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Predictive Analysis Among Thinking Styles, Goal Orientations and Academic Achievement of Student Teachers

Öğretmen adaylarında düşünme stilleri, amaç yönelimleri ve akademik başarı arasındaki yordayıcı ilişkilerin analizi

Mustafa Buluş

Department of Early Childhood Education, Faculty of Education, Pamukkale University, Denizli, Turkey

Özet

Bu araştırmanın amacı, öğretmen adaylarında düşünme stillerinin amaç yönelimleri ve her iki değişkenin birlikte akademik başarı üzerindeki yordayıcı etkilerini incelemektir. Araştırmaya Pamukkale Üniversitesi Eğitim Fakültesi'nde farklı bölümlerde öğrenim gören 270 öğrenci katılmıştır. Veri toplama araçları olarak Düşünme Stilleri ve Amaç Yönelimleri Ölçekleri ile Kişisel Bilgi Formu kullanılmıştır. Korelasyon analizi sonuçları düşünme stilleri, amaç yönelimleri ve akademik başarı arasında anlamlı ilişkiler olduğunu göstermiştir. Yapılan regresyon analizinde düşünme stillerinin amaç yönelimlerini ve her iki değişkenin birlikte akademik başarıyı anlamlı olarak yordadığı görülmüştür. Bu bağlamda I. Tip düşünme stillerinden hiyerarşik ve liberal stiller öğrenme amaç yöneliminin, yargısal stil ise performans amaç yöneliminin; II. Tip düşünme stillerinden muhafazakar düşünme stili kaçınma amaç yöneliminin anlamlı yordayıcıları olmuştur. Ayrıca, akademik başarının en güçlü yordayıcılarının öğrenme ve kaçınma amaç yönelimleri olduğu bulgulanmıştır. Araştırmada, elde edilen sonuçlar eğitimciler açısından tartışılmış ve önerilerde bulunulmuştur.

Anahtar sözcükler: Akademik başarı, amaç yönelimleri, düşünme stilleri.

Abstract

The aim of this study was to investigate the predictive power of the student teachers' thinking styles on their goal orientations and the predictive power of both thinking styles and goal orientations on their academic achievement. The participants were 270 undergraduate students studying in different departments of the Faculty of Education at Pamukkale University. Thinking Styles, Goal Orientations Inventories and Demographic Information Sheet were used to gather the data. The results of the correlational analysis show significant relationships among thinking styles, goal orientations and academic achievement. Regression analysis indicates that thinking styles predict goal orientations and goal orientations together with thinking styles predict academic achievement. In that sense, hierarchical and liberal Type I thinking styles are the primary predictors of mastery, judicial Type I thinking style is the primary predictor of performance, conservative Type II thinking style is the primary predictor of avoidance goal orientations and mastery and avoidance goal orientations are the primary predictors of academic achievement. In the study, implications of the findings are discussed and suggestions are given.

Keywords: Thinking styles, goal orientations, academic achievement.

Student teachers' developmental characteristics and tendencies are important sources of personal differences in self-regulation processes and well being which affect behavioral reactions of students in and out of school settings. Thinking styles and goal orientations can be seen as two of those individual-differences. In the literature, each of these constructs and their relationships with academic achievement have been examined extensively. However, the relationships between the two constructs and the predictive power of them on academic achievement have not been investigated yet, except the study of Fan and Zhang (2009). On the other hand, researchers and educators need to understand and explain the quality of the students' performances by the nature of the relations of various theories addressing the learning behavior. It is also important for teacher educators to understand how their students learn and perform in order to find efficient ways for

İletişim / Correspondence:
Mustafa Buluş
Department of Early Childhood Education, Faculty of Education, Pamukkale University, Denizli, Turkey
e-mail: mbulus@pau.edu.tr

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improving educational experiences and quality of learning of their students (Beyaztaş and Senemoğlu, 2015; Senemoğlu, 2011). Thus the primary goal of this study is to verify the relationships between the Sternberg's (1988, 1994, 1997) theory of mental self-government (MSG) and the achievement goal theory (AGT) (Dweck and Leggett, 1988). Correspondingly, the aim of this research is to examine the predictive power of thinking styles on goal orientations and the predictive power of both thinking styles and goal orientations together on student teachers' academic achievement.

