14	0,04	0,18	0,18	0,17
Control of learning beliefs	-0,38	0,15	-0,27*	0,11	0,09	0,14	-0,03	0,11	-0,03
Self-efficacy	0,22	0,17	0,18	0,20	0,10	0,22	0,16	0,13	0,18

Test anxiety	0,33	0,09	0,04	0,06	0,07	0,1	-0,11	0,08	-0,17
Year of study	-0,17	0,08	-0,26*	0,15	0,1	0,15	-0,20	0,09	-0,24*
Gender	-0,44	0,23	-0,20	-0,07	0,17	-0,04	0,33	0,21	0,20
R^2			0,36***			0,43**			,49***
Intrapersonal resource manag.									
Intrinsic goal orientation	0,42	0,14	0,43**	0,27	0,17	0,23	0,15	0,2	0,14
Extrinsic goal orientation	0,10	0,11	0,11	0,35	0,12	0,34**	0,18	0,12	0,22
Task value	-0,06	0,12	-0,07	-0,30	0,16	-0,28	0,06	0,21	0,06
Control of learning beliefs+A63	-0,20	0,14	-0,16	0,05	0,10	0,06	-0,09	0,13	-0,09
Self-efficacy	0,34	0,15	0,30*	0,30	0,12	0,31*	0,11	0,15	0,12
Test anxiety	-0,04	0,08	-0,06	-0,22	0,08	-0,31*	-0,23	0,10	-0,35*
Year of study	-0,41	0,21	-0,19	-0,44	-0,20	-0,22*	-0,20	0,11	-0,23*
Gender	-0,01	0,11	-0,01	0,14	0,12	0,13	0,11	0,24	0,06
R^2			0,39***			0,35***			0,31*
Interpersonal resource manag.									
Intrinsic goal orientation	0,16	0,19	0,14	0,55	0,21	0,40*	0,49	0,23	0,39*
Extrinsic goal orientation	-0,08	0,15	-0,07	0,14	0,15	0,12	0,23	0,14	0,23
Task value	0,16	0,17	0,17	0,02	0,21	0,01	0,18	0,24	0,14
Control of learning beliefs	-0,01	0,19	-0,06	-0,15	0,12	-0,14	0,31	0,15	0,27*
Self-efficacy	0,18	0,21	0,14	0,10	0,15	0,09	-0,37	0,17	-0,35*
Test anxiety	0,16	0,12	0,18	0,00	0,10	0,00	-0,16	0,11	-0,20
Year of study	0,14	0,15	0,13	0,08	0,25	0,30*	0,03	0,12	0,03
Gender	0,14	0,29	0,06	0,37	0,15	0,03	0,82	0,27	0,41**
R^2			0,15			0,25**			0,24**
Course grade (motivation)									
Intrinsic goal orientation	0,26	0,11	0,36*	0,23	0,16	0,22	-0,05	0,17	-0,05
Extrinsic goal orientation	0,05	0,09	0,07	0,10	0,11	0,11	-0,12	0,10	-0,19
Task value	-0,1	0,10	-0,18	0,14	0,15	0,14	0,09	0,18	0,10
Control of learning	-0,21	0,11	-0,22	-0,22	0,09	-0,29*	-0,07	0,11	-0,09
Self-efficacy	0,12	0,13	0,15	-0,12	0,11	-0,13	0,19	0,13	0,26
Test anxiety	0,05	0,07	0,09	-0,2	0,08	-0,32*	-0,09	0,09	-0,17
Gender	-0,28	0,17	-0,18	-0,39	0,19	-0,22*	-0,15	0,20	-0,11
R^2			0,19*			0,25**			0,22
Course grade (strategy use)									
Cognitive strategy use	0,01	0,03	0,04	0,03	0,04	0,14	0,04	0,04	0,18
Metacognitive strategy use	-0,18	0,09	-0,26	-0,12	0,19	-0,13	0,02	0,18	0,02

Intrapersonal res. management	0,40	0,09	0,55**	0,13	0,12	0,14	0,08	0,14	0,10
Interpersonal res. management	0,03	0,07	0,04	0,09	0,09	0,12	-0,26	0,11	-0,36*
Gender	-0,19	0,16	-0,13	-0,33	0,21	-0,18	0,01	0,2	0,01
R^2			0,23**			0,10			0,13

Note. * p<.05 ** p<.01 *** p<.001 1 = females 2 = males

Next, we used a series of regression analyses where we simultaneously regressed our criterion variables onto the set of predictors. Table 2 will show that gender, year of study, and all six motivational variables together accounted for a significant portion of the variances in cognitive strategy use - EL [F(6,591)= 48.6, p<.001], TL [F(7,439= 71.4, p<.001], and BIO [F(4,499) = 36.5, p<.001]; metacognitive self-regulation - EL [F(4,931)= 3.6, p<.001], TL [F(7,029)= 3.7, p<.001], and BIO [F(5,585)= 2.4]; and intrapersonal resource management - EL [F(5,623)= 3.5, p<.001], TL [F(4,912) = 3.5, p<.001], and BIO [F(2,633)= 1.5, p<.05]. The same set of variables, however, predicted interpersonal resource management only for TL department [F(3,157)= 3.6, p<.01] and BIO [F(3,179)= 2.4, p<.01]. The predictability of subjects' course grades was not as strong or generalizable.

