



## FARKLI AKADEMİK BAĞLAMLARDA ÖĞRENME STİLLERİ VE MOTİVASYONEL STİLLER: BOYLAMSAL BİR ÇALIŞMA

### LEARNING STYLES AND MOTIVATIONAL STYLES IN DIFFERENT ACADEMIC CONTEXTS: A LONGITUDINAL STUDY

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**ÖZET:** Bu çalışmada üniversite öğrencilerinin öğrenme stilleri ve motivasyonel stilleri arasındaki farklılıklar iki farklı akademik bağlamda incelenmiştir. Öğrencilerin öğrenme stilleri ve motivasyonel stillerindeki değişiklikler de bir akademik yıl üzerinden boylamsal bir desen aracılığıyla incelenmiştir. Bu çalışmanın sonuçları, öğrencilerin hem öğrenme stillerinin hem de motivasyonel stillerinin alan-odaklı, değişken ve birbirlerinden görece bağımsız yapılar olduklarını göstermiştir. Ayrıca, bu çalışma stil kavramsallaştırmasının öğrenme ve motivasyonun değişken doğasını ele almada uygun olduğunu ortaya çıkarmıştır. Son olarak, öğrencilerin öğrenme stillerinin motivasyonel stillerine göre hem akademik yılın başında hem de sonunda anlamlı düzeyde bir farklılık göstermediği de bulunmuştur. Çalışmada eğitimsel çıkarımlar ve gelecekteki araştırmalar üzerinde de durulmuştur.

**Anahtar sözcükler:** öğrenme stilleri; motivasyon stilleri; üniversite öğrencileri.

**ABSTRACT:** In this study, individual differences among the first year undergraduate students' learning styles and motivational styles were examined in two different academic contexts. Changes in students' learning styles and motivational styles were also investigated through a longitudinal design over one academic year. The results of this study showed that both students' learning styles and motivational styles were domain-specific, malleable, and independent constructs. Furthermore, the present study revealed that style conceptualization was appropriate to capture the malleable nature of learning and motivation. Finally, it was also found that students' learning styles did not significantly differ according to their motivational styles both at the beginning and at the end of the academic year. Educational implications and directions for future research were also emphasized in this study.

**Keywords:** learning styles; motivation styles; undergraduate students.

#### 1. INTRODUCTION

Students' learning styles have long been investigated in different lines of research along with various conceptions (Kolb, 1984; Hardigan & Sisco, 2001; Barmeyer, 2004; Demirkaya, 2008). The same is also true for student motivation (Elliot, 1999; Fryer & Elliot, 2007). Interestingly, little research addressed the student motivation within a style framework (Johnstone & Al-Naeme, 1995; Bahar, 2002, 2003). However, it can be said that is important to investigate students' learning styles (LSs) together with their motivational styles (MSs) through a longitudinal design research, in which different academic contexts are also considered, for at least two reasons. Firstly, revealing the changes in students' LSs and MSs, if any, may significantly contribute to studies on curriculum development because the individual differences in student learning and motivation are among the major sources in planning and developing a curriculum (Oliva, 1997).

Secondly, previous studies on student learning and motivation have shown that both of them could be expressed with the concept of style that refers to something "malleable" by nature (Kolb, 1984; Hardigan & Sisco, 2001; Bahar, 2003). However, none of these studies on "motivational styles" were longitudinal in design, indicating that the question of whether students' motivational styles are malleable in nature has remained to be challenged to date. Therefore, the present study is also important to shed light on the neglected side of the student motivation, that is, the changes in students' (MSs).

#### 1.1. Learning Styles

Learning styles can be defined as the "cognitive, affective, and physiological traits that are relatively stable indicators of how learners perceive, interact with, and respond to the learning

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environment” Keefe (1979, p. 4). Although the approaches and definitions regarding LSs are somewhat vary by their scope, they all share a common goal, that is, to explain individual differences in performance and learning that are not explained by abilities (Zhang & Sternberg, 2000). However, this conception is still open to question and needs further investigation due to lack of longitudinal research to see whether students’ LSs change over time with respect to their academic experiences or not (Nulty & Barret, 1996; Hardigan & Sisco, 2001; Hsu, 1999). Nulty and Barret (1996), for example, showed that undergraduate students’ LSs resembled to each other at the beginning of their first year at the university, and changed through their discipline in their third year at the university. Taking one step further in her longitudinal study, Hsu (1999) tried to answer such questions as: “does the major attract students of a particular LS or does the students’ LSs change according to their majors?” As a result, she found that the answer was “both” for hospitality management students. In addition, the curriculum type or fields of study variable affects students’ LSs, suggesting that the changes in students’ LSs may probably vary according to their fields of study (Kolb, 1984; Matthews & Hamby, 1994; Boyle et al., 2003).

## 1.2. Motivational Styles

While a number of definitions of motivation are to be found in the current literature such as “the factors that direct and energize behavior” (Feldman, 1997, p. 275), there is no unique definition that describes motivation adequately to capture its complex nature in a general sense (Chruden & Sherman, 1984). However, an analysis of major definitions indicates that motivation is primarily concerned with three factors: what energizes behavior, what directs or channels such behavior, and how this behavior is maintained or sustained (Chruden & Sherman, 1984). Investigating such a complex phenomenon such as motivation caused to consider different points of view which are based on instincts, cognition, incentives, needs, and goals. Within this framework, the concept of MS is largely based on the needs that drive individuals’ achievement and social goal -related behaviors. In his seminal work, Adar (cited in Bahar, 2003), for example, developed a MS framework in which students’ motivational preferences are defined by their achievement and social goal-related needs in educational settings.

