Investigating Predictive Role of 2x2 Achievement Goal Orientations on Learning Strategies with Structural Equation Modeling

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ABSTRACT

The purpose of this study is to examine the relationships between achievement goal orientations and Learning Strategies. The sample of study consists of 350 public high school students (135 males and 215 females, mean age: 17± 0.65) from two high schools in Kerman province of Iran selected by random multistage cluster sampling method. In this study, The Achievement Goal Orientations Scale (Elliot & McGregor, 2001) and Learning Strategies Scale (Kember, Biggs, & Leung, 2004) were used. Structural equation modeling (SEM) was used to test the hypotheses. In correlation analysis, mastery goals predicted positive deep strategy and performance goals predicted positive surface strategy in a positive way. The model demonstrated fit ($\chi 2/df$= 1.99, GFI= .97, AGFI= .97, CFI= .93, NFI= .93, RFI= .93, and RMSEA= .05). According to the results, achievement goal orientations (exception of the path from performance-approach to deep strategy) were significant determinants of learning strategies. Results were discussed in the light of literature.

Keywords: *achievement goal orientation, learning strategies, Structural Equation Modeling*

INTRODUCTION

THE achievement goal orientations theory, one of the most attractive research areas in recent years, has been extensively studied in education (Akın & Cetin, 2007; Eren, 2009). Goal orientations refer to one's dispositional or situational goal preferences in achievement situations (Payne, Youngcourt, & Beaubien, 2007). In the original goal models, two classes of goals were identified: performance goals, where the purpose is to validate one's ability or avoid demonstrating a lack of ability, and learning goals (mastery), where the aim is to acquire new knowledge or skills (see Dweck & Elliott, 1983). Different researchers have used different labels for these two classes of goals; performance goals have also been called ego-involved goals (e.g., Nicholls, 1984) or ability goals (e.g., Ames, 1992; Ames & Archer, 1988), and learning goals have also been called mastery goals (e.g., Ames 1992; Ames & Archer, 1988; Elliot & Harackiewicz, 1996) or task goals (e.g., Middleton & Midgely, 1997; Nicholls, 1984).

In the 1990s, researchers differentiated between approach and avoid components of goal orientations. This occurred first for the performance goal orientation, beginning with work by Elliot and Harackiewicz (1996) and Skaalvik (1997), among others. These further distinctions emerged for two main reasons. Empirically, findings concerning the outcomes of having a performance goal orientation were somewhat contradictory, leading researchers to wonder why this occurred. Theoretically, Elliot and Harackiewicz (1996) noted that traditional achievement motivation theories, such as Atkinson's (1957) expectancy-value model, included both approach and avoidance motives. By contrast, most modern theories

focus primarily on the approach aspect, thus overlooking the importance of avoidance motivation. Therefore, Elliot and Harackiewicz (1996) proposed approach and avoidance aspects of performance goals, as did Skaalvik (1997). Performance-approach goals refer to the students' desire to demonstrate competence and outperform others. Performance-avoidance involves a normative competence standard with a preference to avoid failure.

VandeWalle et al. (2001) suggested that since individuals with performance- approach goal orientation believe that ability is difficult to develop, they will focus more on effort rather than competency development. On the other hand, individuals engage in tasks with the strategy of avoiding demonstrations of incompetence and negative judgments, relative to others (Elliot & McGregor, 1999).