The interest in "styles" construct as an individual-difference variable has been pronounced through some types of works such as the conceptual integration of previous studies and the empirical research (Zhang, 2000a). In relation to conceptual integration, the most recent type of work is the Threefold Model of Intellectual Styles proposed by Zhang and Sternberg (2005) as an integrative model of styles. The authors were conceptualized their model based on the empirical investigations about thinking styles proposed in the theory of MSG.

The styles in the Sternberg's theory are cognitive in their way of looking at things and correspond to preferences in the use of abilities. Therefore, a style is not in itself an ability but rather a preferred way of using one's abilities. In fact, the abilities refer to what one can do. The basic idea in Sternberg's theory of MSG (1988, 1994, 1997) is that like governments, people manage their everyday activities in different ways with which they feel comfortable. These different ways are learned through life-span development specifically by the effects of culture, parenting styles, schooling and occupation. Thus, people come to have not just a single style but a profile of styles which are teachable, measurable and variable across tasks and situations. Consequently, thinking styles are in part socialized meaning that they can, to some extent, change by the effects of environmental factors in which people live (Sternberg, 1997).

In his theory, Sternberg postulated five dimensions of MSG including 13 thinking styles. They are three functions (legislative, executive and judicial), four forms (monarchic, hierarchic, oligarchic, and anarchic), two levels (global and local), two scopes (internal and external) and two leanings (liberal and conservative) (Zhang, 2004a).

The research done by Zhang, Sternberg and their colleagues (Zhang, 2000b and 2001c; Zhang, 2003; Zhang and Postiglione, 2001; Zhang and Sternberg, 2000) shows that the thinking styles in Sternberg's theory can be classified into three groups. The first group consists of legislative, judicial, hierarchical, global, and liberal styles that generate creativity and require higher levels of cognitive complexity which were referred to as Type 1 thinking styles. The second group was called as Type 2, and it contains thinking styles (executive, local, monarchic, and conservative) that denote a norm-conforming tendency and require lower levels of cognitive complexity. The remaining four thinking styles (anarchic, oligarchic, internal, and external) may be perceived as belonging neither to the Type 1 group nor to the Type 2 group and referred to as Type 3 thinking styles. However, they may manifest the characteristics of the styles from both groups, depending on the stylistic demand of the specific task (Zhang, 2004a).

In the studies, thinking styles based on the theory of MSG were examined in relation to learning approaches (Zhang and Sternberg, 2000), learning styles (Cano-Garcia and Hewitt Hughes, 2000), personality types (Balkıs and Işıker, 2005; Zhang, 2001a), teaching approaches (Duman and Çelik, 2011; Zhang, 2001b), self-esteem (Zhang, 2001c; Zhang and Postiglione, 2001), academic achievement (Buluş, 2006; Grigorenko and Sternberg, 1997; Zhang, 2004b; Zhang and Sternberg, 1998), cognitive developmental levels (Zhang, 2002a), modes of thinking (Zhang, 2002b), critical thinking dispositions (Emir, 2013; Zhang, 2003), students' preferences for teaching styles and students' conceptions of effective teachers (Zhang, 2004a), self regulated learning strategies and motivation towards mathematics (Akkuş İspir, Ay and Saygı, 2011), locus of control (Başol and Türkoğlu, 2009) and social skill levels (Yıldız, 2012).

These studies mainly revealed that positive human characteristics and behaviors (e.g., the personality trait of openness, high cognitive development level, deep approach to learning, high self-esteem and academic achievement) were significantly correlated with Type 1 and the attributes and the behaviors that are generally viewed as being negative (e.g., the personality trait of neuroticism, low cognitive development level, surface approach to learning, low self-esteem and academic achievement) were significantly correlated with Type 2 thinking styles. All these findings have made many educational implications for school settings, specifically for students' learning behavior and academic performance.

Additionally, the social-cognitive theory of motivation (Dweck, 1986; Dweck and Leggett, 1988) focuses on the importance of motivational characteristics and postulates that there is a relationship between a person's goal orientations and his/her responses in academic settings. Within this framework, AGT focuses on how students think about themselves, their tasks and their performances (Dweck and Leggett, 1988).

According to the goal theory, the motives that the students use to complete their tasks are called as goal orientations (Ames, 1992; Dweck, 1986). In literature, many researchers have adopted a goal orientation perspective and defined three types of goals. These are mastery (also known

as learning or tasks), performance approach and performance avoidance goal orientations.