Several studies were conducted based on the Adar’s classification of MS (e.g., Kempa & Diaz, 1990; Johnstone & Al-Naeme, 1995; Bahar, 2003). Using Adar’s classification of MSs in an environmental science course, Bahar (2003), for example, demonstrated that students’ MSs significantly and positively affected their performance in group work and discussion based seminars (Bahar, 2003, 2002). On the other hand, in their longitudinal cluster-analytic study, Braten and Olaussen (2005) showed that motivational profiles of nursing students and business administration students changed over one academic year. More importantly, those changes in students’ motivational profiles were varied as a function of their fields of study. Similarly, Gerhardt and Brown (2006) were also reported that students’ motivational beliefs are not fixed but malleable by nature.

In summary, based on those explanations above, it can be claimed (a) students’ MSs and LSs are related with one another; (b) students’ MSs and LSs are malleable by nature; (c) the probable changes in students’ LSs and MSs could also be affected by their fields of study.

## 2. AIM

The aim of this study is twofold: first, it is to examine the individual differences among the undergraduate students’ LSs and MSs in two different academic contexts; and second, it is to examine the changes in students’ LSs and MSs over one academic year.

## 3. RESEARCH QUESTIONS

In line with the aim of this study, four research questions were formulated:

1. Do students’ learning styles vary as a function of their fields of study both at the beginning and at the end of the academic year?
2. Do students’ motivational styles vary as a function of their fields of study both at the beginning and at the end of the academic year?
3. Do students’ learning styles and motivational styles change over one academic year?

4. Do students' learning styles vary according to their motivational styles both at the beginning and at the end of the academic year?

As the present study is explorative in nature, no specific hypotheses were suggested.

## **4. METHOD**

### **4.1. Participants**

The present study was conducted in a university located in Western Black Sea Region in Turkey. Data were collected in 2004-2005 academic year. Based on the survey method, a total of 185 first year undergraduate students participated in this study. Of them, forty-eight were female (68 %). Participants ranged in age from 18 to 25. However, only 71 was consisted the sample of the present study due to the match-mismatch procedure regarding students' motivational styles (see Table 3). Of them, thirty-four (48 %) major in education (i.e., classroom teaching and preschool teaching), whereas the remainings (52 %) major in science (i.e., physics and chemistry).

### **4.2. Instruments and Procedures**

The Learning Style Preferences Inventory (LSPI) (Eren, 2002) and the Turkish version of Motivational Styles Instrument (MSI) (Bahar, 2003) were used to assess students' learning styles and motivational styles respectively.

#### **4.2.1. Learning Style Preferences Inventory**

The Learning Style Preferences Inventory (LSPI, Eren, 2002) was used to assess students' learning styles in the present study. The LSPI is a 60 item inventory which was designed to measure undergraduate students' learning styles on four scales: auditory (e.g., listening about the things that I do not know helps me to learn a lot), visual (e.g., I am easily aware of the visual effect mistakes of movies on television or at the cinema), active (e.g., my friends say that I am vivacious), and reflective (e.g., I like to study on theories). Auditory and visual dimensions refer to perceiving information whereas active and reflective dimensions refer to the processing information. Each subscale in the LSPI contains a total of 15 items. These items are anchored with 5-point Likert-type response format, ranging from 5 (*completely appropriate to me*) to 1 (*not at all appropriate to me*).

Using principal component analysis with Varimax rotation method (see Rencher, 2002), Exploratory Factor Analysis (EFA) was conducted to assess whether the four factor structure of LSPI is confirmed in the present study. The EFA results showed that the four factors explained together 31.92 % of the total variance, suggesting that the factor structure of LSPI is replicated on the present sample. Internal reliabilities were .66, .76, .72, .78 for auditory, visual, active and reflective subscales, respectively. Finally, the results of the zero-order (Pearson) correlation analysis showed that correlation coefficients are ranged from .33 to .59, indicating that the factors of LSPI are related, but distinct factors.

#### **4.2.2. Motivational Styles Instrument**

Based on the students' educational needs, Adar (1969, cited in Bahar, 2003, p. 462) suggested four different motivational types: (i) the need to achieve; (ii) the need to satisfy one's curiosity; (iii) the need to discharge a duty; and (iv) the need to affiliate with other people. These motivational types are learner types and are classified as achiever students, curious students, conscientious students and social students. These four groups can be defined as follows (Bahar, 2003, p. 462):

*Achievers* have a distinct preference for an expository method of teaching to enable them to achieve well. They compete to be top and get pleasure from excelling.

*Conscientious* students want to be told exactly what to do and enjoy clearly stated objectives.

*Curious* students keep asking why. They have a distinct preference for discovery learning and problem solving activities.

*Social* students enjoy their opinions being heard. They conform easily and like working in groups. They like studying and discussing problems with their friends.