Following the utility of the trichotomous goal framework, emerged the proposal for a 2x2 achievement goal framework consisting of four goal orientations (Elliot, 1999; Elliot & McGregor, 2001; Pintrich, 2000a, 2000b), where the concept of mastery-avoidance was introduced into the trichotomous goal framework. Elliot (1999), Elliot and McGregor (2001), and Pintrich (2000c) proposed that the mastery goal orientation also may be divided into approach and avoid components, rather than being solely conceived as reflecting an approach tendency. These researchers argued that mastery-avoidance goals include such things as working to avoid misunderstanding, or the use of standards to not be wrong when doing an achievement activity. Elliot (1999, p. 181) defined mastery-avoidance goals as "striving to avoid losing one's skills and abilities (or having their development stagnate), forgetting what one has learned, misunderstanding material, or leaving a task incomplete or unmastered", and such a goal orientation is likely to result in some positive and some negative consequences. It seems that those who pursue mastery goals tend to seek more challenges, have higher reported use of effective learning strategies, than those individuals who pursue performance goals (Middleton & Midgley, 1997; Pintrich, 2000b; Wolters, 2004).

Other later studies also confirmed the four-factor structure and proceeded to further explore the utility of this framework (Bong, 2009; Coutinho & Neuman, 2008; Nien & Duda, 2008; Sideridis, 2008). These two classes of goals (performance and mastery) were related to a wide range of cognitive, emotional and behavioral outcomes, including self-regulated learning, affect and well-being, self-handicapping strategies, and disruptive behavior (Elliot, 1999; Pintrich, 2000b). In fact, goal orientation is presumed to be a function of individual differences or to be included by situational constraints, as it influences the strategy students take to learn and the strategies they use in learning. Strategies to learning refer to the learners' different ways of relating to the learning task- 'how' and 'why' a learner learns'. The 'how' are the strategies devised by the learner to solve the problems defined by their motives (the why of learning) (Shelly, 2009). This combination of motive and strategy is called "a strategy to learning". A deep motive by contrast is intrinsic, and meaning oriented. The deep strategy involves wide reading and an attempt to integrate new material into previous knowledge. The strategy to learning resulting from this motive-strategy combination is the deep strategy. A surface motive is an instrumental one in which the main purpose is to meet minimum requirements for assessment. Surface strategy is a reproductive one in which the focus is on recalling the essential element of content through rote learning. The superficial strategy to learning resulting from this motive- strategy combination is termed as surface strategy.

If there are differences in the focus on goals, there must be a pattern on how they correlate with learning strategies. Studies on educational psychology have looked at the predicted relationship between achievement goals and learning strategies. Such studies have shown that through effective use of achievement goals they are able to comment and assert a great deal of use of higher order learning and study strategies (Elliot et al., 1999; Shelly, 2009; Somuncuoglu & Yildirim, 1999). The two strategy goal orientations were once again the most adaptive, each with a different focus.

Mastery-approach predicted deep learning strategies (Bartels & Magun-Jackson, 2009; Elliot & McGregor 2001; Kaplan, & Maehr, 2007). Numerous studies have found that students who adopt mastery goals are more likely to engage in deep cognitive processing, such as thinking about how newly learned material relates to previous knowledge and attempting to understand complex relationships. In contrast, students who adopt performance goals tend to use surface-level strategies, such as rote memorization of facts and immediately asking the teacher for assistance when confronted with difficult academic tasks (Pintrich & Garcia, 1991).

It appears that a focus on mastery goals can result in deeper cognitive processing of academic tasks than a focus on performance goals (grades, besting others), which seems to result in more surface processing and less overall cognitive engagement (Kaplan, & Maehr, 2007; Pintrich et al., 1993).

Tickle (2001) concluded that students who adopt deep learning strategies are motivated by mastery - oriented goals. Those who adopt surface level learning are motivated by "pass only" aspirations and hence, develop minimum effort learning strategies, often dictated by rote learning of only what is necessary. Chan and Lai (2002) found that students who scored higher on learning goal orientation were more likely to cognitively engage in deep strategy. Byrne et al. (2001) revealed that the deep strategies are positively associated with high academic performance and the surface strategy with poor academic performance. For performance- type of goals, both strategy and avoidance goals were significantly related to adopting shallow or surface strategy to studying (Chan et al., 2005; Chan & Lai 2008). Grant and Dweck (2003) found that performance goals predicted surface processing and mastery goals predicted deeper processing of course material. Similarly, Entwistle and Ramsden (1983) found that a deep strategy was associated with intrinsic motivation, whereas a surface strategy was associated with extrinsic motivation.