4. Discussion

With respect to our first research question, students in all domains reported similar levels of intrinsic and extrinsic orientation, (supporting results by Pintrich 1999, Pintrich & Schrauben, 1992), and self-efficacy. TL and BIO students reported stronger beliefs in the importance of their courses. According to social cognitive theory, the perceived importance of a task is in large part the result of the outcome expectations an individual has for a particular task (Pajares, 1996). Thus, EL students may fail to perceive a direct relevance between the literature courses and their future careers as English language teachers.

Gender differences were clearly observed with girls reporting higher means for intrinsic and extrinsic goal orientation and task value (supporting results by Wolters & Pintrich, 1998; Thorkildsen & Nicholls, 1998). Female students in middle-eastern cultures tend to have a stronger desire for success in their educational endeavors as it is the key to a promising future in a "man's world". Unlike the conclusions of Wolters & Pintrich (1998), and Wigfield & Eccles (1994), females in our study did not report significant differences in their levels of self-efficacy and test anxiety than males.

Self-regulation is argued to be closely related with competence development in a specific content domain (Boekaertz & Cascallar, 2006) because it allows students to interact actively with the fundamental concepts and structures of that domain. Despite our expectations in this direction, third-year students did not report higher levels of strategy use than first-year students. Self-efficacy appears to decline by years as the result of exposure to more advanced and difficult courses. As students take examinations and receive feedback on their academic performance, their confidence levels might naturally decrease (see Zusho et al., 2003).

In answer to our second research question, our subjects' intrinsic goal orientation, task value, and self-efficacy levels correlated most strongly with each other for all three domains. Wigfield et al. (1997) found that correlations between efficacy beliefs, interest, and value become stronger over time with age, which is observed here with university students. Students that reported higher intrinsic orientation also accommodated sophisticated reasoning skills and learning strategies. For all domains, students that were more concerned with the external rewards of achievement reported higher levels of test anxiety, and in turn were less effective users of cognitive and metacognitive strategies (see Pintrich, 1989). In Pintrich's (2000) revised goal theory, students who are both mastery- and performance-oriented show higher levels of SRL behavior orientations. Extrinsic orientation in our study correlated significantly with some of the cognitive and metacognitive constructs.

Our findings did not include many correlations between course grade and (meta)cognitive and motivational constructs: task value, efficacy, and test anxiety correlated significantly with BIO student's course grades, while deep-level processing strategies of organization and elaboration, intrinsic goal orientation and intrapersonal resource management strategies correlated with literature students' course grades.????

For all domains, the motivational construct stood out as a significant predictor of cognitive, metacognitive, intrapersonal and interpersonal (excluding EL) resource management strategies. A striking outcome of the study is that intrinsic goal orientation was almost always the best individual predictor of cognitive and metacognitive strategy use for all three departments (consistent with Riveiro et al., 2001). While self-efficacy was a significant predictor of cognitive and intrapersonal strategy use for EL and TL departments (supporting Wolters & Pintrich, 1998; Pintrich & De Groot, 1990), text anxiety and control of learning beliefs had debilitating effects on the BIO and TL students' levels of motivation and strategy use (see Seipp, 1991).

Our final research question is whether course grade can be predicted by motivation and strategy constructs with gender and department as fixed variables. For EL students, intrinsic goal orientation and time/study environment management significantly predicted course grade; for TL students, control of learning beliefs and test anxiety (both inversely), and gender significantly predicted course grades. Academic achievement of BIO students was predicted neither by their levels of motivation nor cognitive strategy use. Pintrich & De Groot (1990) argue that significant but modest relations with course grade are reasonable since there are many other factors that are related to college course grade that go unmeasured by the MSLQ. However, the fact that our subjects' course grades fail to account substantially for the motivational and cognitive involvement of these students is quite puzzling and disturbing. Zimmerman & Mantinez-Pons (1986) argue that it is one of the major goals of higher education to develop self-responsible and self-regulated students who are viewed as metacognitively, motivationally, and behaviorally active participants in their own learning, which in turn should enhance academic achievement.

