

The Effect of Teaching Metacognitive Strategies on Achievement Goals and Academic Performance Metacognitive Strategies Achievement Goals

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Abstract: The aim of this study was studying the effect of teaching metacognitive strategies on achievement goals and academic performances. The participants were all sophomore students of Psychology in Islamic Azad University, sari branch (N= 118). The sample group consists of 90 freshmen students (21 males and 69 females) who had been randomly chosen from 5 volunteer classes. (Two classes were in the experimental participants and two were controls). The experimental group passed the metacognitive course in combination with the routine syllables and the control Group received just had the routine one. The measurements for student's achievement goals was done according to Achievement Goal Questioner (AGQ), for specific academic performance we used the scores of general psychology course and finally, the average scores of current and previous semesters was used to measure the total academic performance. The participants filled in AGQ questionnaires three times: at the beginning, end of the semester and follow up in a 5 month later. The test for academic performance is also done twice: at the beginning and at the end of semester. The pervious and current semester average score is also considered as a total performance of students. The results showed that teaching metacognitive strategies have a positive effect on achievement in mastery-performance, performance-approach and mastery-avoidance goals whereas they affect performance-avoidance goals in a negative way. The findings also indicated that teaching metacognitive strategies only significantly affect the specific academic performance of student and has nothing to do with their total academic performance.

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Introduction:

One of the most important theoretical frameworks that have considered the consequences of student's education since two decays ago is an achievement goals theory. The achievement theory is related to rational reasoning of the learner about why he is choosing or doing a certain goal or activity for example why someone wants the "A" score or the top mark in the class (Saribas & Bayram, 2009). Elliot, McGregor & Gable (1999) divide the achievement goals in to two groups: mastery and performance goals. The former is related to confidence, mastery on tasks and overcoming the challenges. The later one is related to the person and his potentials to show those confidence and competence along with the others. Some authors divide the theory into three groups. With dividing performance goals into two dimension, performance-approach and performance-avoidance, they developed the achievement goals theory into three dimensions: mastery-approach, performance-approach and performance-mastery (Dupeyrat & Marine, 2005) Those learners who choose

performance-approach goals want to compare their performance with the others in other to show their dominant or their amount of "being better" than any one. Those who choose performance-avoidance goals are somehow the same but the difference is they try not to be too much worse than the others or taunted for not being the best one (Ryan, & Pintrich, 1997). Recently, Elliot and McGregor (2001) add a fourth dimension to the achievement goals and done it through a combination of cognitive social goal and achievement motivation theories. This new dimension is called mastery-avoidance goal in which learners are motivated because they want to avoid the lack of mastery or any mistakes in the learning process and the goal is eliminating any misunderstand in learning (Elliot & McGregor, 2001).

Different achievement goals can significantly affect the quantity and quality of learners' performance (Taylor, & Corrigan, 2005) in one side, accepting of mastery goals required more challenging home works and more attention in the time of correction for students (Ames, 1992; Schmidt & Ford,

2003) and in the other side, less resistance in facing problems and the tendency to do less challengeable home works (Anderman & Maehr, 1994) was seen along them that could be interpreted as performance goals. Thus, governments, organizations, educational centers and any other related entities are always looking for practical strategies in which they can improve their clients' motivation (achievement goals) in order to build better qualitative learning. For motivating and improving the learning ability among learners, different methods have suggested by a variety of theories. One of the most effective ways in motivating and learning enhancement is optimizing the conditions and improving the qualitative educational level that can be achieved through teaching metacognitive strategies. These strategies have proved to be among the best methods for increasing the motivation and effective learning of the learners (Anderson, and Brigham Young University, 2002). Metacognitive strategies are sequential procedures for controlling cognitive activities and ensure us that we can achieve one certain goal. They help us to arrange and control learning activities like: conscious controlling, time programming and choosing the strategy needed, reviewing the learning procedure and finally analyzing and changing them if it is necessary (Ridley, Schutz, Glanz, & Weinstein, 1992). The existing literature on teaching metacognitive strategies show a significant effect on interesting issues like teaching Chinese as a foreign language (Wang, Spencer, & Xing, 2009) strategic memory (Carretti, Borella, Zavagnin, & De Beni, 2011) academic performance (Koçak, & Boyaci, 2010; Veenman, & Verheij, 2003) problem solving (Hoffman, & Spataru, 2008) and learning simple and complicated texts (Prins, Veenman, & Elshout, 2006) Studies have also showed that metacognitive strategies application is related to the achievement goals, as a motivation theory (Saribas, & Bayram, 2009). The majority of studies confirm the strong positive relation between mastery-achievement goals and using the cognitive and metacognitive strategies. For example, Pintrich (1999) founds a positive relation between cognitive and metacognitive strategies and the acceptance of mastery goals. Students who choose more challengeable tasks (Ames, 1992; Schmidt, & Ford, 2003) and try to review their tasks for the best performance (Butler, 1993). are supposed to accept mastery goals. Although the literature showed a positive correlation between being involved in cognitive activities and the acceptance of mastery goals; there are a few evidences in the case of performance goals and metacognitive involvement. Some authors emphasized on the negative effect of performance goals (Dupeyrat & Marine, 2005; Ames,