Mastery goal is an orientation that stimulates learners genuinely to acquire knowledge and to increase their accomplishment for self development. Research has consistently documented that being mastery oriented is related with more adaptive patterns of behaviors. Students holding mastery goal believe that effort is the cause of success or failure. They make more positive self statements (Diener and Dweck, 1978), use especially deep strategy processing (Ho and Hau, 2008; Meece, Blumenfeld and Hoyle, 1988; Nolen, 1988; Pintrich and De Groot, 1990; Seifert, 1995; Somuncuoğlu and Yıldırım, 1999), indicate a greater preference for challenge, report more positive and less negative effects, take responsibility for success (Seifert, 1995), show positive behaviors towards learning, and have high academic achievement level and self efficacy perception (Chan, 2008; Fenollar, Román and Cuestas, 2007; Grant and Dweck, 2003; Hsieh, Sullivan and Guerra, 2007; Linnenbrink, 2005; Middleton and Midgley, 1997).

Performance approach is oriented toward obtaining favorable judgments of competence (Elliot and Church, 1997; Middleton and Midgley, 1997). Students with performance goal orientation are interested in demonstrating their ability and emphasizing high grades to enhance their ego. They believe that ability is the cause of success or failure (Elliot and Church, 1997; Middleton and Midgley, 1997). In literature, performance approach goal has been related to both positive outcomes such as high competence and high performance, and maladaptive outcomes such as surface learning strategies (Midgley, Middleton and Kaplan, 2001). However, recently, researchers have found that performance approach goal is related to more positive outcomes such as course achievement (Church, Elliot and Gable, 2001; Elliot and Church, 1997), use of cognitive strategies (Pintrich, 2000) and are not correlated with use of surface learning strategies (Archer, 1994). These studies show a disagreement about the findings related to the positive effects of performance approach goal. But according to Midgley, Middleton and Kaplan (2001), performance approach goal seems to be beneficial for certain types of individuals (e.g., boys, older students) and under certain types of conditions (e.g., competitive environments, situations where mastery goals are also present). For that reason Midgley, Middleton, Gheen and Kumar (2002) conceptualized both the mastery and the performance goals as "approach" goals (as cited in., Gutman, 2005). Because students try to approach the task rather than avoid when they use both goal orientations.

On the other hand, performance avoidance goal is oriented toward avoiding unfavorable judgments of competence (Elliot and Church, 1997; Middleton and Midgley, 1997). Students with avoidance goal mainly focus on hiding their lack of ability (Elliot, 1999). They use less sophisticated strategies (Nolen, 1988; Seifert, 1995; Somuncuoğlu and Yıldırım, 1999), make more negative self-statements and attribute success to uncontrollable factors (Seifert, 1995). Avoidance goal has been consistently related to maladaptive outcomes such as insufficient patterns of learning, negative affect and low performance, low self-efficacy and low intrinsic value for learning (Elliot, 1999; Elliot and McGregor, 2001; Hidi and Harackiewicz, 2000; Middleton and Midgley, 1997; Pajares, Britner and Valiante 2000).

All these studies indicate that some students place importance on learning whereas others prefer to get high performance and some others trying to avoid unfavorable judgments. All these differences result from the fact that students differ in the way they approach and perceive the situations, the achievement and themselves (Dweck and Leggett, 1988).

Bearing in mind that the achievement goal orientation is an important determinant of student behaviors in educational settings, researchers must focus on the classroom environment and teacher related variables affecting the development of mastery goal orientation (Ames and Ames, 1981; Midgley and Anderman, 1998). Consequently, AGT proposes that students' level of motivation and behaviors can be understood by considering the reasons or purposes they use while doing their academic works (Ames, 1992; Dweck and Legget, 1988). In the light of these recommendations, it can be said that there are many factors like certain characteristics of classroom and school, teachers' approaches and students' perceptions that influence motivational orientations.

In that respect, it is seen that there is a need to test the nature of the relations between the AGT (Dweck and Leggett, 1988), the theory of MSG (1988, 1994, 1997) and the academic achievement all together in order to understand and explain the differences among the learning behaviors of students. Therefore, the first aim of this study is to examine the predictive power of the student teachers' thinking styles in their preferred goal orientations. The second and equally important aim of the study is to explore the predictive power of both thinking styles and goal orientations in student teachers' academic achievement. Consistent with these aims and on the basis of the available evidence explored briefly above, following questions were shaped the framework of this research:

- Are there any significant relationships among the student teachers' thinking styles, goal orientations and academic achievement?
- Does thinking styles predict goal orientations significantly?
- Do student teachers' both thinking styles and goal orientations contribute to their academic achievement?