Several explanations could be extended for our results. Firstly, self-report questionnaires may not be sufficient and/or totally reliable to register subjects' motivational and strategic levels. Hence, a combination of assessment tools is necessary to capture what students think, feel, and undertake to direct their learning and motivation. Secondly, Pintrich's model of SRL may not be a good indicator of the types

of self-regulation strategies that our students need to acquire in order to self-regulate the acquisition of knowledge in their different domains. Thirdly, we need to consider whether the educational environment includes affordances for these purposes and types of self-regulation. Finally, the cyclical nature of self-regulation suggests that students use feedback from prior learning experiences to make adjustments to goals and strategies for subsequent efforts (Zimmerman, 2000).

The following are recommended to teachers under the light of the above discussions. We need to create "powerful learning environments" (Boekaertz & Cascallar, 2006) that promote students to collaborate in small groups on authentic problems, and share information and engage in knowledge building discourse. This collaborative meaning generation and knowledge construction process can satisfy multiple learning goals, such as mastery and belongingness goals, resource provision and acquisition goals, self-determination goals, as well as performance and well-being goals. The negative relation between test anxiety and self-efficacy can be averted by practicing confidence-raising activities. Competitive ability goals in classrooms encourage students not to pay attention to the importance of learning in order to focus attention and effort on doing better than others. Such competitive-goal situations can be expected to raise levels of anxiety. Classrooms using incentives for group work are seen to correlate positively with use of elaboration strategies, critical thought, and metacognition (Arias, 2004).

REFERENCES

Altun, S., & Erden, M. (2006). Öğrenmede motive edici stratejiler ölçeğinin geçerlik ve güvenirlik çalışması. *Yeditepe Üniversitesi, Edu7, 2*(1), 1-16.

Ames, C. (1992). Classrooms: Goals, structures, and student motivation. *Journal of Educational Psychology*, 84, 261-271.

Arias, J de la F. (2004). Recent perspectives in the study of motivation: Goal orientation theory. *Electronic Journal of Research in Educational Psychology*, 2(1), 35-62.

Boekaerts, M., & Cascallar, E. (2006). How far have we moved toward the integration of theory and practice in self-regulation? *Educational Psychology Review*, 18, 199–210.

Garcia, T., & Pintrich, P. R. (1994). Regulating motivation and cognition in the classroom: The role of self-schemas and self-regulatory strategies. In D. H. Schunk, & B. J. Zimmerman (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp. 127–153). Hillsdale, NJ: Lawrence Erlbaum Associates.

Kaplan, A. (2008). Clarifying metacognition, self-regulation, and self-regulated learning: What's the purpose? *Educational Psychology Review*, 20, 477-484.

Lin, Y-G., McKeachie, W. J., & Kim, Y. C. (2003). College student intrinsic and/or extrinsic motivation and learning. *Learning and Individual Differences*, 13, 251-258.

Linnenbrink, E. A. & Pintrich, P. R. (2003). The role of self-efficacy beliefs in student

engagement and learning in the classroom. *Reading & Writing Quarterly,* 19, 119-137.

McKeachie, W. J., Pintrich, P. R., & Lin, Y. G. (1985). Teaching learning strategies. *Educational Psychology,* 20, 153-160.

McWhaw, K., & Abrami, P. C. (2001). Student goal orientation and interest: Effects on students' use of self-regulated learning strategies. *Contemporary Educational Psychology*, 26, 311-329.

Pajares, F. (1996). Self-efficacy beliefs in academic settings. *Review of Educational Research, 66*(4), 543-578.

Pajares, F., Miller, M. D., & Johnson, M. J. (1999). Gender differences in writing self-beliefs of elementary school students. *Journal of Educational Psychology*, 91, 50-61.

Pintrich, P. R. (1989). The dynamic interplay of student motivation and cognition in the college classroom, In C. Ames, & M. L. Maehr (Eds.), *Advances in motivation and achievement: Motivation-enhancing environments* (pp.117-160). Greenwich, CT: JAI Press.

Pintrich, P. R. (1994). Continuities and discontinuities: future directions for research in educational psychology. *Educational Psychologist*, 29, 37-148.

Pintrich, P. R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Journal of Educational Research*, 31, 459-470.

Pintrich, P. R. (2000). An achievement goal theory perspective on issues in motivation terminology, theory, and research. *Contemporary Educational Psychology*, 25(1), 92−104.

Pintrich, P. R., & De Groot, E. V. (1990). Motivational and self-regulated learning components of classroom academic performance. *Journal of Educational Psychology*, 82(1), 33-40.