1992; Anderman, & Maehr, 1994; Sperling, Howard, Staley & DuBois, 2004) Some other emphasizes on the positive relation between metacognitive strategies and accepting performance-approach goals researchers (Schmidt, & Ford, 2003; Pintrich, 1999; Cury, Elliot, Da Fonseca, Moller, 2006; Wolters, 2003). There are limited studies on the relation of mastery-avoidance goals and the application of metacognitive strategies and all those few ones emphasis on the positive rule of these goals and the application of metacognitive strategies (Vrugt, & Oort, 2008) Metacognition can also affect the academic performance of the individuals (Koçak & Boyaci, 2010; Savia, Coutinho & Neuman, 2008; Vrugt & Oort, 2008) Slavin (2006) defines metacognition as the cognition of a cognition or the knowledge about the procedures of learning. Brown (1980) declares that such a knowledge can be interpreted as understanding the rules, strategies and goals in which help the learner to adapt his/her cognitive abilities with new tasks in a more efficient and flexible way and this can lead to individual's success in doing the learning tasks. At the same time, the lack of skills or metacognitive knowledge, or any incomplete application (Bannert, Hildebrand & Mengelkamp, 2009) can brings about improper outcomes in the learning process. Bannert, Hildebrand, & Mengelkamp, 2009) believe that teaching metacognitive strategies can activate a set of metacognitive skills that facilitate the learning and transition procedure.

Although the relation between metacognition, achievement goals and academic performance is studied in several papers, the attitude has been mostly about the cause of effect or correlation of performance-approach and performance-avoidance goals and no separation has done between them and mastery goals are also just considered from the approach point of view (Vrugt, & Oort, 2008; Savia, Coutinho & Neuman, 2008). There is not even a single study in which, by doing an experimental program, studying the effect of teaching metacognitive strategies on achievement multiplies goal and academic performance. In this paper, we're looking forward to explore the effects of teaching metacognitive strategies combined with educational content on the achievement goals and academic performance of the students. In addition, exploring the effect of teaching metacognitive strategies as a kind of self-regulated method for those students who have exposed to inactive and teacher-directed systems, has been another concern, involved in the research process.

The predictions in next lines are done according to the review of literature and introductory facts:

1-The experimental group in which had the metacognitive teachings, will show a significant increase in choosing mastery-approach goals, mastery-avoidance goals, performance-approach goals and performance-avoidance goals, comparing with the control group. 2- Experimental group in which had metacognitive teachings will have a better score in their specific academic performance Test and total academic performance, comparing with our control group.

1. Materials and method

This study was an experimental one which done with two groups accomplishing the pre, post and follow up tests, respectively. The participants were 118 undergraduate sophomore students (31 males, 87 females) who distributed in 5 classes of the Sari Islamic Azad University and registered in general psychology course in the third semester of 2010. This university is a non-governmental institute in Iran and has over 10000 students in different fields. The sample group consisted of 90 sophomore students (21 males, 69 females) who have randomly chosen from those 5 selected classes. It's worthy to note that we chose sophomores just because we need student's total average scores in last term for evaluating the testis with total academic performance. The procedure for choosing the sample group was as follow: First, we randomly chose 4 classes out of 5 registered ones. Then, we randomly divided students in those 4 classes into two groups: experimental and a control (2 classes in experimental and 2 in control groups). The age of testis was in the range of 18 to 28 ($M= 21.61$, $SD=1.85$); 19 to 24 years old for males ($M= 21.14$, $SD=1.03$) and 18 to 28 year for females ($M= 21.75$, $SD=1.97$).