Methods

Research Design

While conducting the research which aimed to investigate the predictive power of the student teachers' thinking styles on their preferred goal orientations and of both orientations on academic achievement, the descriptive survey model was used.

Participants

A total of 270 third (104) and fourth (166) grade student teachers enrolled from different undergraduate programs at the Faculty of Education in Pamukkale University, Denizli, participated in the study. The sample included 192 female and 78 male students whose age ranged from 19 to 33 years.

Procedures

Permission to collect the data from participants was obtained from the faculty administration. The two inventories and a short demographic information measure were given to the students during their class meetings with the permission of the instructors. Students were informed that the study is voluntary and anonymous. The inventories were completed by volunteers in approximately half an hour.

Measures

Demographic Information Sheet

Demographic information sheet includes questions to get personal information about participants' gender, age, grade and reported academic achievement (average GPA).

Thinking Styles Inventory (TSI)

The TSI (Sternberg and Wagner, 1992) is a self-report test including 104 items with 13 subscales, each containing eight statements and measuring one thinking style defined in the theory of MSG. For each item, the participants rate themselves on a 7 point Likert-type scale ranging from 1 indicating that the item did not describe them at all to 7 indicating that the item described them extremely well.

In the study, the short Turkish form of the TSI including 65 items, of which five used 13 subscales. The inventory was translated and validated by Buluş (2006). The item-scale correlations for the short form of the TSI were ranged from .31 to .84. The alpha coefficients for 13 subscales ranged from .66 (anarchic) to .93 (monarchic) with a median of .81. The factor structure of the TSI was computed by principal-components analysis using a varimax rotation. The results yielded five factors with eigenvalues larger than 1 and they accounted for 68.3% of the variance.

In this study the Cronbach's alpha coefficients (α) for 13 subscales of TSI were computed and the results are given below: Legislative (.69), Executive (.73), Judicial (.85), Monarchic (.52), Hierarchic (.87), Oligarchic (.70), Anarchic (.65), Global (.87), Local (.80), Internal (.79), External (.88), Liberal (.86), and Conservative (.92).

Goal Orientations Inventory (GOI)

GOI is a self-report test developed by Middleton and Midgley (1997) including 30 items with three subscales, each containing 10 statements which assess individuals' orientations on mastery, performance approach and avoidance goals in math. For each item, the participants were asked to rate themselves on a 5-point Likert-type scale ranging from 5 indicating that the item described them extremely well to 1 indicating that the item did not describe them at all. The inventory was first translated and validated by Özgüngör (2006) and the wordings of the statements were changed in the direction to assess the students' goal orientations in elementary education. In her study, Özgüngör (2006) examined only the alpha coefficients for 3 subscales. Relevant with the purposes of this study, the approach to assessment is based on the definition of achievement goals as purposes or reasons for achievement behavior, in a way that the GOI was validated again in this study and the results were given below.

Item analysis: In the study, first the item-scale correlations to determine the suitability of the items were calculated for each subscale. By means of these results, the lowest item-scale correlations were identified and four of these items for mastery and two of these items for performance approach and avoidance goals subscales were omitted from the GOI. Thus, the remaining item-scale correlations (r) ranged from .56 to .66 for mastery, .57 to .75 for performance approach and .61 to .79 for performance avoidance subscales. Thus the remaining 22 items constitute the new form of the GOI.

Scale reliabilities: The alpha coefficients for 3 scales, given in Table 1 ranged from .83 (mastery) to .91 (avoidance) with a median of .87. These results are strong enough and suggesting adequate reliability of the instrument.

Scale intercorrelations: Intercorrelations for the 3 subscales are given in Table 2 and provide acceptable results which support the rationale of the theory of goal orientations and the majority of the findings of research studies.

Table 1. GOI subscales: means, standard deviations and α (N=270).

Scale	Items	$\bar{X}$	Ss	α
Mastery	2,3,5,7,8,9	3.8407	4.0588	.8339
Performance	11,12,13,14,15,16,17,18	2.5060	7.4085	.8862
Avoidance	21,23,24,26,27,28,29,30	1.7370	6.6921	.9142

Factor analysis: The factor structure of the GOI was computed by principal-components analysis (PCA) using a varimax rotation and summarized in Table 3.