Pintrich, P. R., & Garcia, T. (1991). Student goal orientation and self-regulation in the college classroom. In M. Maehr, & P. R. Pintrich (Eds.), *Advances in motivation and achievement: Goals and self-regulatory processes* (pp.371-402). Greenwich, CT: JAI Press.

Pintrich, P. R., Smith, D., Garcia, T., & McKeachie, W. (1991). *A manual for the use of the motivated strategies for learning questionnaire (MSLQ)*. The University of Michigan, Ann Arbor, MI.

Pintrich, P. R., & Schrauben, B. (1992). Students' motivational beliefs and their cognitive engagement in classroom tasks. In D. H. Schunk, & J. Meece, (Eds.), *Student perceptions in the classroom: Causes and consequences* (pp.49-183). Hillsdale, NJ: Lawrence Erlbaum Associates.

Pintrich, P. R., Smith, D. A., Garcia, T., & McKeachie, W. J. (1993). Predictive validity and reliability of the Motivated Strategies for Learning Questionnaire (MSLQ). *Educational and Psychological Measurement,* 53, 801-813.

Pintrich, P. R., & Schunk, D. H. (1996). *Motivation in education: Theory, research, and*

applications. Englewood Cliffs, NJ: Merrill Prentice-Hall.

Purdie, N., Hattie, J., and Douglas, G. (1996). Student conceptions of learning and their use of self-regulated learning strategies: A cross-cultural comparison. *Journal of Educational Psychology,* 88(1), 87-100.

Riverio, J. M. S., Cabanach, R. G. & Arias, A. V. (2001). Multiple-goal pursuit and its relation to cognitive, self-regulatory, and motivational strategies. *British Journal of Educational Psychology,* 71, 561-572.

Schunk, D.H. (1991). Self-efficacy and academic motivation. *Educational Psychologist,* 26, 207-231.

Seipp, B. (1991). Anxiety and academic performance: A meta-analysis of findings. *Anxiety Research,* 4, 27-41.

Thorkildsen, T. A. & Nicholls, J. G. (1998). Fifth graders' achievement orientations and beliefs: Individual and classroom differences. *Journal of Educational Psychology,* 90, 179-201.

Wigfield, A., & Eccles, J. S. (1994). Children's competence beliefs, achievement values, and general self-esteem change across elementary and middle school. *Journal of Early Adolescence, 14.*

Wigfield, A., Eccles, J. S., Yoon, K. S., Harold, R. D., Arbreton, A. J. A., Freedman-Doan, C., & Blumenfeld, P. S. (1997). Change in children's competence beliefs and subjective task values across the elementary school years: A 3-year study. *Journal of Educational Psychology,* 89, 451-469.

Wolters, A., & Pintrich, P. (1998). Contextual differences in student motivation and self-regulated learning in mathematics, English, and social studies classrooms. *Instructional Science, 26,* 27-47.

Zimmerman, B. J. (1989). Models of self-regulated learning and academic achievement. In B. J. Zimmerman, & D. H. Schunk, (Eds.), *Self-regulated learning and academic achievement: Theory, research, and practice* (pp.1-25). New York: Springer-Verlag.

Zimmerman, B. J. (1994). Dimensions of academic self-regulation: A conceptual framework for education. In D. H. Schunk, & B.J. Zimmerman, (Eds.), *Self-regulation of learning and performance: Issues and educational applications* (pp.3-21). Hillsdale, NJ: Lawrence Erlbaum Associates.

Zimmerman, B. J., & Martinez-Pons, M. (1990). Student differences in self-regulated learning: Relating grade, sex, and giftedness to self-efficacy and strategy use. *Journal of Educational Psychology,* 82, 51-59.

Zimmerman, B. J. (1998). Developing self-fulfilling cycles of academic regulation: An analysis of exemplary instructional models. In D. H. Schunk & B. J. Zimmerman (Eds.), *Self-regulated learning: From teaching to self-reflective practice* (pp.1-19). New York: Guilford.

Zimmerman, B. J. (2000). Attaining self-regulation: A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation: Theory, research, and applications* (pp.13-39). San Diego, CA: Academic Press.

Zusho, A., Pintrich, P. R., & Coppola, B. (2003). Skill and will: The role of motivation and cognition in the learning of college chemistry. *International Journal of Science Education, 25* (9), 1081-1094.

Appendix

Number of Items and Coefficient Alpha Ranges of the MSLQ

Scale	Number of items	Range for αs
Motivation scales		
Value beliefs	14	0.79 – 0.84
Expectancy	12	0.77 – 0.80
Affect	5	0.66 – 0.68
Learning Strategies scales		
Cognitive strategies	19	0.84 – 0.86
Metacognitive self-regulation	12	0.73 – 0.80
Resource management	19	0.68 – 0.77
Total	81	0.91