Recent research based on the trichotomous model have further clarified the outcomes associated with performance goals. Performance-approach and performance-avoidance goals predict different patterns of behavioral, cognitive, and affective results. Also, it appears that both mastery and performance-approaches goals support learning behaviors conducive to high achievement (compared with performance-avoidance goals) (Shih, 2005).

Therefore, there is a need to study the relationship of achievement goals and learning strategies because adapting to a specific or to a multiple achievement goal will have an effect on a student's learning strategies whether the adoption of goals depict a positive or a negative effect on a student. The present study sought to test the relationship between specific achievement goals (mastery-approach, mastery-avoidance, performance-approach, and performance-avoidance) with different learning strategies (deep and surface strategies).

The Present Study

In the previous studies like those mentioned before (Bartels & Magun-Jackson, 2009; Elliot & McGregor 2001; Pintrich & Garcia, 1991; Pintrich et al., 1993) some studies emphasize the role of achievement goal orientations on learning strategies as core to academic achievement indirectly. Also, some studies assessed cognitive and metacognitive strategies (Somuncuoglu & Yildirim, 1999), and self-planning, and self-monitoring strategies (Ames & Archer, 1988). None of the previous studies have considered the role of deep and surface strategies.

Therefore, on the basis of the literature review and bearing in mind the aforementioned limitations of previous research, the purpose of this research is to examine the relationship between the 2X2 achievement goals and learning strategies (deep and surface). The hypotheses to be tested in this study include:

1) Mastery (approach and avoidance) goal orientations would be related positively to deep strategy and negatively to surface strategy.

2) Performance (approach and avoidance) goal orientations would be related positively to surface strategy and negatively to deep strategy. This model is represented schematically in Figure 1.
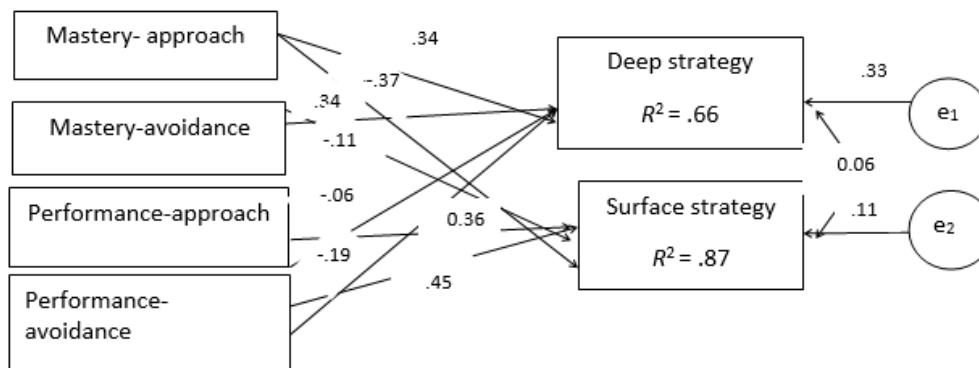
Figure1. Hypothesized model of the relationships between achievements goal orientations and learning strategies.

METHOD

This study adopted a predominantly quantitative design. The research design fully relied on self-report data acquired via psychometric instruments previously validated. The relationships between achievement goal orientations and learning strategies were examined using correlation analysis and the hypothesized model was tested through structural equation modeling. No causation was hypothesized.

Participants

The sample consisted of 350 public high school students aged between 15 and 19 years (135 males and 215 females, mean age: 17± 0.65) drawn from two high schools in Kerman province of Iran who were selected by random multistage cluster sampling method. Subjects answered the validated Persian translations of questionnaires according to the instructions. The questionnaires were anonymous and informed consent was taken from each student.