The method of study was as below: first, we did the pre-test on the both groups. Then, we provided metacognitive strategies teaching for the experimental group and in controls, the usual teaching syllabuses (teacher-directed) are performed. Those metacognitive teachings that were presented to the experimental group in combination with the routine syllabus during ten sessions were included: First and second sessions: In these sessions the time mostly dedicated to breaking the ices and explanation about the goals of the course and description of metacognitive activities. At the beginning, a general definition was presented. The instructor initially explained the skill through the obvious samples and then divided students into small groups and asked them to find some other instances for those skills and practically simulate them. During the third to tenth sessions as a main body of our teaching course, the teaching of metacognitive strategies were done in parallel to the routine syllabus presented. In the

control group, we present some explanations about the course and then the teacher-centered method was carried out. At the end of the course (four months), both groups (sample and control) took the post- test. The follow up test is also done in five months after the post- test.

In order to teach metacognition entity for the experimental group, we used ascertained education package. This package is designed based on Pintrich and DeGroot (1990) theoretical framework in which the metacognition is one of the essential components of self -regulated learning and includes planning, self-regulative and cognition modification strategies. Those metacognitive strategies which presented in the course included: a) planning strategies include: determining the studying goal, estimating the optimum time for learning, determination of the studying pace, analyzing the circumstances in learning subjects, Choosing proper cognitive strategies. b) Control and monitoring strategies include: Achievement evaluation, monitoring self conscious, question developing during the studying or learning, controlling the time or pace of the studying, predicting test's questions. c) Regulating strategies include adjusting the pace of studying and learning, the modification or substitution of cognitive strategies.

The Persian version of Achievement Goals questioner Elliot and McGregor (2001) in which Jekar and Delavarpour (2007) translated and normalized it was used to measure the achievement goals. The questioner had 12 questions and measured four kinds of achievement goals including mastery-approach, mastery-avoidance, performance-approach and performance-avoidance. For each factor we had a scaled spectrum based on a likert scale that ranged from 5 (completely agree) to 1 (completely disagree). The validity and reliability of this scale is desirable according to the authors (Elliot, & McGregor, 2001). Jowkar and Delavarpour (2007) translated this questioner to Persian and reported that the scale's validity coefficients for mastery-avoidance, performance-approach, mastery-approach and performance-avoidance were 0.86, 0.77, 0.61 and 0.54; respectively. In our study, the scale's validity coefficients for mastery-avoidance, performance-approach, mastery-approach and performance-avoidance goals were 0.88, 0.78, 0.70 and 0.65; respectively. Specific academic performance test: the scores for the General psychology have been used as a measure for evaluating student's specific academic performance. Total academic performance test: the last term and current average scores are chosen as a measure for evaluating student's total academic performance.

2. Result

At the beginning, the normalization of variance is tested by Kolmogorov –Smirnov Test and ensured us

for the use of parametric test for our data. Statistical features of groups' standard deviation and mean-were measured in pre, post and follow-up tests (table 1).

Table 1: Group statistics (M & SD) for pre, post and follow-up tests

Dependent variables	Pre-test		Post-test		Follow-up	
	experimental M(SD)	Control M(SD)	experimental M(SD)	Control M(SD)	experimental M(SD)	Control M(SD)
Specific per	15.705(2.138)	16.191(1.932)	16.162(1.944)	16.211(1.872)		
total per	15.162(2.091)	15.449(1.568)	16.323(1.683)	16.125(1.520)		
Mastery app	6.479(1.571)	6.357(1.575)	7.708(1.443)	6.476(1.533)	7.304(1.775)	6.585(1.264)
Perform app	7.000(1.321)	6.595(1.515)	8.125(1.424)	6.714(1.348)	7.695(1.412)	6.341(1.131)
Mastery av	6.521(1.414)	6.667(1.803)	8.625(1.296)	7.262(1.754)	8.261(1.583)	6.780(1.710)
Perform av	6.917(1.527)	6.833(1.395)	6.208(1.570)	7.238(1.358)	5.696(1.812)	6.829(1.283)

