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ABSTRACT

A goal mediational model to conceptualize the effects of students' motivational beliefs on their learning strategies was modified with the three goal orientations: task, performance-approach, and performance-avoidance goals. Questionnaires were administered to 161 Korean fifth graders (boys = 88; girls = 73) in an elementary school math class. Consistent with previous studies, the task goal primarily stimulated appropriate learning strategies; students with a higher level of the task goal were more competent with their ability and had higher levels of task values and deep learning strategies. The performance-approach goal also motivated students to use appropriate learning strategies as does the task goal; students with a higher level of the performance-approach goal were more competent with their ability and had higher levels of task values and deep learning strategies. The performance-avoidance goal proved detrimental in the math class. Students with a higher level of the performance-avoidance goal had higher level of superficial learning strategies and lower levels of competence beliefs, deep learning strategies, and academic achievement. Implications for the three goal orientations in education are discussed. (Contains 28 references, 1 table, and 1 figure.) (Author/MM)

Running head: A STRUCTURAL MODEL OF STUDENTS' MOTIVATION

A Structural Model of Task Values, Goal Orientations, and Learning Strategies in Elementary School Mathematics Class

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Abstract

A goal mediational model to conceptualize the effects of students' motivational beliefs on their learning strategies was modified with the three goal orientations: task, performance-approach, and performance-avoidance goals. Questionnaires were administered to 161 Korean fifth graders (boys = 88; girls = 73) in elementary school math class. Consistent with previous studies, the task goal primarily stimulated appropriate learning strategies; students with higher level of the task goal were more competent with their ability and had higher levels of task values and deep learning strategies. The performance-approach goal also motivated students to use appropriate learning strategies as does the task goal; students with higher level of the performance-approach goal were more competent with their ability and had higher levels of task values and deep learning strategies. The performance-avoidance goal played a detrimental role in math class. Students with higher level of the performance-avoidance goal had higher level of superficial learning strategies and lower levels of competence beliefs, deep learning strategies, and academic achievement. Implications for the three goal orientations in education are discussed.

A Structural Model of Task Values, Goal Orientations, and Learning Strategies in Elementary School Mathematics Class

It is to be desired that all of students get involved in an active learning process: integrate and organize new information, construct meaning, and monitor comprehension. However, educators have found that students have difficulties in activating appropriate knowledge and learning strategies. Studies on achievement motivation have suggested that students' motivational beliefs should be considered as significant variables to explain these difficulties (Ames, 1992; Ames & Archer, 1988; Anderman & Young, 1994; Hidi & Harackiewicz, 2000; Meece, Blumenfeld, & Hoyle, 1988; Middleton & Midgley, 1997; Pintrich & De Groot, 1990; Pintrich & Schunk, 1996; Pokey& Blumenfeld, 1990; Weinstein & Mayer, 1986; Wittrock, 1991). For example, several studies utilized a goal mediational model that conceptualized the effects of motivational beliefs on learning strategies through task and performance goals (Meece et al., 1988; Seo & Kim, 2001). By the way, recent studies have argued that students' goal orientations should be understood as the three conceptual constructs: task, performance-approach, and performance-avoidance goals (Elliot & Church, 1997; Hidi & Harackiewicz, 2000; Middleton & Midgley, 1997; Midgley, Kaplan, Middleton, Maehr, Urdan, Anderman, Anderman, & Roeser, 1998; Pintrich, 2000; Seo & Kim, 2001). Consequently, it was meaningful to modify a goal mediational model with the three goals and to examine the extent to which the three goals mediate motivational beliefs on learning strategies in Korean elementary school math class.

Students' Achievement Goal Orientations and Learning Strategies

Achievement goals are defined as cognitive presentations of the different purposes that students take in different achievement situations (Ames, 1992; Hidi & Harackiewicz, 2000; Pintrich & Schunk, 1996). Until now, two contrasting achievement goals have received main attention from researchers: the goal to develop and improve ability and the goal to demonstrate ability. Although researchers used these two goals with different names, they are conceptually overlapped (Ames, 1992; Elliot & Church, 1997; Hidi & Harackiewicz, 2000; Midgley et al., 1998; Pintrich, 2000; Pintrich & Schunk, 1996). In this paper, a pair of the two goals was referred to as task and performance goals.