The results yielded three factors with eigenvalues larger than 1 and they accounted for 59.9% of the variance. The results also indicated factor loadings higher than .62 for each item and all items loaded on their components (Table 4). All these results are consistent with the three-factor model corresponding to the three dimensions of the theory of goal orientations.

Table 2. Interscale Pearson correlation matrix for 3 scales of the GOI (N=270).

Scale	1	2	3
Mastery	-	.020	-.274*
Performance		-	.439*
Avoidance	-.274*	.439*	-

*p<.01

Table 3. Summary statistics for three factor model for GOI.

	Factor 1	Factor 2	Factor 3
(% of variance)	32.518	17.613	9.807
(Cum. % of var.)	32.518	50.131	59.937
Eigenvalues	7.154	3.875	2.157

Table 4. Summary statistics for items in the GOI.

				Factors		
Items	$\bar{X}$	SD	r	I	II	III
2	4.1037	.8984	.6442	.757		
3	3.7556	1.0163	.5629	.724		
5	4.1444	.7600	.6134	.718		
7	3.8630	.9405	.6697	.760		
8	3.6333	.9577	.5821	.716		
9	3.5444	.8981	.5911	.713		
11	2.1889	1.1199	.6884		.757	
12	2.4852	1.3182	.7539		.843	
13	3.2444	1.2932	.5789		.695	
14	2.3111	1.2582	.6889		.746	
15	1.8667	1.0927	.6329		.622	
16	2.6778	1.2687	.6007		.697	
17	2.4556	1.2209	.6922		.705	
18	2.8185	1.3360	.6315		.707	
21	1.8963	1.1061	.6165			.646
23	1.7630	1.0749	.7361			.758
24	1.6148	1.0837	.7475			.808
26	1.8889	1.0359	.6934			.739
27	1.6556	1.0184	.7657			.793
28	1.7111	1.0265	.7928			.801
29	1.5259	.9666	.7805			.820
30	1.8407	1.1442	.6411			.731

Data analysis

Previous researchers have found that thinking styles, goal orientations and academic achievement are relational. For that reason, preliminary statistical analyses were conducted first to identify possible relationships among thinking styles, goal orientations and academic achievement. Second, to test the predictions about the relationships between student teachers' thinking styles and their preferred goal orientations, linear regression analysis was conducted with the goal orientation scales as the dependent variables and the thinking style scales as the independent variables. To explore the contributions of both thinking styles and goal orientations together to academic achievement, stepwise regression analysis was used. In this analysis, academic achievement was dependent and thinking styles and goal orientations were independent variables.

Results

Correlational Analysis

Table 5 gives Pearson's correlation coefficients among the scales from the two inventories and academic achievement. Results showed that mastery goal orientation was correlated with academic achievement and all thinking styles except the global, monarchic and conservative ones. Performance goal orientation was correlated with monarchic and conservative thinking styles. Avoidance goal orientation was correlated with judicial, liberal, monarchic, conservative and anarchic

Table 5. Correlations among TSI, GOI and academic achievement.

	Mastery	Performance	Avoidance	Achievement
Type I style				
Legislative	.167*	.052	-.061	-.034
Judicial	.303*	-.094	-.220*	-.075
Global	-.037	.006	.117	-.140†
Hierarchic	.382*	.068	-.118	.077
Liberal	.319*	-.040	-.244*	-.049
Type II style				
Executive	.206*	.113	.036	-.138†
Local	.176*	.105	-.104	-.047
Monarchic	.090	.130†	.126†	-.022
Conservative	-.039	.141†	.275*	-.133†
Type III style				
Oligarchic	.201*	.063	-.022	-.069
Anarchic	.312*	.019	-.126†	.052
Internal	.158*	.107	-.043	.018
External	.143†	.068	-.065	-.082
Achievement	.137†	-.033	-.183*	1

*p<.01, †p<.05

thinking styles and academic achievement. Academic achievement was correlated with global, executive and conservative thinking styles.