We just compared two groups in pre-test components and no significant differences were seen between the experimental and control groups. Then, the components for post and follow up tests were compared between our study groups. In order to compare the achievement goals components in experimental and control groups, the Multivariate analyses of covariance (MANCOVA) was done for post and follow up tests. To moderating the effect of pre-test on post and follow up tests in both groups, the pre-test scores of achievement goals set as covariate in

MANCOVA. To moderating the effect of pre-test on post-test total and specific academic performance pre-test scores set as covariate In UNCOVA. As table 1 show, the scores for testis' total and specific academic performance in experimental group have increased in post-test. We can also see that the scores for all achievement goals components except the performance-avoidance goals; have increased significantly in post-test and have maintained in follow up test. The Performance-avoidance goals have greatly decreased in post and follow up tests.

Table 2: Comparison of post and follow up tests in two groups.

Dependent variables	Post-test				Follow-up			
	F	df	P value	Partial Eta	F	df	P value	Partial Eta
Mastery app	20.981	1	.000	.200	4.899	1	.030	.057
Perform app	28.723	1	.000	.255	21.869	1	.000	.213
Mastery av	28.844	1	.000	.256	25.144	1	.000	.237
Perform av	28.383	1	.000	.253	18.710	1	.000	.188

R Squared = > .630 (Adjusted R Squared = > .608)

Mastery app= Mastery approach goals, Perform app= Performance approach goals, Mastery av= Mastery avoidance goal, Perform av= Performance avoidance goals

As table 2 shows, a significant difference exists between two groups in all achievement goals ' components if we consider the post and follow up tests though the differences increased in achieving mastery-approach, mastery-avoidance and performance-approach goals and decreased just in performance-avoidance goal. The Eta square showed that 0.47 to 0.63 % of dependent variable changes are due to the group factor.

Table 3 Comparison of post-tests in two groups

Dependent variables	F	df	P value	Partial Eta
Specific per	1.471	1	.228	.017
total per	8.662	1	.004	.091

R Squared = > .900 (Adjusted R Squared = > .898)

Specific per = specific performance, total per = total performance

In table 3, you can see a significant difference between our study groups in specific academic performance related to the post-test while no difference is found in student's total academic performance. The

Eta square effect size showed that 0.90 of changes in dependent variable changes are due to the group factor.

3. Discussion:

As we can see in table 2, the experimental group, after implying the independent variable, had a significant positive improvement in the mastery component of achievement goals and maintained it with a slight decrease after 5 months. Our results are consistence with those of Pintrich and DeGroot (1990) Pintrich (1999) and Schmidt and Ford (2003). that showed a positive relation between the application of metacognitive strategies and accepting mastery goals. Since metacognitive strategies are a subgroup of self-regulation learning (Wolters, 2003) and the learner regulate learning process based on his/her needs and personal interests; more task involvement for the learner is possible and it consequently leads to the a better learning and enhances the goals in which bring about such a success. Doing this, the individuals will be

determined to imply those goals in the best way possible.

The mastery-avoidance component of achievement goals is increased after applying the dependant variable in experimental group. Our findings were consistent with those of Savia, Coutinho, & Neuman (2008). Based on the Multiple Goal approach theory (Cury, Elliot, Da Fonseca, Moller, 2006) individuals can have different goals with different levels that affect them separately. It seems that the effort for having a comprehensive understanding and overcoming challenges in learning activities that in most cases, is in harmony with mastery-approach goals is not contradictory to the avoiding any misunderstanding that is usually consistent with mastery-avoidance ones and they are actually two sides of a same coin. For example, as organizing the materials –that is a metacognitive strategy- helps the learner to have a correct understanding of what have been learned; the self-monitoring metacognitive strategy help him/her to avoid the mistakes, misunderstanding. Thus, we supposed that the acceptance of mastery-avoidance goals in which emphasis on avoiding any mistakes or misunderstand, will improved if we enhance the metacognitive activities. The performance-approach component of achievement goals is also increased after applying of independent variable in the experimental group. Our results were consistent with the results reported by Pintrich, (1999) and Vrugt and Oort (2008) but they didn't meet the findings of Ames (1992), Anderman and Maehr (1994) and Dupeyrat and Marien (2005). Similar to the works of Cury, Elliot, Da Fonseca, Moller, (2006) we showed that the effort to being better than others is not necessary inconsistent with the endeavourer to achieve mastery in doing a certain task. Thus, enhancing the metacognitive strategies can improve the performance-approach goals, too. In the other word, those who choose performance-approach goals use metacognitive strategies as a tool for being better than others and consequently, if mastery in such skills helps them to be more successful, they motivated to use them again and again. The performance-approach component of achievement goals is decreased after applying of independent variable in the experimental group. The results were similar to the findings of Schmdit and Ford (2003); Wolters (2003); Vrugt and Oort (2008); and Savia, Coutinho, & Neuman (2008) that showed choosing performance-avoidance goals can be related to the applying deep cognition and metacognitive strategies. The difficulty level of a chosen goal can be an important factor for the individual to make decisions about how much effort and what strategies he/she will need to successfully meet the pre-determined goals. For instance, Locke and Latham (2002) claim that the