It has been suggested that students' different achievement goal orientations stimulate different learning strategies (Ames, 1992; Hidi & Harackiewicz, 2000; Meece et al., 1988; Pintrich & Schrauben, 1992; Pintrich & Schunk, 1996). For example, students oriented toward the task goal tended to use deep, metacognitive, and self-regulated learning strategies; they were oriented toward improving new skills and attaining a sense of mastery by their standards. Students oriented toward the performance goal tended to achieve normatively defined goal and focused on public recognition; they were likely to use superficial learning strategies such as memorizing and writing down quickly what they learned in class.

The positive relationship between the task goal and deep learning strategies has been consistently reported across studies (Ames, 1992; Ames & Archer, 1988; Anderman & Young, 1994; Elliot & Dweck, 1988; Elliot & Church, 1997; Meece et al., 1988; Middleton & Midgley, 1997; Pintrich & De Groot, 1990; Seo & Kim, 2001). However,

the relationship between the performance goal and deep learning strategies has been inconsistent across studies. These conflicting findings implied that studies on students' goal orientation failed to divide the performance goal into approach and avoidance components. Finally, researchers separated the performance goal into the performance-approach and performance-avoidance goals (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Hidi & Harackiewicz, 2000; Middleton & Midgley, 1997; Midgley et al., 1998; Pintrich, 2000; Seo & Kim, 2001).

Even after separating the performance goal, however, there were still conflicting results on the effects of the performance-approach goal on educational variables such as intrinsic motivation, appropriate learning strategies, and academic achievement. While some of researchers have reported that the performance-approach goal had a negative effect on them (Anderman & Young, 1994; Meece et al., 1988; Middleton & Midgley, 1997; Middleton et al., 1998), others have support the standpoint that the performance-approach goal had a positive effect on them (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Hidi & Harackiewicz, 2000; Pintrich, 2000; Seo & Kim, 2001). Specifically, Seo and Kim (2001) reported that the performance-approach goal had a positive influence on deep learning strategies in Korean elementary school math class. As a result, it was predicted that both the task and performance-approach goals positively related to deep learning strategies and that the performance-avoidance goal positively related to superficial learning strategies.

Students' Motivational Beliefs and Achievement Goal Orientations

It has been suggested that students' competence beliefs influence their achievement-related behaviors such as academic achievement and deep learning

strategies (Kloosterman & Cougan, 1994; Pokay & Blumefeld, 1990; Seo & Kim, 2001). Also, the competence beliefs positively related to the task goal. For example, students who were competent with their ability sought out opportunities that allowed them to satisfy needs for competence, curiosity, and mastery (Harter, 1982; Eccles & Wigfield, 1995; Kloosterman & Cougan, 1994; Meece et al. 1988; Pintrich & De Groot, 1990; Seo & Kim, 2001; Wigfield & Eccles, 2000). It has been reported that students' competence beliefs also positively related to the performance-approach goal (Elliot & Church, 1997; Seo & Kim, 2001). Consequently, it was predicted that competence beliefs positively related to both the task and performance-approach goals.

Research has suggested that students' task values are empirically distinguished as the three components: importance, interest, and usefulness and that the three components positively relate to their competence beliefs (Eccles, 1983; Eccles & Wigfield, 1995; Wigfield, 1994; Wigfield & Eccles, 2000; Wigfield et al., 1997). It has been also reported that students' task values positively related to their deep learning strategies (Ames & Archer, 1988; Pintrich & De Groot, 1990; Meece et al. 1988). However, a few studies have tested how the three components related to the three goals. Meece et al. (1988) reported that students' general positive attitudes toward science positively related to the task goal, and Pintich and De Groot (1990) reported that task values positively related to intrinsic motivation. Specifically, Seo and Kim (2001) reported that task values positively related to both the task and performance-approach goals in Korean elementary school math class. Thus, it was predicted that task values would positively relate to both the task and performance-approach goals.

The Present Study

A conceptual framework describing relationships among students' motivational beliefs, goal orientations, learning strategies, and academic achievement that were hypothesized earlier was tested. Then, the following hypotheses were tested: First, students' goal orientations directly influenced learning strategies. Second, students' competence beliefs indirectly influenced the goal orientations through task values and indirectly influenced learning strategies through the goal orientations. Third, students' task values indirectly influenced learning strategies through the goal orientations.