Regression Analysis

Regression analysis is a statistical technique for estimating the relationships between a dependent variable and one or more independent variables (or 'predictors'). It depends on certain assumptions about the variables used in the analysis. According to Osborne and Waters (2002) there are four basic assumptions for regression analysis. These are normality, linearity, reliability and homoscedasticity assumptions. In this study, the normality assumption was checked with Kolmogorov-Smirnov test and the results showed that only the variable labeled as executive thinking style has normal distribution (p=.055>.05). This means non-normally distributed variables in the study (highly skewed or kurtotic variables) can distort relationships and significance tests. The linearity assumption was tested with Pearson correlation analysis and the results were given in Table 5. According to Osborne and Waters (2002), standard regression analysis can only accurately estimate the relationship between dependent and independent variables if the relationships are linear. In this study, the results of the correlational analysis showed that most relationships between the variables are linear as seen in Table 5. Literature argues that unreliable measurement causes relationships to be underestimated, increasing the risk of Type II errors. For that reason, the reliability assumption of the variables was tested with reliability analysis technique for all sub-tests of the scales and the results were given in Table 1 for GOI subscales and in title labeled as Thinking Styles Inventory (TSI) in page 8 for thinking styles subscales. These analysis indicated higher than .70 Cronbach's alpha coefficients for all variables except judicial (α=.69), monarchic (α=.52) and anarchic (α=.65) sub-tests. Lastly, the homoscedasticity assumption was checked with test of homogeneity of variances. Homoscedasticity means that the variance of errors is the same across all levels of the independent variables (Osborne and Waters, 2002). The results of the analysis showed that except academic achievement (p=.001<.01), the significant levels of all of the data groups about the variables are not meaningful, meaning that the data groups used in this study are homogeneous. By means of all of these results, it can be said that the assumptions for regression analysis are mostly met.

In the study to test the predictive power of thinking styles in goal orientations and the power of both thinking styles and goal orientations in academic achievement, a series of regression analyses were performed.

Predicting Goal Orientations from Thinking Styles

Linear regression analysis was conducted to examine the predictive power of thinking styles on goal orientations and the results were given in Tables 6, 7 and 8.

Table 6 presents the summary statistics for the contribution of thinking styles to mastery goal orientation. Results indicated that thinking styles significantly predicted student teachers' use of mastery goal orientation. Thinking styles accounted for 24% of the variance. These results revealed that hierarchic and liberal thinking styles are the primary predictors of mastery goal orientation.

Table 7 presents the summary statistics for the contribution of thinking styles to performance goal orientation. Results

Table 6. Summary statistics for variables predicting mastery goal orientation.

Variables	B	SEB	β
Legislative	-.116	.070	-.114
Executive	.075	.050	.098
Judicial	.061	.050	.087
Monarchic	.002	.057	.002
Hierarchic	.197	.046	.288*
Oligarchic	.024	.046	.033
Anarchic	.073	.052	.098
Global	-.048	.037	-.085
Local	.030	.040	.047
Internal	-.001	.047	-.001
External	.010	.038	.016
Liberal	.118	.052	.175†
Conservative	.018	.044	.028

Note. ΔR^2=.243, *p<.001, †p<.05

Table 7. Summary statistics for variables predicting performance goal orientation.

Variables	B	SEB	β
Legislative	.015	.140	.008
Executive	.074	.100	.053
Judicial	-.218	.101	-.170*
Monarchic	.140	.115	.094
Hierarchic	.019	.092	.015
Oligarchic	.072	.092	.054
Anarchic	-.026	.106	-.019
Global	-.087	.075	-.085
Local	.095	.080	.082
Internal	.178	.095	.143
External	.116	.076	.104
Liberal	-.038	.106	-.031
Conservative	.066	.089	.056

Note. ΔR^2=.078, *p<.05

indicated that thinking styles significantly predicted student teachers' use of performance goal orientation. Thinking styles accounted for 8 % of the variance. These results revealed that judicial thinking style is the primary predictor of performance goal orientation.

Table 8 presents the summary statistics for the contribution of thinking styles to avoidance goal orientation. Results indicated that thinking styles significantly predicted student teachers' use of avoidance goal orientation. Thinking styles accounted for 8% of the variance. These results revealed that conservative thinking style is the primary predictor of avoidance goal orientation.

Predicting Academic Achievement Based on Goal Orientations and Thinking Styles

Hierarchical regression analysis were computed to examine the predictive power of both thinking styles and goal orientations on academic achievement (Table 9). The results indicated that both goal orientations and thinking styles significantly predicted student teachers' academic achievement. Goal orientations and thinking styles accounted for 14% of the variance. These results revealed that mastery and avoidance goal orientations are the primary predictors of academic achievement.