Previous studies showed that Adar's conceptualization is both valid and reliable framework to assess students' motivational styles (e.g., Lyall & Johnstone, 1999). The Motivational Styles Instrument (MSI) has also been used to assess Turkish undergraduate students' motivational styles (see Bahar, 2002, 2003). Thus, the Turkish version of the MSI was used to assess participants' motivational styles in the present study. The adapted version of MSI contains two separate forms (form A and form B). In form A, the questionnaire consisted of statements regarding different aspects of teaching and learning (i.e., class work, practical work, discovery learning, and social life), which were presented in balloon form with four individuals stating their opinions (Bahar, 2003, p. 466). The sample students were required to choose a name in one row that they agreed the most with and write down the name in the space at the end of each row regarding the different items in the questionnaire (e.g., I enjoy hearing the applications to everyday life whether they are examined or not-curious statement; it is very important to me to be in the top of the class-achiever statement (Bahar, 2003, p. 466).

The following criteria were used to classify students in one of the four motivation clusters: If a student chooses four curious statements (ratio 4:0) or three curious statements and one of the others (ratio 3:1) or two curious and, for example each of achiever and social (ratio 2:1:1), the student is classified as curious (Bahar, 2003, p. 466). However, if she/he picks two curious and two of any other such as two conscientious or two achiever (ratio 2:2) she/he is regarded as unclassifiable. These patterns which emerged as above (ratios 2:2 and 1:1:1:1) were considered normal, because people are believed to have mixture of these characteristics, except that they would display a bias towards one in particular (Bahar, 2003, p. 466). In form B, all four statements that were typical to a certain group of motivational pattern were written together with the names which were different from form A. Students were asked to tick only one box they agreed the most with. Form A was used to classify the students' motivational styles whereas form B was used to find out whether there was any strong agreement or disagreement between two sheets of motivational patterns (Bahar, 2003, p. 466). Due to the fact that form B and form A contained the same statements, form B was given to the students one week after form A was given in order to obtain more valid and reliable data, as well as to avoid possible effects of copying from form A. This procedure was in the same order both at the beginning and at the end of the academic year. In the present study, the inter-form reliability (Form A and Form B) was computed based on the ratios which were held by estimating the numbers of students that show no pattern in their motivational styles to the numbers of students that show a significant pattern in each fields of study (i.e., education and science). Consequently, the inter-form reliabilities were found to be satisfactory for both education (87 %) and science (95 %) majors.

## 5. RESULTS

### 5.1. Learning Styles by Fields of Study

Independent samples t-tests were used to explore whether students' LSs vary as a function of their fields of study both at the beginning (Time 1) and at the end of the academic year (Time 2). In t-test routines, fields of study variable were entered as independents and the subscales of LSPI were entered as dependents. Cohen's (1977) coefficients *d* were also calculated in order to show the effect size of independents on dependents. Finally, the Type-I error was checked by dividing the classical significance level to numbers of the dependent variables ( $0.05/4 = 0.013$ ,  $p \leq .01$ ). The t-test results were summarized in Table 1 and Table 2.

As depicted in Table 1, none of the students' LSs are significantly differed at Time 1. However, students' reflective LSs approached significancy ( $t = -2.17$   $p = .03$ ), indicating that science students ( $M = 60.89$ ;  $SD = 5.83$ ) are more tended to adopt reflective LSs comparing to education students ( $M = 57.70$ ;  $SD = 6.54$ ) at Time 1. Indeed, Cohen's (1977) coefficients *d* were small for auditory ( $d = -.16$ ) visual ( $d = -.08$ ), and active ( $d = .01$ ) dimensions whereas it was moderate for the reflective dimension ( $d = -.52$ ). However, as shown in Table 2, this tendency was disappeared at Time 2 ( $t = -.03$   $p > 0.01$ ,  $d$



= .01). In fact, the mean scores of students' reflective LSs were more similar than those of other mean scores both in science ( $M = 58.08$ ;  $SD = 7.67$ ) and in education majors ( $M = 58.03$ ;  $SD = 7.06$ ) at Time 2 (see Table 2).

**Table 1: The t-test results regarding students' LSs at Time 1**

Dimensions	Education	Science	t	p	d
<b>Auditory</b>	55.24 (6.20)	56.27 (6.05)	-.71	.48	-.16
<b>Visual</b>	54.50 (6.68)	55.05 (7.90)	-.32	.75	-.08
<b>Active</b>	54.06 (5.96)	53.97 (8.51)	.05	.96	.01
<b>Reflective</b>	57.70 (6.54)	60.89 (5.83)	-2.17	.03	-.52

$p > .01$

Note. Numbers into the brackets indicate standard deviations.

**Table 2: The t-test results regarding students' LSs at Time 2**

Dimensions	Education	Science	t	p	d
<b>Auditory</b>	57.56 (6.48)	56.02 (6.23)	.25	1.02	.31
<b>Visual</b>	57.68 (5.46)	55.86 (7.59)	.28	1.15	.26
<b>Active</b>	56.47 (6.50)	55.16 (7.52)	.18	.78	.44
<b>Reflective</b>	58.03 (7.06)	58.08 (7.67)	.01	-.03	.98

$p > .01$

Note. Numbers into the brackets indicate standard deviations.

## 5.2. Motivational Styles by Fields of Study

As noted earlier, form B was used to find out whether there was any strong agreement or disagreement between the answers about the motivational patterns. The sample distribution with regard to the motivational patterns at Time 1 was shown in Table 3.