Method

Subjects

The sample of the present study consisted of 161 fifth graders (boys = 88; girls = 73) from one elementary school in Korea. Within each classroom (totally 5 classrooms), all students were asked to participate in this study. Project staff members administered questionnaires to students who had returned their consent forms indicating their willingness to participate.

Procedure and Measures

In late June 2000, the Korean fifth graders (n = 161) completed the questionnaire measuring their achievement goal orientations, competence beliefs, and learning strategies after the math class. All items were answered using a 5-point Likert-style response scale and read aloud to all the students in class. To assess students' academic achievement, the researcher used a teacher-made exam that was administered at similar times, one week apart from administration of questionnaire.

Competence beliefs. Wigfield et al.'s (1997) 3-item competence beliefs were used. This scale included questions such as " How good in math are you?", "If you were to list all the students in your classroom the worst to the best in math where would you put yourself?", and "Compared to most of your other school subjects, how good are you in math?". The reliability of the scale for this study was .87.

Task Values. Wigfield et al.'s (1997) 6-item task values were used. Two items were used to measure students' interest such as "How much do you like doing math". Two items assessed students' importance and asked students how important they thought being good in math was. Two items assessed usefulness and asked them how useful they thought they learned in math. The reliabilities of these subscales were as follows: interest is .91, importance .64, and usefulness .63.

Achievement Goal Orientations. Items assessing students' task, performance-approach, and performance-avoidance goal orientations were used from Middleton and Midgley's (1997) 15-item achievement goal orientations. The task goal orientation contained five items such as "An important reason why I do my math work is because I like to learn new things" and "I do my school work because I am interested in it". The reliability of the scale was .78. The performance-approach goal orientation contained five items such as "I would feel successful in math if I did better than most of the other students in the class" and "I would feel really good if I were the only one who could answer the teachers' questions in math class". The reliability of the scale was .77. The performance-avoidance goal orientation included items such as "I do my math work so others in the class won't think I am dumb" and "It's very important to me that I don't look stupid in my math class." The reliability of the scale was .83.

Learning Strategies. Anderman and Young's (1994) 11 -item learning strategies were used such as "When the work in this class is difficult, I either give up or do the easy parts" for surface learning strategies (4 items), and "I try to figure out how things I learn in math are connected to things in the real world" for deep learning strategies (7 items). The reliability of the scale for surface learning strategies was .72 and that of deep learning strategies was .74.

Results

Correlational Analyses

Table 1 shows the zero-order correlations among students' academic achievement, competence beliefs, task values, goal orientations, and learning strategies [Insert table ONE]. Students' task and performance-approach goals positively related to each other. Both of them positively related to competence beliefs, task values, deep learning strategies and negatively related to superficial learning strategies. In addition, both of them positively related to academic achievement. The performance-avoidance goal had negative relations with competence beliefs ($p = 0.07$), deep learning strategies, and academic achievement. However, it positively related to superficial learning strategies. There were positive relations among students' task values. All of the three components positively related to the task and performance-approach goals and negatively related to the performance-avoidance goal. They also positively related to deep learning strategies and negatively related to superficial learning strategies. They positively related to their academic achievement. There were positive relations between competence beliefs and task values. Competence beliefs positively related to deep learning strategies and

academic achievement. Deep learning strategies positively related to academic achievement, and superficial learning strategies negatively related to it.

Structural Equation Modeling

A structural equation analysis was performed to clarify the relationships among variables by using EQS (Bentler & Wu, 1995). Confirmatory Factor Analysis (CFA) allows researchers to test the hypothesized structure of a set of factors and provides statistical information about the models to be chosen as the best fitting model. To choose goodness-of-fit indices to assess how well a given model fits the data, we considered that a goodness-fit index should have a large model misspecification effect accompanied with trivial effects of sample size, distribution, and estimation method (Hu & Bentler, 1998). Thus, the goodness-of-fit indices such as chi-square, TLI (Turket-Lewis Index), CFI (Comparative Fit Index), SRMR (Standardized Root-Mean-Square Residual), and RMSEA (Root Mean-Mean-Square Error of Approximation) were used to assess the adequacy of the hypothesized models (Hu & Bentler, 1998).