Measures

Achievement goal oriented scale (Elliot & McGregor, 2001)

The 2X2 AGOS (Elliot & McGregor, 2001) is a 12-item self-report scale using a 7-point Likert scale (1 = *strongly disagree,* 7 = *strongly agree*) and has four sub-scales: mastery-approach (three items), mastery-avoidance (three items), performance-approach (three items), and performance-avoidance (three items). In the present study, results of confirmatory factor analysis have demonstrated that the items loaded on four factors. The results of confirmatory factor analysis indicate that the model was well fit (χ^2 =49.20, DF = 39, NNFI = .91, CFI = .95, IFI = .95, and RMSEA = .058). For reliability of the Iranian version of the AGOS the internal consistency coefficient was calculated. The Cronbach's alphas for internal consistencies were .77, .82, .84, 86, and .85 orderly for mastery-approach, mastery-avoidance, performance-approach, performance-avoidance, and for the whole achievement goals questionnaire respectively. The corrected item-total correlations of AGOS ranged from .41 to .88.

Learning strategies (Kember, Biggs & Leung, 2004).

Learning strategies were assessed using 22 items from the Revised Learning Process Questionnaire (R-SPQ-2F (Kember, Biggs, & Leung, 2004). Participants responded to each item on a 5 -point Likert scale (1 = never, 5 = always). This instrument has two sub-scales: deep-strategy (eleven items), and surface-strategy (eleven items).

In the present study, results of confirmatory factor analysis (CFA) have demonstrated that the items loaded on two factors. Results of CFA demonstrated that the two dimensional model was well fit (χ^2 = 67.69, DF = 45, NNFI =.90, NFI = .91, CFI = .91, IFI = .91, RFI = .90, GFI = .95, RMSEA = .054). For reliability of the Iranian version of the R-SPQ-2F the internal consistency coefficient was calculated. The Cronbach's alphas internal consistencies were .66, .81, and .87 orderly for deep-strategy, surface-strategy, and for the

whole learning strategies questionnaire respectively. The corrected item-total correlations of R-SPQ-2F ranged from .39 to .65.

Procedure

Firstly, the Ethics committee of Education organization in Kerman province of Iran approved this study. Written informed consents were obtained before entering into the study. Then, participants were informed of the purpose and of the voluntary nature of study and were ensured anonymity for all responses given. In this research, Pearson correlation coefficient and structural equation modeling were utilized to determine the relationships between achievement goal orientations and Learning strategies. These analyses were carried out via LISREL 8.54 (Joreskog & Sorbom, 1996) and SPSS 18.

RESULTS

Descriptive Data and Inter-correlations

Table 1 shows the means, descriptive statistics, inter-correlations, and internal consistency coefficients of the variables used.

Table 1 Descriptive Statistics and Inter-correlations of the Variables

Variable	M	SD	1	2	3	4	5	6
1. Per-App	16.64	4.22	-					
2. Per Av	15.22	4.08	.78**	-				
3. Ma-App	17.83	3.83	.42**	.58**	-			
4. Ma-Av	15.57	4.23	.27**	.49**	.46**	-		
5. D-S	25.22	4.08	-.07	-.19**	.51**	.51**	-	
6. S-S	23.83	3.83	.44**	.61**	-.55**	-.18**	-.18**	-

**p < 0.01

Note: Per-App (Performance-approach), Per-Av (Performance-avoidance), Ma-App (Mastery-approach), Ma-Av (Mastery-avoidance), D-S (Deep-Strategy) and S-S (Surface-Strategy).

The mean scores, standard deviations, and zero-order correlations among the variables are summarized in Table 1. As shown in the table, performance-approach and performance-avoidance goals were negatively correlated with deep strategy, whereas mastery-approach and mastery- avoidance goals were positively related to deep strategy. On the other hand, performance-approach and performance-avoidance goals were positively correlated with surface strategy, whereas mastery-approach and mastery-avoidance goals were negatively related to surface strategy.