Discussion

The current study was designed to examine the predictive power of thinking styles on goal orientations and of both constructs together on student teachers' academic achievement in. The results of the study, in general, confirmed the predictions. First of all, close relationships were found between thinking styles and the goals set by the students. Regression analysis shows the contributions of thinking styles to goal orientations. In that sense, it is seen that hierarchic and liberal Type I thinking styles are the primary predictors of mastery, judicial Type I thinking style is the primary predictor of performance and conservative Type II thinking style is the primary predictor of avoidance goal orientations. The regression analysis also indicated that the positive correlations among legislative, judicial, executive, local, oligarchic, anarchic, internal, external thinking styles and mastery goal orientation were suppressed by hierarchic and liberal thinking styles; the positive correlations among monarchic, conservative thinking styles and performance goal orientation were suppressed by judicial thinking style negatively; the positive correlation with monarchic thinking style and the negative correlations among judicial, liberal, anarchic thinking styles and avoidance goal orientation were suppressed by conservative thinking style. In the light of these results, it can be said that the level of mastery goal orientation increases as the level of hierarchic and liberal thinking styles increase, the level of performance goal orientation decreases as the level of judicial thinking style increases and the level of avoidance goal orientation increases as the level of conservative thinking style increases.

These results, compared to earlier findings, are partially consistent with those reported by Fan and Zhang (2009). The

Table 8. Summary statistics for variables predicting avoidance goal orientation.

Variables	B	SEB	β
Legislative	.109	.123	.065
Executive	-.035	.088	-.028
Judicial	-.114	.088	-.098
Monarchic	.122	.101	.090
Hierarchic	-.137	.081	-.121
Oligarchic	.034	.081	.028
Anarchic	-.011	.093	-.009
Global	.020	.066	.022
Local	-.058	.070	-.055
Internal	.013	.083	.012
External	-.011	.066	-.011
Liberal	-.099	.093	-.089
Conservative	.213	.078	.203*

Note. ΔR^2=.078, *p<.01

Table 9. Summary statistics for variables predicting academic achievement.

Variables	B	SEB	β
Step 1			
Mastery	.123	.089	.088
Performance	.033	.052	.043
Avoidance	-.151	.060	-.178*
Step 2			
Mastery	.193	.097	.137*
Performance	.034	.052	.044
Avoidance	-.147	.061	-.173*
Legislative	-.022	.106	-.016
Executive	-.122	.075	-.114
Judicial	-.119	.076	-.120
Monarchic	.062	.086	.054
Hierarchic	.068	.072	.071
Oligarchic	-.059	.069	-.058
Anarchic	.146	.079	.139
Global	-.109	.057	-.139
Local	-.093	.060	-.105
Internal	.084	.071	.087
External	-.020	.057	-.023
Liberal	-.149	.080	-.158
Conservative	-.092	.068	-.102

Note. ΔR^2=.139, *p<.05

positive contributions of hierarchic and liberal Type I styles to mastery goal orientation indicate that participants who tended to use more creativity and higher levels of cognitive complexity generating thinking styles also tended to be more confident and inclined to acquire knowledge to learn and increase their competence for self development. This result is consistent with the theoretical conceptualization done by Sternberg and Lubart (1992). Also, as cited by Zhang (2000b) and Zhang and Sternberg (2000), students rated high in Type I thinking styles tend to take a deep approach to learning. Therefore, it can be argued that students with a hierarchic style who prefer working towards several goals at once through setting priorities and students with a liberal style who likes to do things in new ways (Sternberg, 1997) also tend to believe that effort is the cause of success or failure and try to get knowledge to learn and increase their competences (Ames and Archer, 1988) which are the motives for mastery goal orientation. In another word, it is thought that being oriented with hierarchic and liberal styles may result in a preference for mastery goal orientation.

The negative contribution of judicial Type I style to performance approach goal orientation found in the study reveals that participants who like to evaluate rules and procedures, to prefer problems in which they can analyze and evaluate things and ideas, are not oriented toward obtaining favorable judgments of competence and are not interested in demonstrating their ability. This means, in another word, that having a high tendency of judicial thinking style causes a decrease in performance approach goal orientation. This result is consistent with the theoretical conceptualizations done by Ames (1992), Dweck (1986) and Sternberg (1994, 1997).