Evaluation model fit. The model that appears on Figure 1 showed reasonable values in terms of the criteria of goodness-of-fit indices (e.g. chi-square = 161.57, df = 107, $p<.001$; TLI = 0.950 CFI = 0.961; SRMR= 0.050; RMSEA = 0.057) [Insert figure ONE]. The empirical hypotheses were generally confirmed. First, students' goal orientations had unmediated effects on appropriate learning strategies. Second, students' competence beliefs had indirect effects on the three goal orientations through task values and indirect effects on appropriate learning strategies through the three goals. Third, students' task values had indirect effects on their learning strategies through the three

goals. The direct and indirect effects of the variables are shown in Table 2 [Insert table TWO].

Discussion

The results of this study demonstrate that a goal mediational model for conceptualizing the effects of students' motivational beliefs on learning strategies is modifiable with the three goals: task, performance-approach, and performance-avoidance goals. Consistent with previous research, the task goal positively relates to competence beliefs, task values, and deep learning strategies, academic achievement and negatively relates to superficial learning strategies. In addition, the task goal has the biggest direct effect on appropriate learning strategies and mediates the effects of motivational beliefs on learning strategies (Ames, 1992; Ames & Archer, 1988; Anderman & Young, 1994; Meece et al., 1988; Middleton & Midgley, 1997; Pintrich & De Groot, 1990; Seo & Kim, 2001). This study supports the standpoint that students who pursue the task goal use active and appropriate learning strategies in class.

Students' performance-approach goal positively relates to their competence beliefs, task values, academic achievement, and deep learning strategies and negatively relates to their superficial learning strategies. It has a positive direct effect on appropriate learning strategies as does the task goal. It also mediates the effects of competence beliefs, task values, and the task goal on appropriate learning strategies. Students who follow the performance approach goal use deep learning strategies in math class. Consequently, these results support the point of view that the performance-approach goal has a positive effect on educational variables (Elliot & Church, 1997; Elliot & Harackiewicz, 1996; Hidi & Harackiewicz, 2000; Pintrich, 2000; Seo & Kim, 2001). We

argue that researchers and educators should reconsider the effects of the performance goal on educational outcomes.

Students who had higher level of the performance-avoidance goal had lower levels of competence beliefs, deep learning strategies, and academic achievement. However, it had higher level of superficial learning strategies (Middleton & Midgley, 1997). It is notable that students' competence beliefs have a negative effect on the performance-avoidance goal and that the performance-avoidance goal has a negative direct effect on appropriate learning strategies: students who are less competent with their ability tend to follow the performance-avoidance goal and use superficial learning strategies. It is assumed that the performance-avoidance goal plays a detrimental role in student's math learning (Elliot & Church, 1997; Pintrich, 2000; Middleton & Midgley, 1997). By the way, researchers suggested that particular classroom structures such as tasks, evaluation, and authority influence students' goal orientations (Ames, 1992; Blumenfied, 1992). For example, cooperative learning that encourages every students to participate in their group activates improve their intrinsic motivation, learning strategies, and academic achievement in math class (Nichols & Miller, 1994; Seo, 1999; Stevens & Slavin, 1995). Thus, teachers are encouraged to manage or improve their classroom structures that can provoke students' task goal.

The results of this study demonstrate that students' competence beliefs are significant variable to explain individual differences in math class. Their competence beliefs positively relate to academic achievement, task values, the task goal and performance-approach goals, and deep learning strategies (Eccles, 1983; Elliot & Church, 1997; Harter, 1982; Seo & Kim, 2001; Wigfield & Eccles, 1995). Structural equation

analysis shows that competence beliefs have a big indirect effect on the task and performance approach goals and their learning strategies (Elliot & Church, 1997; Seo & Kim, 2001). Students competent with their ability take either the task or the performance-approach goal or both goals. These two goals finally lead students to activate and use their deep learning strategies in math class. On other hand, competence beliefs have a negative effect on the performance-avoidance goal. It negatively relate to the performance-avoidance goal and superficial learning strategies. Students who are not competent with their ability do not want to get involved in class activities or works because they are afraid of showing their ability with those activities or works.