Before applying SEM, the assumptions of SEM were investigated. Multivariate normality tests which check a given set of data for similarity to the multivariate normal distribution were conducted via LISREL. The results of multivariate normality tests indicated that there was sufficient evidence that the data are multivariate normally distributed. Multivariate outliers were investigated using Mahalanobis distance. Influential outliers cause concern because they have potential to bias the model and to affect major assumptions. Some 13 cases were a significant distance from the model. Box's M test for equality of variance covariance matrices was used to test for homoscedasticity. Based on a statistically significant ($p < .05$) Box's M test (Stevens, 2002) indicates that the data meet the criteria of homoscedasticity.

To test the hypothesis model, structural equation modeling (SEM) was used. Several indices may be considered to assess the model fit. Though no index is perfectly reliable separately, it is advised that several fit indices should be used in conjunction to make a decision. It is recommended that the ratio of chi square (χ^2) to degrees of freedom (df), root mean square error of approximation (RMSEA), goodness of fit index (GFI), adjusted goodness of fit index (AGFI), comparative fit index (CFI), and normed fit index (NFI) should be used to assess the model fit in general (Kline, 2005). The model demonstrated good fit (χ^2/df = 1.99, GFI = .97, AGFI = .97, CFI = .93, NFI = .93, RFI = .93, and RMSEA = .05) and four achievement goal orientations accounted for 66% of the deep strategy and 87% of the surface strategy variances.

The standardized coefficients in Figure 2 clearly showed that deep strategy was predicted positively by mastery-approach and mastery avoidance (β = .34, β = .34, respectively) and negatively by performance-approach, and performance avoidance (β = -.06, β = -.19, respectively). On the other hand, surface strategy were predicted positively by performance-approach, and performance-avoidance (β = .36 and β = .45, respectively), and negatively by mastery-approach, and mastery-avoidance (β = -.37, β = -.11, respectively). However, the path from performance-approach to deep strategy was not significant. Figure 2 presents the results of SEM analysis.
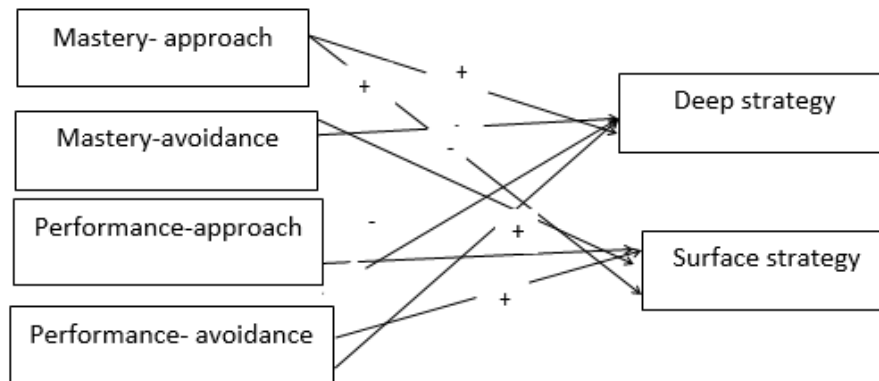

Figure2. Final Integrated Model of achievement goal orientations and Learning strategies.

DISCUSSION

The aim of the present study was to determine the predictive role of 2x2 achievement goal orientations on learning strategies with using structural equation modeling. Based on literature review, it was hypothesized that mastery-approach, mastery-avoidance goal orientations would be associated positively and performance-approach, performance-avoidance goal orientations would be associated negatively with deep strategy. Performance-approach and performance-avoidance goal orientations would be associated positively and mastery- approach, mastery- avoidance goal orientations would be associated negatively with surface strategy. The fit indices indicated that correlations among measures were explained by the model and that the formulation was psychometrically acceptable (Hu & Bentler, 1999). The results from SEM confirmed these hypotheses and the importance of achievement goal orientations on learning strategies. These findings also show achievement goal orientations as significant determinants of learning strategies.