**Table 3: The sample distribution by fields of study at Time 1**

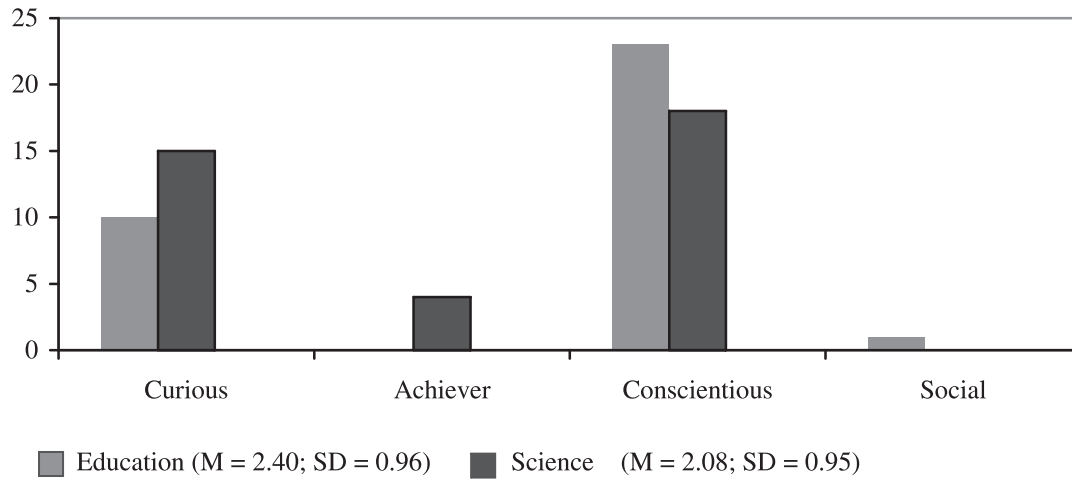
Pattern	Education			Science			Total match
	Sheet A	Sheet B	Match	Sheet A	Sheet B	Match	
<b>Curious</b>	25	24	10 (29)	30	28	15 (40)	25 (35)
<b>Achiever</b>	18	19	-	16	14	4 (11)	4 (6)
<b>Conscientious</b>	35	40	23 (68)	28	33	18 (49)	41 (58)
<b>Social</b>	10	18	1 (3)	6	9	-	1 (1)
<b>No pattern</b>	13			4			
<b>Total</b>	101	101	34 (100)	84	84	37 (100)	71 (100)

Note. Numbers in the brackets show percentages.

As shown in Table 3, a total of 71 students (34 education and 37 science students) showed meaningful pattern with regard to their MSs at Time 1. Histograms were used to demonstrate the differences among the students' MSs with regard to the fields of study both at Time 1 (see Figure 1) and Time 2 (see Figure 2).

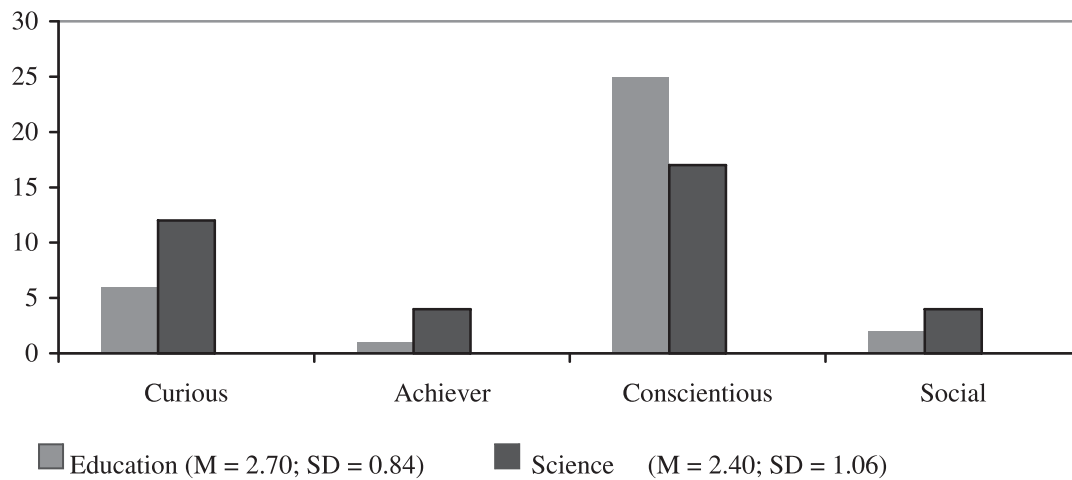
As seen in Figure 1, both the curious cluster ( $N_e = 10$ ,  $N_s = 15$ ) and the conscientious cluster ( $N_e = 23$ ,  $N_s = 18$ ) were the most evident clusters in education and science at Time 1 (see also Table 3). However, the curious cluster was more evident in science than education, whereas the conscientious cluster was more evident in education than science (see Figure 1). The achiever ( $N_s = 4$ ) and social styles ( $N_e = 1$ ) were the least preferred ones in both education and science majors. Furthermore, none of the science students preferred social MSs. Similarly, the achiever style was not preferred by any of the education students.