In this study, students' task values play a valuable role to promote appropriate learning strategies in math learning. The three components of task values positively correlate with each other. They positively relate to competence beliefs, academic achievement, and deep learning strategies and negatively relate to superficial learning strategies (Eccles, 1983; Eccles & Wigfield, 1995; Pintrich & De Groot, 1990; Pokay & Blumenfeld, 1990; Wigfield & Eccles, 2000; Wigfield et al., 1997). Task values positively related to the task and performance-approach goals and had no relation with the performance-avoidance goal. In addition, task values have a positive indirect effect on the task and performance-approach goals and indirect effect on appropriate learning strategies through the goal orientations. Students who like math and know about the importance and usefulness of mathematics take either or both of the two goals to play a positive role in students' appropriate learning strategies.

The general results of this study imply what is reflected in the following statement by Hidi & Harackiewicz (2000):

> We do not disagree that mastery goals are associated with a multitude of adaptive behaviors, and we support efforts to promote the adoption of mastery goals. What concerns us is the reluctance to recognize the potential additional benefits of external interventions, situational interest, and performance goals. (p. 167)

It should be acknowledged that there are some limitations of this study. First, data represents only one elementary school without validating whether or not the modified goal mediational model was applicable to a different context such as different schools, subject matter, or age groups. Second, this study does not conclude the effects of motivational beliefs on learning strategies using experimental design. Further experimental study should be conducted to give a clear idea on how students' motivational beliefs will have an influence on their learning and educational outcomes and what components of goal orientations will have positive or negative effects on them. Finally, it has been reported that there were cultural differences between Asian and American students' motivational beliefs in math learning and learning strategies (Stevenson et al., 1994; TIMSS, 1997). Thus, it would be interesting to see whether or not the modified model demonstrated by this paper is applicable to different cultural contexts.

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Table 1

Zero-Order Correlations for Motivational Variables, Learning Strategies, and Achievement

	1	2	3	4	5	6	7	8	9	10
1. Interest	----									
2. Importance	.20*	----								
3. Utility	.27**	.25**	----							
4. Competence Beliefs	.64**	.31**	.42**	----						
5. Task Goal	.65**	.33**	.44**	.56**	----					
6. Performance-approach	.36**	.19**	.34**	.33**	.52**	----				
7. Performance-avoidance	0	-0.11	-0.03	-0.14	0	.22**	----			
8. Superficial Strategies	-.37**	-.34**	-.35**	-.48**	-.51**	-.29**	.20**	----		
9. Deep Strategies	.49**	.25**	.39**	.41**	.58**	.51**	-0.08	-.54**	---	
10. Academic Achievement	.30**	.25**	.30**	.44**	.30**	.26**	-.18*	-.16*	.23**	---