Furthermore, in this study it was also found that conservative Type II thinking style has a positive role in the variance of performance avoidance goal orientation. This result indicates that participants, who tended to use existing rules and procedures, minimize change and avoid ambiguous situations in work which are more norm-favoring and simplistic information processing tendencies (Zhang and Sternberg, 2005), also oriented toward avoiding unfavorable judgments of competences and tended to be more resistant to originalities and new ways of doing their works. This result is consistent with the finding that denote students rated high in Type II thinking styles tend to take a surface learning approach (Zhang, 2000b; Zhang and Sternberg, 2000). This result also can be attributed to the orientations in cultural and educational systems. Since in Turkish educational system, almost in all levels, the emphasis is generally on giving more and more knowledge and the classroom management approach is teacher and the child-rearing attitudes are parent-oriented, the students are being trained as implementers. Thus, in Turkey, it could be said that the formal and informal educational systems value and encourage the conservative thinking styles among students over others and this tendency may play role in the variance of performance avoidance goal. However, this argument may not be definite and it is therefore necessary to verify the results by further studies (Buluş, 2006).

Secondly, the results indicate that both goal orientations and thinking styles significantly predict student teachers' academic achievement. These results specifically reveal that mastery and avoidance goal orientations are the primary predictors of academic achievement. By means of the regression analysis, it is also seen that the negative correlations among global, executive, conservative thinking styles and academic achievement were suppressed by mastery and avoidance goal orientations. For that reason, it can be concluded that the level of academic achievement increases as the level of mastery goal orientation increases and the level of academic achievement decreases as the level of avoidance goal orientation increases. These results are consistent with the findings reported by Elliot (1999), Elliot and Church (1997), Elliot and McGregor (2001), Grant and Dweck (2003), Middleton and Midgley (1997), Midgley and Urdan (2001), Pajares, Britner and Valiante (2000), Pintrich (1999), and Skaalvik (1997). The students with mastery goal orientation believe that effort is the cause of success. Consistent with this belief, they use especially deep strategies (Ho and Hau, 2008; Meece, Blumenfeld and Hoyle, 1988; Pintrich and De Groot, 1990; Seifert, 1995; Somuncuoğlu and Yıldırım, 1999), make more positive self statements (Diener and Dweck, 1978), take responsibility for success (Seifert, 1995), show positive behaviors towards learning and have high self efficacy perceptions (Chan, 2008; Elliot, McGregor and Gable, 1999; Grant and Dweck, 2003; Linnenbrink, 2005; Middleton and Midgley, 1997). Therefore, by using all of these characteristics-tendencies they could increase their academic performance. On the other hand, students with performance avoidance goal are oriented toward avoiding unfavorable judgments of competence (Elliot and Church, 1997; Elliot and Harackiewicz, 1996; Middleton and Midgley, 1997) which have been related to maladaptive outcomes such as insufficient strategies, negative effect and low performance (Eliot and Church, 1997; Elliot and McGregor, 2001; Middleton and Midgley, 1997; Midgley and Urdan, 2001; Pintrich, 1999; Skaalvik, 1997).

Finally, the results confirm that the Goal Orientation Scale is a reliable and valid instrument to identify the level of the dispositions and motives that Turkish student teachers use to complete their tasks and took part in their learning activities.

Consequently, although there are many factors that affect goal orientations and academic achievement, in this study, goal

orientations are assumed to be dependent variables on thinking styles and academic achievement is assumed to be a dependent variable on goal orientations and thinking styles together. The results conclude that the proposed factors (thinking styles) are found to be important and predict student teachers goal orientations and both thinking styles and goal orientations predict academic achievement significantly. Therefore, the findings of the analyses can serve as cues for the evaluation of the effectiveness of the colleges, departments, educational programs, and instructional and developmental processes. In that sense, to increase mastery goal orientation and academic achievement in student teachers, the colleagues should stimulate their students to develop and use Type I thinking styles and a mastery goal orientation. Additionally, as thinking styles and goal orientations develop in formal and informal interactions, both parents' and instructors' attitudes, communication skills and approaches towards students should be effective for strengthening qualified efforts and habits in relation to academic works in student teachers so that their learning based dispositions and academic achievement increase. In short, it can be said that the results point out the importance of the quality of the family and university life for learning and achievement.

Lastly, it can be concluded that this study has important theoretical and practical implications since it expands previous research in the factors affecting student teachers' goal orientations and academic achievement.

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