Frequencies



**Figure 1: Students' MSs at Time 1**

Frequencies



**Figure 2: Students' MSs at Time 2**

On the other hand, as displayed in Figure 2, students' MSs at Time 1 were somewhat different from their MSs at Time 2. More specifically, the number of curious (N = 6), achiever (N = 1), conscientious (N = 25) and social (N = 2) students in education in one hand, and the number of curious (N = 12), achiever (N = 4), conscientious (N = 17), and social (N = 4) students in science on the other, were somewhat different at Time 2 comparing to Time 1 (see Table 3). Accordingly, there were more students in curious, achiever and social clusters in science majors at the end of the academic year comparing to Time 1. Additionally, the number of conscientious students was higher in education (N = 25) than the science majors (N = 17) at Time 2. Finally, both the achiever and social clusters became more evident at Time 2 in education (N = 1) and science majors (N = 4) (see Figure 2). Overall, it can be said that the domain differences in students' MSs became more evident at Time 2 comparing to Time 1.

**5.3. Changes in Students' Learning Styles**

Using Type-I error criteria ( $p \leq .01$ ), paired samples t-tests were conducted to see whether students' LSs changed over one academic year. Results showed that education students' visual ( $t = -3.91$   $p < .001$ ) and active LSs ( $t = -2.85$   $p < .01$ ) significantly differed at Time 2 comparing to Time 1

(see Table 3). As seen in Table 4, the effects of time on visual ( $d = .52$ ) and active ( $d = .39$ ) dimensions were found to be moderate for education students. On the other hand, the reflective LSs were the only one that significantly and negatively changed at Time 2 ( $t = 2.71$   $p \leq .01$   $d = -.41$ ).

**Table 4: Paired Samples t-test results regarding students' LSs**

Dimensions	Education				Science			
	M <sup>1</sup>	M <sup>2</sup>	t	d	M <sup>1</sup>	M <sup>2</sup>	t	d
<b>Auditory</b>	55.24	57.56	-2.38	.37	56.27	56.02	.28	-.04
<b>Visual</b>	54.50	57.68	-3.91*	.52	55.05	55.86	-.85	.11
<b>Active</b>	54.06	56.47	-2.85**	.39	53.97	55.16	-1.91	.15
<b>Reflective</b>	57.71	58.03	-.35	.05	60.89	58.08	2.71**	-.41

\* $p < .001$ ; \*\* $p < .01$

Note. M<sup>1</sup> indicates the students' mean scores at Time 1; and M<sup>2</sup> indicates the students' mean scores at Time 2.

#### 5.4. Changes in Students' Motivational Styles

The frequencies and percentages of science and education students' MSs were presented in Table 5. Sample students' MSs were clustered by the numbers of the students in each cluster in order to highlight those changes in their MSs (see Braten & Olaussen, 2005). As displayed in Table 5, the conscientious, achiever, and the social MSs remained stable over one academic year in both majors; whereas the number of the students in curious clusters were somewhat decreased for both in education ( $F^1 N = 10$ , 29.4 %;  $F^2 N = 6$ , 17.6%) and in science majors ( $F^1 N = 15$ , 40.5 %;  $F^2 N = 12$ , 32.46%) at Time 2. Of particular importance, three curious and one conscientious science students and one curious education student changed their MSs as social and achiever respectively at Time 2. In addition, education students' curious MSs also changed as conscientious and social MSs; whereas the other clusters remained stable at Time 2 (see Table 5). The same is also true for science students, except one student whose conscientious MS changed as social MS at Time 2 (see Table 5). Overall results of the analysis showed that the curiosity cluster was the most changed one at Time 2.

**Table 5: Changes in students' MSs according to their fields of study**

	Education		Science	
	F <sup>1</sup> (%)	F <sup>2</sup> (%)	F <sup>1</sup> (%)	F <sup>2</sup> (%)
<b>Curious</b>	10 (29.4)	6 (17.6)	15 (40.5)	12 (32.4)
<b>Achiever</b>	-	1 (2.9)	4 (10.8)	4 (5.5)
<b>Conscientious</b>	23 (67.6)	25 (73.5)	18 (48.6)	17 (45.9)
<b>Social</b>	1 (2.9)	2 (5.9)	-	4 (10.8)
<b>Total</b>	34 (100)	34 (100)	37 (100)	37 (100)

Note. F<sup>1</sup> indicates the students' frequencies of the MSs at Time 1; F<sup>2</sup> indicates the frequencies at Time 2.

#### 5.5. Students Learning Styles according to Their Motivational Styles

**Table 6: The summary of the Kruskal-Wallis H test**

Dimensions	$\chi^2$ (Time 1)	$\chi^2$ (Time 2)
<b>Auditory</b>	.72	0.23
<b>Visual</b>	1.98	0.90
<b>Active</b>	2.66	2.80
<b>Reflective</b>	5.02	.94

$p > .01$

Because the number of students in each MS cluster was not high enough to meet the criteria of parametric tests (Tabachnick & Fidel, 1989), Kruskal-Wallis H test was conducted to explore whether students' LSs vary according to their MSs both at Time 1 and Time 2. In the analysis, MSs were determined as grouping variables, whereas LSs were determined as dependent variables. Results showed that students' LSs did not vary according their MSs. In other words, students' MSs did not significantly affect their LSs. In fact, this view was similar both at Time 1 and Time 2 (see Table 6).