* $p < .05$

** $p < .01$

*** $p < .001$

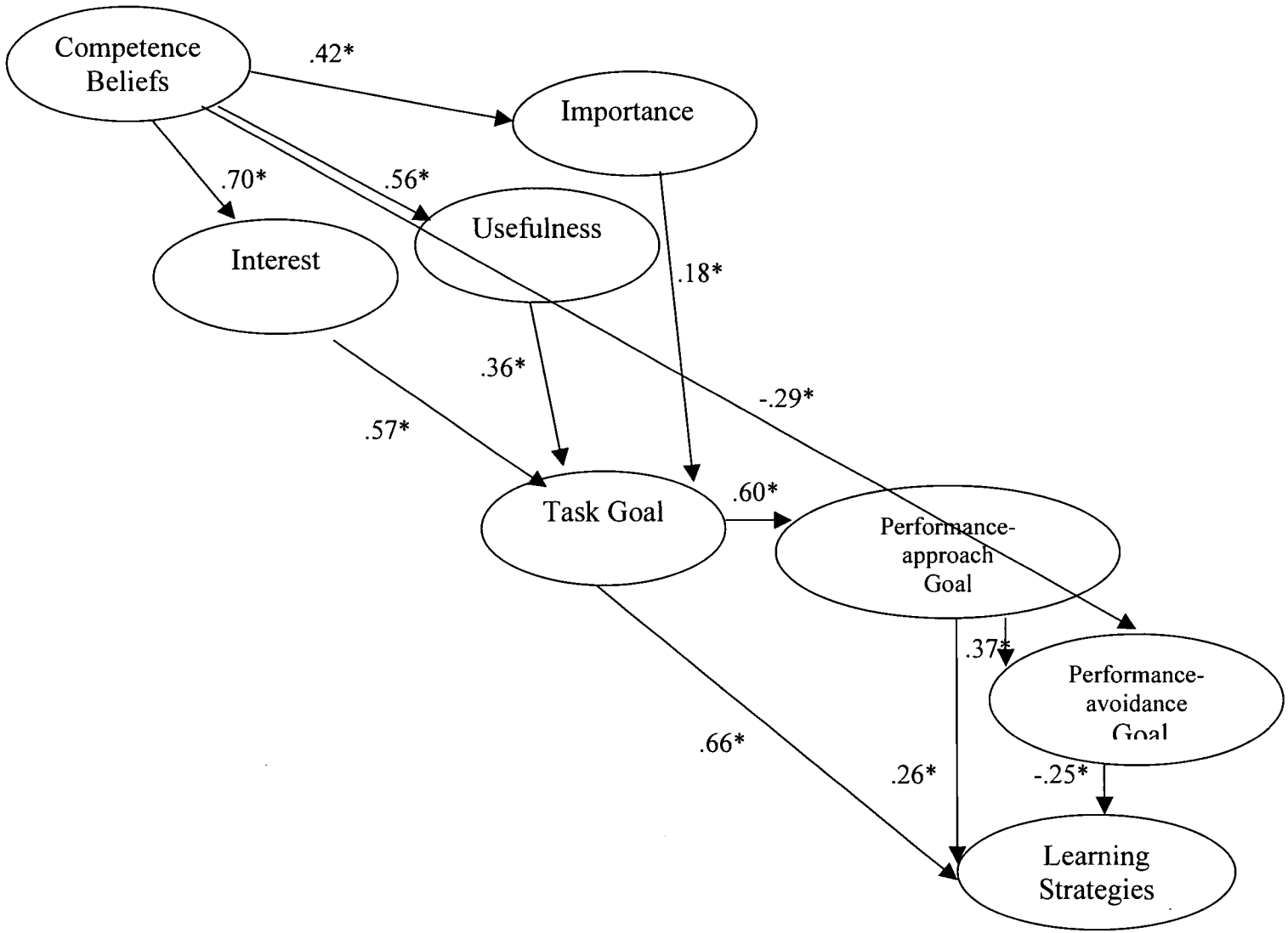
Table 2
Standardized Direct and Indirect Effects of Predictors in Hypothesized Model

Endogenous	Predictors						
	Competence Beliefs	Interest	Importance	Usefulness	Task Goal	Performance-Approach	Performance-Avoidance
Interest							
Direct effect	0.70 ***						
Cum. Indirect	0.00						
Importance							
Direct effect	0.42 ***						
Cum. Indirect	0.00						
Usefulness							
Direct effect	0.56 ***						
Cum. Indirect	0.00						
Task Goal							
Direct effect	0.00	0.57 ***	0.18 *	0.36 ***			
Cum. Indirect	0.67 ***	0.00	0.00	0.00			
Performance-approach							
Direct effect	0.00	0.00	0.00	0.00	0.60 ***		
Cum. Indirect	0.40 ***	0.34 ***	0.11 *	0.22 ***	0.00		
Performance-avoidance							
Direct effect	-0.29 **	0.00	0.00	0.00	0.00	0.37 ***	
Cum. Indirect	0.15 **	0.12 **	0.04	0.08 *	0.21 ***	0.00	
Learning Strategies							
Direct effect	0.00	0.00	0.00	0.00	0.66 ***	0.26 **	-0.25 **
Cum. Indirect	0.59 ***	0.44 ***	0.13 *	0.28 ***	0.11	-0.10 *	0.00

* $p < .05$
** $p < .01$
*** $p < .001$

Figure Caption

Figure 1. Estimated Structural Model of Students' Motivation and Learning Strategies (*p<.05).


Competence Beliefs
.42*
Importance
.70*
.56*
Usefulness
Interest
.18*
.36*
-.29*
.57*
Task Goal
.60*
Performance-approach Goal
.37*
Performance-avoidance Goal
.66*
.26*
-.25*
Learning Strategies

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