In interpreting the results of the present findings, several plausible explanations exist. First, the path model indicated that mastery goals predicted positive deep strategy in a positive way. This result is parallel with previous studies (Bartels & Magun-Jackson, 2009; Pintrich & Garcia, 1991; Pintrich et al., 1993; Elliot & McGregor 2001; Tickle, 2001). Tickle (2001) concluded that students who adopt deep learning strategies are motivated by mastery- oriented goals. Those who adopt surface level learning are motivated by pass only aspirations and hence, develop minimum effort learning strategies, often dictated by rote learning, only what is necessary. An important assumption in goal orientation theory is that mastery goals, reflecting their desire to increase competence and skills, are the most adaptive patterns of learning among motivation orientations. Students who pursue mastery goals are concerned with developing their ability over time and acquiring the skills needed to master a particular task. When individuals with mastery goals experience failure they interpret the event as providing information regarding their effort in that particular situation and attribute failure to a lack of effort or ineffective strategy use (Dweck, 2000). Chan and Lai (2002) found that students who scored higher on learning goal orientation were more likely to cognitively engage in deep strategy. Those who pursue mastery goals tend to seek more challenges and have higher reported use of effective learning strategies than individuals who pursue performance goals (Middleton & Midgley, 1997; Pintrich, 2000b; Wolters, 2004).

Second, as expected, performance goals predicted positive surface strategy in a positive way. This result is parallel with previous studies (Chan et al., 2005; Chan & Lai, 2008; Bartels & Magun-Jackson, 2009; Elliot & McGregor 2001; Pintrich & Garcia, 1991; Pintrich et al., 1993; Tickle, 2001). Those who adopt surface level learning are motivated by "pass only" aspirations and hence develop minimum effort learning strategies, often dictated by rote learning involving only what is necessary (Chan & Lai, 2002; Grant & Dweck, 2003; Tickle, 2001).

From a cognitive perspective, studies have shown that achievement goals foster self-regulatory skills, cognitive and metacognitive learning strategies that help students to plan, learn and achieve their desired goals (Wolters, 2004). Students engaged in mastery goals used cognitive and metacognitive strategies for learning. They also adapted positive outcomes, such as higher level of self-efficacy, self-regulated learning, and positive attitudes and well-being (Ames, 1992; Wolters, 2004). Performance goal orientation was found to be allied with surface learning, whereas mastery goal was associated with deep learning strategies and help-seeking behavior (Kaplan & Maehr, 2007). Therefore, mastery goals can result in deeper cognitive processing of academic tasks than a focus on performance goals (grades, besting others), which seems to result in more surface processing and less overall cognitive engagement.

Limitations of the present study should be considered when interpreting these results. First of all, perhaps the most important limitation is that the results obtained in this study should not be generalized to all university students nor to other student populations, since the data were collected at just one school in Kerman, Iran. Therefore further study is required to assess the relationship between achievement goals and learning strategies that target other student populations to generate more solid relationships among the constructs examined in this study. Secondly, because this research intended to build a model rather than test an existing model, findings from the research have explanatory characteristics.

CONCLUSION

To sum up, the findings of the present study highlighted the contributing role of developing goal orientations in enhancing learning and academic achievement. Therefore, according to the present study, achievement goal orientations may be an important predictor of learning strategies. Thus, these research findings may also encourage teaching techniques that present information to students in ways that encourage the use of mastery goals and deep strategy in learning.

In particular, it implies implementing appropriate goal triggers for students to set goals for themselves, select appropriate strategies, plan courses of actions required for attaining their goals and use strategies while engaging in an activity. Based on this and other work researchers have proposed that schools should work to foster mastery goal orientations (particularly mastery-approach) rather than performance goal orientations.

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