## 6. DISCUSSION

The results of between-subjects design analysis showed that the domain differences in students' LSs were only the case for their reflective LSs at Time 1, indicating that the students who take degrees in education majors significantly preferred the reflective LS at Time 1 as compared to those students who took degrees in science majors. However, this significant difference remained marginal. Indeed, this marginal difference was disappeared at Time 2. On the other hand, no significant differences were observed between the groups in the remaining dimensions of LSPI (auditory, visual and active) in either period of the academic year. This result of the present study is not in line with the earlier studies, in which disciplinary differences were reported through both longitudinal and cross-sectional analysis (e.g., Slaats, Lodewijks, & Van der Sanden, 1999; Jones et al., 2003). Nulty and Barret (1996), for example, found that students' LSs were similar to each other at the beginning of their first year at the university, and undergraduates' LSs changed through their discipline in their third year at the university. In a cross-sectional design, Slaats et al. (1999) found disciplinary differences among the LSs of students majoring in commercial, technical, health and agricultural domains. This result is not in line with previous studies (e.g., Nulty & Barret, 1996).

Given that the students have to adapt their LSs in order to meet the skill requirements of their fields of study or at least being advantageous to meet the skill requirements of their fields of study, one plausible explanation for this finding is that the teaching strategies and learning process, which are more effective than teaching the content of curriculum due to the fact that teaching strategies and learning process are activating the content in an education process (Ornstein & Hunkins, 1988), may be similar in both education and science fields. Additionally, given the fact that the students are likely to adapt to the demands of the education system, and learn to navigate the choppy waters of the curriculum (Cano, 2005), students' beliefs about whether their LSs can make sense in their learning process or not, may be another possible explanation that needs further investigation. This finding contributes to the relevant literature at least for one reason: Domain differences in students' LSs are not warranted in educational settings, indicating that the domain-specificity and domain-generality in students' LSs remains to be challenged. The results of the frequency analysis showed that the domain differences in students' MSs, unlike their LSs, became more evident at Time 2 than Time 1, indicating that the conscientious and the curious MSs were dominant styles both at Time 1 and Time 2 in education and science majors. Given the fact that both the major views of student motivation can be affected by the fields of study (e.g., Gerhardt & Brown, 2006) and student motivation is more open to the effects of the curriculum than the other educational variables in educational settings (e.g., Braten & Olaussen, 2005), it can be understood that why students' MSs significantly changed over one academic year.

On the other hand, paired samples t test results demonstrated that the education students' visual, and active LSs and sciences students' reflective LS differed significantly at Time 2 as compared to Time 1. At this point, the suggestion of Wintergerst et al. (2003) could explain these changes in students' LSs. In sum, research showed that either as a result of heredity, educational background, situational requirements, age, or other factors, learners understand and process information differently. During this understanding and information processing, individuals could use and prefer different and subjective ways even if they interact with the same learning environments. In the same way, these different and subjective ways of learning could indicate changes and differences over time with respect to the nature and the situational characteristics of the teaching/learning environment. Finally, the result of the paired samples t test also showed that the students' LSs were not fixed during the education process, but malleable, suggesting that the malleable nature of the LSs should be considered



in education and curriculum studies in general, and instructional strategies in particular. This view was also true for the changes in students' MSs over one academic year. In other words, results also showed that students' MSs, especially the curious and conscientious styles, were changed over one academic year. This result is consistent with the previous studies, in which both conscientious and curious MSs appeared as dominant styles in science education (Kempa & Diaz, 1990; Bahar, 2002, 2003). However, the curious cluster was that the the most changed one in both education and in science majors over one academic year. More specifically, students' curiosity decreased at Time 2 as compared to their conceptions at Time 1, regardless of their fields of study.

Given the fact that the educational environments should arouse students' curiosity, it can be said that these changes were not expectable. However, this can be due to the school culture and/or perceived classroom environment each of which can be a possible source of the decrease in students' curiosity, although these variables were not considered in the present study. As a matter of fact, recent research on student motivation, especially those research on students' achievement goals, support the notion that school culture and/or perceived classroom environment are important elements affecting the students academic goal orientations (e.g., mastery goals, and performance approach-avoidance goals) (e.g., Church, Elliot & Gable, 2001). Furthermore, Johnstone (1997 cited in Bahar, 2003, p. 472) demonstrated that the use of worksheets and multiple choice exams, which are frequently used to assess students' academic achievement in Turkey, is fine for conscientious students, but curious students find fixed response items irksome because there is no room to allow their curiosity to reveal it. If this is the case, it can be understood why the curious cluster was the most malleable one among the other clusters. Obviously, this issue deserves a further investigation.

Finally, students' LSs did not significantly differ according to their MSs in either of the periods. Specifically, results showed that students' LSs and MSs were somewhat independent constructs, indicating that the former was not significantly explained by the latter, at least in the sample of the present study. Although several studies showed that students' learning process was predicted by the motivation variables (e.g., Dupeyrat & Mariné, 2005), this prediction was not replicated in the present sample. One possible explanation for this result is that both motivation and learning variables are considered in a style format in the present study, indicating that the results of this study are not comparable with the previous studies in which student motivation was considered within the other frameworks such as motivational beliefs. Another explanation is that the interactions among students' MSs and LSs may overshadow the effects of the MSs on LSs. Unfortunately, these possible interactions were not checked out in the present study due to the small and different number of students in each category of independents, suggesting that these interactions should also be controlled in future studies with more robust methods such as multivariate analysis of variance.