amount of effort done by any person is related to his/her clear goals that are an easy goal implies a little effort while difficult ones need a hard Endeavour. Saif (2009) said that learners use simple cognition strategies like reviewing the lessons for doing simple learning tasks but when we talk about more complicated tasks; strategies like rational comparison are useful for the students. The assumption is learners with performance-avoidance doubt their actual abilities (Elliot, & McGregor, 2001). Their definitions of success is very simple - as much as they can be "ordinary" among the others- because they avoid actions with a high risk of defeat and usually apply the most common and simplest strategies in their learning process. Having a low profile in the mind, these individuals may believe that no more hard work is necessary to fulfill the learning conditions. Thus, even fulfilling those simple plans can not affect his/her motivation or efficiency, because being successful in some few simple tasks cannot be a measure for individuals' ability (Atkinson, 1981). Teaching metacognitive strategies can increases the sense of self confidence and efficiency through the enhancement of student's ability to encounter changeable situations. This component -the efficiency- has had the highest correlation coefficient with accepting mastery goals and applying metacognitive strategies (Savia, Coutinho & Neuman 2008).

According to the facts above, it is logical if we consider that with a more effective teaching and improving the sense of efficiency in every individual, his/her attitude maybe declined to the acceptance of mastery goals or an approachable attitude that needs more effort and metacognitive strategies. This leads the learner to use more complicated cognition and metacognitive strategies and this can be interpreted as avoiding those performances –avoidance goals with shallow and simple strategies.

Based on the positive effects of teaching metacognitive strategies on almost all achievement goals in students and with exclusion of the performance-avoiding ones, our results mainly confirmed Multiple Achievement Goal theory in which we assume that the learner follow the mastery and performance goals, simultaneously. Accepting different goals allow us to manage the learning procedures and make it more reflexive to learners. Thus, they can effectively adopt their behavior with tasks and gain some more positive results. Our results that the effect of metacognitive strategies on academic achievement was effective about specific academic performance and the total academic performance are partly affected. These findings are consistence with Glaser, Schauble, Raghavan, & Zeitz, (1992) and Veenman, Elshout, & Meijer, (1997) findings that, have related teaching metacognition with education environment in which

students, instead of extending one area of study to the other, use such skills in a repeated areas. Based on this fact that presentation of exclusive metacognitive strategies is concentrate on psychology subject and in other studying subjects, the learning was based on the teacher-directed method, we suggest the hypothesis that maybe students doubted the efficiency of the method and have not applied in other classes and this, probably affected the total performance of them. Another hypothesis is that different learning subjects (units) need different metacognitive strategies and the effectiveness of these strategies differs from one study subject to another. This issue is still a potential area of research for future studying.

These strategies are instructive and we can modify them with complete and continues teaching. We can apply the developed academic plan resulted from our study to optimize metacognitive strategies, achievement goals and academic performances. The authors also suggest teaching of these skills as a tool for identifying and modification of students' weaknesses in doing a certain task or evoking the motivation in students. Teachers must pay more attention to new learning methods and improving skills instead of excessive emphasis on the quantity of learner's tasks. Students can enhance their learning abilities through metacognitive strategies teachings and acquiring firsthand knowledge as over- activated learners. Based on this fact that exclusive performance of students is strongly affected by metacognitive teaching; it is better to teach them in combination with some other subjects. Some limitations of this study that were out of researchers control include:

1. infirmity in controlling the side effects of test taking, for example the equality scores in pre and post education achievement tests.
2. The majority of participants were females that can reduce the inclusion of finding for males.

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