### **6.1. Limitations**

The present study has some limitations. First, the sample size was quite small. Second, the present sample consisted of more female students than male students. The former limits the generalizability of the current results whereas the latter indicates that the current results are open to possible effects of gender.

## **7. CONCLUSION**

In conclusion, the present study revealed that both students' LSs and MSs are domain specific, malleable, and independent constructs. Specifically, the findings of the study demonstrated that there was a significant difference between the reflective LSs of students who took degrees in science and education majors at Time 1. However, this significant difference between the domains disappeared at Time 2. On the other hand, significant changes were observed in both students' LSs and MSs at Time 2 as compared to Time 1. Additionally, students' LSs did not differ according to their MSs in either of the periods, indicating that the relationship between students' LSs and MSs are not warranted. Overall, the results of this study pointed out that the style conceptualization is appropriate to capture the *malleable* nature of student learning and motivation in educational settings. Based on the results of this study, it can be suggested that (a) the malleability in students' MSs should be considered in

educational settings; (b) the effects of fields of study on students' LSs and MSs should be checked out with regard to the changes in students' MSs; (c) students' MSs and LSs should also be separately investigated in educational settings because of the reason that the relationship between students' MSs and LSs are not always warranted.

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## GENİŞLETİLMİŞ ÖZET

Konu alanı ile ilgili literatürde öğrenme stilleri ve motivasyon konularına ilişkin önemli miktarda araştırma bulunmasına rağmen, motivasyon konusunun stil kavramı bağlamında ele alınarak incelendiği oldukça az sayıda araştırma bulunduğu görülmektedir. Üstelik, konuyla ilgili literatürde öğrencilerin öğrenme stilleri ve motivasyon stillerinin bir arada ele alınarak boylamsal bir yaklaşımla incelendiği bir araştırmaya da rastlanmamıştır. Bu çerçevede, farklı akademik alanlarda öğrenim gören öğrencilerin öğrenme ve motivasyon stillerinin bir arada ve boylamsal bir yaklaşımla incelenmesi iki açıdan önemli görülmüştür; öncelikle, öğrencilerin öğrenme ve motivasyon stillerinin öğrenim gördükleri alanlara göre incelenmesi, söz konusu alanlarda gerçekleştirilecek olan eğitim programları ile ilgili çalışmalara önemli katkılar sağlayabilir. Çünkü bireysel farklılıklar konusu eğitim programlarının planlanmasında ve geliştirilmesinde önemli bir yer tutmaktadır. Ayrıca, öğrenme ve motivasyon stillerinin boylamsal bir yaklaşımla incelenmesi, literatürde az sayıda araştırmada rapor edilen öğrenme stillerindeki değişebilirlikle birlikte bu açıdan henüz ele alınmamış motivasyon stillerinin değişebilirliğinin sorgulanması açısından da literatüre önemli bir katkıda bulunabilir.

Bu araştırmanın iki amacı bulunmaktadır: Fen ve eğitim bilim alanlarında öğrenim gören üniversite öğrencilerinin öğrenme ve motivasyon stilleri arasındaki bireysel farklılıkların ve söz konusu öğrencilerin öğrenme stili tercihleriyle ve motivasyon stillerinde bir akademik yıl sonunda meydana gelen değişmelerin incelenmesidir. Çalışmanın amacı doğrultusunda, çalışma sırasında dört soru belirlenmiştir: (a) Öğrencilerin öğrenme stilleri akademik yılın başında ve sonunda öğrenim gördükleri alanlara göre farklılaşmakta mıdır? (b) Öğrencilerin motivasyon stilleri akademik yılın başında ve sonunda öğrenim gördükleri alanlara göre farklılaşmakta mıdır? (c) Öğrencilerin öğrenme stilleri ve motivasyon stilleri bir akademik yıl boyunca değişmekte midir? (d) Öğrencilerin öğrenme stilleri akademik yılın başında ve sonunda motivasyon stillerine göre farklılaşmakta mıdır?

Araştırma Türkiye'nin Batı Karadeniz Bölgesinde yer alan ve yaklaşık olarak 16.000 öğrencisi olan bir üniversitede 2004–2005 öğretim yılı içerisinde gerçekleştirilmiştir. Tarama yönteminin kullanıldığı çalışmaya toplam 185 üniversite birinci sınıf öğrencisi katılmıştır. Üniversite öğrencilerinin % 68'ini (n=48) kız öğrenciler oluşturmakta ve öğrencilerin yaşları 18 ile 25 arasında değişmektedir. Öğrencilerin motivasyon stilleri Adar tarafından geliştirilen ve Bahar (2002, 2003) tarafından Türkçeye uyarlanan Motivasyon Stilleri Ölçeği aracılığıyla belirlenmiştir. Öğrencilerin öğrenme stilleri ise Eren (2002) tarafından geliştirilen Öğrenme Biçimi Tercihleri Envanteri aracılığıyla tespit edilmiştir. Öğrencilerin Motivasyon Stilleri ölçeğine verdikleri cevaplarının uyum/uyumsuzluk kriteri bağlamında değerlendirilmesi sonucunda, yalnızca 71 üniversite birinci sınıf öğrencisinin söz konusu kriteri karşılamakta olduğu görülmüştür. Dolayısıyla, çalışmanın örneklemini 71 öğrenci oluşturmuştur. Bu öğrencilerin % 48'i (n=34) eğitim bilim alanlarında (örneğin Sınıf Öğretmenliği ve Okul Öncesi Öğretmenliği), % 52'si ise (n=37) fen bilim alanlarında (Fizik ve Kimya) öğrenim görmektedirler.

Araştırmanın bulguları öğretim yılı başında öğrencilerin öğrenme stillerinin öğrenim gördükleri alana göre farklılaşmadığını göstermiştir. Ancak, öğrenim görülen alan değişkeninin öğrencilerin öğrenme stilleri üzerinde marjinal düzeyde bir etkide bulunduğu saptanmıştır. Buna göre, akademik yılın başında, eğitim alanında öğrenim gören öğrencilerin yansıtıcı öğrenme stili tercihleri fen bilim alanlarında öğrenim gören öğrencilere göre marjinal düzeyde yüksek bulunmuştur. Ancak, bu marjinal farklılık öğretim yılı sonunda gözlemlenmemiştir. Diğer taraftan, akademik yılın sonunda öğrencilerin öğrenme stillerinde öğrenim gördükleri alanlara göre anlamlı bir farklılık saptanmamıştır. Nitekim bu bağlamda elde edilen etki büyüklükleri görece küçük değerlere sahiptirler. Öğrencilerin motivasyon stillerinin ise, öğrenme stillerinden farklı olarak, hem akademik yılın sonunda hem de akademik yılın başında öğrenim görülen alan değişkeninin etkisini yansıtan görünümlere sahip oldukları gözlemlenmiştir. Nitekim öğrenim görülen alan değişkenine yönelik olarak dönem başında elde edilen

söz konusu görünüm akademik yılın sonunda daha da belirginleşmiştir. Buna göre, eğitim alanında bilinçli motivasyon stiline sahip öğrencilerin sayısı fen bilim alanlarında öğrenim gören öğrencilere göre daha fazladır. Bununla birlikte, her iki alanda da başaran ve sosyal motivasyon stillerinin dönem sonunda benzer tercih oranlarına sahip olduğu da bulgulanmıştır.

Kesitsel bulgulardan farklı olarak, araştırmanın boyamsal bulguları eğitim alanında öğrenim gören öğrencilerin görsel ve aktif öğrenme biçimi tercihlerinde ve fen bilim alanlarında öğrenim gören öğrencilerin yansıtıcı öğrenme biçimi tercihlerinde öğretim yılı başına göre öğretim yılı sonunda anlamlı düzeyde farklılaştığını göstermiştir. Buna göre, eğitim alanında öğrenim gören öğrencilerin görsel ve aktif öğrenme stillerinde anlamlı düzeyde bir artma, fen bilim alanlarında öğrenim gören öğrencilerin yansıtıcı öğrenme stillerinde ise anlamlı düzeyde bir azalma söz konusudur. Benzer bir değişim öğrencilerin motivasyon stillerinde de gözlemlenmiştir. Bulgular her iki alanda da sosyal, başaran ve bilinçli motivasyon stillerine sahip olan öğrencilerin bu tercihlerinin akademik yıl boyunca görece sabit kalma eğiliminde olduğuna işaret ederken, meraklı motivasyon stili tercihinine sahip olan öğrencilerin akademik yılın sonunda söz konusu tercihlerini değiştirdiklerini ortaya koymuştur. Son olarak, öğrencilerin motivasyon stillerinin gerek akademik yılın başında gerekse sonunda öğrenme stili tercihleri üzerinde anlamlı bir etkide bulunmadığı saptanmıştır. Başka bir deyişle, öğrencilerin öğrenme stili tercihleri motivasyon stillerine göre farklılaşmamaktadır.

Sonuçta, araştırmadan elde edilen bulgular öğrencilerin hem öğrenme stillerinin hem de motivasyon stillerinin alan-odaklı, değişken, görece birbirlerinden bağımsız yapılar olduğunu ve ayrıca stil kavramsallaştırmasının motivasyon gibi eğitimsel anlamda önemli bir değişkenin değişebilirliğini göstermesi açısından uygun olduğunu ortaya koymuştur. Söz konusu bulgulardan hareketle şu önerilerde bulunulabilir: (a) Öğrencilerin motivasyon stillerinin değişebilirliği eğitim ortamlarında dikkate alınmalıdır; (b) öğrenim görülen alan değişkeninin öğrencilerin motivasyon stilleri ve öğrenme stilleri üzerindeki etkileri öğrencilerin motivasyon stillerinin değişkenliği dikkate alınarak incelenmelidir; (c) eğitim ortamlarında öğrencilerin motivasyon stilleri ve öğrenme stilleri arasındaki ilişkilerin her zaman garanti olmaması nedeniyle, söz konusu değişkenler ayrı olarak da ele incelenmelidir. Son olarak, araştırmanın örnekleminin küçük olması, kız öğrencilerin sayısının erkek öğrencilere kıyasla daha fazla olması ve araştırmada yalnızca nicel araştırma yönteminin kullanılması, yukarıda özetlenen bulguların genellenebilirliğini sınırlandırmıştır. Dolayısıyla, araştırmanın bulguları gelecekte yapılacak olan araştırmalarda dikkatle yorumlanmalıdır.